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Sustaining Sustainable Mobility : the Integration of Multimodal Public Transportation in Addis Ababa

Berhanu Woldetensae Hussen

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Berhanu Woldetensae HUSSEN

Sustaining Sustainable Mobility:

*The Integration of Multimodal Public Transportation in
Addis Ababa*

Favoriser une mobilité durable:

*L'intégration du transport public multimodal à Addis
Abeba*

Devant le jury composé de :

Bruno FAIVRE D'ARCIER, Professeur émérite, Université Lumière Lyon 2, Président

Pierre ZEMBRI, Professeur des universités, Université Paris Est Marne-La-Vallée

Jérôme LOMBARD, Directeur de Recherches, Institut Recherche Développement

Didier PLAT, Ingénieur Divisionnaire M.E. H.D.R., École Nationale des Travaux Publics de l'État, Directeur de thèse

Université Lumière Lyon 2

Ecole doctorale Sciences Sociales ED 483

Laboratoire Aménagement Economie Transports

**Favoriser une mobilité durable : l'intégration du
transport public multimodal à Addis Abeba**

*Sustaining Sustainable Mobility: The Integration of
Multimodal Public Transportation in Addis Ababa*

Thèse présentée et soutenue publiquement par

Berhanu Woldetensae HUSSEN

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Jury :

Jérôme Lombard (Rapporteur), Directeur de Recherche, IRD

Pierre Zembri (Rapporteur), Professeur, Université Paris Est Marne-la Vallée

Bruno Faivre d'Arcier (Examineur, Président du jury), Professeur émérite,
Université Lumière Lyon 2

Didier Plat (Directeur de thèse), Ingénieur Divisionnaire T.P.E., Habilité à Diriger des
Recherches

Favoriser une mobilité durable : l'intégration du transport public multimodal à Addis Abeba

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Chapitre 1. Introduction

1.1 Contexte

L'Afrique Subsaharienne est la partie la moins urbanisée du monde et va subir un processus rapide d'urbanisation dans les prochaines décennies. Le niveau d'urbanisation en Éthiopie est faible. L'Éthiopie, faisant partie de l'Afrique Subsaharienne, va connaître un rythme accéléré de croissance urbaine et d'urbanisation. En Éthiopie, le taux d'urbanisation est passé de 11,4 % en 1984 à 13,7 % en 1994 et 15,7 % en 2004 (CSA, 2008). Il devrait atteindre 24 % en 2020 (PNUD, 2012). Actuellement, il y a 927 implantations urbaines en Éthiopie et l'urbanisation est estimée à environ 17 % (CSA, 2008).

Addis-Abeba, avec une superficie de 540 km² et une population de 3,1 millions d'habitants (Demographia World Urban Areas, 2012), connaît des transformations socio-économiques et physiques à un rythme soutenu. La ville est non seulement le centre politique, commercial, économique et financier du pays, mais aussi une ville internationale servant de siège à l'Union africaine et à beaucoup d'organisations internationales. Addis-Abeba a subi une forte croissance de sa population qui a plus que doublé entre 1964 et 1984 et de nouveau entre 1984 et 2012. La population de la ville augmente actuellement à un taux d'environ 2,1 % par an et devrait atteindre 4,6 millions de personnes en 2020 selon l'Office Central de Statistiques (CSA, 2008). Bien que les villes régionales soient de plus en plus importantes en raison de la décentralisation et de la politique de développement régional du gouvernement actuel, Addis-Abeba en tant que métropole va continuer à attirer de nombreux migrants et connaître une croissance énorme de sa population à l'avenir.

Corrélativement, la demande en matière de transport va augmenter dans les années à venir en raison de la croissance de l'urbanisation, des revenus et de l'expansion physique de la ville. Une étude du transport urbain (ERA, 2005) montre que la longueur des trajets ainsi que les taux de mobilité sont en augmentation. Selon cette étude, le taux de mobilité en 2005 était de 1,07 déplacement/personne/jour produisant 3,35 millions de trajets par jour et devrait passer à 1,4 déplacement/personne/jour en 2020, produisant ainsi 7,7 millions de déplacements de personne par jour. La part des déplacements motorisés dans la mobilité totale devrait augmenter de 0,43 déplacement/personne/jour en 2005 à 0,7 en 2020. Bien qu'en légère baisse, la marche est toujours le mode de transport le plus important de la ville. Il était de 70 % en 1984 et a légèrement baissé à 60 % en 2005. Malgré une tendance haussière, le niveau de motorisation dans la ville est faible (1 véhicule pour 42 personnes) et la part des véhicules personnels comme mode de transport individuel, d'environ 8 %, est resté constant au fil des années (Woldetensae et al., 2011).

Les expériences quotidiennes et plusieurs études indiquent que le système de transports en commun existant à Addis-Abeba ne répond pas à la demande existante de transport (ORAAMP, 2001, ERA, 2005, FDRE, 2008). Pourtant, les transports en commun continuent d'être un moyen important de mobilité motorisée pour la population de la ville. Comme il n'y a aucun transport en commun urbain basé sur le ferroviaire, la ville dépend exclusivement d'un système de transports en commun basé sur la route. Les transports en commun sont assurés par l'entreprise publique Anbessa et des milliers d'opérateurs privés de taxis-minibus, de midibus, de berlines et de tricycles (*Bajajas*). L'Office des Transports d'Addis Abeba (2012) a évalué qu'environ 18 000 véhicules de transports en commun sont opérationnels quotidiennement dans la ville, les taxis-minibus de 12 places et les berlines représentant environ 90 % de la flotte totale. Compte-tenu d'une faible densité d'infrastructure routière (13 % de l'espace total), le grand nombre de véhicules de transport en commun de faible

capacité accentue la pression sur les axes principaux de la ville enclins aux encombrements. Les bus et les taxis représentaient 22 % de la part modale en 1984 mais 32 % 2005. Au cours de cette période, il faut noter que la part des taxis a augmenté significativement de 10 % en 1984 à 21 % en 2005, tandis que la part des bus a légèrement diminué de 12 % à 11 % au cours de la même période (Woldetensae, 1996, Woldetensae et al., 2011, ERA, 2005). Une étude (Woldetensae et al., 2011) indique que la performance globale de la société publique Anbessa a baissé et, en effet, la clientèle des bus de la ville a diminué de 50 % entre 2002 et 2010. Bien que les minibus fournissent un service de transports en commun significatif, comme l'indique leur part modale élevée, leur nombre n'est pas suffisant pour couvrir la demande considérable de transport. De plus, augmenter leur nombre pour satisfaire la demande de déplacements n'est pas une solution idéale dans la mesure où un plus grand nombre de minibus ne ferait qu'accentuer l'encombrement endémique sur les principaux axes routiers de la ville.

Aujourd'hui, l'introduction de nouveaux systèmes de transport collectif de masse et l'amélioration des performances du système de transports en commun existant à Addis-Abeba pour répondre aux demandes de mobilité des résidents de la ville constituent les principaux objectifs de développement. Le gouvernement, conscient de ces enjeux en matière de déplacements et des pénuries de transport urbain, a mis en œuvre un certain nombre de mesures et de réformes pour améliorer les transports en commun urbains. En 2008, le gouvernement fédéral a importé un certain nombre de midibus Higer qui devaient appartenir et être exploités par des opérateurs individuels. Il a rétabli le Bureau du Transport et des Routes de la ville comme l'institution municipale compétente en fusionnant l'ancienne autorité routière de la ville, le bureau fédéral de transport d'Addis Abeba et la société Anbessa. Anbessa est devenue une institution budgétaire propre de la municipalité, mettant ainsi un terme aux années d'ambiguïté durant lesquelles elle était placée entre le gouvernement fédéraux et la municipalité. La municipalité a alors fourni les fonds nécessaires pour remettre à niveau la flotte d'Anbessa. En conséquence, en 2011, Anbessa a commandé 350 bus standards assemblés localement et 150 bus articulés avec une mise de fonds totale de 53,3 millions de dollars américains. L'introduction de zones pour rationaliser l'exploitation du paratransit, le lancement du projet pour mettre en œuvre un système de bus rapides (BRT), la construction du système de Transport Ferroviaire Léger (LRT) et la recherche des mécanismes de financement possible pour les divers projets font aussi partie des initiatives qui ont été prises pour améliorer le système de transports en commun (Addis-Ababa Transport Bureau, 2011).

Malgré ces mesures pour améliorer les résultats du système de transports en commun, introduire de nouveaux modes et résoudre les principaux problèmes financiers et organisationnels du secteur, le système de transports en commun reste handicapé par l'absence d'une approche unifiée et intégrée de son exploitation, de sa planification et de sa gestion. En conséquence, le système de transports en commun à Addis-Abeba se caractérise par l'absence d'un système de transport collectif de grande capacité et la présence de divers modes de transports en commun avec peu ou pas de coordination entraînant des enchaînements pénibles de trajets. Il existe des milliers d'opérateurs de transports en commun formels et informels, publics et privés entre lesquels il existe des concurrences intermodales inutiles le long des principaux axes. On note aussi un manque total de planification et d'exploitation d'itinéraires coordonnés ainsi que l'absence de tables horaires et, plus largement de système d'informations aux usagers. Le système souffre également de l'absence d'un système billettique tarifaire unifié et intégré. Il y a une intégration physique insuffisante aboutissant à des transferts modaux inopportuns et à une faible connectivité. Plus globalement, la planification du transport est à peine coordonnée avec la planification de l'aménagement de l'espace. Les

réseaux de transports en commun ne sont pas étendus et leur couverture est limitée aux axes principaux de transport. En résumé, le système a pâti de la faible capacité de planification, du manque de mécanismes de coordination institutionnels, du problème de financement et de l'absence d'une approche métropolitaine de la planification du transport.

Les réponses en termes de planification aux problèmes de transports en commun ont aussi été entravées par des faiblesses institutionnelles et par la capacité technique inadéquate dans la planification du transport urbain. À la suite de la crise politique de 2005 et par choix purement politique, le gouvernement fédéral a supprimé l'autorité de transport de la ville et l'a transférée au ministère fédéral des transports. Par conséquent, entre 2005 et 2011, la ville n'a eu pratiquement aucune autorité de transport pour planifier et gérer le secteur des transports urbains, ce qui n'a fait que dégrader encore une situation déjà difficile. Le bureau local de transport d'Addis Abeba auprès du ministère fédéral des transports et de la communication, comme on l'appelait alors, était plus centré sur les aspects opérationnels quotidiens du transport au sein de la ville et la fonction de planification était pratiquement inexistante dans ses activités. Dans ces circonstances, le bureau local n'a pas pu mettre en œuvre le plan de transport de la ville de 2001 et développer une stratégie à long terme pour surmonter des défis en matière de transport sans cesse croissants (Woldetensae et al., 2011). De la même façon, ce fut également pendant cette période que la société Anbessa a subi un certain nombre de problèmes, dont une baisse des usagers dans les bus, une baisse de la subvention, un vieillissement de la flotte sans presque aucun remplacement de celle-ci, bien que le plan de développement de la ville de 2001 ait prévu l'amélioration du service d'autobus de la ville, entre autres, par l'achat de véhicules supplémentaires. L'administration provisoire de la ville d'Addis Abeba, au pouvoir entre 2006 et 2008, n'a pas pu intégrer la planification du transport urbain dans le cadre de la planification du développement dans la mesure où elle n'avait pas d'autorité compétente en matière de transport sous son mandat. Elle a néanmoins exprimé auprès du gouvernement fédéral sa préoccupation que soit rétablie une autorité de transport directement sous la responsabilité de l'administration municipale. Cependant, cela a pris du temps et ce n'est qu'en 2011 que le bureau de transport a été réorganisé comme un organe propre de l'administration municipale, responsable du transport, des infrastructures routières et de l'exploitation des transports en commun. Ceci était cohérent avec l'approbation par le gouvernement fédéral de la politique des transports urbains d'Addis Abeba. Cette politique prévoit, entre autres, l'introduction d'un transport « sans couture » dans la ville et l'adoption d'une approche intégrée de l'offre de transports en commun de la ville (Woldetensae et Fanta, 2010).

Le processus continu de restructuration institutionnelle et de changement des rôles institutionnels et des responsabilités, les réponses inadéquates en matière de planification aux problèmes de transport urbain de la ville, les mauvaises connexions entre la planification du transport et de l'aménagement de l'espace, le manque d'expertise et de connaissances appropriées pour traiter techniquement des questions urbaines complexes de transport, la forte rotation du personnel et la faiblesse du nombre de spécialistes en transport, les pénuries financières et le manque d'approches novatrices pour le financement du transport urbain sont les principaux défis du système de transport urbain d'Addis Abeba. De plus, l'absence d'une approche métropolitaine à la planification du transport régional due au chevauchement et au rôle ambigu de la ville en tant que capitale fédérale, capitale de l'état et administration locale avec la défiance et les intérêts politiques contradictoires qui en découlent a contribué aux problèmes de transport au niveau de la ville-région. Dans ces conditions, il est urgent d'aborder les problèmes de transport de la ville en entreprenant des réformes complètes du secteur. La création d'institutions de transport avec les capacités professionnelles nécessaires, l'instauration d'un climat de confiance et de coopération entre les autorités, l'introduction

d'un nouveau système de transport collectif de masse intégré, la réorganisation des réseaux de transports en commun pour être en phase avec ce nouveau système, l'amélioration des performances des modes de transports en commun et leur intégration modifieront fondamentalement l'évolution du système dans la bonne direction.

Une des réformes les plus profondes dans l'organisation et l'offre de transports en commun est l'intégration des transports en commun dans les villes et leurs régions. Généralement conçue pour augmenter la qualité, l'attrait et la part modale des transports en commun, l'intégration des transports en commun dans les villes et leurs zones métropolitaines est en pratique dans les villes du nord depuis plus de cinq décennies (Dimitriou & Gakenheimer, 2011). Les toutes premières villes qui ont commencé à intégrer leurs systèmes de transports en commun furent les villes de Toronto dont le système de transport a été établi en 1954, de Paris, avec le Syndicat des transports en 1959, de Hambourg, avec le HamburgerVerkehrersVerbund en 1967 et de Londres, dont le Greater London Council est opérationnel depuis plus de 30 ans (Prointec Inocsa Stereocarto, 2000). Le Syndicat des Transports d'Ile-de-France (STIF) offre un service de transports en commun intégré pour l'Ile-de-France (Paris et ses environs) et le processus d'intégration a été initié par le besoin de fournir un ticket intégré pour les usagers là où il y avait trop d'opérateurs privés et publics (NEA, OGM & TSU, 2003). Le HamburgerVerkehrsVerbund (HVV) a été établi en 1967 à Hambourg. Son but était de réformer et d'améliorer le service de transports en commun de Hambourg et de la zone métropolitaine qui était alors non coordonné, varié et fourni par un mix de secteur public et privé, ce qui avait conduit à une baisse de 16 % du nombre d'usagers des transports en commun entre 1956 et 1965. Ce modèle d'intégration des transports en commun de Hambourg s'est ensuite étendu à d'autres villes allemandes et aux pays germaniques de l'Autriche et de la Suisse (Pucher et Kurth, 1995). Ce système de transports en commun intégré du Verkehrersverbund avait réussi à améliorer la qualité des transports en commun et à augmenter le nombre d'usagers des transports en commun face à l'augmentation des véhicules et de la motorisation dès sa création à Hambourg. Depuis lors, un grand nombre de villes dans beaucoup de pays développés ont adopté un système intégré semblable de transports en commun. Cette tendance se répand lentement dans les métropoles des pays en voie de développement, bien que l'Afrique n'ait jusqu'à présent aucun exemple de système de transports en commun intégré qui vaille la peine d'être mentionné (Hidalgo & Carrigan, 2010). L'introduction du Integrated Rapid Transit (IRT) du Cap qui a été lancé en 2008 a été principalement motivée par le besoin de pallier la non-durabilité des services de transports en commun fragmentés et non-intégrés, dans la perspective de la Coupe du Monde de Football 2010 accueillie par l'Afrique du Sud (City of Cape Town, 2008).

Comme le déplacement est multimodal, on s'attend à ce que l'intégration des transports en commun provoque une synergie et offre un transport sans rupture dans les villes et leurs régions urbaines. Pour autant, les questions suivantes se posent : "Qu'est-ce qui motive les grandes villes à présenter un service de transports en commun intégré et quels sont les impacts d'un système de transports en commun non intégré ?". Les réponses à ces questions ont une importance fondamentale dans la compréhension du processus d'intégration des transports en commun. Le système de transports en commun non-intégré, comme un rapport de l'Union européenne (SPUTNIC, 2009b) le note, mène à l'insatisfaction du client et à la baisse du nombre d'usagers du fait de l'inconfort, des tickets multiples, d'un système tarifaire compliqué, du manque de coordination dans les horaires de correspondance entre divers opérateurs et donc de l'existence de services compliqués. Une étude de la littérature sur l'intégration explique pourquoi l'intégration des transports en commun est entreprise. Sabir, Ommeren, Koetse, & Rietveld (2010) indiquent que comme le trajet en transports en commun implique un certain nombre d'activités liées au déplacement (l'accès, l'attente, le transfert,

l'embarquement et le parcours terminal), le fait d'intégrer les chaînes de déplacement est nécessaire. Des chaînes de déplacement intégrées des transports en commun sont alors susceptibles d'augmenter le nombre d'usagers et d'amener un changement modal de la voiture vers les transports en commun. De même, Givoni & Banister (2010a) estiment que, comme le transport dans les villes est multimodal, le système de transport est constitué de différents éléments (des modes, des usagers, des opérateurs et des infrastructures) et implique un certain nombre de transferts, qui doivent être combinés afin de diriger le système efficacement à un coût minimum. Le but de l'intégration est ensuite de réduire les désagréments des transferts. Des temps de transfert plus longs ou des transferts inutiles entre les modes sont les indicateurs d'un besoin d'intégration (Vasconcellos, 2001). Comme les déplacements en transports en commun sont multimodaux, Priemus, Nijkamp and Banister (2001) mettent en évidence l'importance d'une harmonisation sans rupture des chaînes de déplacements entre les différents réseaux pour un fonctionnement fluide du système de transports en commun. Il y a pour eux deux types d'harmonisation : l'harmonisation entre les réseaux de rabattement et ceux à plus longue distance appelée interconnexion verticale et la connexion entre réseaux présents à une même échelle spatiale appelée interconnexion horizontale. De même, Hine & Scott (2000) dans leur recherche qualitative (focus group et entretiens approfondis) sur la perception par les usagers des transports en commun et les automobilistes des aspects négatifs des pôles d'échange ont mis en évidence l'importance du déplacement sans rupture perçu comme la caractéristique attendue du système de transports en commun. Après avoir différencié l'intégration dans une perspective large d'intégration du transport avec d'autres secteurs et l'intégration dans une perspective plus étroite au sein du secteur des transports, Diaz Olvera, Guezere, Plat & Pochet (2014) soulignent que le but de l'intégration du transport qui a des composants fonctionnels et modaux est de promouvoir le transport sans rupture en enchaînant les déplacements. Les trajets présentant de longs parcours terminaux, des temps d'attente et de changement importants comme les changements nombreux et la fréquence faible des services de transports en commun entraînent une diminution du nombre d'usagers et de l'attrait des transports en commun et par conséquent le transfert modal vers les voitures.

Bien évidemment, les programmes visant à améliorer ces maillons faibles des transports en commun sont sensés être des alternatives moins chères que celles qui impliquent un investissement lourd dans les infrastructures de transport, les acquisitions et les remplacements de véhicules (Krygsman, Dijsta, & Arentze, 2004). Dans l'étude du BRT de Jakarta, Dirgahayani, Harata, & Ohmori (2010) mentionnent aussi la disponibilité des modes de rabattement et des pôles d'échange comme deux problèmes majeurs des déplacements intermodaux en transports en commun. En conséquence, comprendre le déplacement complet comme un tout complexe et améliorer l'intégration multimodale en incluant l'intégration physique ("*hardware*"), de l'information aux usagers ("*software*") et des tarifs ("*finware*") pourraient permettre de surmonter ces inconvénients et ces obstacles. L'intégration, comme le remarque May (1995), aboutit à de meilleurs résultats que ceux réalisés par "la mise en œuvre décousue de mesures individuelles" (p.98). Un système de transports en commun entièrement intégré avec "un réseau, un horaire, un ticket, un prix", assurera donc un déplacement sans rupture en transports en commun (SPUTNIC, 2009a).

L'offre désorganisée de services de transports en commun est mentionnée comme une justification de l'intervention publique. Comme O'Sullivan et Patel (2004) le soulignent, la fragmentation des transports en commun, qui a été le résultat de la privatisation de plusieurs types de segments de l'offre de transport ces dernières années, doit être limitée pour que "l'intégrité du système" puisse être maintenue. La fragmentation se manifeste dans plusieurs problèmes principalement liés aux questions de coordination des interconnexions et de la

billettique et à l'interaction et l'interconnexion intra- ou inter-modale des services. Donc, un système de transports en commun si fragmenté est caractérisé par le manque, et dans de nombreux cas, par l'absence totale d'interconnexion et d'interaction intra- ou inter-modale parmi les modes de transports en commun. Comme il y a une plus grande interdépendance entre les opérations de transport à la fois au sein de chaque mode et tous modes confondus (intra- et inter-modalité), O'Sullivan et Patel (2004) soulignent l'importance de l'intervention gouvernementale pour assurer l'intégrité du système mise en péril par les externalités dues à la fragmentation. On estime qu'une telle mesure entraînerait en fin de compte de meilleurs fréquences, une meilleure planification et une intégration tarifaire. Younana & Wilson (2010) soulignent l'importance de la coordination des services de transit pour augmenter l'attractivité, améliorer la qualité de service, attirer de nouveaux usagers et accroître la productivité de système de transports en commun intermodal et/ou intramodal. Leur étude fait apparaître que la coordination de l'offre à l'échelle du réseau pourrait engendrer de grands avantages tant pour les usagers que pour les opérateurs, bien que "ces avantages" ne soient pas explicitement exposés. Dans une perspective plus large, concevoir une politique des transports qui faciliterait la coopération et la coordination entre différentes institutions est un des trois instruments utilisés pour améliorer globalement les transports en commun (Vilchis, Tovar & Flores, 2010). May, Kelly & Shepherd (2006) expliquent que l'apparition de l'approche en termes de stratégie intégrée de transport est associée à la prise de conscience que l'approche "prévoir et fournir" n'est plus défendable, que la demande de transport doit être contrôlée par des stratégies de gestion de la demande et que la planification de l'usage des sols devrait compléter la politique des transports.

Au niveau de la planification, Meyer & Miller (2001) appréhendent la notion de transport comme un système qui comprend divers composants et avec de multiples interactions entre ces éléments constitutifs du système. Ainsi, ils soulignent l'importance d'une approche de planification intégrée et multimodale du transport qui prenne en compte tout le réseau de transport, les connexions intermodales, l'usage des sols et les institutions de transport. Au niveau opérationnel, l'efficacité d'un nouveau système de transports en commun de masse est liée aux mesures d'intégration complémentaires qui devraient être prises pour soutenir le nouveau système. Ainsi, l'intégration modale, la disponibilité de pôles d'échange et les mesures de restructuration des lignes de bus sont exposées comme des conditions préalables au succès d'un nouveau système de transports en commun de masse (Banque mondiale, 2002b).

La littérature montre ainsi qu'il y a de multiples conceptions de ce qu'est l'intégration et comment elle peut être réalisée. En dépit de ces diverses conceptions d'intégration, il est reconnu tacitement qu'il est important de concevoir des politiques et des instruments d'intégration du transport et que l'intégration du transport ne devrait pas être perçue comme un objectif en soi, mais plutôt comme un moyen d'obtenir des niveaux de service de transport plus élevés. Les théories de l'intégration reconnaissent la présence de différents niveaux d'intégration et admettent que la complexité de l'intégration du transport augmente alors que l'ampleur et le niveau d'intégration passent de niveaux opérationnels inférieurs à des niveaux stratégiques plus élevés et plus larges. Mais plus le niveau d'intégration est élevé dans cette échelle d'intégration, plus la difficulté d'obtenir les résultats escomptés est grande.

Les villes africaines présentent des caractéristiques spécifiques en matière de transport urbain. Comme les taux d'équipement en véhicules particuliers sont très faibles, les transports en commun sont les moyens fondamentaux de mobilité motorisée. Dans la plupart de ces villes, les transports en commun basés sur le ferroviaire ne sont guère disponibles. Mais il y a néanmoins de nombreux modes de transports en commun disponibles. Ils proposent des services de transports en commun concentrés le long des axes principaux et assez souvent

sujets à des concurrences féroces à la fois pour les usagers et pour les routes. Comme les offres de grands bus proposées par les gouvernements ont été inefficaces et peu attractives, les transports en commun sont de plus en plus fournis en grande partie par des milliers d'opérateurs privés pour qui la maximisation des profits est le but principal. Néanmoins, il y a une sérieuse pénurie de transports en commun et la concurrence pour les usagers entre les nombreux opérateurs est tout à fait habituelle. Mais comme la fragmentation est plus répandue ici, le besoin de coordination est plus élevé que dans les villes du nord. L'intégration de milliers d'opérateurs privés dans un système unique est vraiment une tâche énorme et aucune ville n'a réussi à intégrer le secteur informel et artisanal. L'enchaînement des parcours et l'assurance d'un déplacement sans rupture sont des défis beaucoup plus stimulants dans les villes africaines que dans les villes développées. Les axes de développement urbain et les axes de transport en commun ne sont pas cohérents et certaines zones de la ville sont mal desservies ou même totalement inaccessibles par des réseaux de transports en commun. Malgré les différences contextuelles entre les villes du nord et du sud, l'objectif ultime d'un système de transports en commun intégré reste le même. L'introduction de transports en commun intégrés va probablement améliorer la qualité des transports en commun, augmenter leur clientèle, promouvoir les déplacements sans rupture, fournir une plate-forme pour une plus grande coordination et une meilleure coopération entre les opérateurs de transports en commun et les gouvernements locaux, régionaux et nationaux et, in fine, améliorer le développement urbain durable. Cependant, il n'y a aucune solution ni approche sur mesure pour l'intégration qui convienne à toutes les villes. Le processus est long et doit prendre le contexte local en considération. Il nécessite une intervention gouvernementale plus proactive grâce aux instruments de planification, de financement, d'organisation et d'appels d'offres des lignes, à la conception de mécanismes novateurs et localisés pour intégrer le secteur du transport informel, de développement des capacités institutionnelles et de planification, de promotion de la coordination et du partenariat public-privé. Le rôle de leader dans ces processus revient aux autorités de transport et de planification urbaine mais ces institutions doivent développer les compétences techniques nécessaires tout en ayant une vision clairement articulée d'un système de transports en commun intégré.

1.2. Objectifs de la recherche

Les transports en commun offrent un mode motorisé de mobilité pour une grande majorité de résidents d'Addis-Abeba, une ville dans laquelle la motorisation et la possession d'une voiture par habitant sont faibles. Une chaîne de déplacement de transports en commun typique à Addis-Abeba implique le changement de modes différents entre l'origine du déplacement et la destination, de longs temps d'attente aux stations et aux terminaux surtout pendant les périodes d'affluence du matin et de l'après-midi, les encombrements et les retards dans les déplacements, la connexion difficile et limitée aux stations de transfert et aux principaux terminaux, des systèmes tarifaires différents et le paiement en espèces des tickets à bord en l'absence de tickets prépayés, le manque d'informations sur les conditions de déplacement. Les lignes de transports en commun sont concentrées sur les axes principaux et une grande partie de la ville n'est pas accessible en transports en commun. La faible coordination entre l'aménagement des sols et la planification du transport a encore compliqué le problème. Il est évident que le système actuel d'exploitation, de planification et de gestion du système de transports en commun de la ville est non systématique, désorganisé et coûteux. Il apporte un certain nombre d'inconvénients à l'utilisateur, à l'opérateur et à l'administration municipale. L'intégration peut offrir un transport sans rupture et une synergie dans le système de transports en commun. Nous postulons que l'introduction d'un système intégré de transports

en commun à Addis-Abeba fournit les moyens pour coordonner les différents modes de transports en commun, du point de vue des horaires, des parcours, des stations et des modes de transfert. L'intégration offre des mécanismes de planification, exploitation et gestion des transports en commun et donne les moyens de présenter un système de tarification et d'organisation spatiale acceptable par toutes les parties prenantes et avantageux pour l'utilisateur et les opérateurs. Elle réduit la concurrence inter- et intra-modale inutile entre les divers opérateurs privés et publics. Elle fournit aussi les mécanismes pour canaliser correctement les finances publiques en faveur des investissements dans les infrastructures de transports en commun, l'acquisition de nouveaux véhicules pour le remplacement de la flotte existante. L'intégration fournit également une base pour un partenariat public-privé dans le secteur des transports en commun. Elle offre le moyen de soulager la pénurie de transports en commun, augmente le nombre de voyageurs des transports en commun et améliore le développement urbain durable. Elle améliore la diffusion des services de transports en commun dans des zones jusqu'ici non ou mal desservies ainsi que la mise à disposition de transports en commun abordables pour les pauvres. Elle ouvre la voie à la planification à l'échelle régionale du système de transport en commun afin de prendre en compte le développement spatial de la ville à long terme et sa relation symbiotique avec la zone métropolitaine. Enfin, l'intégration fournit l'opportunité d'intégrer l'aménagement des sols et le développement du transport.

Compte tenu de ces suppositions, les étapes du processus d'intégration des transports en commun à Addis-Abeba comprennent alors l'identification des formes d'intégration à adopter, la description des activités pour chaque forme d'intégration, l'établissement d'un calendrier de mise en œuvre de chaque forme d'intégration, l'identification des acteurs clés et leurs devoirs respectifs, la préparation et la ratification du cadre légal pour la création et la mise en place de l'organisme responsable de la politique d'intégration à Addis-Abeba et sa région.

En conséquence, les objectifs de recherche généraux sont donc d'explorer la gouvernance, la croissance et le développement d'Addis-Abeba, d'examiner l'histoire des processus de planification urbaine et du transport et les institutions impliquées, d'étudier l'offre actuelle de transports en commun à Addis-Abeba dans la perspective d'un système de transports en commun intégré, d'identifier les formes possibles d'intégration, d'examiner l'état des connaissances sur la définition et la mise en œuvre de systèmes d'offre de transports en commun intégrés au regard des expériences existantes. Il s'agit aussi d'identifier les obstacles à l'intégration et de formuler des stratégies appropriées pour la mise en œuvre réussie de l'intégration des transports en commun. Enfin, il convient de développer un cadre d'intégration qui contribuera à identifier des stratégies, des politiques et des instruments pour mettre en œuvre le système de transports en commun intégré à Addis-Abeba. Un tel cadre doit inclure la priorisation et la mise en phase des formes d'intégration et le fait de prendre en compte à la fois les politiques, les règlements et les institutions facilitantes ou contraignantes.

1.3. Questions de recherche

La thèse cherchera principalement à fournir des réponses aux deux questions suivantes liées à l'introduction d'un système intégré de transports en commun à Addis Abeba, à savoir :

1. Quelles formes d'intégration Addis Abeba peut-elle mettre en œuvre ?
2. Comment Addis Abeba peut-elle mettre en œuvre les formes d'intégration choisies ?

Les réponses à ces questions principales de recherche exigent la formulation d'un ensemble de sous-questions. D'une part, les sous-questions abordées dans la partie théorique de la thèse fournissent les réponses sur la notion générale d'intégration et les pratiques de transports en commun intégrés dans les villes tant du Nord que du Sud. Les sous-questions sont :

1. Qu'est-ce que l'intégration des transports en commun ?

2. Quelles sont les formes d'intégration ? Quelles sont les caractéristiques et les fonctions de chacune de ces formes d'intégration ?
3. Comment doivent-êre partagés les coûts et les revenus entre les différents membres (public et privé) ? Comment doivent être répartis la subvention gouvernementale et le fonds de remplacement de la flotte ?
4. Quelles sont les dispositions institutionnelles et comment les divers opérateurs (privé et public) se retrouvent-ils sous un même organisme dirigeant ? Quel devrait être son cadre légal ? Comment les responsabilités sont-elles partagées ?
5. Quels sont les principaux enjeux/obstacles à l'adoption d'une approche intégrée ?
6. Que peut-on apprendre des pratiques d'intégration des transports en commun des villes qui ont réussi à mettre en œuvre l'intégration ?
7. Que peut apprendre Addis-Abeba de ces pratiques et comment peut-elle développer son propre système intégré de transports en commun prenant en compte ses spécificités ?

D'autre part, la partie de contextualisation de la thèse fournit les éléments spécifiques à Addis-Abeba concernant la planification urbaine et du transport et l'organisation des transports en commun. Il répond aux questions suivantes :

1. Quel est le contexte urbain d'Addis-Abeba, y compris sa croissance et son évolution ? Comment avaient été organisés et menés la planification et le développement urbains et de transport ?
2. Comment se présentent l'offre et la demande de transport ?
3. Comment les transports en commun sont-ils organisés et fournis à Addis-Abeba ?
4. Quelles sont les expériences réelles de déplacements des résidents d'Addis-Abeba dans l'accès aux emplois et aux services ?

1.4. Méthodologie de recherche

Comme exposé ci-dessus, les sujets de recherche couvrent l'intégration des transports en commun et la mise en œuvre d'une telle intégration à Addis-Abeba. Le questionnement aborde aussi l'urbanisme et le développement urbain, les processus de planification du transport, les institutions et l'organisation de l'offre de transports en commun à Addis-Abeba. La méthodologie de recherche a été organisée autour de ces sujets principaux et cherche à fournir le cadre pour répondre à ces diverses questions. Le manque de données sur les comportements en matière de transport de la population d'Addis-Abeba a nécessité une enquête sur les déplacements auprès d'un échantillon de ménages.

Le concept d'intégration est complexe et il existe diverses formes et divers niveaux d'intégration. Une revue de la littérature sur le sujet de l'intégration du transport en général et l'intégration des transports en commun en particulier est utilisée pour aboutir à une synthèse des connaissances sur le thème de l'intégration. Nous utilisons des sources récentes publiées et non publiées du monde universitaire, des administrations locales, des autorités de transport, des opérateurs de transport et des associations de transport. Elles abordent le vaste sujet de l'intégration du transport avec un accent particulier sur l'intégration des transports en commun. La synthèse de l'analyse documentaire fournit les réponses aux sous-questions théoriques de recherche ce qui permet alors de mettre en place un cadre théorique d'intégration des transports en commun à Addis Abeba. Ce cadre est le résultat final de la partie théorique.

La mise en œuvre de l'intégration des transports en commun à Addis Abeba nécessite la compréhension du contexte urbain et des transports. Cette partie de la thèse fournit des réponses sur les questions contextuelles. Elle donne un contexte général sur la croissance

historique et le modèle de développement, la gouvernance, les processus de planification urbaine et des transports, les institutions de planification urbaine et des transports, l'offre et la demande de transports et l'organisation des transports en commun à Addis-Abeba. L'analyse a utilisé différentes sources primaires et secondaires publiées et non-publiées. Elle s'appuie sur des données statistiques gouvernementales, des rapports et des documents politiques et stratégiques. Elle recourt à des documents historiques sur la planification urbaine et les transports et à des données primaires sur les transports en commun pour fournir une analyse du secteur. Un certain nombre d'entretiens formels et informels ont eu lieu avec des autorités gouvernementales appropriées, particulièrement celles associées à la planification urbaine et des transports ainsi qu'à la gestion et à l'exploitation des transports en commun. L'expérience professionnelle précédente de l'auteur dans l'administration municipale a facilité les discussions et l'accès aux documents et aux informations statistiques sur la ville, étapes qui sinon auraient été chronophages et difficiles.

La disponibilité de données fiables et historiques est un obstacle majeur quand on est engagé dans une recherche empirique dans les villes des pays en voie de développement. Addis-Abeba n'a jamais conduit d'étude détaillée et périodique sur les déplacements des ménages. Il manque des données fiables et de première main sur les caractéristiques démographiques et socio-économiques des ménages, sur les caractéristiques des déplacements urbains et l'utilisation des transports en commun. Il était alors nécessaire d'effectuer un travail de terrain. L'entretien a été utilisé à la fois comme méthode et comme matériel empirique. Il y avait trois types d'entretien : un questionnaire à questions fermées sur la base d'un face-à-face et d'un entretien au domicile avec des ménages, des entretiens semi-structurés en face-à-face avec des exploitants de transports en commun, des membres d'institutions gouvernementales et non gouvernementales intervenant dans les transports et un questionnaire à questions fermées sur la base d'une enquête en face-à-face aux principaux terminaux de transfert de transports en commun. Le processus d'enquête a impliqué plusieurs étapes et s'est étendu sur de nombreux mois.

Une enquête a été menée pour produire des données empiriques sur les ménages et les caractéristiques des déplacements et des transports en commun. La méthode d'échantillonnage à plusieurs étages a été utilisée pour rassembler des données sur les caractéristiques socio-économiques et démographiques, les comportements de déplacement, l'accès aux emplois et aux services et les préférences révélées et déclarées des ménages sur les transports en commun. Un questionnaire à questions fermées a été mis en place ; il comprenait des questions de positionnement socio-démographique, d'attitude/d'opinion et de comportement (Stopher, 2012). Les questions de l'enquête doivent être préparées en amont et ceci a impliqué une analyse documentaire sur les méthodes et contenus des enquêtes sur les ménages et les déplacements (Stopher, 2009 & 2012). L'expérience du LET dans la conduite d'enquêtes sur les ménages en Afrique a aussi été très utile (Behrens, Diaz-Olvera, Plat & Pochet., 2006) pendant la préparation des questionnaires. Un échantillon total de 420 ménages a été pris dans huit Wereda (la plus fine division administrative) représentatifs qui ont été systématiquement choisis parmi 109 Wereda d'Addis-Abeba et quatre terminaux principaux de transport. Au sein des Wereda sélectionnés, des ménages ont été sélectionnés en s'assurant de la représentativité de l'échantillon. Le travail a requis l'assistance de l'administration de chaque Wereda et il a été mené à l'aide de huit diplômés universitaires du programme de planification urbaine et régionale de l'EiABC. Le codage des données des 420 entretiens des ménages (Voir Annexes 35, 36 et 37) et la production des résultats préliminaires ont constitué le processus final.

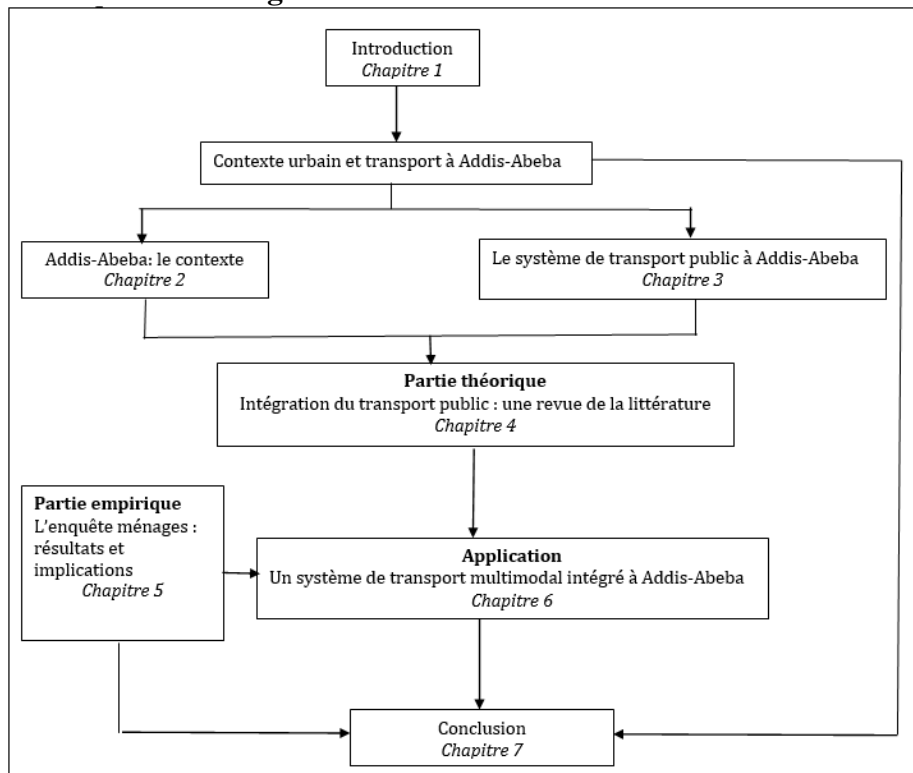
1.5. Limites

La pauvreté des données sur les caractéristiques des déplacements, les revenus et les dépenses constitue de sérieuses limites pour mener des recherches dans des pays en voie de développement et Addis Abeba ne fait pas exception. La recherche a été sérieusement entravée par ce problème. Le remaniement constant de l'organisation publique dans la ville et le pays en général et la rotation élevée du personnel ont rendu difficile le fait de suivre des décisions historiques importantes (mémoires institutionnelles pauvres) qui ont été prises par le passé. Le manque de financement pour faciliter la collecte de données primaires et secondaires, la réalisation de l'enquêtes-ménages et les entretiens fut également un frein déterminant.

1.6. Structure de la thèse

La thèse est organisée autour de six chapitres principaux (Figure 1.1). Le chapitre deux analyse la situation d'Addis-Abeba au regard de l'histoire, de la gouvernance, de l'économie, du transport urbain, de la planification et du développement. Le chapitre trois porte sur l'organisation, l'exploitation et la gestion des transports en commun dans la ville. La revue de la littérature sur la théorie et la pratique de l'intégration est présentée dans le chapitre quatre et permet de construire un cadre théorique d'intégration des transports publics. Les résultats de l'enquête sur les déplacements des ménages sont exposés au chapitre cinq. Le sixième chapitre explique les étapes et les actions à mettre en œuvre pour instaurer l'intégration des transports en commun à Addis Abeba sur la base du cadre théorique développé dans le chapitre quatre. Enfin, la conclusion et les recommandations sont abordées dans le septième chapitre.

Figure 1.1 : Structure de la Thèse



Chapitre 2. Addis-Abeba : le contexte

Addis-Abeba est une ville jeune qui est passée par des phases distinctes de croissance urbaine et de développement. Elle s'est étendue horizontalement dans toutes les directions géographiques à partir de son noyau originel, le palais impérial de l'Empereur Menelik. Sa croissance, comme beaucoup de villes en Afrique, s'est faite horizontalement (Mukoko, 1996). L'Éthiopie a un faible taux d'urbanisation et, comme beaucoup de pays de l'Afrique sub-saharienne, va connaître un rapide processus d'urbanisation dans les prochaines décennies. Addis-Abeba, ville primatale, continuera à dominer le processus d'urbanisation, bien que l'on s'attende aussi à ce que des villes régionales subissent un niveau élevé d'urbanisation. Durant la majeure partie de son histoire, la croissance et le développement de la ville ont été guidés par des forces spontanées plutôt que des interventions conscientes de planification urbaine. Cependant, il faut noter que les divers gouvernements qui ont été au pouvoir ont tous essayé de développer une métropole moderne dont le développement devait être encadré par des instruments de planification urbaine. Dans la plupart des cas, le processus de planification urbaine n'était pas lié au processus budgétaire, dans ce qui est appelé "le divorce de la planification et des processus budgétaires". De ce fait, l'estimation des coûts d'investissement des plans spatiaux proposés et la préparation des mécanismes financiers correspondants ont rarement été faites. De plus, jusqu'à très récemment, des consultants étrangers et des entreprises d'ingénierie et de planification ont été surtout employés pour développer le plan directeur de la ville. La création de NUPI et ORAAMP dans les années 1990 a changé cette tendance et a considérablement augmenté les contributions des planificateurs et des architectes locaux dans la préparation de plans de développement urbain. Le plan de développement de la ville de 2001 a largement contribué à la transformation radicale d'Addis-Abeba. La ville connaît maintenant un processus de transformation radicale inégalé dans les périodes précédentes. Les programmes de renouvellement de quartiers en centre-ville, la gentrification d'anciennes zones centrales très peuplées de la ville, les immenses logements sociaux principalement aux abords de la ville, l'expansion des infrastructures routières, le LRT et le boom de l'immobilier changent radicalement la ville. Le nouveau plan métropolitain controversé d'Addis-Abeba est en cours d'achèvement et son approbation accélérera l'expansion urbaine d'Addis-Abeba dans les villes voisines et les terres agricoles fertiles du gouvernement régional d'Oromia. La traditionnelle Addis-Abeba se transforme en une ville nouvelle et s'étend horizontalement plus rapidement. Les conséquences, à la fois négatives et positives, d'un tel modèle de développement urbain restent à voir. Mais il semble que ce sont les communautés urbaines pauvres et les communautés rurales qui vont probablement le plus pâtir du développement de la ville. La ville s'est engagée sur la voie de la décentralisation depuis le début des années 2000. Le pouvoir et les responsabilités ont été transmis aux niveaux les plus bas de l'administration municipale. De nouvelles institutions ont été établies et d'autres ont été amenées à disparaître. Le remaniement constant du personnel et le processus de restructuration institutionnelle créent une entrave plus grande pour une bonne gouvernance urbaine et l'efficacité des services. Ce manque de continuité dans le processus de renforcement institutionnel a été aggravé par le manque de professionnels et la politique de recrutement qui est basée sur l'appartenance politique au parti en place au lieu du mérite et de la compétence. Il a diminué la capacité des institutions à effectivement s'acquitter de leurs responsabilités. Le bureau de transport d'Addis-Abeba est un exemple classique d'une telle approche erronée. Le résultat se traduit par l'incapacité de la ville à entièrement gérer son système de transport et développer des stratégies appropriées pour aborder les problèmes complexes de transport que la ville

rencontre. De fréquents embouteillages, des pénuries de transports en commun, des taux élevés d'accidents, la dégradation de l'environnement et la non-prise en compte du transport non-motorisé caractérisent le système de transport de la ville. L'accroissement du réseau routier ne mène pas à une réduction des embouteillages mais, au contraire, ils deviennent plus endémiques. Addis-Abeba a besoin de regarder l'exemple des villes qui ont délaissé les approches basées uniquement sur l'offre pour se tourner vers des stratégies de gestion de la demande de transport plus réussies, ont promu les transports en commun et le transport non-motorisé et ont mis des contraintes à l'utilisation du véhicule personnel. Elle devrait aussi essayer de renforcer la coordination entre les diverses institutions impliquées dans l'infrastructure, la planification et la gestion du système de transport, de favoriser des liens forts entre les processus de planification urbaine et des transports et d'investir dans l'amélioration des ressources humaines compétentes pour la planification et la gestion des transports en commun.

Chapitre 3. Le système de transport public à Addis-Abeba

Dans un mouvement visant à atténuer les conséquences négatives de la motorisation rapide et à favoriser le développement urbain durable, beaucoup de villes essaient de promouvoir le transport non motorisé, l'utilisation des transports en commun et le *transit oriented development* (TOD). Il est reconnu que le réchauffement climatique a des conséquences négatives et il est prévu que ceci soit plus destructeur pour les villes des pays en voie de développement. La motorisation croissante dans ces villes accélère le processus. Le coût du réchauffement climatique est évalué entre 5 et 9 % du produit intérieur brut des pays en voie de développement (Banque Mondiale, 2002b). La fourniture de transports en commun abordables, accessibles, durables, intégrés et rentables demeure cependant une tâche énorme à réaliser par des villes durables. Malgré le rôle central des transports en commun dans ce processus, il doit faire face à de nombreux problèmes. La baisse de la productivité financière et physique, l'augmentation des coûts d'investissement et d'exploitation, l'élargissement de l'écart entre les revenus et les dépenses nécessitant une subvention publique plus élevée sont les enjeux fondamentaux du secteur formel des transports en commun (Transport Research Board, 2001 citée dans Buehler et Pucher, 2010 p. 126). Le secteur formel des transports en commun d'Addis-Abeba a vu ses services se détériorer au fil des années comme l'analyse de la société Anbessa le montre. Le secteur informel des transports s'est installé pour combler le déficit qui a été créé par des transports en commun formels de moins en moins attractifs et de moins en moins efficaces. La croissance rapide du secteur informel, basée sur des véhicules de faible capacité et âgés, contribue à la congestion croissante, à la pollution de l'environnement et aux accidents de la route, bien que ce secteur fournisse des services de transports en commun remarquables le long des axes principaux et dans des zones hors de la portée des transports en commun formels et sans opportunités d'emplois (Halcrow Fox in association with Traffic and Transport Consultants, 2000, Cervera & Golub, 2007).

Les transports en commun à Addis-Abeba se caractérisent par des pénuries, une grande affluence et des temps de déplacements plus longs pendant les heures de pointe et la mauvaise qualité de service et des temps d'attente plus longs pendant les heures de faible affluence. Les encombrements récurrents et l'absence de priorité pour les transports de masse réduisent de manière significative l'efficacité opérationnelle des transports en commun. Une concurrence intramodale et intermodale malsaine entre les modes formels et informels est tout à fait habituelle. Ce phénomène est particulièrement prononcé sur les voies principales fréquentées

à la fois par le transport formel et informel et pendant les heures de pointe du matin et de l'après-midi. Comme la plupart des terminaux et des arrêts de bus intra-urbains sont sur la rue, les usagers montent à bord et sortent des bus sur la route, ce qui constitue la principale cause d'encombrement le long des routes principales et aux croisements. Les terminaux mal intégrés et dispersés impliquent des trajets piétonniers importants et de longs temps de transfert.

Les nouveaux systèmes de transport collectif du LRT et du BRT, qui ont été proposés dans un certain nombre d'études d'urbanisme et de transport antérieures, sont en cours de mise en œuvre, bien que leur implication en matière de ressources financières de la ville ait été à peine examinée tout comme les effets des stratégies de recouvrement des coûts et les impacts de leurs tarifs sur les revenus des ménages et la structure des dépenses des ménages. La Banque Mondiale (2002b) avertit les villes qu'elles doivent faire preuve de prudence dans le choix des technologies de transports en commun de masse et souligne l'importance de l'évaluation critique des ressources financières disponibles et des prestations de chaque système avant de choisir une technologie de transports de masse spécifique. Dans l'exemple d'Addis-Abeba, l'option de choisir entre le BRT et le LRT le long des axes nord-sud et est-ouest à partir des comparaisons de coûts et de performance ne fut pas sans controverse parmi les planificateurs et les politiques. Le choix final a plus été une décision politique et le LRT est financé par un prêt étranger, construit par une entreprise étrangère et par une main-d'œuvre étrangère. De plus, l'exploitation du LRT doit être prise en charge par une société étrangère. Cependant, comme il est prévu que le prêt soit remboursé par les recettes tarifaires et les revenus du TOD autour des principales stations, assurer l'accessibilité financière du LRT doit être examiné soigneusement et des concessions doivent être faites. Les questions de savoir comment les nouveaux et les vieux systèmes de transports en commun doivent être intégrés, entre eux et avec des installations fixes (Wright, 2001, Hensher, 2007) et comment ces nouveaux systèmes de transports en commun pourraient former l'axe d'un développement urbain à forte densité de population restent à débattre entre les urbanistes, les experts des transports et les autorités des transports.

L'exercice consistant à fournir un transport abordable aux plus démunis constitue une menace sérieuse pour la durabilité financière des exploitants de transports en commun. Une subvention plus élevée pour compenser les pertes met une tension sur les finances publiques de la ville. Il est nécessaire de trouver un équilibre entre les objectifs d'accessibilité des pouvoirs publics et l'objectif de recouvrement des coûts des opérateurs des transports en commun. Les difficultés d'exploitation sur les principaux axes de transports en commun enclins aux encombrements sont les principaux obstacles que subissent les exploitants de transports en commun pour couvrir leurs coûts à partir des tickets et devenir plus durables financièrement. En l'absence d'une quelconque forme de subvention et de soutien financier de la part du gouvernement, les transports en commun informels dépendent exclusivement des sommes acquittées par les usagers pour couvrir les coûts d'exploitation et l'amortissement des véhicules. L'accès des transporteurs informels au prêt bancaire pour l'acquisition de la flotte et son remplacement est limité car d'une part il est habituellement difficile de satisfaire les exigences des banques en matière de garantie et d'autre part le secteur est considéré comme risqué.

La planification des transports en commun n'est pas suffisamment développée et est faite d'une façon fragmentée et indépendante par les organismes concernés. La société Anbessa est responsable de la planification et de la gestion globale des bus de la ville. Le bureau, nouvellement établi, des routes et du transport essaie d'introduire une exploitation planifiée et régulée du secteur des transports en commun informels. Il est absolument essentiel d'augmenter la compétence technique de l'autorité de transport en matière de planification que

l'on peut considérer maintenant comme très rudimentaire quels que soient les critères utilisés. Un nouveau dispositif institutionnel, qui facilitera la coordination entre les divers acteurs impliqués dans les transports en commun urbains, améliorera l'intégration entre le développement de l'urbanisme et des transports et développera la coopération au lieu de la concurrence entre exploitants, est d'une importance capitale en vue d'améliorer le système de transports en commun d'Addis-Abeba.

Chapitre 4. Intégration du transport public : une revue de la littérature

L'intégration des transports en général et l'intégration des transports en commun en particulier ont évolué et ont été mis en œuvre dans les villes du Nord où la baisse de la clientèle des transports en commun, la présence de nombreux opérateurs publics et le nombre croissant de véhicules particuliers ont fourni l'arrière-plan contextuel. Les critères de développement urbain durable sont également apparus récemment au premier plan dans la promotion de l'intégration des transports en commun. La discussion menée dans ce chapitre a montré que l'intégration des transports est définie différemment selon la perspective disciplinaire. Il n'y a pas de définition universellement acceptable de l'intégration des transports et des moyens pour la réaliser, bien qu'elle soit unanimement considérée comme bénéfique. Il y a aussi consensus général sur la nécessité d'adopter des politiques et des outils d'intégration et de concevoir l'intégration du transport non pas comme un objectif en soi, mais comme un moyen de réaliser des niveaux de service des transports en commun plus élevés. L'intégration des transports en commun a un fort point de vue systémique. A la lumière de ceci, elle peut être perçue comme un processus organisationnel et une procédure de planification complète qui assure une meilleure qualité et des services de transports en commun plus attractifs par la prise en compte systémique de toutes les dimensions des transports en commun. Cependant, la littérature ne fournit pas de réponse explicite aux questions sur la façon de la réaliser, sur les conditions préalables et sur les mesures supplémentaires qui faciliteront le processus organisationnel et les procédures de planification compréhensive. L'intégration des transports se fait à des niveaux différents et son degré de complexité augmente lorsque l'on passe des niveaux opérationnels inférieurs aux niveaux stratégiques plus larges. L'intégration des transports en commun relève toutefois des niveaux inférieurs dans l'échelle de l'intégration. Bien que l'intégration des transports en commun soit sensée apporter une synergie et favoriser le « déplacement sans rupture », la littérature ne fournit pas de réponse facile à ce qui devrait être un niveau « idéal » ou « optimal » d'intégration des transports en commun, ni quels instruments ou combinaison d'instruments sont disponibles pour le réaliser.

Malgré les notions divergentes, l'écart des connaissances et les divers degrés de difficultés de mise en œuvre, l'intégration des transports en commun vaut la peine d'être poursuivie et apporte un certain nombre d'avantages. L'intégration des transports en commun améliore la coordination de la planification, de l'exploitation et de la gestion du système de transports en commun, aide à éviter la concurrence intermodale et intramodale inutile et augmente l'attrait et le nombre d'usagers des modes de transports en commun. L'intégration des transports en commun fournit un cadre systématique pour fixer les tarifs et les zones tarifaires acceptables par toutes les parties prenantes des transports en commun et offre la base d'un service de transport abordable pour les communautés urbaines à faible revenu. La gestion du processus d'intégration des transports en commun promeut le partenariat public-privé entre les gouvernements locaux et régionaux, les autorités de transport et les fournisseurs de transports en commun. L'institution créée par le biais d'un tel partenariat sert de support pour canaliser

les finances publiques, tant à des fins de subvention que pour le développement d'infrastructures de transports en commun à long terme. L'intégration des transports en commun qui s'étend au-delà de la frontière de la ville jusque dans la zone métropolitaine rend les trajets pendulaires mieux organisés, plus faciles, plus efficaces et plus abordables. Les réseaux de transports en commun servent d'axes de développement urbain de forte densité quand ils deviennent une partie intégrante du processus de développement spatial de la ville. Le succès de l'intégration des transports en commun dépend en grande partie de l'identification des obstacles lors des phases de planification et la formulation de stratégies et de politiques pour les contrer. Une compréhension mutuelle et une plus grande coopération entre les institutions, les autorités de transport, les administrations locales et les fournisseurs de transports en commun sont des ingrédients essentiels pour des programmes d'intégration des transports en commun réussis. De plus, des institutions engagées en faveur de schémas de planification, politiques et législatifs sont aussi des conditions préalables essentielles pour promouvoir une plus grande intégration des transports en commun. Il faut noter cependant, qu'il n'est pas facile de quantifier les avantages et les coûts des projets d'intégration des transports en commun. Il est évident que le fait de quantifier les coûts et les avantages de projets et programmes d'intégration des transports en commun a priori ou a posteriori a rarement été traité dans la littérature. Il sera ainsi très important pour la recherche de développer des méthodologies d'évaluations chiffrées des projets et des programmes d'intégration des transports en commun.

L'intégration des transports en commun se présente sous différentes formes. Les intégrations physiques et tarifaires sont les formes d'intégration les plus largement pratiquées, bien que d'autres formes apparentées d'intégration des transports en commun soient disponibles. L'intégration physique qui fournit un lien physique entre divers modes est conçue pour rendre les correspondances des transports en commun plus pratiques et attractives. Les principaux pôles d'échange pourraient aussi servir de zones de développement urbain de forte densité (TOD). Le succès de l'intégration physique dépend du processus de restructuration du réseau de transports en commun. Cette tâche est subordonnée à la disponibilité d'un plan directeur de transport en commun général qui devrait clairement montrer les réseaux de transports en commun du présent et de l'avenir. Un tel plan directeur fournira l'outil pour aider à décider des répartitions de lignes entre les divers opérateurs et déterminer la hiérarchisation des pôles d'échange nécessaire pour l'intégration physique du réseau de transports en commun. Financer la construction et la gestion des aménagements des pôles d'échange, garantir le terrain nécessaire et développer les dispositifs institutionnels pour les administrer et les gérer sont des questions importantes dans l'intégration physique. Il est recommandé pour les projets de développement urbain de prendre en compte les futurs réseaux de transports en commun et de réserver des espaces pour des pôles d'échange très tôt dans le processus de planification ou plus tard quand les plans de développement de la ville seront mis à jour et révisés.

L'intégration tarifaire améliore le déplacement sans rupture en transports en commun en surmontant les obstacles de tarifs et de tickets multiples qui sont inhérents à un système de transports en commun multimodal non-intégré. La mise en œuvre de l'intégration tarifaire n'est pas non plus un processus facile. Des décisions doivent être prises sur les questions essentielles de la structure et du niveau tarifaire, du recouvrement du tarif et de son contrôle et de la répartition des recettes acceptable par tous les acteurs. Les décisions sur les moyens de paiement et les technologies de validation du ticket sont également des décisions importantes. Il s'agit de questions compliquées pour des villes africaines en voie de développement où il y a des milliers d'opérateurs privés et un système de transports en commun mal coordonné. Il est impensable à l'heure actuelle pour des villes africaines d'avoir un système tarifaire entièrement intégré et un système de validation et de recouvrement entièrement automatisé.

Les villes africaines doivent développer une stratégie d'intégration tarifaire qui s'étendra sur de nombreuses années. L'intégration tarifaire en Afrique devrait avoir pour but de fournir des transports en commun abordables pour la plupart des citoyens. Ces villes doivent passer progressivement d'une phase d'intégration tarifaire la plus simple à une phase d'intégration tarifaire complète plus complexe. Il serait alors souhaitable de commencer l'intégration tarifaire par les grands opérateurs publics de transports en commun. Ceci pourrait être le mode ferroviaire là où il y a des transports en commun basés sur le ferroviaire mais cette situation est rare dans la plupart des villes africaines. On peut faire en sorte que les grands bus du secteur public fournissent des services avec tarif intégré le long des axes principaux et secondaires où ils fonctionnent. L'intégration du secteur du transport artisanal dans un plan d'intégration tarifaire, cependant, est une tâche à long terme qui exige des négociations prolongées entre les artisans et les pouvoirs publics sur les principaux éléments de l'intégration tarifaire. Les villes devraient se décider quant au futur rôle du secteur artisanal en prenant en compte tant les intérêts des pouvoirs publics pour de meilleurs services que la motivation des exploitants de maximiser les bénéfices. La décision devrait aussi dépendre des directives de développement spatial à long terme des villes. Des institutions de transport urbain pleinement engagées et qui favorisent une plus grande coopération en ayant une vision claire de l'avenir auront un rôle fondamental à jouer dans le processus d'intégration. Il y a plusieurs types d'institutions de transport et les villes africaines devraient minutieusement passer en revue les meilleures pratiques et leurs contextes locaux pour décider du type d'institutions qui répondent le mieux à ces fortes attentes. Il est nécessaire de renforcer ces institutions afin qu'elles soient capables de développer des réponses appropriées et volontaires aux énormes problèmes de transport que de telles villes rencontrent d'ores et déjà et auxquels elle risquent de faire face à l'avenir du fait du prévisible processus d'urbanisation rapide du continent.

Il est vrai que la planification du transport et celle de l'usage des sols devraient être menés de front. La méthodologie et les outils de la modélisation conjointe du transport et de l'usage des sols (modélisation LUTI) ont été développés dans les villes des pays développés et les applications de ces modèles dans des villes africaines n'ont pas été exemptes de critiques. Les modèles conjoints transport-urbanisme qui conviennent aux villes africaines doivent encore être développés. D'autre part, le fait de lier les principaux axes de développement urbain avec les principaux axes de transports en commun actuels et futurs offre une occasion pour les villes africaines d'aller dans une direction durable. Il n'y a pas d'autres choix viables que de promouvoir un modèle de développement compact de la ville dans lequel les villes sont piétonnes et aisément accessibles en transports en commun. Les villes africaines devraient d'une façon significative examiner leur stratégie de développement urbain actuelle pour déterminer si elle est durable ou pas. Financer et promouvoir le développement urbain orienté sur la voiture n'est absolument pas durable en Afrique. Les villes africaines devraient davantage se diriger vers le développement orienté par les transports en commun et la ville polycentrique, des stratégies qui maximisent l'utilisation des transports en commun de masse. Les villes de Paris, Hambourg, Singapour, Curitiba, Sao Paulo et Singapour ont été étudiées pour tirer diverses leçons utiles aux villes africaines sur le processus d'intégration des transports en commun. Il faut souligner en préalable que comme il y a des différences entre celles-ci et les villes africaines, la reproduction directe des meilleures pratiques n'est ni possible, ni recommandée. Les BRT de Lagos et du Cap constituent des approches locales de l'intégration des transports en commun en Afrique. Le BRT de Lagos est un bon exemple dans lequel le tarif a été réduit, du fait de vitesses commerciales plus rapides des bus dans le couloir du BRT ce qui a diminué les coûts d'exploitation.

Motivé par le besoin d'améliorer les transports en commun et d'augmenter leur clientèle du fait d'un service aujourd'hui fortement disjoint et fragmenté, le processus d'intégration des transports en commun est un long processus et nécessite un organisme politique engagé ayant plus d'autorité et permettant un cadre légal. Le processus d'intégration devrait partir des formes les plus simples et avancer progressivement vers les formes d'intégration plus élevées et plus complexes des transports en commun. L'intégration de la planification de l'aménagement de l'espace et des transports en commun est réalisée au mieux quand les décisions sur les programmes de développement urbain sont basées sur les critères de disponibilité d'accès aux transports en commun. Un tel cadre d'audit général des transports en commun découragera les futurs programmes de développement urbain qui n'ont aucun accès assuré aux réseaux de transports en commun actuels ou planifiés. Le contexte organisationnel idéal pour une telle prise de décisions est la présence de représentants des autorités d'urbanisme dans l'organisme qui coordonne, gère et planifie le système global des transports en commun et vice versa. La présence d'un système de transport collectif de masse, issu du secteur public, facilite l'intégration des transports en commun. Le système du BRT à faible prix et cependant forte capacité pourrait fournir la plate-forme d'intégration pour les villes africaines qui prévoient de moderniser et d'augmenter l'attrait et la capacité de leurs systèmes de transports en commun. Les mesures améliorant la vitesse des transports en commun et la priorité aux transports en commun sur les routes et les intersections qui augmentent les performances des transports en commun devraient compléter les programmes d'intégration. De tels avantages améliorant les performances des transports en commun semblent avoir en partie compensé la mise en place de politiques tarifaires qui promeuvent un transport abordable pour les pauvres et la partie défavorisée de la population en assurant en même temps le statut de recouvrement des coûts des exploitants. Bien que les transports en commun continuent d'obtenir un soutien financier gouvernemental substantiel, les autorités en charge des transports en commun et les administrations locales devraient s'efforcer de trouver des mécanismes de financement innovants. Il existe diverses options et bonnes pratiques pour un tel financement extrabudgétaire. Les opérateurs des transports en commun devraient faire des analyses de marché et promouvoir les stratégies marketing qui augmentent le type et le volume de leurs ventes de tickets. Des transports en commun urbains régionaux dans les zones métropolitaines qui regroupent de nombreuses administrations locales peuvent être entravés par des questions juridiques. Des accords réciproques entre ces administrations locales sont donc nécessaires afin de décider des niveaux de services de transports en commun et de financement. Il existe des bonnes pratiques de la part d'associations de transports en commun qui ont surmonté de tels obstacles à l'intégration de transports en commun régionaux dans des zones métropolitaines.

Une grande partie des contributions sur l'intégration des transports en commun ne provient pas du monde universitaire, mais du monde des professionnels des transports en commun, à savoir les autorités de transport, les associations internationales de transports en commun, les administrations locales et les opérateurs de transports en commun. De plus, une grande partie des travaux sur l'intégration des transports en commun porte sur les villes du Nord. Les villes africaines ont très peu d'expérience en matière d'intégration des transports en commun. Les villes africaines ont un contexte urbain et de transport différent des villes du Nord. Ces villes ont des taux de possession et d'usage de la voiture peu élevés, sont fortement dépendantes des transports en commun pour une mobilité motorisée, ont une part modale de la marche plus élevée, un plus faible revenu par habitant et sont caractérisées par la coexistence du développement urbain informel. Très peu de villes africaines ont des transports en commun urbains basés sur le ferroviaire et dans la plupart des cas, les transports en commun possédés et exploités par la puissance publique ont perdu de l'importance. Dans ces conditions, le

secteur du transport informel et artisanal a connu une forte croissance pour combler le déficit créé par le secteur public inefficace et dans la plupart des villes, il fournit les moyens principaux de mobilité mécanisée. Ce qui rend ces villes fondamentalement différentes des villes du Nord est la taille même et la diversité des transports en commun exploités par le privé. Il y a des milliers d'exploitants, principalement détenus par des particuliers. Le plus grand défi pour l'intégration des transports en commun dans les villes africaines sera donc la tâche incroyable d'intégrer le transport artisanal. Il n'y a aucun exemple réussi d'intégration du transport artisanal. Plusieurs tentatives ont été effectuées pour l'intégrer et le processus prendra probablement longtemps comme le montrent ces exemples. D'ici-là, néanmoins, le transport artisanal devrait être capable de fournir des services de qualité plus élevés avec le transport formel intégré, en mettant en place des appels d'offres par lignes et des normes de qualité de service. L'intégration des transports en commun en elle-même n'apportera pas les résultats escomptés et les villes devraient aussi s'efforcer d'améliorer l'efficacité de leurs systèmes de transports en commun en employant plus de stratégies de gestion de l'offre et de la demande de transport.

La recherche de l'intégration du transport en général et de l'intégration des transports en commun en particulier dans les villes africaines devrait s'aligner pour s'adapter à leurs contextes urbains et de transport spécifiques. La question est alors ce que devrait être l'intégration du transport dans le contexte africain dans une perspective à la fois plus étroite et plus large. Il n'y a aucune réponse dans la littérature à cette question. Nul doute que la voie vers l'intégration des transports en commun reste toujours profitable pour les villes mais ceci est un processus complexe et long. À long terme, de ce fait, les tentatives d'intégration des transports en commun dans les villes africaines, en apprenant des pratiques des villes du nord, devraient être basées sur le développement d'un cadre d'intégration prenant en compte le contexte local. Par-dessus tout, l'intégration des transports en commun a besoin d'institutions de transport fortes et capables, d'un engagement politique et d'une bonne administration qui a pour principal ambition l'intégration des transports en commun.

Chapitre 5. L'enquête-ménages : résultats et implications

Addis-Abeba jusqu'à présent, comme la plupart des villes dans les pays en voie de développement, manque d'enquêtes sur les déplacements menées auprès des ménages de manière systématique et régulière. Les quelques exemples d'enquêtes sur les déplacements à la disposition de la ville étaient limités dans leur champ et étaient conditionnés par des objectifs de projets spécifiques. Cette enquête a été faite pour pallier le manque de données détaillées sur les déplacements à Addis-Abeba et produire des données socio-économiques, démographiques et sur les déplacements représentatives. Cette enquête était plus large, plus scientifique et elle a pris en compte de bons exemples de questionnaires d'enquête sur les déplacements à partir de contributions françaises et tout particulièrement d'expériences d'enquête sur les déplacements réalisées en Afrique de l'Ouest par des chercheurs du LET. Les choix méthodologiques d'enquête ont déterminé la conception du contenu de l'enquête sur les déplacements. L'enquête a utilisé des entretiens face-à-face et des questions fermées. Ceci a nécessité un examen minutieux et approfondi de toutes les réponses possibles pour chacune des questions de l'enquête. Un pré-test des questionnaires auprès d'un échantillon comprenant des personnels administratifs, des personnels enseignants et des étudiants de l'EiABC a été effectué pour tester si les réponses prévues étaient exhaustives. Quelques modifications ont été apportées au questionnaire original après le pré-test. La conception de questionnaires sur

les déplacements des ménages qui correspondent au contexte local et qui doivent être passés dans les langues locales n'est pas une tâche facile, comme le démontre l'expérience de cette enquête. Le processus nécessite une préparation minutieuse, une analyse de la littérature sur les enquêtes-ménages déplacements et des exemples de questionnaires conçus antérieurement pour des villes africaines.

La validité des conclusions tirées à partir des données de l'enquête sur les déplacements est en étroite corrélation avec la taille de l'échantillon, le degré de représentativité des échantillons aux plans des zones géographiques et des groupes socio-économiques, les méthodes d'échantillonnage utilisées et la réalisation pratique de l'enquête. Augmenter la taille de l'échantillon à 1 % de tous les ménages n'était pas faisable d'un point de vue pratique et seulement 0,1 % des ménages ont été inclus dans l'enquête. Ce n'était pas à cause d'une incapacité technique ou administrative mais en raison du manque de financement pour gérer une plus grande taille d'échantillon. Garantir un financement suffisant est essentiel dans les processus d'enquête mais obtenir un financement public est difficile dans la mesure où il y a un manque de conscience et d'expériences d'enquêtes sur les déplacements chez les autorités de transport de la ville.

La technique de l'échantillonnage à plusieurs degrés a été utilisée pour choisir les Wereda d'enquête parmi l'ensemble des Weredas de la ville puis les ménages au sein des Wereda choisis. Tous les Wereda d'Addis-Abeba ont donné lieu à une classification en fonction de critères de population, de distribution géographique, d'accès au transport et de distance au centre-ville. Le jugement et l'expérience personnels ont également été utilisés dans la sélection finale des Wereda pour assurer une distribution équitable des échantillons pour chaque groupe d'échantillonnage. La sélection des ménages dans chaque Wereda a suivi la même technique d'échantillonnage. Ils ont été choisis sur la base du nombre de zones dans chaque Wereda. Les zones sont des entités géographiques définies pour faciliter l'administration dans le Wereda. Le processus de sélection des ménages types dans chaque zone visait à assurer une représentation équitable.

Localiser les ménages sélectionnés dans chacune des zones était une tâche difficile dans la mesure où il n'y a pas de système de numérotation cartographique des maisons. L'expérience de cette enquête montre également l'importance de l'organisation et de la conduite de l'enquête et le rôle des enquêteurs. Les enquêteurs étaient de jeunes diplômés en planification urbaine et régionale de l'EiABC. Ils avaient une forte expérience en matière d'urbanisme de terrain et une bonne connaissance d'Addis-Abeba. De plus, ces enquêteurs étaient disponibles à plein temps dans la mesure où ils venaient juste de finir leurs études. Leur motivation pour la réussite de l'enquête, leur connaissance de la ville et leur désir d'avoir des expériences pratiques d'enquête étaient les atouts qui ont assuré la réussite de l'enquête. Une journée supplémentaire de formation d'enquêteur leur a été donnée ; elle portait sur les objectifs de l'enquête, le contenu des questionnaires, les procédures d'enquête et les règles de conduite durant le processus d'enquête. Enfin, le codage des données et leur traitement sont tout aussi importants que la conduite de l'enquête. Les soixante-six questions de l'enquête pour chaque ménage, Wereda et terminal ont été codées dans une fiche excel et l'outil statistique SPSS a été utilisé pour produire les résultats. Un assistant, qui a également participé à l'enquête, a pris la responsabilité du codage et de la production des résultats préliminaires. La tâche a nécessité beaucoup de travaux et de tests et ses connaissances riches et diversifiées en matière de logiciels ont facilité la tâche. A l'issue de cet exercice, il est apparu que l'engagement et l'expérience des enquêteurs aussi bien qu'une gestion et un contrôle attentif des enquêtes sont importants pour la réussite du processus. La plupart des ménages ont répondu à toutes les questions et très peu de « non- réponse » ont été relevées.

L'enquête était une tentative pour combler le manque de données sur les déplacements et examiner les caractéristiques socio-économiques, démographiques et de mobilité des ménages à Addis-Abeba. Les résultats de l'enquête ont été traités à l'échelle de l'agglomération et aucune tentative n'a été faite pour analyser les données pour chaque Wereda. De plus, comme la taille de l'échantillon est petite, il ne serait pas très réaliste de tirer des conclusions significatives et valables qui seraient vraies pour tous les ménages et Wereda d'Addis-Abeba. Néanmoins, certaines des constatations de l'enquête ont des ressemblances saisissantes avec certains rapports officiels. Premièrement, les niveaux de revenu sont très bas dans tous les Weredas et la majorité des ménages ont indiqué que leurs niveaux de revenu sont soit restés stables soit ont baissé au cours de l'année écoulée. Deuxièmement, il n'y a pas de différence marquée en matière de revenus entre les différentes catégories de revenus et la plupart ont des revenus qui sont bien au-dessous du seuil de pauvreté. Il n'y a pas non plus de différence de revenus significative entre les Weredas. Ceci est en grande partie attribué à l'absence de ségrégation résidentielle par catégories de revenus à Addis-Abeba dans la mesure où les pauvres et les riches vivent ensemble. L'enquête montre que les gens ont dépensé plus qu'ils ne gagnent et que les dépenses en matière de transport sont plutôt élevées, que ce soit comme pourcentage des dépenses du ménage ou des revenus globaux. La plupart des services de base ne sont pas assurés dans l'environnement proche des résidences. La plupart des déplacements liés au travail et aux services impliquent l'utilisation d'une combinaison de modes de transport (intermodalité et multimodalité). La plupart des participants à l'enquête utilise une combinaison des modes de transport pour avoir accès aux emplois et aux services. Les bus publics d'Anbessa ne sont pas le mode le plus important, mais ce sont les taxis-minibus qui sont largement utilisés tant dans les déplacements pour le travail que pour les services. La marche comme mode non-motorisé de mobilité a une part modale disproportionnée.

On a pu tirer de l'enquête les observations suivantes liées au transport et à l'intégration :

- Comme la plupart des services de base ne se trouvent pas près des lieux résidentiels, des politiques d'équipement sont nécessaires. Il est souhaitable de localiser des services de base dans des lieux plus proches et à distance de marche des résidences pour que les gens fassent peu de longs déplacements motorisés.
- Comme la marche est un mode de transport important, il est impératif que les formes non-motorisées de mobilité soient prises en compte dans les politiques d'intégration des transports en commun et dans les programmes et projets de développement d'infrastructures routières.
- Les minibus privés assurant la mobilité motorisée pour la majorité de la population, ils devraient recevoir de la part de la ville et du gouvernement fédéral plus d'aide, plus de soutien institutionnel et une reconnaissance positive des services qu'ils rendent.
- La multimodalité des déplacements est un indicateur de la nécessité de rendre la marche et l'attente lors des correspondances plus pratiques et plus courtes par l'intégration du réseau de transports en commun.
- Comme les services qui sont fréquemment utilisés par presque tous les ménages sont accessibles par trois (ou plus) combinaisons de modes de transport, ceci peut être pris comme une indication de la nécessité d'une intégration modale, opérationnelle et tarifaire.
- Comme les revenus des gens sont faibles, l'intégration tarifaire et les programmes de subvention qui maintiennent la dépense de transport basse pourraient être un instrument efficace pour la réduction de la pauvreté et l'amélioration de l'insertion sociale des groupes à faible revenu.

- Les autorités d'Addis-Abeba en charge du transport ne peuvent pas fournir des données réelles et précises sur les parts modales, les usagers des transports en commun, les origines et destinations des déplacements, les revenus et les dépenses de transport, etc. Ainsi, il est recommandé à l'autorité de transport de la ville de mener des enquêtes détaillées et régulières sur les déplacements des ménages.
- La réponse de la société Anbessa au questionnaire qui lui a été envoyé (voir l'Annexe 37) montre la nécessité de déployer beaucoup d'efforts pour améliorer la qualité de ses services, moderniser le système de collecte des tickets, proposer des abonnements et examiner les options d'intégration de son service et la restructuration du réseau quand le LRT sera opérationnel.

Généralement, les résultats de l'enquête et la situation réelle des transports sur le terrain montrent la nécessité d'aborder les problèmes croissants de circulation et des transports de la ville avec une nouvelle approche, une approche qui tire profit du financement public énorme qui est investi pour améliorer la performance et l'attrait des transports en commun. Les programmes d'augmentation de la flotte d'Anbessa et le nouveau transport ferroviaire léger pourraient être utilisés comme une opportunité de réformer le système de transports en commun de la ville et d'établir les bases d'un service de transports en commun intégré. Ces programmes de développement des transports en commun pourraient aussi être utilisés pour intégrer le développement urbain avec les réseaux de transports en commun. Un transport public multimodal à Addis-Abeba devrait être fondé sur un système d'intégration des transports en commun qui offre des réseaux de transport plus denses et plus structurés, un transport en commun sans rupture, plus accessible, rapide, abordable et fiable et qui fournit un niveau de services de transport plus élevé avec une meilleure qualité de service dans les véhicules. Enfin, les mesures d'intégration devraient être complétées ou même précédées par des programmes de gestion du trafic améliorant la productivité et l'efficacité des modes de transports en commun. Ceci aurait dû être fait depuis longtemps mais Addis-Abeba a pris du retard dans leur mise en œuvre. De telles mesures pourraient mener à une productivité accrue, des coûts d'exploitation réduits et la réduction des prix des transports en commun comme l'a si bien démontré le BRT du Lagos.

Chapitre 6 : Un système de transport multimodal intégré à Addis-Abeba

Le cadre d'intégration des transports en commun a fourni des directives méthodiques pour mettre en œuvre l'intégration des transports en commun à Addis-Abeba. Le processus d'intégration s'étendra sur un grand nombre d'années. Par principe, l'intégration commencera par les formes d'intégration les moins complexes et avancera progressivement vers les formes d'intégration plus complexes. Le cadre a également pris en compte d'autres mesures indirectes qui amélioreront le processus d'intégration. Parmi ces dernières, la restructuration du réseau public et la mise en œuvre de stratégies de demande de déplacements et de gestion du trafic sont extrêmement importantes et permettraient d'atteindre plus rapidement les buts escomptés de l'intégration des transports en commun.

Le cadre proposé a contribué à identifier les obstacles à l'intégration ainsi que les mesures possibles pour surmonter ces obstacles, fixant la vision à long terme, définissant les formes d'intégration dans le contexte d'Addis-Abeba et développant des critères pour les apprécier et les prioriser. Il a également défini la configuration de chaque forme d'intégration, identifié les acteurs et leurs rôles spécifiques. Il a précisé le calendrier de mise en œuvre progressive de l'intégration et signalé l'importance du cadre légal qui posera les règles du processus

d'intégration et le dispositif institutionnel nécessaire pour la mise en œuvre des tâches d'intégration. Le « service des transports en commun multimodaux et intégrés d'Addis-Abeba » proposé jouera, en collaboration étroite avec toutes les parties prenantes en général et avec le Bureau des Routes et des Transports d'Addis-Abeba en particulier, le rôle principal dans le processus d'intégration. Il aura à renforcer ses capacités de mise en œuvre et de recherche et à cet égard les contributions des institutions éducatives supérieures du pays, particulièrement l'Université d'Addis-Abeba, sont très importantes. Il devrait aussi chercher à garantir tous les engagements nécessaires de toutes les parties prenantes. Les gouvernements d'Addis-Abeba, d'Oromia et fédéral devraient fournir tout le soutien dont le bureau a besoin pour fournir un système de transports en commun efficace, fiable, abordable, attractif et sans rupture à Addis-Abeba et dans sa zone métropolitaine. Ceci est en effet l'objectif final de l'intégration des transports en commun et du développement urbain durable.

Chapitre 7 : Discussion et conclusion

7.1. Introduction

Nous avons supposé que l'intégration des transports en commun multimodaux à Addis-Abeba est avantageuse et fournit les mécanismes pour supprimer la plupart des goulots d'étranglement des transports en commun urbains et mettre Addis-Abeba sur la voie du développement urbain durable. L'intégration est sensée contribuer à fournir un système de transports en commun multimodal abordable, efficace, durable et intégré et pour promouvoir la coordination et les partenariats public-privé.

L'intégration des transports en commun a été largement développée et mise en œuvre dans les villes du Nord. Elle était à l'origine prévue comme un moyen de contenir la motorisation rapide et d'inverser la baisse de la clientèle dans les transports en commun. L'intégration cherche à fournir un déplacement en transports en commun sans rupture et attractif. Bien que la question "qu'est-ce que l'intégration" soit comprise différemment selon les disciplines, tout le monde s'accorde sur la nécessité de mettre en œuvre des politiques d'intégration comme moyen d'obtenir des niveaux de services de transport plus élevés. Ceci a fait l'objet de discussions approfondies dans le Chapitre 4.1.

La thèse a cherché à répondre aux questions de recherche :

- Quelles formes d'intégration Addis-Abeba peut-elle mettre en œuvre ?
- Comment Addis-Abeba peut-elle mettre en œuvre les formes d'intégration choisies ?

Pour répondre à ces questions, il nous a semblé important de développer des sous-questions qui aideront à répondre aux questions de recherche principales. Une revue de la littérature sur l'intégration a fourni des réponses aux sous-questions suivantes :

- Qu'est-ce que l'intégration des transports en commun ?
- Quelles sont les formes d'intégration ? Quelles sont les caractéristiques et les particularités de chacune de ces formes d'intégration ?
- Quels sont les défis et les barrières principaux lors de l'adoption d'une approche intégrée ?
- Quels sont les dispositifs institutionnels et comment les divers opérateurs (privés et publics) peuvent-ils être rassemblés dans une institution de coordination ? Quel devrait être son cadre légal ? Comment les responsabilités sont-elles partagées ?
- Comment les coûts et les recettes doivent-ils être partagés entre les différents membres (publics et privés) et comment la subvention gouvernementale et le fonds de remplacement de la flotte sont-ils répartis ?

- Que peut-on apprendre des pratiques d'intégration des transports en commun des villes qui l'ont mis en œuvre avec succès ?
- Que peut apprendre Addis-Abeba de ces pratiques et comment peut-elle développer son propre système intégré de transports en commun en prenant en compte ses spécificités ?

L'analyse du contexte fournit des réponses aux questions suivantes :

- Quel est le contexte urbain d'Addis-Abeba, en prenant en compte sa croissance et son évolution ? Comment la planification urbaine et le développement des transports ont-ils été organisés et menés ?
- Comment se présentent l'offre et la demande de transport ?
- Comment les transports en commun sont-ils organisés et exploités à Addis-Abeba ?
- Quelles sont les expériences réelles de déplacements des résidents d'Addis-Abeba dans l'accès aux emplois et aux services ?

L'objectif de ce chapitre de conclusion est de résumer la thèse à l'aune des questions de recherche. Une synthèse de la méthodologie utilisée et les difficultés rencontrées sont présentés à la section 7.2. La section 7.3 rappelle les grandes lignes de la croissance et du développement d'Addis-Abeba, la pratique de la planification urbaine et du transport, présente les institutions de planification urbaine et de transport compétentes ainsi que les traits principaux de l'offre et la demande de transport. La section 7.4 traite de l'organisation des transports en commun à Addis-Abeba. La section 7.5 traite des constatations théoriques sur l'intégration des transports en commun en les mettant en perspective avec nos questions principales de recherche. La section 7.6 expose les résultats majeurs issus de l'enquête sur les déplacements. La section 7.7 présente le résumé sur le cadre d'intégration des transports en commun à Addis-Abeba. La section finale ouvre la réflexion, notamment sur des suggestions de recherches futures.

7.2. Méthodologie

Nous avons utilisé trois outils pour répondre à la question principale de recherche, aux sous-questions et aux questions sur le contexte urbain d'Addis-Abeba.

Premièrement, la revue de la littérature sur l'intégration a montré que l'intégration des transports en commun a été développée dans des villes européennes et que les villes africaines n'ont pratiquement aucune expérience d'intégration. Il y a peu de documents sur le sujet de l'intégration des transports en commun en Afrique et ce thème fait l'objet de peu de recherches. Cela pose une difficulté pour la mise en œuvre de l'intégration des transports en commun en Afrique. Elle devrait être modifiée pour s'adapter aux contextes locaux tout en maintenant le but ultime de l'intégration comme instrument pour obtenir de meilleurs services de transport. Nous avons développé un cadre théorique d'application au cas d'Addis-Abeba et avons montré les étapes nécessaires pour l'implantation de l'intégration des transports en commun.

Deuxièmement, nous avons utilisé de multiples rapports, bulletins statistiques, documents historiques et diverses discussions formelles et informelles pour examiner le contexte d'Addis-Abeba. Les difficultés majeures rencontrées étaient le manque et l'incohérence des informations, l'absence de données de séries chronologiques et une mémoire institutionnelle défaillante. Mes longues années d'activité au sein de la municipalité d'Addis-Abeba ont facilité la tâche. Il est important qu'Addis-Abeba se dote de l'institution nécessaire pour rassembler, documenter et diffuser les données urbaines pour la recherche et à d'autres fins.

Troisièmement, nous avons mené une enquête sur les déplacements des ménages pour obtenir des données sur les ménages et les individus qui sont totalement indisponibles dans la ville. Le processus a nécessité beaucoup de temps et a été contraint par le manque de financement. Nous avons fait face à un certain nombre de problèmes et avons notamment eu des difficultés dans la sélection des ménages dans les Wereda où le système d'identification par numéro des maisons n'était pas disponible. Nous avons également observé un manque de motivation pour fournir des réponses aux questionnaires. Il était évident que les expériences des enquêteurs étaient un atout qui a atténué les problèmes de non-réponse. Les enquêteurs qui étaient diplômés des programmes de planification urbaine et régionale de l'EiABC avaient de longues années d'expériences de terrain. Nous avons également remarqué le rôle positif de l'administration locale et des organisations communautaires qui ont facilité les enquêtes auprès des ménages en stimulant l'entière collaboration des participants à l'enquête.

7.3. Développement urbain, urbanisme et transport

Addis-Abeba, en tant que capitale et métropole, domine le processus d'urbanisation et l'économie du pays. Elle bénéficie d'un système décentralisé de gouvernement et la charte de la ville fournit le cadre légal pour sa pleine autonomie de décision sur toutes les questions dans sa juridiction. Durant la majeure partie de son histoire, la croissance et le développement de la ville ont été conduits par des tendances spontanées plutôt que par des instruments modernes d'urbanisme. La plupart des plans qui ont été préparés pour guider le développement de la ville ont été surtout faits par des cabinets de conseil étrangers, bien que la tendance change maintenant dans la mesure où plus de personnel local est impliqué dans les processus d'urbanisme. Le manque de continuité dans le processus de construction institutionnelle a sérieusement détérioré la capacité des institutions de planification urbaine et du transport à gérer correctement l'urbain et le transport.

La croissance et le développement de la ville se sont faits sur le terrain et Addis-Abeba s'est étendue horizontalement à partir de son noyau original autour du palais impérial, quoique ce modèle historique de développement est de nouveau en train de changer. La ville passe actuellement par une phase de développement urbain rapide, inconnue dans les périodes précédentes. La structure urbaine d'Addis-Abeba change dynamiquement en raison du développement d'infrastructures majeures de transport, de la prolifération de l'immobilier et des programmes de logements sociaux en cours dans la ville. La ligne de LRT nouvellement construite et la structure physique ferroviaire en surface ont changé l'image de la ville le long des axes majeurs est-ouest et nord-sud. L'infrastructure de transport public ferroviaire qui couvre plus de 30 kilomètres d'Ayat à Tor Hailoch en passant par Lagare dans la direction est-ouest et Piazza par Merkato et Lagare à Kalti (Voir le schéma 3.27) est un nouveau point de repère urbain dominant. L'infrastructure du LRT impacte déjà l'écoulement des flux de véhicules au long de ces axes majeurs de circulation. Les nouveaux projets de construction et d'élargissement de routes partout dans la ville, qui ouvrent des quartiers pauvres autrefois très peuplés, démolis pour des programmes de renouvellement urbain et de création de nouvelles zones vertes pour le nouveau développement urbain, changent aussi le paysage urbain d'Addis-Abeba. Bien que la densité routière ait progressivement augmentée comme l'indiquent les statistiques des autorités routières de la ville, les encombrements sont plus répandus, plus graves et plus fréquents. De même, le développement d'infrastructures routières en faveur de la voiture prend insuffisamment en compte les besoins des formes non-motorisées de mobilité et des transports en commun. Ceci se manifeste par une absence totale de couloirs et de voies réservées aux bus le long des principaux axes de transports en commun, l'absence de priorité pour ces modes aux principales intersections, la faiblesse du

nombre d'arrêts de bus et de taxis hors voirie, la rareté des installations piétonnières et l'absence de terminaux et de pôles d'échange correctement équipés hors voirie.

Ce sont non seulement les infrastructures de transport qui changent le paysage urbain d'Addis Abeba, mais aussi la construction de bâtiments à plusieurs étages dans le centre-ville, le développement immobilier dans les zones intermédiaires et extérieures de la ville ainsi que les projets de logements sociaux aux marges de la ville. Les anciennes zones urbaines centrales sont démolies pour laisser place à des bâtiments à plusieurs étages. Le prix du terrain dans ces zones réhabilitées est devenu si élevé que la majorité des anciens résidents ne peut simplement pas se permettre de l'acheter. Le résultat de ce processus de gentrification est que les quartiers défavorisés du centre-ville sont transformés en zones à fort revenu et les anciens résidents sont relogés dans des quartiers éloignés de logements sociaux ou reçoivent un dédommagement et une parcelle habituellement à l'extérieur de la ville. Dans le même temps, l'expansion horizontale de la ville dans des zones jusqu'ici agricoles a lieu à une allure plus rapide. Les nouvelles implantations de zones-dortoirs aux périphéries de la ville qui se sont développées suite aux programmes de logements sociaux à grande échelle sont mal connectés aux principaux axes de transports en commun. Les résidents font face à des problèmes insurmontables de transport pour faire la navette en direction et en provenance du centre-ville et des sous-centres, ce qui en fin de compte limite leur accès à l'emploi, aux commodités et aux services et augmentent ainsi leur exclusion sociale. Le processus de reconstruction actuel et l'étalement urbain ne sont pas durables et ont des impacts indésirables pour les résidents des quartiers centraux déshérités qui ont été déplacés de quartiers accessibles et réinstallés dans les périphéries. Le modèle de croissance et de développement urbain d'Addis-Abeba, dans lequel les liens entre le transport et l'aménagement de l'espace ont été mal étudiés, est indésirable. Un tel modèle de développement urbain devrait être interrompu. Relier le développement urbain avec celui des réseaux de transports en commun et réorienter les programmes de renouvellement urbain aidera à renverser cette tendance non durable. Ces questions sont abordées principalement dans le chapitre 2

7.4. Le transport en commun à Addis Abeba

Les transports en commun qui fournissent la mobilité motorisée pour la plupart des résidents de la ville sont fournis par des milliers d'opérateurs du transport informel et par des réseaux d'autobus formels. Ces services ne sont pas suffisants pour couvrir la demande de transports en commun. Les pénuries, les moyens de transport bondés et les temps de déplacement rallongés pendant les heures de pointe, la mauvaise qualité de service et des temps d'attente plus longs pendant les heures creuses sont les manifestations du déséquilibre entre l'offre et la demande de transports en commun. La pénurie de transports en commun est devenue plus grave et s'est spatialement diffusée comme en témoignent la fréquence des longues files d'attente des usagers attendant des bus et des minibus tout comme les bus bondés particulièrement aux heures de pointe le matin et l'après-midi. Il n'est pas inhabituel d'attendre aux heures de pointe une heure ou plus dans les files d'attente pour prendre un minibus ou un bus de la ville puis d'être coincé dans les embouteillages une fois à bord d'un véhicule. De plus, les transports en commun ne sont pas coordonnés et sont concentrés sur les principaux axes. Ils affichent souvent des concurrences intermodales intenses pour les usagers comme pour la route. Les encombrements et les longs temps de déplacement font du déplacement un mal quotidien auquel beaucoup de résidents d'Addis-Abeba sont confrontés. Cette situation plaide pour une réforme fondamentale de l'organisation et l'exploitation des transports en commun à Addis-Abeba. Le nouvel LRT a apporté plus de poids à l'importance de changements dans l'organisation du secteur des transports en commun. Les terminaux et les

arrêts mal intégrés impliquent que le temps de marche de la correspondance est plus long. L'analyse montre l'importance de fournir un système de transports en commun abordable, accessible, fluide, durable, intégré et rentable. Il est également évident que le fait d'intégrer les divers modes de transports en commun est important. Mais un plan directeur des transports en commun et les dispositifs institutionnels pour planifier et gérer les transports en commun, encourager plus de coordination entre les acteurs et relier le développement du transport et l'aménagement des sols, font cruellement défaut. La question contextuelle de l'organisation des transports en commun à Addis-Abeba est abordée en détail dans le chapitre trois.

7.5. Qu'est-ce que l'intégration des transports en commun ?

Nous avons étudié à partir de la littérature la vaste thématique de l'intégration du transport en nous concentrant particulièrement sur l'intégration des transports en commun. Nous avons aussi exploré des études de cas montrant une intégration des transports en commun en prenant l'exemple de villes d'Europe, d'Asie, d'Amérique Latine et d'Afrique. Ceci a été largement traité dans le chapitre quatre. Comme résultat final, nous avons développé un cadre d'intégration des transports en commun qui a récapitulé les résultats de la revue de la littérature en fonction des questions de recherche. Dans le chapitre six, ce cadre a été appliqué à Addis-Abeba qui a entièrement répondu aux questions de recherche.

La section 4.2 discute la notion la plus large d'intégration et permet de répondre à "*Qu'est-ce que l'intégration des transports en commun ?*" La revue de littérature montre clairement qu'il n'y a aucun consensus sur ce qu'est une politique d'intégration du transport et comment elle peut être réalisée au mieux, alors qu'il y a un consensus sur le fait que proposer un transport intégré est utile et contribue au développement urbain durable. Il est également clair que l'intégration du transport ne devrait pas être simplement considérée comme une fin, mais plutôt un moyen d'atteindre des niveaux de services de transport plus élevés (May et al., 2006, NEA et al., 2003). Des stratégies d'intégration du transport devraient être formulées pour accroître la synergie tout en surmontant les obstacles à l'intégration (May et al., 2006). Les perspectives systémiques du transport permettent de définir l'intégration du transport comme *acte* ou *processus* qui rassemble tous les éléments du système de transport et des sous-systèmes en un tout cohérent (Meyer & Miller, 2001, Anderton, 2010, Szyliowicz, 2010). Dans cette perspective, l'intégration est un signe d'intermodalité et de multimodalité (Banister & Givoni, 2010). Différents niveaux (Fox, 2000), types (May et al, 2006 & Stead, 2010), échelles (échelons) (Potter & Skinner, 2000, Preston, 2010) et domaines (Hull, 2005) d'intégration sont aussi différenciés. La difficulté à atteindre les résultats d'intégration escomptés croît des niveaux inférieurs aux niveaux plus élevés. L'intégration des transports en commun est perçue comme un processus organisationnel et une planification globale des services par lesquels tous les éléments du système des transports en commun sont rationnellement organisés pour créer un déplacement en transports en commun efficace, fluide et durable (Rivasalta, 2008b et NEA et al, 2003). Comme le processus d'intégration des transports en commun implique divers acteurs au sein de l'administration locale, à différents niveaux du gouvernement et entre des gouvernements voisins, la délimitation claire des rôles et des responsabilités et la construction d'une confiance mutuelle sont importantes pour améliorer l'intégration des transports en commun. L'intégration des transports en commun dans des villes africaines va probablement être difficile étant donné l'inadéquation des expériences de planification, les carences institutionnelles et l'exploitation fortement fragmentée des transports en commun.

La section 4.3 s'attache à repérer les formes, les fonctions et les caractéristiques d'intégration, en envisageant tout d'abord l'intégration physique puis l'intégration tarifaire et enfin d'autres formes possibles d'intégration. L'intégration physique est la forme d'intégration des transports en commun la plus largement mise en œuvre et la moins coûteuse. Elle est nécessaire parce que le déplacement urbain implique un certain nombre de trajets et les transferts sont en conséquence inévitables. L'intégration physique est également nécessaire pour changer de modes de transports en commun à d'autres fins que le transfert (Rivasplata, 2008a, Guo & Wilson, 2011). Le but de l'intégration physique est donc de relier les divers trajets et modes de transports en commun pour que les étapes non fluides soient réduites et que les correspondances soient améliorées et plus pratiques. Elle aboutit en fin de compte à la réduction des inconvénients et des coûts liés aux transferts. Les pôles d'échange disposant de connexions intermodales que l'on trouve aux nœuds principaux des réseaux de transport public améliorent l'enchaînement des déplacements multimodaux et facilitent les transferts intermodaux et intramodaux des usagers (NEA et al, 2003, Henry, 1990 dans Rivasplata, 2008b, Transport for London: Integration department, Priemus, Nijkamp & Banister, 2001). La conception des pôles d'échanges devrait viser à rendre le transfert, son environnement et l'attente, de qualité et animés (Guo & Wilson, 2011). Des pôles d'échange majeurs ont été envisagés comme le cœur de programmes d'urbanisme visant à un usage mixte du sol et de forte densité (PROCEED, 2009). Le succès de l'intégration physique dans la réalisation de transports en commun sans rupture et attractifs dépend des réformes du réseau de transports en commun, de la disponibilité des finances et de la mise en place d'un dispositif institutionnel de gestion des pôles d'échange et des installations connexes.

L'intégration tarifaire vise à promouvoir un déplacement en transports en commun sans rupture en enlevant les obstacles de tarifs et de billets multiples que l'on rencontre dans un système de transports en commun multimodal non-intégré. L'intégration tarifaire distingue les tarifs intégrés et la billettique intégrée (Holvad, 2010). Un système unifiée de billettique permet l'utilisation d'un billet unique pour toutes les étapes du déplacement indépendamment des modes et des opérateurs (NEA et al., 2003, SPUTNIC, 2009b, Fouracre, Allport & Thomson, 1990). Arriver à une intégration tarifaire pose trois questions principales, à savoir : déterminer les tarifs de correspondance, développer un système de perception unifiée et une billettique intégrée, concevoir une grille de tarif intégrée (Ong, 2008). Y répondre suppose de disposer d'une méthodologie permettant pour les parcours à plusieurs trajets de fixer un prix, de percevoir les sommes dues et de disposer d'une clé de répartition entre les différents exploitants. (Rink dans Barr, 2008, Scottish government, 2008). L'intégration tarifaire a différents niveaux de mise en œuvre (SPUTNIC, 2009b). Une clé de l'intégration tarifaire est la conception de mécanismes de fixation des prix pour fermer l'écart financier qui provient de la déconnexion entre le système de billettique (tarifs et billettique intégrés) et la distribution des revenus (et implicitement des coûts) entre les exploitants de transports en commun qui ont adhéré au plan d'intégration tarifaire. Diverses méthodes pour répartir les recettes tarifaires sont mentionnées : la méthode du remboursement, la méthode comptable et la méthode de l'utilisateur externe (PROCEED, 2009). D'autres méthodes de répartition dont celles basées sur des mesures de performance et de qualité de service sont également utilisées (SPUTNIC, 2009b, Estache & Gomez-Lobo, 2005). Les modalités institutionnelles pour gérer l'intégration des tarifs et des billets font aussi l'objet de discussions dans le chapitre 4.3.2. Trois formes de structure de gestion sont présentées, à savoir, une autorité organisatrice, un arrangement coopératif statutaire entre les opérateurs et une filiale commune représentant les opérateurs principaux (Scottish government, 2008). L'intégration tarifaire devrait être complétée par d'autres formes d'intégration. Comme l'intégration tarifaire est un processus complexe, elle devrait passer par des phases successives, n'atteignant qu'au bout du compte l'intégration

tarifaire complète pour la ville entière et la région métropolitaine. Elle nécessite des décisions sur les stratégies de perception tarifaire et de redistribution des recettes aussi bien que sur les moyens de paiement et la technologie de validation. La présence de milliers d'opérateurs privés dans beaucoup de villes dans les pays en voie de développement ne peut que complexifier le processus d'intégration tarifaire.

D'autres formes possibles d'intégration comprennent l'intégration modale, de l'information, du service, institutionnelle et, enfin, opérationnelle. L'importance de l'intégration institutionnelle et la présence d'institutions qui planifient, coordonnent et gèrent le transport urbain et les transports en commun est fortement soulignée, divers modèles étant proposés (Costa, 1996, Groenewald, 2003, Meakin, 2002, Parti et al., 2009). Ceci fournit une réponse à la question de configuration institutionnelle et du cadre légal de l'intégration. L'intégration du service se concentre sur la coordination des parcours, des horaires et des billets dans le cas de systèmes hiérarchisés, sur la base ou non d'un réseau principal et d'un réseau secondaire (Miller, 2004, Wright & Hook, 2007). L'intégration modale améliore les connexions intermodales en fournissant des parcs-relais pour voitures ou bicyclettes et des installations piétonnières pratiques aux pôles d'échange. L'intégration de l'information fournit des informations sur les parcours, les tarifs et les horaires/calendriers. L'intégration opérationnelle a de larges implications et est principalement concentrée sur le développement de lignes secondaires aux horaires coordonnés dans le but d'améliorer l'harmonisation des chaînes de trajets multimodaux (Shrivastava & O'Mahony, 2009, Priemus & Konings & Parti et Katoch, 2009).

La section 4.4 aborde l'intégration des transports en commun avec l'urbanisme et le développement urbain. Le rôle positif des transports en commun dans leur contribution au développement urbain durable est largement reconnu. Les programmes d'amélioration d'infrastructures routières qui cherchent à améliorer la situation des transports en commun et des modes non-motorisés favorisent le développement urbain durable (UN-HABITAT, 2010). La conception de Banister de « *ville durable* » (2008) est basée sur un modèle de développement urbain qui promeut l'utilisation mixte des sols et se concentre le long des axes de transports en commun et autour des pôles d'échange de transports en commun fortement accessibles. Un tel modèle de développement urbain devrait être soutenu par des mesures complémentaires de « mobilité durable » qui réduisent le besoin de voyager, diminuent les durées de trajet, augmentent les parts modales des modes durables et accroissent l'efficacité des systèmes de transport. Les stratégies de TOD promeuvent aussi l'intégration des transports en commun et l'aménagement des sols en encourageant le développement urbain mixte de forte densité autour des arrêts des transports en commun. La stratégie de « *ville réseau* » de Curtis (2008) est basée sur sa notion « d'accessibilité durable ». La promotion du développement urbain dans les lieux les plus accessibles et l'importance de lier usage des sols et transports en commun sont fortement préconisées. Ces deux conceptions de la ville encouragent le modèle polycentrique de développement urbain dans lequel les réseaux de transports en commun assurent les liens entre les centralités principales et secondaires. Les villes africaines qui sont caractérisées par leur forte dépendance aux transports en commun pour la mobilité motorisée devraient fortement lier leur développement urbain avec les réseaux de transports en commun.

La section 4.5 examine des études de cas d'intégration des transports en commun. Nous avons indiqué que le processus d'intégration des transports en commun a commencé en Europe et s'est répandu plus tard à d'autres villes non-européennes, bien que des villes africaines aient peu d'exemples de réussite de politiques d'intégration. Nous avons pris des exemples de villes en Europe (Paris et Hambourg), en Amérique Latine (Curitiba et Sao Paulo), en Asie (Singapour) et en Afrique (Le Cap et Lagos). Nous avons essayé de tirer des leçons sur la façon dont l'intégration a été lancée, qui était à son initiative, quelles institutions et quels

processus ont été impliqués, quels modes de transports en commun ont été concernés, quel acteur a joué le rôle principal, quel(s) mode(s) transports en commun a/ont formé le squelette de l'intégration, comment ont été menées les politiques de tarification, de perception et de distribution des recettes, quelle a été la configuration institutionnelle, quel a été le rôle du gouvernement et comment a été réalisée l'intégration plus large entre les transports en commun et l'urbanisme. Généralement, nous avons observé que le succès de l'intégration des transports en commun dépend en grande partie de la forte implication du gouvernement et que le processus d'intégration devrait s'étendre sur plusieurs années. Pour beaucoup de villes en Afrique, en Amérique Latine et en Asie, le plus grand défi dans l'intégration publique des transports est le transport en commun informel ou artisanal. Ce n'est pas seulement le caractère informel du secteur, mais aussi le nombre considérable d'opérateurs, le caractère fragmenté et individualisé de l'exploitation qui constitue un défi majeur pour l'intégration. Il y a eu quelques tentatives à petite échelle (incitations financières pour des achats de véhicule de grande capacité et formation d'associations de transporteurs informels) pour intégrer le secteur, mais il n'y a aucun exemple de formalisation à grande échelle et réussie du secteur et de son intégration avec les transports en commun formels. Le chapitre 4.6 donne quelques exemples d'intégration du transport informel en Afrique et en Amérique Latine et les défis auxquels le processus fait face.

Comme il s'agit d'un long processus complexe, la mise en œuvre de l'intégration des transports en commun fera face à un certain nombre d'obstacles. L'anticipation de ces défis tôt dans le processus d'intégration et la formulation de mesures appropriées facilitera la mise en œuvre de l'intégration des transports en commun. Ceci a fait l'objet de discussions dans le chapitre 4.7 et nous avons essayé d'énumérer certains des défis de l'intégration et des stratégies pouvant la faciliter. Nous avons retiré diverses leçons de ces analyses que nous avons ultérieurement appliquées à la conception d'un schéma d'intégration des transports en commun à Addis-Abeba.

7.6. Résultats empiriques

L'enquête sur les déplacements des ménages a été conçue et menée pour produire des données de première main et détaillées sur les ménages et leurs caractéristiques de déplacements. Nous avons en particulier essayé de tirer des constatations empiriques pour les questions suivantes.

- Quelles sont les caractéristiques démographiques et socio-économiques qui affectent les comportements de déplacement ?
- A combien s'élèvent les revenus des ménages et quelles sont les sources de leurs revenus ?
- Combien les ménages dépensent-ils en transport et quelles sont les autres dépenses de base des ménages ?
- Comment les ménages ont-ils accès aux services de base et à quels problèmes font-ils face pour avoir accès et utiliser ces services ?
- Combien de temps les ménages et les individus passent-ils dans les déplacements vers les destinations principales ? Quels modes ou quelles combinaisons de modes utilisent-ils ?
- Combien d'argent et de temps dépensent-ils dans les différents trajets leur permettant d'avoir accès aux emplois et aux services ? Comment évaluent-ils ces trajets ?
- Quels modes ou quelles combinaisons de modes de transports en commun sont utilisés ? Quels sont les déterminants des choix modaux ?
- Quelles sont les préférences déclarées des gens en matière de transports en commun ?

L'enquête n'a été analysée qu'au niveau agrégé de la ville. Nous avons découvert que les niveaux de revenus sont faibles et cependant, pour la plupart des ménages, ils sont soit restés stables, soit ont même baissé au fil du temps. Nous avons aussi découvert que les dépenses sont plus élevées que les revenus et que les dépenses de transport sont significativement élevées tant en regard des dépenses totales que du revenu total. Il est également apparu que la plupart des services de base ne sont pas localisés à proximité des lieux de résidence et que l'accès aux emplois et aux services implique l'utilisation de divers modes de transports en commun dont la marche. L'enquête nous a permis de tirer quelques enseignements généraux. Elle a révélé l'importance de lier étroitement la planification du transport et celle de l'usage des sols, en mettant plus l'accent sur le transport non-motorisé et en rendant les correspondances plus pratiques. Nous avons aussi observé à partir des résultats de l'enquête que l'utilisation de divers modes de transport est une indication du besoin d'intégration. Nous avons également relevé l'importance de disposer de bases de données sur les déplacements des ménages, de moderniser et d'améliorer la qualité de service des transports en commun formels et de donner plus de soutien au secteur des transports en commun informel. Il était évident que les mesures d'intégration tarifaire devraient être destinées à profiter aux communautés à faible revenu et aux groupes socialement désavantagés en réduisant la part des dépenses de transport tant dans les dépenses totales que les revenus totaux.

7.7. Cadre d'intégration du transport public à Addis Abeba

Le chapitre 6 est la production finale de la thèse dans lequel nous avons répondu aux questions principales de notre recherche. Pour ce faire, nous y avons développé un cadre d'intégration des transports en commun. Les sous-questions de recherche sur l'intégration et les questions contextuelles nous ont fourni les bases théoriques et pratiques pour le développement de ce cadre. Il a explicitement montré les diverses étapes et processus qui sont nécessaires pour la mise en œuvre de l'intégration des transports en commun à Addis-Abeba. Nous avons identifié les obstacles à l'intégration et les mesures possibles pour les surmonter. Nous avons développé une première ébauche de critères permettant de déterminer les formes d'intégration à mettre prioritairement en œuvre et indiqué les délais de mise en œuvre. Nous avons détaillé toutes les actions nécessaires pour la mise en œuvre de chaque forme d'intégration. Les diverses parties prenantes ont été identifiées et nous avons alors proposé une structure institutionnelle permettant de mener à bien le processus d'intégration des transports en commun à Addis-Abeba, structure dénommée « *service des transports en commun multimodal et intégré d'Addis-Abeba* ». Nous avons indiqué les fonctions et la structure de cette nouvelle institution.

Le processus d'intégration des transports en commun à Addis-Abeba va probablement être long et exige l'engagement actif de toutes les parties prenantes. Le Bureau des Transports et des Routes d'Addis-Abeba et l'organisme ad hoc d'intégration devraient être activement engagés dans la mise en œuvre du processus et devraient en évaluer et contrôler périodiquement les progrès.

7.8. Recommandations pour de futures recherches

La thèse a soulevé de nouvelles questions qui nécessitent des recherches plus approfondies et des recommandations quant aux actions à entreprendre.

Premièrement, nous avons constaté qu'il y a une grande difficulté à déterminer les coûts et les avantages de l'intégration. Mesurer les avantages et les coûts des formes d'intégration qui ont

été déjà mises en œuvre ou qui sont proposées pour une future mise en œuvre a rarement été fait. De plus, la difficulté de mesurer a priori ou a posteriori les coûts et les avantages des programmes d'intégration augmente avec la complexité du processus d'intégration. Cela appelle à plus de recherches pour définir et quantifier les coûts et avantages des projets d'intégration.

Deuxièmement, nous avons défini l'intégration des transports en commun comme une planification globale des services qui aboutit à une organisation rationnelle des modes et services de transports en commun. Du point de vue de la perspective d'intégration des transports en commun, ceci implique des processus de décision et des formes d'intégration qui aboutissent en fin de compte à des transports en commun sans rupture et durables. Mais la littérature n'expose pas explicitement comment cela doit être réalisé, quelles sont les conditions préalables et quelles sont les mesures supplémentaires pour faciliter le processus. Nous considérons donc qu'il est nécessaire d'effectuer plus de recherches pour clarifier ces incertitudes.

Troisièmement, il est vrai que la complexité de l'intégration augmente lorsque que l'échelle et le niveau d'intégration passent des niveaux opérationnels inférieurs à des niveaux stratégiques plus élevés et plus larges. Plus le niveau d'intégration est élevé, plus la difficulté à obtenir les résultats escomptés est grande. Pour autant, la littérature n'indique pas clairement ce qui devrait être un niveau « idéal » ou « optimal » d'intégration des transports en commun, ni quels instruments ou combinaison d'instruments sont disponibles pour l'atteindre. De même, il n'y a aucune réponse sur ce qu'est le niveau « minimal » d'intégration des transports en commun. Des recherches supplémentaires permettraient de fournir des réponses à ces questions.

Quatrièmement, bien qu'il n'y ait aucun questionnement sur l'importance de l'intégration des transports en commun, nous pensons qu'il est nécessaire d'effectuer plus de recherche sur l'intégration dans le contexte africain. Comme les pratiques d'intégration ont été développées et appliquées dans les villes du Nord, leur reproduction à l'identique dans des villes africaines n'est pas adéquat. Les villes africaines souffrent d'un manque d'expériences en matière de planification et disposent d'un transport en commun fortement dérégulé et fragmenté. L'intégration du transport en commun artisanal ou informel présente une grande difficulté. Il y a peu de travaux sur le sujet de l'intégration du transport artisanal et ceci appelle évidemment à plus de recherche sur comment intégrer des milliers d'opérateurs privés dans un système mieux coordonné et plus rationnel de transports en commun.

Enfin, le manque de séries chronologiques et de données complètes sur les caractéristiques de l'offre et de la demande de transport sont les obstacles majeurs pour des travaux de recherche sur les transports urbains dans beaucoup de villes des pays en voie de développement. Nous avons essayé de surmonter ces problèmes en produisant nos propres données sur les comportements en matière de déplacements, d'accès aux services de base, les niveaux de revenus et de dépenses et les caractéristiques générales des ménages en menant un projet pilote à petite échelle dans quelques Wereda d'Addis-Abeba. Mais nous pensons que ce n'est pas suffisant. Nous recommandons fortement à Addis-Abeba, et à d'autres villes africaines, d'acter officiellement la nécessité de mener régulièrement de larges enquêtes détaillées sur les déplacements des ménages, d'en documenter correctement les résultats et de fournir un accès facile tant aux micro-données qu'aux résultats aux chercheurs qui les nécessiteraient.

RESUME

Addis-Abeba, qui s'étend sur 540 km² et compte 3,1 millions d'habitants, connaît aujourd'hui des transformations socio-économiques et spatiales rapides. Elle n'est pas seulement le cœur politique, commercial, économique et financier du pays mais aussi une ville internationale accueillant le siège de l'Union africaine et d'autres institutions internationales. Comme d'autres villes africaines, elle connaît un rythme élevé d'urbanisation. Ce processus a impliqué la croissance du nombre d'habitants mais aussi une extension spatiale accrue. En conséquence, la demande de déplacements et la longueur des parcours ont augmenté. Le transport joue ainsi un rôle clé, pesant sur le développement socio-économique et la configuration de l'espace urbain. Tout aussi important, en tant que demande dérivée, il joue sur la capacité des citoyens à accomplir leurs diverses activités. La motorisation des ménages restant faible en dépit d'une lente progression, le transport public constitue le principal moyen d'accès à une mobilité motorisée pour la majorité de la population. L'offre est constituée d'une multitude d'opérateurs formels et informels, travaillant selon un schéma artisanal. On estime à plus de 18 000 les véhicules de transport public, la plupart de faible capacité, qui parcourent chaque jour les rues d'Addis-Abeba. En dépit de son importance, le transport public souffre de capacités d'investissement insuffisantes ainsi que, jusqu'à récemment, du manque d'une politique publique claire et affirmée. Il pâtit également de l'absence d'une approche intégrée, pour sa planification, sa gestion et sa mise en œuvre. De nombreuses villes du Nord, parfois depuis près d'un demi-siècle, ont choisi de construire un service intégré de transport public. L'intégration y est vue comme un outil viable pour offrir un transport urbain de haute qualité et « sans couture », permettant un développement urbain durable. Par contre, les villes africaines, caractérisées par une urbanisation rapide, des taux d'équipement automobile faibles, un système de transport public déficient et des contraintes financières majeures manquent de telles expériences d'intégration du transport public. Notre question est donc : « Comment les villes africaines peuvent-elles reproduire et mettre en œuvre des politiques d'intégration du transport public ? », originellement développées dans les villes du Nord. La thèse essaie d'apporter des éléments de réponse à cette question. Elle s'appuie sur une analyse des différentes formes d'intégration du transport public. Puis elle propose un schéma de conception et de mise en œuvre d'un système de transport public intégré, appréhendé comme un outil de mobilité urbaine durable pour Addis-Abeba.

Mots-clés : Institutions, intégration, intermodalité, multimodalité, réseau intermodal, interconnexion, transport public, mobilité durable, mobilité fluide, synergies

ABSTRACT

Addis Ababa, with an area of 540 km² and with population of 3.1 million people is experiencing a rapid pace of socio-economic and physical transformation. The city is not only the political, commercial, economic and financial hub of the country but also an international city serving as the seat of the African Union and various international organizations. Alike many African Cities, Addis Ababa has been undergoing a high rate of urbanization. This process of rapid urbanization has resulted in the increase in the size of the population and the physical expansion of the city. As a consequence, travel demand and length of the trip are increasing. Transportation plays a key role in determining the socioeconomic development and shaping the spatial development framework of the city. Equally important, transportation as derived demand is also a fundamental means for residents to fulfill their various activities. In Addis Ababa motorization, although on the increase, is low and public transportation is the most important mode of motorized mobility for the large majority of the city's population. There are various formal and informal operators of the public transport mainly operating on individual basis. It is estimated that there are over 18,000 public transport vehicles that are daily running in Addis Ababa, most of them low capacity vehicles. Despite its importance, the public transport sector not only suffers from shortage, insufficient capital investment, and until recently lack of clear governmental policy and leadership but also from the absence of integrated approach to its operation, planning and management. Many cities in the North have embarked on integrating the provision of public transportation for nearly half a century now. In these cities, integration in public transportation has been recommended as a viable instrument for providing high quality and seamless urban transport and enhancing sustainable urban development. African cities which are characterized by their high urbanization rate, low level of private car ownership, deficient public transportation system and significant financial constraints lack public transportation integration experiences. The question is then 'how do African cities replicate and implement public transport integration practices?' that have been originally developed for the Cities of the North. The thesis attempts to answer this question and analyses the different forms of public transport integration. It then proposes a framework for implementing integrated public transport as a sustainable means of urban mobility in Addis Ababa.

Keywords: Institutions, integration, intermodality, multimodality, intermodal network, interchange, public transport, sustainable mobility, seamless mobility, synergy

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List of Acronyms

AACC	Addis Ababa City Council
AACG	Addis Ababa City Government
AACPPPO	Addis Ababa City Planning Project Office
AACRA	Addis Ababa City Road Authority
AAHDP	Addis Ababa Housing Development Project
AAHDPO	Addis Ababa Housing Development Project Office
AAMPPO	Addis Ababa Master Plan Project Office
AARTB	Addis Ababa Road and Transport Bureau
ACBSE	Anbessa City Bus Service Enterprise
AASZDPPO	Addis Ababa and Special Zone Development Planning Project Office
BBC	British Broadcasting Corporation
BOFED	Bureau of Finance and Economic Development of the Addis Ababa City Government
BRT	Bus Rapid Transit
CBD	Central Business District
CSA	Central Statistical Agency of the Federal Democratic Republic of Ethiopia
EiABC	Ethiopian Institute of Architecture, Building Construction and City Development
ERA	Ethiopian Road Authority
ERC	Ethiopian Railway Corporation
FDRE	Federal Democratic Republic of Ethiopia
FUPI	Federal Urban Planning Institute
GDP	Gross Domestic Product
GHG	Greenhouse gas emission
GTP	National Growth and Transformation Plan
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit or German Technical Cooperation
HVV:	Hamburgerverkehrsverbund

ITS	Intelligent Transportation System
KPH	Kilometer per Hour
LAMATA	Lagos Metropolitan Area Transport Authority
LET	Laboratory of Transport Economic
LRT	Light Rail Transit
LUTP	Lagos urban transport project
MetEC:	Metals & Engineering Corporation
NMT	Non-Motorized Transport
NUPI	National Urban Planning Institute (NUPI)
MDG	Millennium Development Goals
MetEC	Metals & Engineering Corporation
MOFED	Ministry of Finance and Economic Development
MWUD	Ministry of Urban Works and Development
NBE	National Bank of Ethiopia
NURTW	National Union of Road Transport Workers
ORAAMP	Office for the Revision of the Addis Ababa Master Plan
PPHD	Persons per Hour per Direction
PPP	Public Private Partnership
STIF	Syndicat des Transports d'Ile-de-France
SWOT	Strengths, Weaknesses, Opportunities and Threats
TOD	Transit oriented development
UATP	Union Africaine des Transports Publics (African Association of Public Transport)
UITP	Union Internationale des Transports Publics (International Union of Public Transportation)
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNPD	United Nations Population Division
URBS	Urbanizacao de Curitiba SA
VAT	Value added tax

Chapter 1 Introduction

1.1 Background

Sub-Saharan Africa is the least urbanized part of the world and will go through a rapid process of urbanization in the coming decades. The urbanization level in Ethiopia is low. Ethiopia, as a part of the Sub-Saharan Africa, will experience accelerated pace of urban growth and urbanization. In Ethiopia, urbanization was 11.4% in 1984, increased to 13.7% in 1994 and 15.7% in 2004 (CSA, 2008) and is projected to reach 24% in 2020 (UNPD, 2012). Currently, there are 927 urban settlements in Ethiopia and urbanization is estimated to be about 17% (CSA, 2008).

Addis Ababa, with an area of 540 km² and with a population of 3.1 million people (Demographia World Urban Areas, 2012) is undergoing a rapid pace of socio - economic and physical transformation. The city is not only the political, commercial, economic and financial center of the country but also an international city serving as the seat of the African Union and many international organizations. Addis Ababa has been undergoing a high rate of urbanization. The city's population more than doubled between the period 1964 and 1984 and again between 1984 and 2012. The city's population is currently growing at a rate of about 2.1% per year and is estimated by the Central Statistical Authority (2008) to reach 4.6 million people by the year 2020. Although regional towns are becoming increasingly important due to the decentralization and regional development policy of the current government, Addis Ababa as a primate city will continue to attract more migrants and will experience a huge growth in its population in the future.

Consequently, the demand for transportation will increase in the coming years due to increasing urbanization, income and physical expansion of the city. The urban transport study (ERA, 2005) shows that both the trip length and mobility rates are on the increase. Mobility rate in 2005 was 1.07 trips/persons/day generating 3.35 million trips per day and is estimated to increase to 1.4 trips/person/day and thereby producing 7.7 million person trips per day in 2020. The share of motorized trip rate from the total mobility is projected to rise from 0.43 in 2005 to 0.7 trips/person/day in 2020. Although slightly declining, walking is still the most important mode

transport in the city. It was 70% in 1984, slightly decreased to 60% in 2005. Despite an increasing trend, motorization level in the city is low (1 car for every 42 people) and the share of private cars as individual mode of transport is about 8% and has remained constant over number of years (Woldetensae, et al., 2011).

Day to day experiences and various studies indicate that the existing public transport system in Addis Ababa is short of meeting the existing travel demand (ORAAMP, 2001, ERA, 2005, & FDRE, 2008). Public transportation continues to be an important means of motorized mobility for the city's population. As there is no rail based urban public transport, the city exclusively depends on road based system of public transportation. Public transport is provided by the governmental Anbessa¹ city bus enterprise and thousands of private operators of minibus taxi, midibuses, saloon taxis and three-wheelers or Bajajas. Addis Ababa Transport Branch Office (2012) estimated that about 18,000 public transport vehicles are daily operational in the city, with 12 seater-minibus taxis and saloon taxis accounting for about 90% of the total fleet. With a low density of the road infrastructure (13% of the total area), the great number of low capacity public transport vehicles puts further pressure on the congestion prone major corridors of the city. Buses and taxis together accounted for 22% and 32% of the modal share in 1984 and 2005 respectively. In this period, it is to be noted that the share of taxis has increased significantly from 10% in 1984 to 21% in 2005, while the share of buses has slightly decreased from 12% to 11 % in the same period (Woldetensae, 1996, Woldetensae et al., 2011, & ERA, 2005). An evaluation study (Woldetensae et al., 2011) indicates that the overall performance of formal Anbessa city bus enterprise has been declining and indeed the city bus patronage has declined by 50% between 2002 and 2010. Although the minibus taxis provide a significant public transport service as indicated by their high modal share, their number is not sufficient enough to cover the huge transport demand. On the other hand, increasing their number to meet the travel demand is not an ideal solution as more minibuses will add to the endemic congestion on the city's main road corridors.

At present an introduction of new mass transit systems and improving performances of the existing public transport system of Addis Ababa to meet the mobility demands of the city residents will be major development goals. The government, cognizant of these mobility

¹ Anbessa is the Formal governmental enterprise providing public bus service in Addis Ababa and the neighbouring towns

challenges and urban transport shortages, has been implementing a number of measures and reforms for improving urban public transport. The federal government in 2008 imported a number of Higer midibuses which were to be owned and operated by individual operators. It re-established the city transport and road bureau as the city government institution by merging the former city road authority, the federal transport branch of Addis Ababa and the Anbessa city bus enterprise. The Anbessa city bus enterprise came as one budgetary institution of the city government, thereby ending years of ambiguous legal position of the enterprise between the federal and city governments. The city government provided the necessary finance to overhaul the fleet of Anbessa. Accordingly, in 2011 Anbessa ordered the purchase of locally assembled 350 standard buses and 150 articulated buses with total capital outlay of 53.3 million US Dollar. The introduction of zoning to streamline the operation of the paratransit, the launching of the project to implement a Bus Rapid Transit (BRT) system, the construction of the Light Rail Transit (LRT) system and finding feasible funding mechanisms for the various projects are also some of the initiatives for improving the public transport system (Addis Ababa Transport Bureau, 2011).

Despite those measures to improve the performance of the public transport system, introduce new modes as well as solve the critical financial and organizational problems of the sector, the public transport system is generally handicapped by the absence of unified and integrated approach to its operation, planning and management. Accordingly the public transportation system in Addis Ababa is characterized by the absence of high capacity mass transit system and presence of different modes of public transportation with little or no coordination resulting in inconvenient trip chains. There are of thousands of public transport operators both formal and informal as well as public and private in which there is wasteful intermodal competitions along major corridors. There is also a total lack of coordinated route planning and operation and absence of route time schedules and travel information system. The system suffers from absence of unified tariff and integrated ticketing system. There is a poor physical integration resulting in inconvenient inter modal transfers and poor connectivity. Transport planning is hardly coordinated with land use planning. The public transport networks are not widespread and their coverage is limited to the main transport corridors. Finally, the system has been subjected from poor planning capacity, lack of institutional coordination mechanisms, financing problem and absence of a metropolitan approach to regional transportation planning.

Planning responses to the public transport problems have also been impeded by institutional weaknesses and inadequate technical capacity in urban transport planning. In the aftermath of the political crisis of 2005 and politically motivated move, the federal government abolished the city's transport authority and transferred the then city's transport authority to the Federal ministry of transport. Consequently, between 2005 and 2011, the city virtually has no transport authority to plan and manage the urban transport sector. Such transfer had further worsened the already constrained situation. The Addis Ababa transport branch office under the Federal ministry of transport and communication, as it was then known, was more focused on the day-to-day operational aspects of the city's transport and the planning function was virtually missing in its activities. Under this circumstances, the branch office was unable to implement the 2001 city transport plan and develop a long term strategy to overcome the ever mounting city's transport challenges (Woldetensae et al., 2011). Similarly, it was during this period also that the Anbessa city bus enterprise suffered a number of problems, including declining bus patronage, declining subsidy, aging fleet and hardly any fleet replacement, though the 2001 city development plan has envisaged improvement in the performance of the city bus service, among other things, through the purchase of additional buses. The caretaker city administration of Addis Ababa which was in power between 2006 and 2008 was unable to integrate transport planning into over city over all development planning framework as it did not have a competent transport authority under its mandate. The caretaker administration, nevertheless, was voicing its concern to the federal government to re-establish transport authority directly accountable to the city government. However, that took some time and it was in 2011 that the transport bureau was reorganized as an organ of the city government responsible for transport, road infrastructure and public transport operation. This followed the approval of the urban transport policy of Addis Ababa by the federal government. This policy foresees, among other things, the introduction of a seamless transport in the city and adoption of an integrated approach to the city's public transport provision (Woldetensae and Fanta, 2010).

The continuous process of institutional restructuring and changing accountability, institutional roles and responsibilities, inadequate planning response to city's urban transport problems, loose connections between transport and land use planning, lack of proper expertise and knowledge to technically handle complex urban transport issues, high staff turnover and shortage of transport professionals, financial shortages and lack of innovative approaches to urban transport financing are major challenges to the Addis Ababa's urban transport system. Moreover, the lack of metropolitan approach to regional transport planning due to the

overlapping and ambiguous role of the city as federal capital, state capital and city governments with attendant mistrust and conflicting political interests have contributed to transport problems at the city-region level. In view of this, there is pressing demand to address the city's transport problems through undertaking comprehensive transport reforms. Creating the necessary transport institutions with the necessary professional capacities, building of trust and cooperation between authorities, introduction of an integrated new mass transit system, reorganization of the public transport networks to align with the new system, improving the performances of the public transport modes and integration of public transportation will fundamentally alter the course in the positive direction.

One of the most profound reform in the organization and provision of public transportation is the integration of public transport in the cities and their regions. Generally designed to increase the quality, attractiveness and modal share of public transportation, the integration of public transportation in cities and the metropolitan areas has been in practice in cities of the north for over five decades (Dimitriou & Gakenheimer, 2011). The earliest cities that started integrating their public transportation systems were the city of Toronto whose transport system was established in 1954, the Syndicat de transport de Paris in 1959, the Hamburger Verkehrsverbund in 1967, and London transport managed by greater London council and has been operational for over 30 years now (Prointec Inocsa Stereocarto, 2000). The Syndicat des Transports d'Ile-de-France (STIF) provides an integrated public transport service for Ile-de-France (Paris and the surrounding region) and the integration process was initiated by the need to provide integrated ticket for passengers where there were too many private and public operators (NEA, OGM & TSU, 2003). The Hamburgerverkehrsverbund (HVV) was established in 1967 in Hamburg. It aimed at reforming and improving the public transport service of Hamburg and the metropolitan area which was then uncoordinated, diverse and provided by mix of public and private sectors. These had negative consequences that led to 16% decline in public transport ridership between 1956 and 1965. This Hamburg model of integration of public transportation has later spread to other German cities and German speaking countries of Austria and Switzerland (Pucher and Kurth, 1995). The integrated public transportation system of the Verkehrsverbund had been successful in improving the quality of public transport and increasing public transport ridership in face of increasing car ownership and motorization since its first inception in Hamburg. Since then many cities in many developed countries have adopted a similar integrated system of public transportation. This trend is slowly diffusing to major cities in the Developing Countries, although Africa to date has hardly any example of

integrated public transport system worth mentioning (Hidalgo & Carrigan, 2010). The introduction of integrated rapid transit (IRT) of Cape Town that was launched in 2008 was mainly motivated by the need to redress the unsustainability of the fragmented and non-integrated public transportation services in the face of the 2010 World Football Cup hosted by South Africa (City of Cape Town, 2008).

As travel is multimodal, integration of public transportation is expected to bring about synergy and provide a seamless transport in the cities and their urban regions. However the questions are “what motivates major cities to introduce an integrated public transport service and what are the impacts of a disintegrated public transportation system”. The answers to these questions are of fundamental importance in understanding the process of public transport integration. Non-integrated public transport system, as an European Union report (SPUTNIC, 2009b) notes, leads to customer dissatisfaction and decline of ridership resulting from discomfort, non-unified tickets, complicated tariff system, lack of unified and harmonious time tables and travel times among various operators and the existence of complicated services. An examination of the literature on integration gives the explanations as to why public transportation integration is undertaken. Sabir, Ommeren, Koetse, & Rietveld (2010) indicate out that as public transport journey involves a number of trip activities (access, waiting, transfer, in-vehicle and egress), integrating the trip chains is necessary. Integrated public transport trip chains is likely to increase public transport ridership and lead to modal shift from cars to public transport. Similarly, Givoni & Banister (2010a) argue that as transport in cities is multimodal, the transport system depends on different elements (modes, users, operators, and infrastructure) and involve number of transfers, these must be brought together so as to run the system efficiently at minimum costs. The purpose of integration is then to reduce the inconveniences of transfers. Longer transfer times and inconvenient transfers between modes are indicator of the need for integration (Vasconcellos, 2001). As public transport trips are multimodal, Priemus, Nijkamp and Banister (2001) highlight the importance of seamless harmonization of the trip chains between various networks for smooth functioning of public transport system. There are two types of harmonization. Harmonization between feeder and interconnecting networks termed as vertical interconnectivity and mutual connection of networks at the same scale level called as horizontal interconnectivity. Similarly, Hine & Scott (2000) in their qualitative research (focus group and in-depth interview) on the perception of public transport and car users on negative aspects of interchange found out the importance of seamless journey as desired feature of public transportation system. After differentiating between integration

from broader perspective of transport integration with other policy sectors and integration from narrower perspective of within transport sector, Diaz Olvera, Guezere, Plat & Pochet (2014) underline that the purpose of transport integration that has functional and modal components is to promote seamless transport by chaining trips. Non-seamless stages and connections along with long access, egress, wait and transfer times, more transfers and infrequent public transport service lead to decrease in public transport ridership and attractiveness and hence in modal shift to cars.

Indeed, programs that are aim at improving these weakest links in public transport are believed to be less expensive alternatives than those involving huge investment in transport infrastructure, vehicles acquisitions and replacements (Krygsman, Dijsta, & Arentze, 2004). In the study of the BRT of Jakarta, Dirgahayani, Harata, & Ohmori (2010) also mention the availability of access and egress modes and interchange as two major problems of intermodal public transport trips. Accordingly, understanding the full trip as a complex whole and improvement in multimodal integration including physical (“hardware”), information (“software”) and fare integration (“finware”) could overcome these inconveniencies and barriers. Integration, as May (1995) remarks, will result in higher performance than that achieved by “the piecemeal implementation of individual measures” (p.98). A fully integrated public transport system with “one network, one timetable, one ticket, one fare” will, therefore, ensure seamless public transport journey (SPUTNIC, 2009a).

The disorganized provision of public transportation services is mentioned as reason for public intervention. Fragmentation of transportation, as O’Sullivan and Patel (2004) point out, that has been the outcome of privatization of many types of transport operations in recent years, needs to be integrated so that “system integrity” can be maintained. Fragmentation manifests itself in number of problems mainly related to co-ordination issues of service interconnections, inter-ticketing, and inter or cross modal interaction and interconnection. Therefore, such a fragmented public transport system is characterized by the lack and in many cases by total absence of service interconnection, intermodal or cross modal interaction among the public transport modes. As there is greater interdependence between transport operations both within each mode and across all modes (inter and multimodalism), O’Sullivan and Patel (2004) emphasize the importance of government intervention to ensure system integrity caused by externalities of fragmentation. It is believed that such measure will ultimately results in better time tabling, planning and inter-ticketing. Younana & Wilson (2010) stress the importance of

coordination of transit services in increasing the attractiveness and service quality, attracting new ridership and improving productivity of intermodal and/or intramodal public transit system. It emerged from their study that greatest benefits could be gained through coordination of transit at a network level both for passengers and transit operator, although “what these benefits are” is not explicitly stated. At broader perspective, designing transport policy that will facilitate cooperation and coordination among different institutions has been one of the three instruments used to improve public transportation globally (Vilchis, Tovar, & Flores, 2010). May, Kelly, and Shepherd (2006) explain that the origin of the approach of integrated transport strategy is associated with the growing understanding that the “predict and provide” approach is no more tenable, that transport demand should be controlled through transport demand management strategies and that land use planning should complement transport policy.

At the planning level, Meyer & Miller (2001) discusses the notion of transport as a system that has different components and with different interactions among these constituent elements of the system. They, therefore, emphasize the importance of integrated and multimodal transportation planning approach that includes all the transportation network, the intermodal connections, land use patterns and transport institutions. At the operational level, the effectiveness of a new mass rapid transit system is related to complementary integration measures that should be taken to support the new system. Thus, modal integration, availability of interchanges facilities and bus route restructuring measures are stated as the preconditions for the success of new mass rapid transit system (World Bank, 2002b).

The literature shows that there are various notions on what integration is and how it can be achieved. Irrespective of these different conceptions of integration, there is a tacit recognition that it is important to follow transport integration policies and instruments and that transport integration should not be perceived as an objective by itself but instead as a means to achieve higher levels of transport service. Integration theories recognize the presence of different levels of integration and that the complexity of transport integration increases as the scale and level of integration moves up from lower operational levels to higher and wider strategic levels. But the higher the level of integration in this ladder of integration, the greater is the difficulty of achieving the desired outcomes.

African cities have unique urban transport characteristics. As per capita car ownership is significantly low, public transportation is the fundamental means of motorized mobility. In most of these cities, rail based public transport is hardly available. There are various modes of public

transportation. They give concentrated public transport services along major corridors and quite often on basis of fierce competitions both for passengers and roads. As the big public buses of the government have been ineffective and unattractive, public transport has been overwhelmingly provided by thousands of private operators for whom profit maximization is the main goal. Nevertheless, there is severe shortage of public transportation and competitions for passengers among the many operators is quite common. Here fragmentation is more prevalent and the need for coordination is more demanding than in the cities of the north. Integrating thousands of private operators into one system is really an awesome task and there are no examples of cities that have been successful in integrating the informal and paratransit sector. Trip chaining and ensuring seamless travel are far more challenging in African cities than in Developed cities. Major urban development and public transport corridors are not linked and some areas of the city are poorly accessed or even totally inaccessible by public transportation networks.

In spite of the contextual differences between cities of the north and south, the ultimate objective towards integrated public transportation system remains the same. The introduction of integrated public transportation is likely to improve the quality of public transportation, increase public transport patronage, promote seamless travel, provide the platform for greater coordination and cooperation between public transport operators , local, regional and national governments and enhance sustainable urban development. However, there are no tailor made solutions and approaches to integration that fit every city. The process will be lengthy and must take local context into consideration. It needs more proactive governmental intervention through the instruments of planning, financing, route structuring and tendering, designing innovative and localized mechanisms for integrating the paratransit sector, developing institutional and planning capacities, promoting coordination and public private partnership. Transport and urban planning authorities will play a lead role in the process but this institutions need to build the necessary technical competencies as well as have a clearly articulated vision of an integrated public transport system.

1.2 Research Objectives

Public transportation offers motorized mode of mobility for the good majority of city residents in Addis Ababa, a city in which motorization and per capita car ownership is low. A typical public transport trip chain in Addis Ababa involves change of different modes between trip

origin and destination, long waiting times at stations and terminals particularly during morning and afternoon peak periods, traffic congestion and travel delays, inconvenient and poor connectivity along the transfer stations and major terminals, different tariff systems and on board and cash based fare payment and absence of prepaid tickets and travel information. Public transport lines are concentrated on major corridors and a considerable part of the city is not accessible by the public transport. Poor coordination between land use and transport planning has further complicated the matter. It is evident that the current system of operation, planning and management of the city's public transportation system is unsystematic, disorganized and costly. It brings a number of disadvantages to the user, provider and the municipal government.

Integration can provide seamless transport and synergy in the public transportation system. It is then postulated that the introduction of an integrated system of public transportation in Addis Ababa provides the means for coordinating the different modes of public transportation, including schedules, route, transfer stations and modes. Integration offers the mechanism for planning, operation and management of public transport and delivers the means for introducing a system of tariff and zoning acceptable by all stakeholders and beneficial to the user and operators. It reduces unnecessary inter and intra modal competition among different private and public operators. It also provides the mechanisms for properly channeling government finances for investment in the public transport infrastructure, new fleet acquisition and replacement. Integration provides the platform for public private partnership in public transport sector. It offers the means to alleviate the shortage of public transportation, increases public transport ridership, and enhances sustainable urban development. It enhances the expansion of the public transportation service in hitherto unserved and poorly served areas as well as the provision of affordable public transport for the urban poor. It provides the avenue for the regional transport planning of the public transport system taking into account the long term spatial development trend of the city and its symbiotic relationship with the metropolitan area. Finally integration provides the opportunity for integrating land use and transport development.

In view of these assumptions, the tasks of public transport integration process in Addis Ababa then include the identification of the forms of integration to be implemented, the delineation of the activities for each forms of integration, the establishment of the time frame for the implementation of each forms of integration, the identification of the key actors and their respective duties, the preparation and ratification of the legal framework for integration and

establishing the body responsible for the whole public transport integration in Addis Ababa and its metropolitan region.

Accordingly, the general research objectives, therefore, are to explore the governance, the growth and development of Addis Ababa, investigate the history of urban and transport planning processes and institutions involved, study the current system of provision of public transportation in Addis Ababa in the context of integrated public transport system, identify the possible forms of integration, investigate the current state of the art on provision of integrated public transportation and explore experiences in integrated public transportation systems. It also seek to identify barriers to integration and formulate relevant strategies for the successful implementation of public transportation integration. Finally, it is ultimately intended to develop an integration framework that will help in identifying strategies, policies and instruments for implementing integrated public transport system in Addis Ababa. The framework must include prioritizing and phasing of the integration forms and taking into account both enabling and constraining policies, regulations and institutions.

1.3 Research questions

The thesis will primarily seek to provide answers to the following two questions related to the introduction of an integrated system of public transportation in Addis Ababa; namely;

1. Which forms of integration can Addis Ababa implement?
2. How can Addis Ababa implement the selected forms of integration?

The answers to these main research questions requires the formulation of a set of sub questions. On one side, the sub questions addressed in full in the theoretical part of the thesis provide the answers on the general notion of integration and the practices of integrated public transportation in cities of both the north and the south. The sub questions are

1. What is public transport integration?
2. What are the forms of integration? What are the characteristics and features of each of these forms of integration?
3. How are costs and revenues to be shared among the different members (public and private)? How is government subsidy and fleet replacement fund to be allocated?
4. What are the institutional arrangements and how do the different operators—private and public- come under one umbrella managing body? What should be its legal framework? How do responsibilities be shared?
5. What are the major challenges/barriers in adopting an integrated approach?

6. What can one learn from public transport integration practices from cities that have successfully implemented integration?
7. What can Addis Ababa learn from these practice and develops its own integrated system of public transportation taking into account its own specific condition?

On the other side, the contextual part of the thesis provides the urban and transport planning background and organization of public transportation. It answers the following questions.

1. What is the urban context of Addis Ababa including its growth and evolution? How had urban and transport planning and development been organized and conducted?
2. How is transport supply and demand?
3. How is public transport organized and provided in Addis Ababa?
4. What are the actual travel experiences of Addis Ababa residents' in accessing jobs and services?

1.4 Research methodology

As outlined above, the research topics cover public transport integration and implementation of public transport integration in Addis Ababa. The questions also address urban planning and development, transport planning processes, institutions and the organization of public transport provision in Addis Ababa. The research methodology has been organized around these main topics and seek to provide the framework for answering the research main questions, sub-questions and contextual questions. The lack of data on transport behaviors of the population of Addis Ababa has necessitated the undertaking of a household survey.

The concept of integration is complex and there are various forms and levels of integration. The literature review on the subject of transport integration in general and public transport integration in particular is used to build a synthesis of knowledge on this topic. The review has used recent published and unpublished sources from the academia, local governments, transport authorities, transport operators and transport associations. The resources address the broad subject of transport integration with particular emphasis given to public transport integration. The synthesis of the literature review provides the answers to the research sub questions which then provided the inputs for developing a framework of public transport integration in Addis Ababa. The framework is the final output of the theoretical part and answers the main research questions.

The implementation of public transport integration in Addis Ababa requires the understanding of the urban and transport context. This part of the thesis provides answers on the contextual questions. It gives a general background on the historical growth and development pattern, governance, urban and transport planning processes, urban and transport planning institutions, transport supply and demand and organization of public transportation in Addis Ababa. The analysis used various published and unpublished primary and secondary sources. It reviewed various government statistics, reports and policy and strategic papers. It referred to historical documents on urban and transport planning and used the primary data on public transport to provide an analysis of the sector. A number of formal and informal discussions were held with relevant government authorities, especially those associated with urban and transport planning, management and public transport provisions. The author's previous work experience in the city government facilitated discussions and the acquisition of the necessary documents and statistical information about the city which otherwise would have been time consuming and difficult.

The availability of reliable and historical data is a major obstacle when one is engaged in some type of empirical research in the cities of the developing countries. Addis Ababa has never conducted detailed and periodical household travel surveys. There is lack of reliable and first hand data on households' demographic and socioeconomic characteristics, urban travel characteristics and public transport use. It was then necessary to conduct a field work. Interview has been used both as a method and empirical material. The interview was of three types; namely closed ended questionnaire based face-to-face and home interview with sample households, semi structured face-to-face interview with public transport providers, governmental and nongovernmental transport institutions and closed ended questionnaire based face-to-face intercept survey at major public transportation transfer terminals. The survey process involved a number of steps and extended over number of months.

A sample survey was conducted to generate empirical data on households and travel characteristics and public transportation. Multistage sampling method was used to collect data on socioeconomic, demographic and travel characteristics, access to jobs and services and revealed and stated preferences of the public transportation of households. A closed ended type of questionnaire were developed and the questions in the questionnaire were combinations of classification, attitude/opinion questions and behavior questions (Stopher, 2012). The survey questions have to be prepared and this involved a review of the literature on household and

travel surveys methods and contents (Stopher, 2009, & 2012). The LET experience in conducting household surveys in Africa on the subject were also very helpful (Behrens, Diaz-Olvera, Plat & Pochet, P., 2006) during the preparation of the survey questionnaires. A total household sample of 420 were taken from eight representative Weredas² that were systematically selected from the 109 Weredas of Addis Ababa and four major transport terminals. Within the selected Weredas, households were chosen ensuring that there was a fair distribution. The field work required the support of the Wereda administration and the interview was conducted with the assistance of eight university graduates of the program of urban and regional planning of the EiABC. Data encoding of the 420 household interviews (See Appendix 35, 36, and 37) and production of preliminary results were the final process.

1.5 Limitations

The paucity of data on travel characteristics, income and expenditure are serious limitations when conducting a research in developing countries and Addis Ababa is not an exception. The research was severely hampered by this problem. The constant reshuffling of public organization in the city and country at large and high turnover of staff made it difficult to trace important historical decisions (poor institutional memories) that have been made in the past. The shortages of funding to support research involved in the primary and secondary data collection, sample surveys and interviews was also a critical limiting factor.

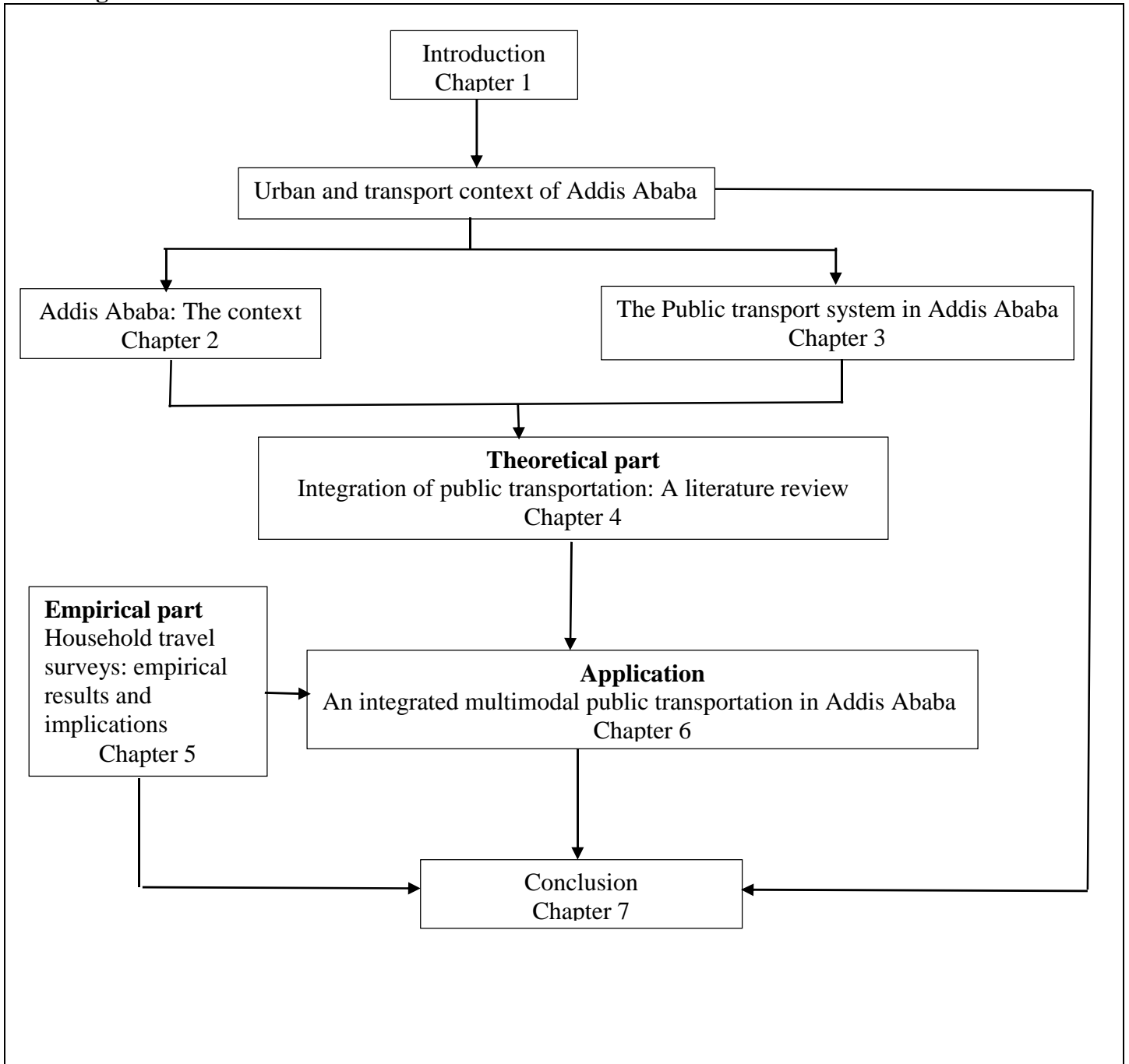
1.6 The thesis structure

The thesis is organized around six major chapters (See Figure 1.1). Chapter two analyzes Addis Ababa within the broad framework of history, governance, economy, urban transportation, urban planning and development. Chapter three is about the organization, operation and management of the public transportation in the city. Literature review on integration theory and practice is presented in chapter four and allows to elaborate a theoretical framework of public transport integration. The empirical findings of the household travel surveys are dealt in chapter five. The sixth chapter explains the steps and actions for the implementation of public transport

² Wereda is lowest administrative unit of the city of Addis Ababa.

integration in Addis Ababa on the basis of the integration framework developed in chapter four. Finally the conclusion and recommendation is addressed in the seventh chapter.

Figure 1.1: Thesis Structure



Chapter 2 Addis Ababa: The Context

2.1 History and geography

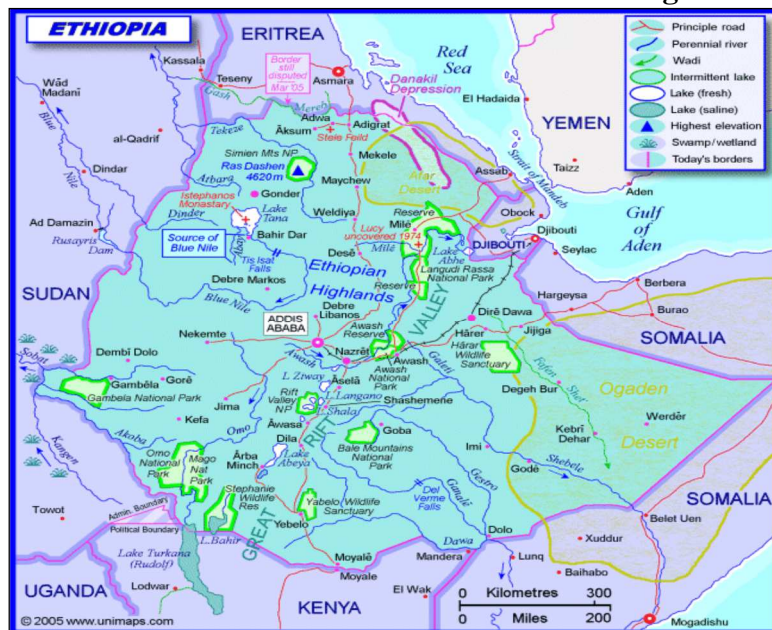
Addis Ababa, a chartered city and with special status in the ethnically structured federal system of Ethiopia, is the overlapping capital city of the country and the Oromia Regional Government, the seat of the United Nations Economic Commission for Africa, the capital city of African Union and home to many international organization. The city is the administrative, economic, financial and political center of the country. The city is relatively young by comparison with many European Cities and was established as the capital city of Ethiopia in 1887 by Emperor Menelik and his wife Empress Taitu. Indeed, it was the empress who was responsible for deciding the location of the city that eventually led to the transfer of the capital and imperial palace from chilly and high Entoto Mountain to current location of Menelik palace at Arat Kilo³. Originally named as “Finfine”, the establishment of Addis Ababa as the capital city of the country heralded the end of the rotating capital cities system prevalent in then contemporary Ethiopia (Addis Ababa City Council, 1986; Engelhard, n.d.).

Addis Ababa is located at 8°59'N latitude and 38°48'E longitude, occupies a central geographic location in Ethiopia (See Figure 2.1). Lying as it is at an elevation of between 2100 and 3000 meters above sea level, the city extends for about 34 and 42 in the kilometers east–west and north-south directions respectively. With a total area of 540 Km², built up area of 290 Km² and average crude density of 5,071 persons/km² (BOFED, 2010), it is enclosed by the Entoto Mountains in the north, Wecehcha and Mengesha Mountains in the west and southwest. As shown in Figure 2.2, it has higher elevations in the west, northwest, north and northeast and it gently slopes form the west, northwest, north and northeast and towards the south, southeast

³ Literally meaning Four Kilometer, it is the oldest part of the city which houses the Federal Parliament, the Palace and other governmental institutions and is the political center of the country. It is currently earmarked for urban renewal where most of the original dilapidated houses had already been demolished.

and east. Major rivers flow from the north towards the south creating divides and gorges as they flow along. Although located close to the equator ($9^{\circ} 2' N$, $38^{\circ} 42' E$), Addis Ababa is not as hot as one expects to encounter. Owing to its higher elevation, it has mild temperature with an average of 15 to 18 degree Celsius all the year round, an average maximum of about 25 degree Celsius for the months of March to May, and an average minimum of 5 to 8 degree Celsius for the months of December to February (BBC, 2012).

Figure 2.1: Addis Ababa in the national and international setting

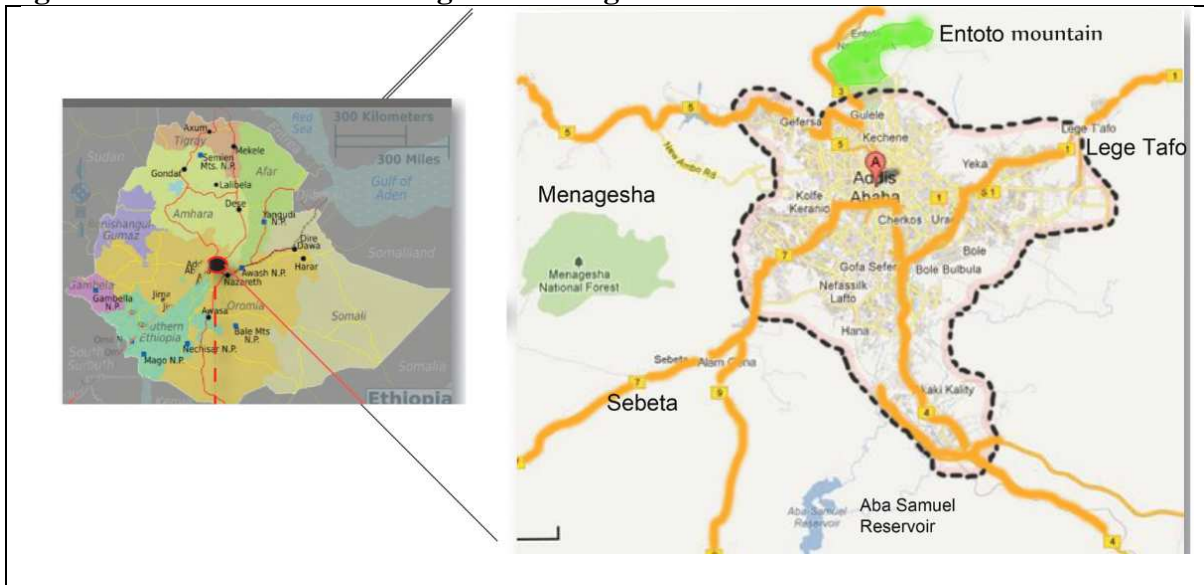


Source: www.unimaps.com in UN Habitat, 2007

The city is the hub of the road networks of the country. Five major radial roads originating from the city, as shown in Figure 2.2, connect Addis Ababa with other parts of the country. The city is physically growing along these major corridors and the spatial growth is extending beyond the city's political boundaries. However, the Entoto Mountain and the green buffer along the northern corridor are forming a natural barrier to the city's expansion (See Figure 2.3). Beyond this zone, the relief opens into flat plains where the satellite, residential and recreational town of Sululuta forms the center of a highly developing and urbanizing zone. Of these five radial roads, the one bound to the southeast is the most significant for it connects the city and the country to the Red Sea port of Djibouti, which is the point of entry and exit for the country's import and export goods. This road has been replaced by eight lanes toll highway connecting

Addis Ababa with the city of Adama located 100 kilometers from Addis Ababa. The Addis Ababa–Adama corridor is the one of the most rapidly urbanizing and developing zone in the country and the new highway will open the extensive agricultural plains to process of rapid urban sprawl.

Figure 2.2: Addis Ababa in a regional setting



Source: www.nationsonline.org/.../map/google_map_Addi viewed on April 25, 2012

2.2 Governance

The consolidation of central Ethiopian government with Addis Ababa as its capital, the introduction of eucalyptus tree as secure source of firewood, the construction of the Addis Ababa–Djibouti railway line, and the gradual introduction of modern institutions and technologies strengthened the importance of Addis Ababa as new urban settlement. In recognition of the need to legalize and regulate its administration, the municipality of Addis Ababa was established in 1907. In 1954, the city got another charter which gave the city a semi-autonomous status in which the city was accountable to the Ministry of Interior and the mayor was appointed by the Emperor. The charter granted Addis Ababa the legal status to have its own council with members elected by the residents. But one has to own a property in the city as a prerequisite to elect or to be elected. This charter was in force until proclamation in July 1975 (Abeje, 2000; & AACC, 1986).

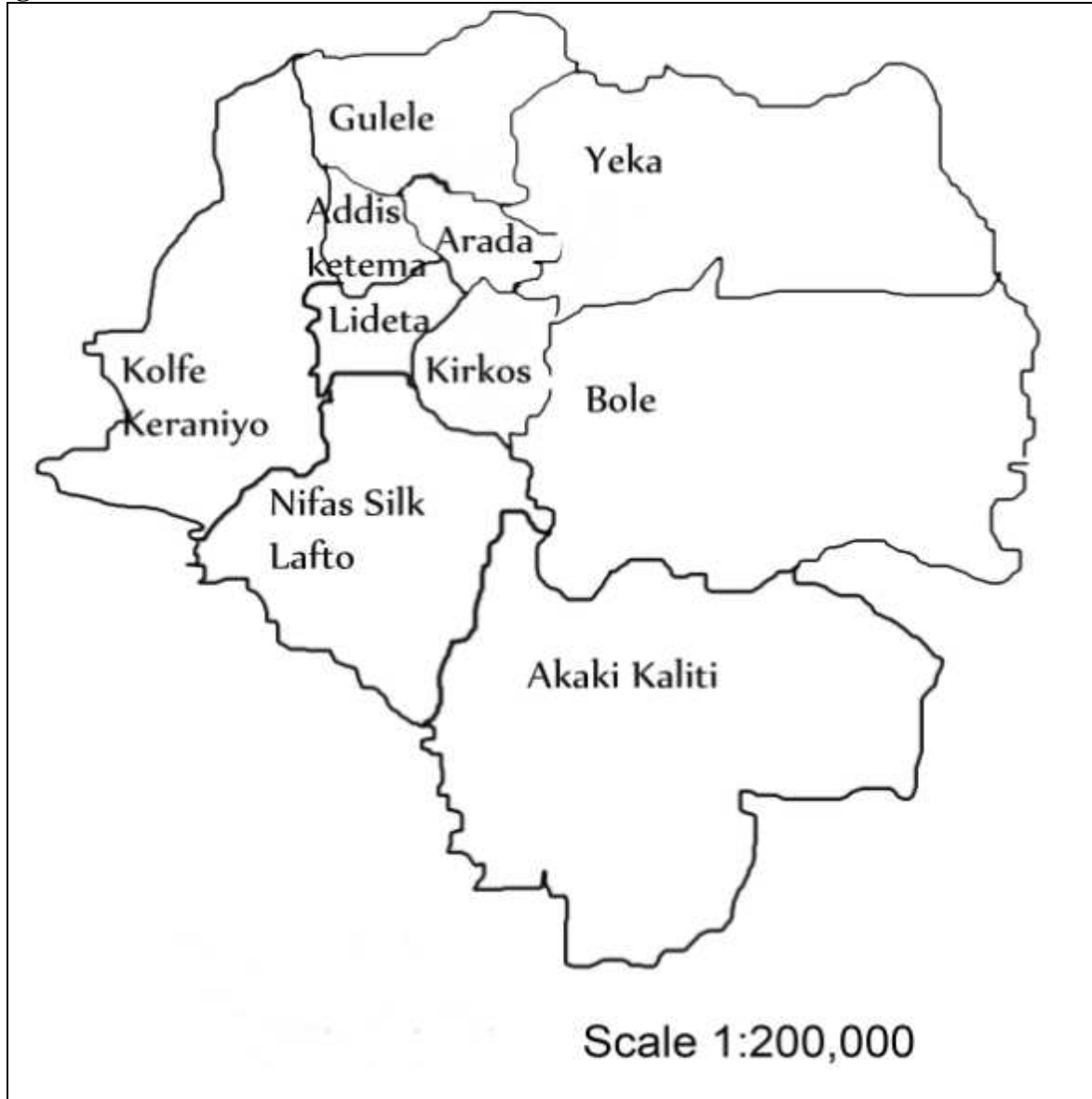
In 1975, the socialist oriented military government nationalized urban land and housing with proclamation 47/1975, a law still in power in the country. With this proclamation and proclamations 104/1976 and 206/1981, a city council was established in the framework of urban dweller association. The Mayor was elected by the central government from the three candidates proposed by the city council. The city had four tiers of self-administering entities: the city, a nonfunctional Zone (“Ketena”), an intermediate level (named “Kiftigna”) and local level (named “Kebele”). The city had then 5 Zones, 25 Kiftigna and 289 Kebeles in 1975 and which was later reduced to 284 Kebeles by the city council in 1978/9. To this date, except the Zone which has been abolished, the city had the same structure of governance, although with some modifications to address emerging needs and government’s interest (Abeje, 2000; & AACC, 1986).

The current Ethiopian government that came into power in 1991 dissolved the prevailing provincial system. It restructured the administrative system of the country and set up a new federal system of government. Accordingly, the country was divided into 9 self-autonomous regions delineated on the basis of ethnic and language criteria. As Addis Ababa, which is home to many ethnic and language groups and as melting pot of the country, could not fulfill these new regional delineation criteria, the city was renamed as region 14 as per proclamation 7/1992. Addis Ababa maintained its status as the capital city of the Federal Democratic Republic of Ethiopia. The government anchored the status of the city as chartered city by the proclamation 87/1997 and enabled the establishment of the Addis Ababa City Government. This charter which is in power now was revised by proclamation 361/2003 replacing proclamation 311/2003 of the same year. The charter, which was the outcome of urban management and capacity enhancement program of the 2001 revision of the Addis Ababa master plan, defined the political and fiscal power and responsibilities as well as its relations with the Oromia regional and the Federal governments.

The 2003 charter paved the way for the establishment of a provisional government to rule the city until the forthcoming election. The provisional city government which was in power between 2003 and 2006 implemented the most radical decentralization program in the city’s history. It established three tiers of government at city, sub city and local level. The city’s functions at all levels were reorganized under government and municipal functions. The devolution of power to lower levels of government and the whole decentralization process was aimed at bringing about effective, transparent and accountable governance and delivery of

service down to the lowest level of the city government (FDRE, 2003). The caretaker city government in power between 2006 and 2008 continued to exercise the same responsibility and policy of the provisional city government. The caretaker city government was replaced by the current city government that was elected to power in 2008.

Figure 2.3: Addis Ababa administrative subdivisions



Source: Own work

Currently, the city has also three tiers of government. These are the City, Sub City at intermediate level and Wereda at lowest level. There are 10 Sub Cities and they are further subdivided into 116 Weredas, each Sub City having a minimum of 10 Weredas (See Figure 2.3). The Weredas were formerly known as Kebeles but have been renamed as Weredas like in

other parts of the country as per proclamation 21/2010 of the Addis Ababa City Government (AACG, 2010). Table 2.1 exhibits the different organs of government with respect to the levels or tiers of city government.

The city government of Addis Ababa is formed by city council which is elected for five year term by the residents of Addis Ababa. The organs of power are the councils which will be established at the three tiers of government; namely at the City, Sub City and Kebele or Wereda Councils. The highest organ of power is the city council with diverse power including the authority to approve the city physical plan and annual budget of the city, approve short–and long-term socioeconomic development plans, establish executive organs and city specific public enterprises and borrow from domestic sources after approval by the Federal Government.

Table 2.1: Structure of city government organs and tiers of government

Organs of Power	Tiers of City Government		
	City	Sub City	Wereda
Highest Organ	City Council	City Council	Wereda Council
Chief Executive Organ	Mayor	Sub City Chief Executive	Wereda Chief Executive
Executive Organ	City Cabinet & City Manager	Sub City Standing Committee & Sub City Manager	Wereda Standing Committee & Wereda Manager
Judiciary	Addis Ababa City Court	None	Wereda Social Court
Audit	City Government Chief Auditor	None	None

Source: FDRE, 2003

The city council has dual accountability; the Federal government and the city residents. The city council, therefore, can be dissolved either by the House of People Representatives of country or through its own decision. Similarly the Sub City council is accountable to the residents of the Sub City and the city council as so does the Wereda council to the Sub city council and the residents of the Wereda. The mayor is not elected directly by the people but by the party which has won the majority seat in the council will elect the mayor. The city cabinet, to be formed by the Mayor and approved by the city council, is the main executive organ of the

city council. At Sub City and Wereda levels, there are the Sub City chief executive and Sub City standing committee as well as Wereda chief executive and Wereda Standing Committee respectively (FDRE, 2003).

The 2003 charter introduced a new structure, the so called manager office, in the city's administration system. It is responsible for the delivery and management of municipal services. It has also a decentralized structure; the city; sub city and Wereda manager. The city manager office is accountable to mayor, while the two lower levels have dual accountability, namely; one to sub city chief executive and one to city manager at the sub city level and to the Wereda chief executive and the sub city manager at the Wereda level. The city manager office was envisaged to be run by professionals and technocrats with especial employment status and salary levels different from the civil service. In earlier phase of this decentralization program, the city government assigned all the posts, with the exception of top management, on the basis of merit and professional qualifications. However as the present recruitment and employment practice indicates, this original arrangement has been abandoned and more weight is given to political loyalty to the ruling party than to professionalism and expertise.

As municipal services, urban transport, including mainly the administration of public transportation and road construction and management, was under the auspices of the city manager office. The new urban transport institutions created and the functions they were delegated were an attempt to handle the complex urban transport planning process and management of Addis Ababa that comprises the infrastructure, traffic and demand management, public transport and freight as in large cities elsewhere (Gakenheimer, 2011). In response to these diverse urban transport responsibilities, different transport institutions have been involved in the governance of urban transport in Addis Ababa but with loosely defined interdepartmental or inter authority coordination mechanisms. The independent and autonomous city transport bureau and the Addis Ababa City Road Authority manage the transport and road management respectively. Traffic safety and control is the mandate of the Addis Ababa Police Commission, a federal government institution accountable both to the city and the federal government. Formal public transport operated by the Anbessa City Bus Enterprise until lately was a federal government organ.

The transport bureau was directly or indirectly in charge of the overall administration of all transport related matters including the day to day management of traffic and public transport run by the different operators of the paratransit and the government owned Anbessa City Bus

enterprise. The Addis Ababa City Road Authority established as autonomous body in 1998 as per Proclamation No 7/1998 is to date accountable for the administration, construction, and maintenance of the city's collector and arterial roads, bridges and drainage facilities (AACRA, 2008).

However, in 2005, the federal government transferred the mandate of the transport bureau from the city government to the Federal Ministry of Transport and Communication, an ill-advised and short sighted move. It was renamed as the Addis Ababa transport branch office and underwent some restructuring to reflect the Ministry's agenda and objective. The city had no its own transport authority until 2011, when the federal government Council of Ministers approved the city's urban transport policy. The city's transport policy recommended the establishment of an umbrella Addis Ababa Road and Transport Bureau consisting of the Addis Ababa Transport Branch Office, Addis Ababa Road Authority, the Anbessa City Bus Enterprise and the Traffic Management and Control department of the City Police Commission (Woldetensae & Fanta, 2010). Earlier studies have also highlighted the need for the establishment of such an urban transport organs (ERA, 2005, & FDRE, 2008). The approved policy gave the city government the legal ground for the reestablishment of the city road and transport bureau.

The Addis Ababa Road Transport Bureau (AARTB) constituting the Anbessa City Bus Enterprise, the Addis Ababa Road Authority, the Addis Ababa Branch Transport Office, and the Traffic Management Department of the city Police Commission was formally established by the proclamation of the Addis Ababa City government No 25/2011. The bureau is directly accountable to the mayor and has decentralized structure with some responsibilities devolving to the sub cities. The power and responsibilities of the new bureau, as stated in the proclamation, include ensuring an efficient transport service in the city that is consistent with the demand, constructing and managing roads and terminals, preparing transport plans that are in conformity with land use plans, managing public transport and traffic, issuing vehicle and driving license and performing other regulatory functions related to the transport services (AACG, 2011).

The new bureau is now being reorganized so as to discharge its new duties and setting up appropriate organizational structures. There will be a friction between the bureau and the semi-autonomous bodies which constituted the new bureau. Consolidation of the fragmented responsibilities, setting up effective institutional and administrative arrangement, designing

strategy to overcome the shortage of qualified professional and improving the technical skills in urban transport planning and management will likely be the main focuses of AARTB.

In its relatively short history, the city had gone under different administrative and governance arrangements reflecting the political ideology of the governing body. The current structure of governance is the outcome of the process to institute an effective urban management within a framework of free market economy. Service delivery, revenue and expenditure assignments and other power and responsibilities have been devolved from the city to lower tiers of local government with the centre still having a decisive authority. The number of local governments at “Wereda” level has been increased with additional new functions. This has happened under constant reorganizing of government organs along with high turnover of staff. It seems that there is no end to this process which puts continuity in institutional building process into jeopardy. This and until recently the absence of a competent umbrella transport institution have resulted in the failure to technically and holistically address the increasing mobility and accessibility needs of the city’s population. Political barriers to adopting a metropolitan or regional planning approach between Addis Ababa and the surrounding rapidly suburbanizing towns, poor coordination mechanisms among different agencies involved in urban transport as well as among providers of public transport both private and public have further complicated the matter. These challenges of governance have been also augmented by the shortage of competent technical and managerial human resource to administer and manage local governments.

2.3 Urbanization

Sub-Saharan Africa is the least urbanized and least developed part of the world and is expected to undergo a faster process of urbanization. In terms of number, the region’s urban population was 20 million in 1950, increased to 67 million in 1975, reached 219 million in 2000 and is projected to reach 648 million in 2030. The region’s contribution to the global urban population, as shown by Cohen (2003) is low. Its share was about 3%, 4% and 8% in 1950, 1975 and 2000 respectively and is estimated to account for 13% of the world’s urban population in 2030. Sub-Saharan Africa was 15% urbanized in 1950; 20% in 1975, reached 38% in 2000 and is estimated to reach 53% in 2030. Despite its low contribution to the global urban population, the region is urbanizing very rapidly and had the highest urbanization rate with an average growth of 4.8%

in the period between 1950 and 2000 and will continue to grow by 3.6% in the period 2000 to 2030.

Ethiopia as a part of the Sub-Saharan is passing through similar process of high population growth, a faster rate of urban growth and urbanization. In the last sixty years, Ethiopia's population has been steadily growing at annual rate of between 2.2% to 3.6%. Nevertheless, the population growth rate is projected to steadily fall down in the coming decades (UNPD, 2012) (See also Appendix 1). A UN demographic data (2012) shows that the population of the country was 18.4 million in 1950, 65.6 million in 2000 (increased by 3.6 fold in 50 years), and is projected to reach 145.2 million in 2050 (to be more than doubled). The population is expected to decline after reaching its apex in 2090. With a current population of 84.7 million, Ethiopia is the second most populous country in Africa, after having overtaken Egypt in the last decade and is trailing far behind Nigeria, the most populous country in Africa and with almost twice as much population as that of Ethiopia (UNPD, 2012).

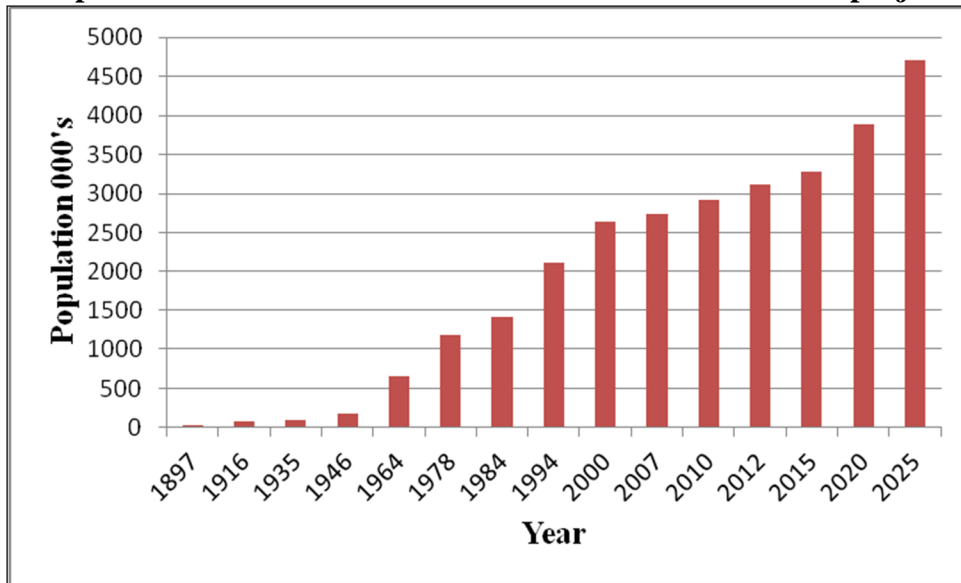
Although the proportion of population living in urban areas⁴ is low even in comparison with the Sub Saharan Africa average, the country is rapidly urbanizing. The urban population is increasing at very much higher rate than that of the national population as a whole. Indeed, the average annual rate of urban population growth was close to 6% in the period between 1950 and 2010 and this trend will continue, albeit at lower rate of an annual average of 3.7%, an urbanization rate that is equal to the urban population growth rate for Sub Saharan Africa for the period 2000 to 2030 (Cohen, 2003).

The Ethiopian urban population was less than one million in 1950, rose to 3.7 million in 1980, and 9.7 million in 2000. It grew by 17 fold in the last 50 years to reach the current population of 14.4 million. According to the UN Projection (2012), the urban population will be 28.4, 39.2, and 51.6 million in year 2030, 2040, and 2050 respectively. The average urbanization rate for Sub Saharan Africa was about 11% in 1950, 21% in 1975, and 34% in 2000 and is projected to reach 51% in 2030. The country's urbanization rate is lower than the average rate for the region and thus the percentage of urban population rose from 4.6% in 1950, to 15 % in 2000, 17% at present and is estimated to reach about 24%, 29% and 36% in 2030, 2040 and 2050 respectively (Cohen, 2003, & UN, 2012).

⁴ In Ethiopian urban areas are defined as settlements with minimum inhabitants of 2,000 people.

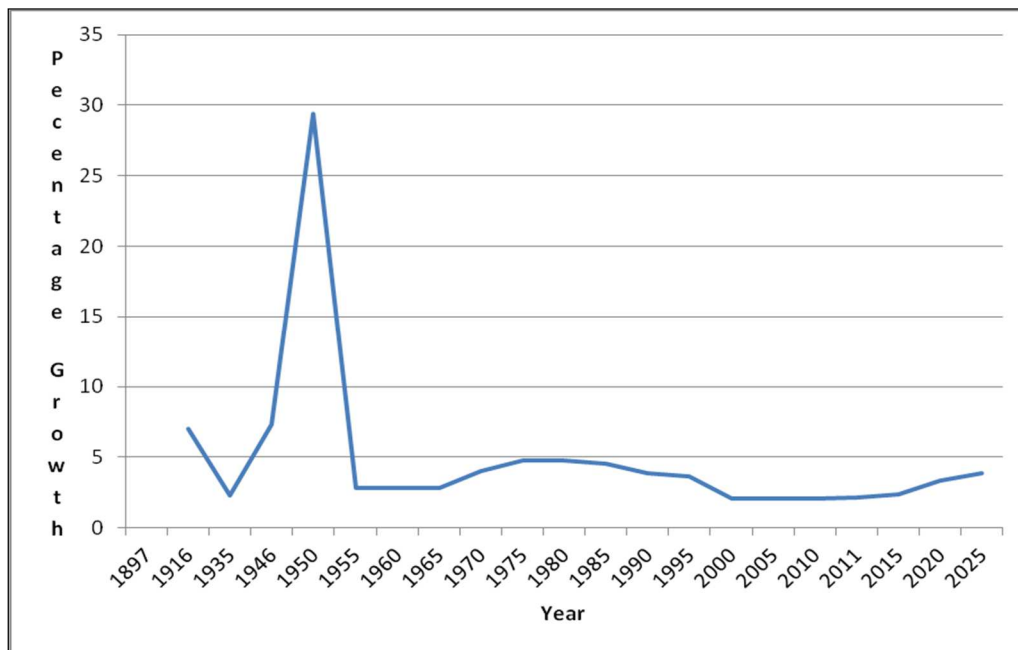
Addis Ababa had a population of about 30 thousand people in its early years of its establishment. As clearly portrayed in Figure 2.4, Addis Ababa crossed the 100 thousand threshold level at the outset of the 2nd World War, joined the ranks of a million cities in the mid 1970's and passed the 3 million population line in 2012.

Figure 2.4: Population size of Addis Ababa between 1897 and 2011 and projection to 2025



Source: Abeje, 2000, & UNPD, 2012

The city had passed through different phases of urbanization and urban development and the historical urban growth patterns are shown in Figure 2.5. From its foundation to 1946, it grew by a rate of 10.2% per annum and its absolute population grew by six fold. It showed a spectacular urbanization process during the period 1946 to 1950. In the period, the city population grew by 29.4% in which its absolute population size doubled in just 4 years. This rapid urbanization process is mainly attributed to the huge influx of rural migrants attracted by the pull factors of better living conditions in the city as the outcome of increased modernization of the city spurred by construction of new social and technical infrastructure and other modern facilities, better employment opportunities in the non-agricultural sector and the push factors of hardships and insecurity in rural Ethiopia (Abeje, 2000, Engelhard, n.d.).

Figure: 2.5 Annual population growth rate of Addis Ababa between 1897 and 2012 and projection to 2025

Source: Abeje, 2000, & UNDP, 2012

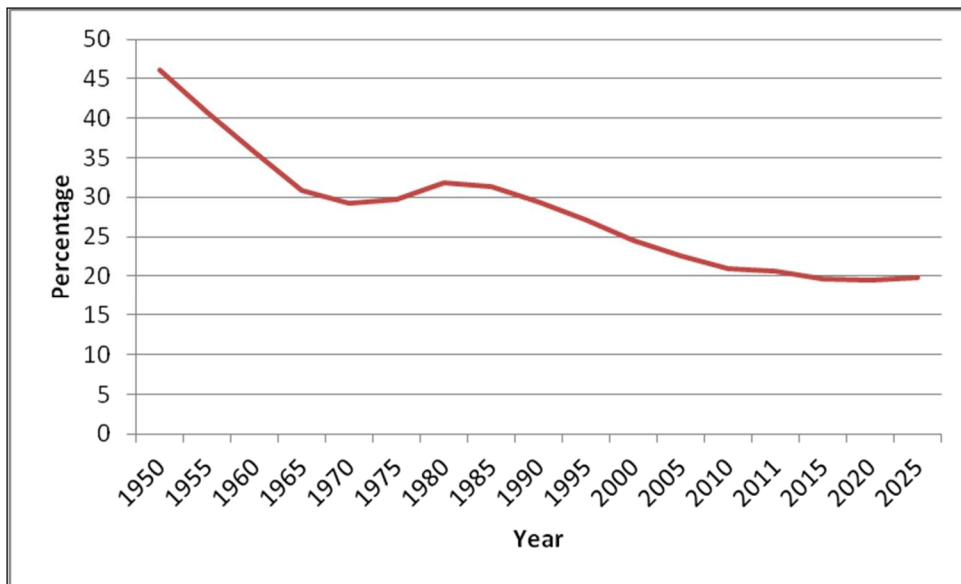
In the period between 1950 and 1970, the city continued to urbanize, though at a lower rate of 2.8% at the end of which the city's population has grown by 1.5 times from that of the population size of 1950. The slow urban growth of the previous period was accelerated and between 1975 and 1995 Addis Ababa urbanized at annual rate of between 3.6 and 4.8%. This period coincides with one of the turbulent times in the Ethiopian history. The period saw overthrow of the imperial government by military government which in turn was toppled down by the current one. It was also a period during when there was wide spread prevalence of drought and famine (1974 & 1985). The civil war that ended in 1991 and that was responsible for the displacement of people also characterizes the period. The higher rate of urbanization of this period than in the previous periods was the consequence of large migration of people mostly from war and drought affected areas to urban areas and mainly to Addis Ababa.

The coming of the current government in power in early 1990's introduced a new process of urbanization in the country. The new federal system of government gave more autonomy to regions and promoted the growth of regional capitals. The regional capitals were to function not only as regional capital cities but also were expected to serve as growth poles promoting and spurring regional socioeconomic development in their respective hinterlands and regions

(MWUD, 2005). This impacted on the unprecedented growth of secondary towns and at the same time slowed down the growth of Addis Ababa. The city's urbanization rate dropped from 3.9% in 1990 to 2.1% in 2011 (CSA, 2008, & UNPD, 2012) of which 1.4% and 0.7% of the growth is accounted by city's natural population increase and net in migration respectively (CSA, 2008). However because of the city's favorable position as a capital city, increasing importance as diplomatic and financial centre and its booming economy and construction sector, the urbanization rate will rise again to higher rates of growth than the current one. Indeed UNPD (2012) projection shows that the city will grow at rate of more than 3% in the coming decades (See also Figure 2.5).

The growth and development of other regional capitals and other smaller towns, as revealed in Figure 2.6, has decreased the role of Addis Ababa as major node of urban population concentration. The share of Addis Ababa from the country's urban population was 46% in 1950, decreased to 32% in 1980 and 29% in 1990 and is currently at about 21% and will remain so in the next decades (UNPD, 2012).

Figure 2.6: Percentage share of Addis Ababa's population of the country's urban population

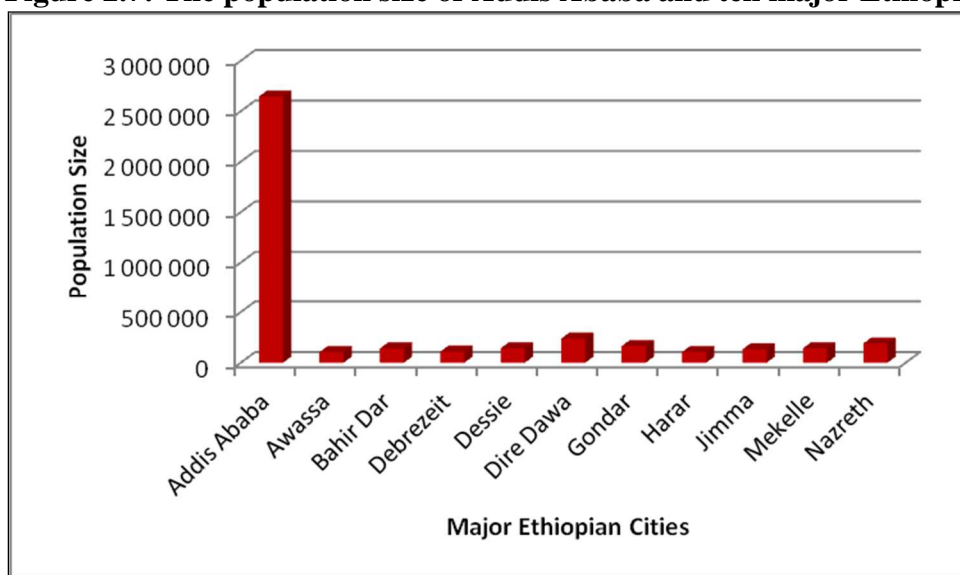


Source: UNPD, 2012

2.4 Population structure and distribution

Ranking as it 129th in the world and 12th in Africa in terms of its population, Addis Ababa is at present home to about 3.1 million people (Demographia, 2012), although some estimate puts the city's population to be about 4 million (UN Habitat, 2008). Figure 2.7 shows the urban population of major Ethiopian cities. The figure unequivocally portrays Addis Ababa dominance as a primate city which is as 11 times as large as Dire Dawa-the second largest city and about two times larger than the population of the ten major cities added together.

Figure 2.7: The population size of Addis Ababa and ten major Ethiopian cities in 2007



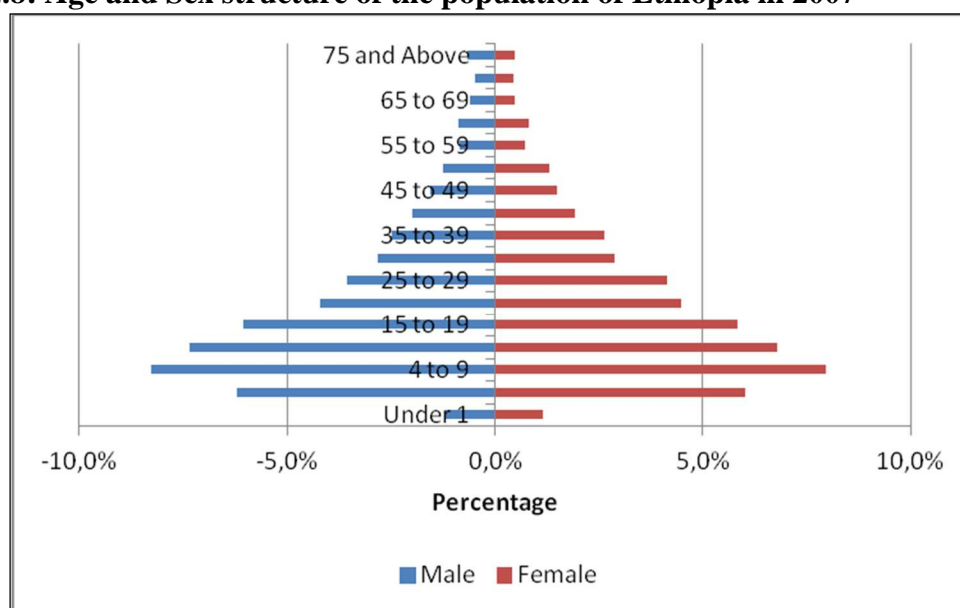
Source: CSA, 2008

A detailed population data for the city is available for 2007, the last census report in the country. According to this report, the city had a population of 2.7 million with 662,728 households (CSA, 2008). However, if the population of the neighbouring urban settlements which have strong functional linkages with the city in terms of employment, housing, commuting and recreation, is to be considered, then the Addis Ababa metropolitan region will have a much higher population number than Addis Ababa's proper.

Characterized as it is by the presence of high proportion younger population, the population pyramid of both Ethiopia and Addis Ababa exhibits a similar feature of the population pyramid of the Developing Countries with wider base and narrow apex. As national growth rate of population has decreased from 3.6% in 1990 to 2.8% in 1994 and 2.6% in 2007 (UNPD, 2012,

& CSA, 2008), there are progressively fewer births than in the previous periods. Life expectancy at birth is low and yet increasing. The average life expectancy at birth for the country for both sexes is 60, while as a universal phenomenon, female's life expectancy is higher than males and is 61.6 at birth and that of male's 58.3. Generally for the country as a whole, about 97% of the population is below the age of 65, 84% below the age of 40 and 45% below the age of 15. There is high preponderance of people in the productive or working age group of 15 to 64 which accounts for 52% of the total population. The sex structure is more also balanced with males slightly higher than females (See Figure 2.8 and also Appendix 4).

Figure 2.8: Age and Sex structure of the population of Ethiopia in 2007

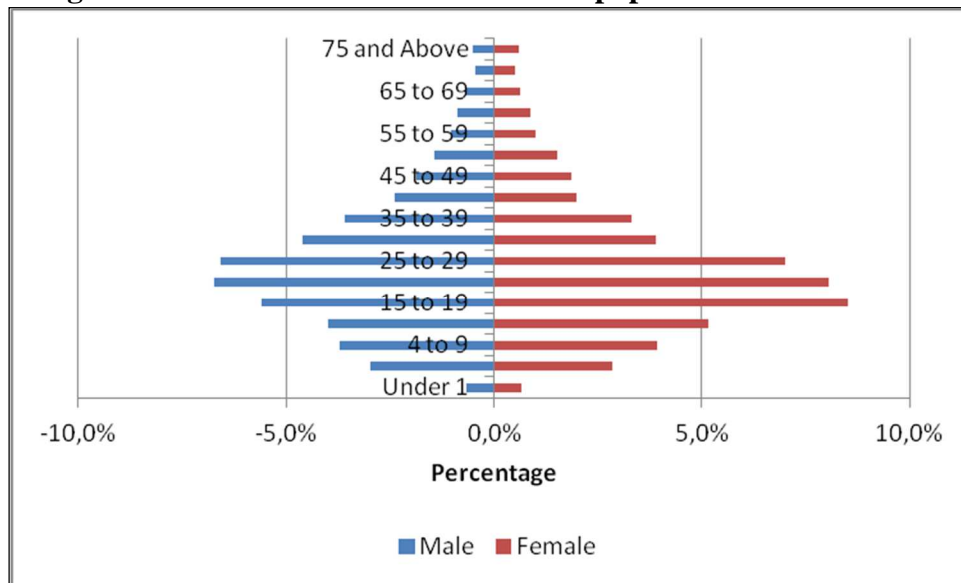


Source : CSA, 2008

The age-sex structure of Addis Ababa shows similar pattern to that of the national structure, though there are some minor differences. City residents expect a higher life expectancy than the country as a whole. The average life expectancy is 64.6, and while female life expectancy at birth is 66.5 that of males is 62.6 (CSA, 2008, & BOFED, 2009). There are more females than males with percentage shares of about 52% and 48% of the city's population respectively, partly due to more female than male net immigration in the age groups of 15 to 24. Alike the national population, there are more people in the younger age groups and indeed about 97% of the population of Addis Ababa is below the age of 64, and 67% below the age of 30. But in contrast to the national average of 45%, only 24% is the population of the city is below the age of 15—a

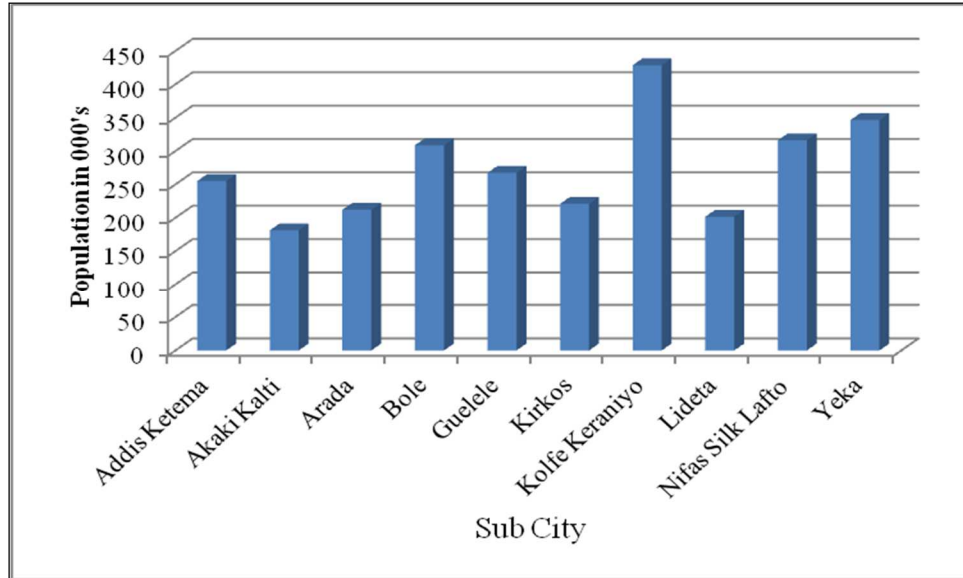
feature that is explained by lower birth rates of the city’s residents (See Figure 2.9 and Appendix 5).

Figure 2.9: Age and sex structure of Addis Ababa’s population in 2007



Source: CSA, 2008

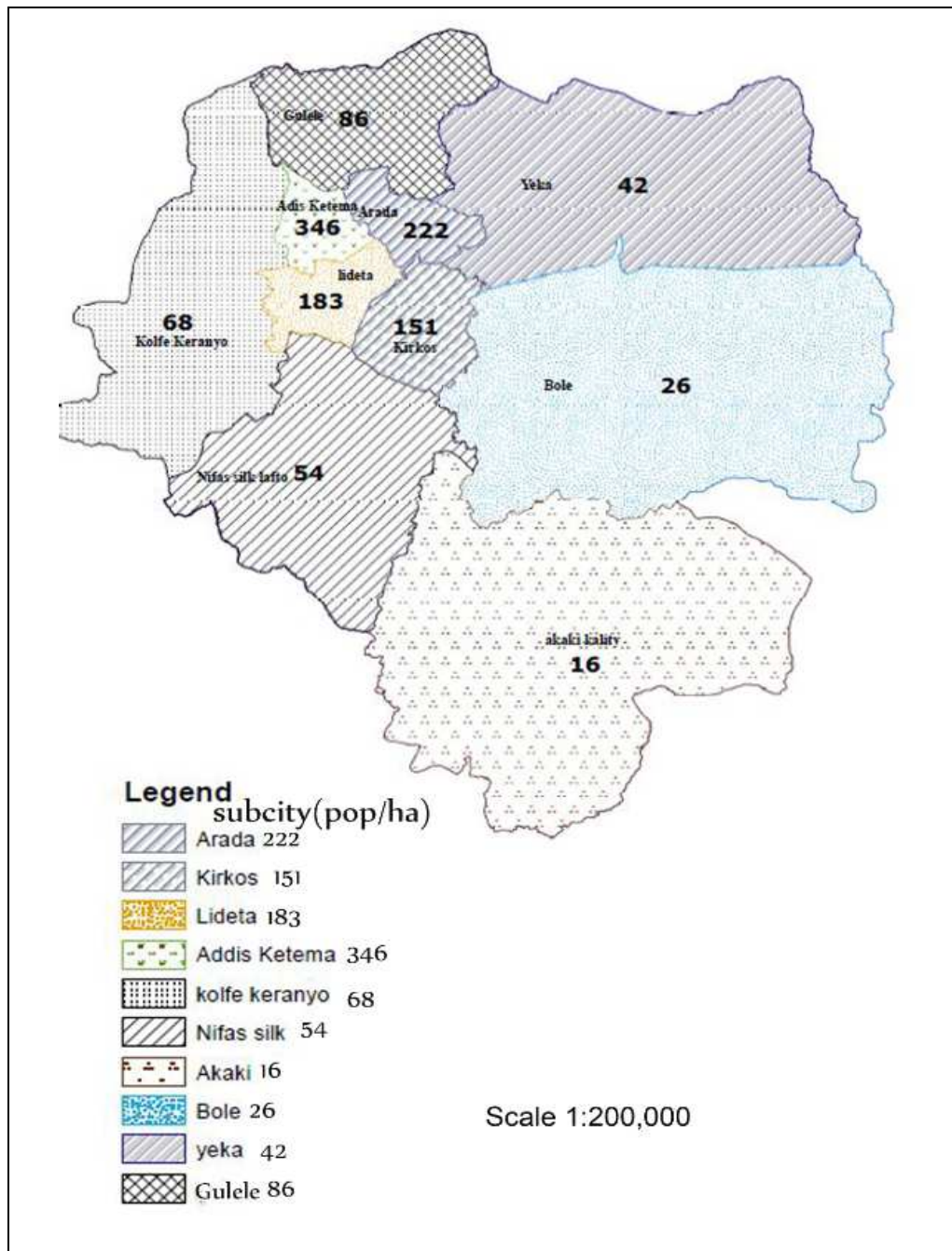
Population distribution at the sub city level is uneven. A more interesting and detailed density pictures would have emerged had one taken the built up area instead of the total area but precise data on built up area of each Sub City and Wereda is not available. It is to be observed that the outlying three largest sub cities of Akaki, Bole, and Yeka contributing to about 73% of the total area of the city, houses only about 31% of the city population. The four inner city sub cities of Addis Ketema, Arada, Lideta, and Kirkos with only about 9% of the total area have 33% of the City’s population (See Figure 2.10 and Appendix 6).

Figure 2.10: Population size by Sub City

Source: CSA, 2008

While the average density for the city is about 54 persons per hectare, it shows significant variations among sub cities, as shown in Figure 2.11. Addis Ketema has the highest density with a value of about 346 persons per hectare followed by Arada with a density of 222 persons per hectare. The densest sub cities house population similar to some global million and mega cities like that of Surat in India with population densities of 29,200, Hong Kong with 25,900 and Bogota with 21,000 persons/km² (UNPD, 2012). The dense sub cities and Weredas are also neighborhoods with higher proportion of slums and poor quality residential areas. At the opposite scale, the relatively recently settled and expansion areas of Akaki and Bole sub cities have the lowest values with respective densities of 16 and 26 persons hectare.

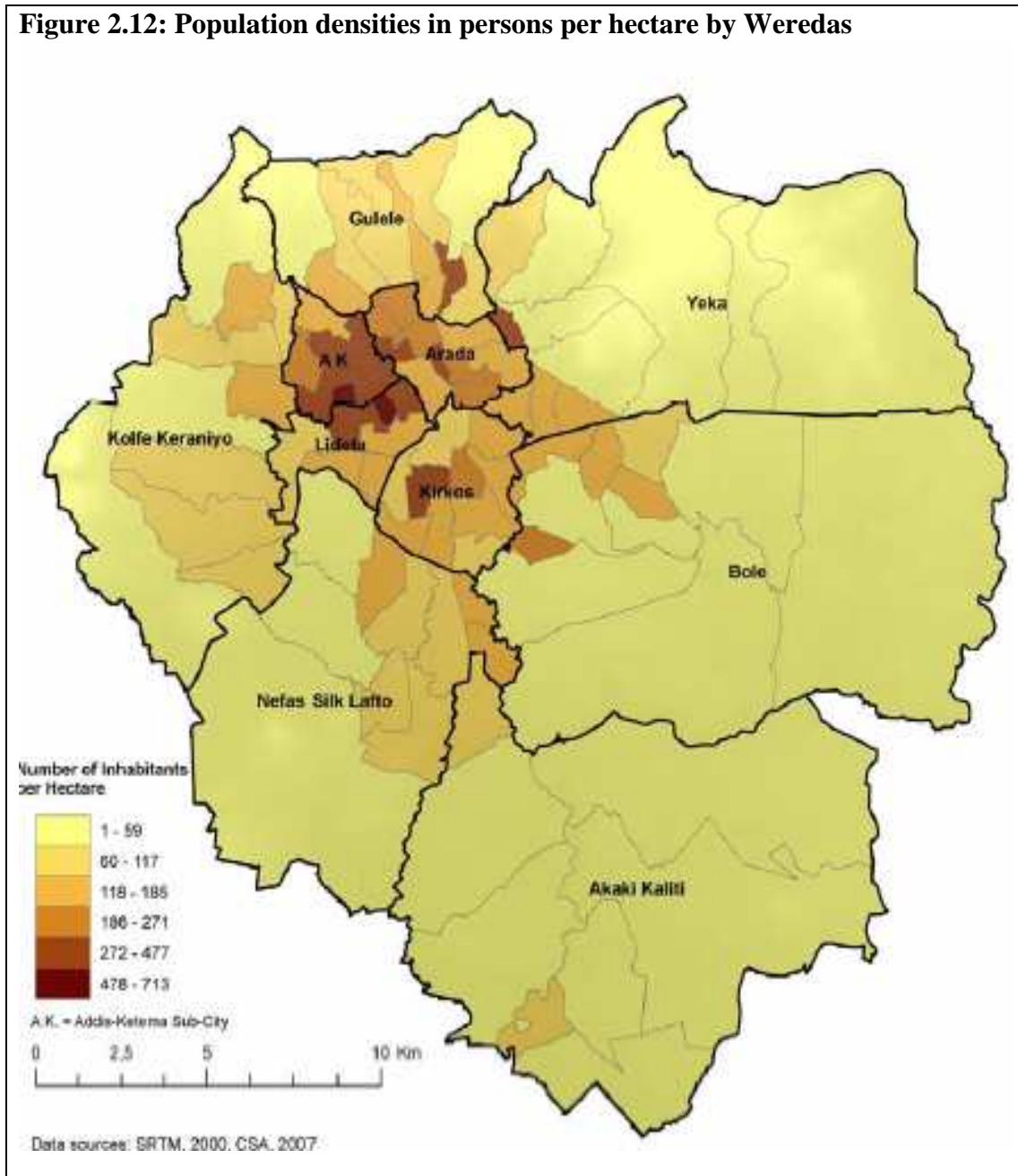
Figure 2.11: Population density of Addis Ababa by Sub City in persons per hectare in 2010



Source: Own work

Population distribution at the smallest administrative units reveals the same pattern of distribution. As shown in Figure 2:12, Weredas in the inner cities have higher densities and the density decreases as one goes from the central to peripheral Weredas.

Figure 2.12: Population densities in persons per hectare by Weredas



Source: BOFED, 2010C

Weredas located in the Sub Cities of Addis Ketema, Gulele and Arada have very high densities and some of them with densities as high as 713 persons per hectare. The density falls to less than 59 persons per hectare in peripheral Kebeles of the Akaki Kallit and Bole Sub Cities (See Figure 2:12). A closer examination at the densities at the sub cities and Kebele levels reveals the close relationship between settlement age and density. The oldest settlements of the city which consists of sub cities in inner core including Addis Ketema, Arada and Lideta are most

densely populated. The less densely populated sub cities of Akaki Kalti, Bole and Yeka have developed in recent years and currently these sub cities are going through rapid densification and urban sprawl. The inner sub cities with high population densities have been earmarked for urban renewal and the old traditional houses (known as “Chiqa” houses that are constructed from wood and mud with roof of mostly corrugated iron sheet) are being demolished on a large scale to give way to new multistory residential and business buildings. ORAAMP (2001) had categorically earmarked 18% of all housing stock in the inner core area of the city to be demolished.

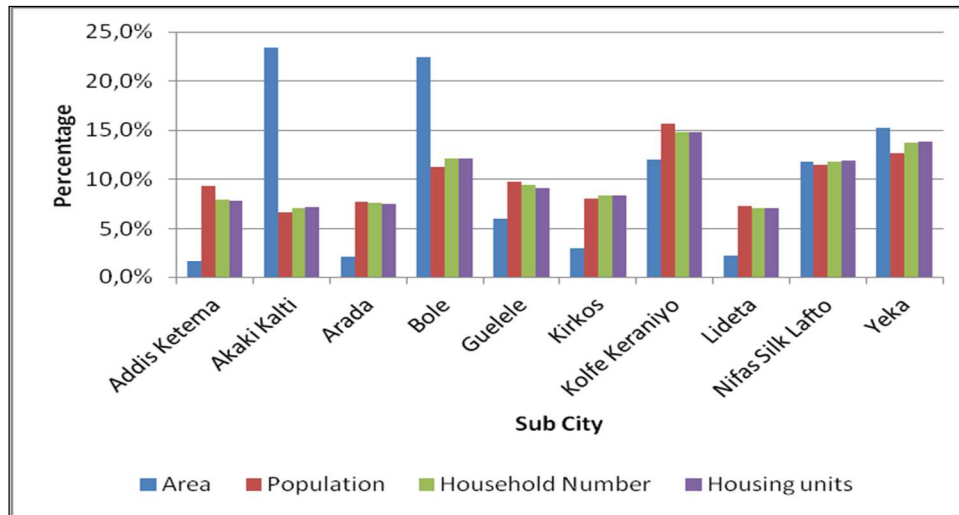
Most of the original residents are relocated to the fringe of the city and they hardly afford to buy the newly constructed residential houses in the inner city. Such pattern of urban development as defined by Mukoko (1996) as a process of “urban transmigration” in which the new buildings in the renewal areas are simply not affordable by the former residents and argued such pattern of urban development as unsustainable. As most of them are of low income group working or earning their living from activities in the inner core, this gentrification process and their residential relocations to peripheral areas of the city have increased trips lengths, transportation costs and disrupted their social relationship. Although widely recognized at policy level, on site relocation is not being promoted and implemented by the city administration.

Household size and number, an important planning parameter critical for estimating future demands for services and infrastructure facilities, show regional variation in the country. According to the CSA census report (2008), the national average household size for the country is 4.7, and the value for Addis Ababa is 4.1 heads per household. It is interesting to note that the mainly nomadic communities of the Afar and Somalia regions had the highest hold size with corresponding values of 6.6 and 5.5 heads per household size. The same report indicates that the Addis Ababa had 662,728 households with a total of 636,447 housing units, indicating a deficiency of 26,281 housing units for 2007 (CSA, 2008). According to data from the 1996 welfare monitoring survey of the CSA (BOFED, 2010a), 83% of all households live in traditional “Chiqa” houses. Moreover, the same study found out that about 97% of the housing stock in Addis Ababa is at the ground level.

On the other hand, occupying 4% of that total area of Addis Ababa, the informal housing accounts between 20% (BOFED, 2010a) and 25% (Yitbarek, et. al, 2011) of the total housing

stock. Figure 2.13 shows the percentage shares of area, population, household number and housing units by each sub city.

Figure 2.13: Percentages shares of area, population, household number and housing Units by Sub Cities



Source: CSA, 2008

In consistent with global trends in major urban areas, more urbanization and the increasing cost of living in cities, there is general tendency for the household size to further fall. This is evident by low natural increase of the city’s population and increasing number of single households. On the other hand, given modest growth of the city’s population which is little above the replacement rate or even assuming constant or declining population, the decline in the absolute size of population does not necessarily lead to a decrease in the number of households. On the contrary, with continuous process of decrease in the size of the household or increase in the number of single head households, there will be an increase in the number of households. Addis Ababa will likely have more number of households in the future with corresponding increasing demand for urban services and housing.

Rapid urbanization process in Addis Ababa has resulted in the increase of its population and the built up area. The urbanization sprawl has spread in all directions from the original nucleus at the center of the city. Rich agricultural lands have been absorbed into the urban space. The horizontal spatial expansion and urban sprawl has not been accompanied by vertical growth. Low density settlement structure, as the outcome of such dispersed pattern of urbanization in Addis Ababa, increases the costs of providing urban services and infrastructure. This is revealed

by poor level of service and inadequate access to infrastructure and utilities by all the city residents.

Rapid population growth, high land prices in the formal market and less affordability of rental housing in the city by the urban poor have led to the development of informal settlements. Such settlements which have little or no infrastructure and service facilities are mostly located on the outskirts of the city and satellite towns adjoining the city (Cohen, 2006). The informal settlements with their substandard housing are not only areas with poor or no infrastructure and service but are also under constant threat of demolition as the owners do not have title deed and tenure security. The urban renewal program is also displacing thousands of residents of the high density areas of Addis Ketema, Arada and Lideta. Most of the residents are being relocated and settled in the peripheries of the city or the “expansion area” of the east, west and south as defined in the city development plan (ORAAMP, 2001). The peripheries have mainly developed as dormitory towns and most jobs and services are concentrated in the inner city and the industrial zones in the south part of the city.

These two processes of formal and informal urban growth in the peripheries are generating more travel demands along major transport corridors, increasing trip lengths and transport costs. Urbanization has not been paralleled by economic growth that is sufficient enough to create new jobs and generate new revenues to finance the infrastructure and service needs of the growing city. The mismatch is manifested in poor transportation infrastructure, high unemployment rate (about 30% in 2009) and increasing poverty in which about 50% of the total households were in absolute poverty in 2009 (BOFED, 2010). Although growing, the city’s tax base is not high enough to finance the growing demand for services and infrastructure and there will be a huge gap between financing needs and available means (BOFED, 2010). Growth in urban population and physical expansion along with increasing multitude of demands of the population for urban services and infrastructure will complicate urban governance and management (Cohen, 2006).

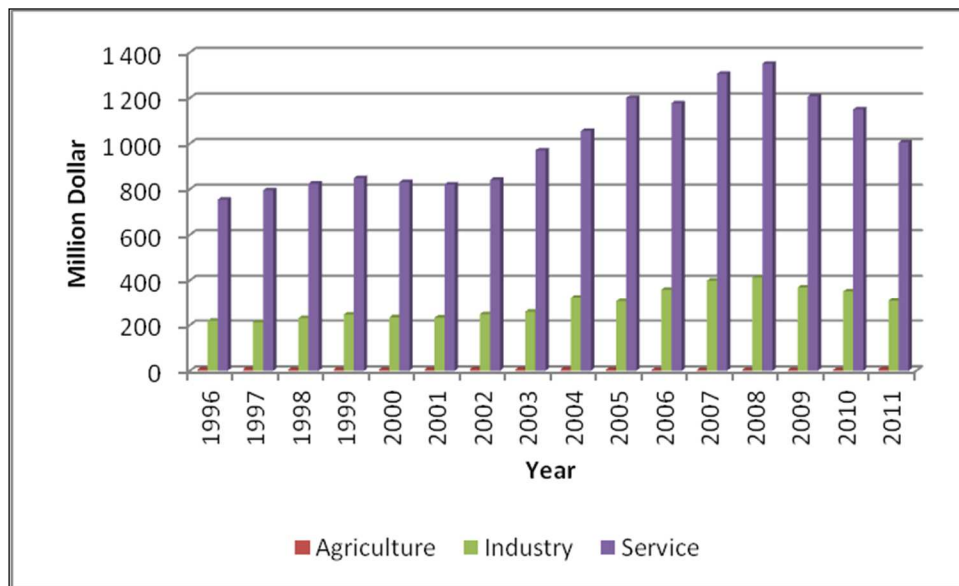
2.5 Economy

Addis Ababa is not only a political capital but is also the economic, financial and industrial heart land of Ethiopia and home to many educational and health institutions. About 85% of the manufacturing industries (FDRE, 2008), 38% of the government owned Commercial bank of Ethiopia and 51% of the insurance institutions are located in Addis Ababa (BOFED, 2010). The

contribution of the gross domestic product (GDP) of Addis Ababa to the national economy is not exactly known because of methodological differences in the calculation of the GDP and base year selection by BOFED for Addis Ababa and MOFED for the whole country (BOFED, 2008). Despite these technical problems of comparison, it is estimated that Addis Ababa economy with only about 4% of the national population accounts for about 25% of national GDP (World Bank, 2002b, & FDRE, 2008b).

The city's economy, as measured in terms of gross domestic product, rose from 979 million in 1999 to 1.8 billion US dollar in 2008 and declined to 1.3 billion US dollar in 2008. It grew at an annual average rate of 8.6% between 1999 and 2011 and the annual growth rate has increased to 10.3% in the period between 2007 and 2011. The service is the backbone of the city's economy with a share about 76%, followed by the industrial sector with a share of 23% and the agricultural sector with contribution of less than 1% of the city's total GDP. The contributions of each sector the city's GDP between 1999 and 2011 is shown in Figure 2.14. The contribution of the agricultural sector has been continuously shrinking mainly due to the conversion of the city agricultural lands into non-agricultural urban land uses (BOFED, 2008, & 2010b). The decline in the GDP volume from 2008 onwards is due to the currency devaluation in which the exchange rate of the Ethiopian Birr against US Dollar and other major foreign currencies has continuously fallen. The Ethiopian currency was trading at 7.69 Ethiopian Birr to a dollar in 1999, 8.71 in 2005, and 13.7 in 2010 (NBE, 2010) and is at present (July, 2012) being exchanged for 17.8 Ethiopian Birr for a dollar.

At the national level, the contribution of the agricultural sector to the national economy has decreased and it has been recently over taken by the service sector. Accordingly, the share of the agricultural sector to the national economy dropped from 51% in 1999 to 42% in 2010, while the service sector share increased from about 37% to 46% in the same period. The industrial sector contribution to the national economy has remained almost constant in the same time period (NBE, 2010).

Figure 2.14: Addis Ababa gross domestic product at constant factor cost from 1996 to 2011 in Million US Dollar

Source: BOFED, 2008 & 2010c

The national GDP Per Capita increased from 134 US Dollar in 2000 to 239 in 2006 and decreased to 141 US Dollar in 2010 (NBE, 2010). On the other hand, Addis Ababa's real GDP per capita is about three times larger than the national average. The city's GDP per capita is annually growing by 8% (BFED, 2010b). It rose from 454 US Dollar in 2000 to 539 dollar in 2005 but slightly decreased to 515 US Dollar in 2011. The decrease of GDP per capita at the national level in 2005 to 2010 period is again attributed to the currency devaluation, despite high economic growth (NBE, 2010, & BOFED, 2008). Generally by international comparison, the GDP per capita nationally and at the city level is low. The picture for Addis Ababa is much better which has twice as much as GDP per capita of the country. However as an average, the GDP per capita does not show the real distribution among the population and in fact the gap between the rich and the poor is believed to be increasing. It is estimated that in Addis Ababa as high as about 50% percent of the City's population lives in absolute poverty (FDRE, 2008, & BOFED, 2010a) and the proportion of the population living in absolute poverty for the country as a whole will indeed be much higher than that of Addis Ababa.

The detailed estimation provided by BOFED (2008) shows that the transport and communication sub group of the service sector is significantly important in wealth creation, service provision and employment generation in Addis Ababa (See Appendix 8 & 9). Form second position in importance after real estate, renting and business services in 1996, the

transportation and communication service rose to become the dominant subsector in 2005. It grew at an annual rate of 5% to 9% between 2003 and 2005, its share of the service sector increased from 25% in 1996 to about 30% in 2005 and that of its contribution to the city's GDP increased from 19% in 1996 to 23% in 2005. Moreover, the formal and informal public transport sector in the city is also source of livelihood for many city residents particularly for those with little qualification.

2.6 Finance

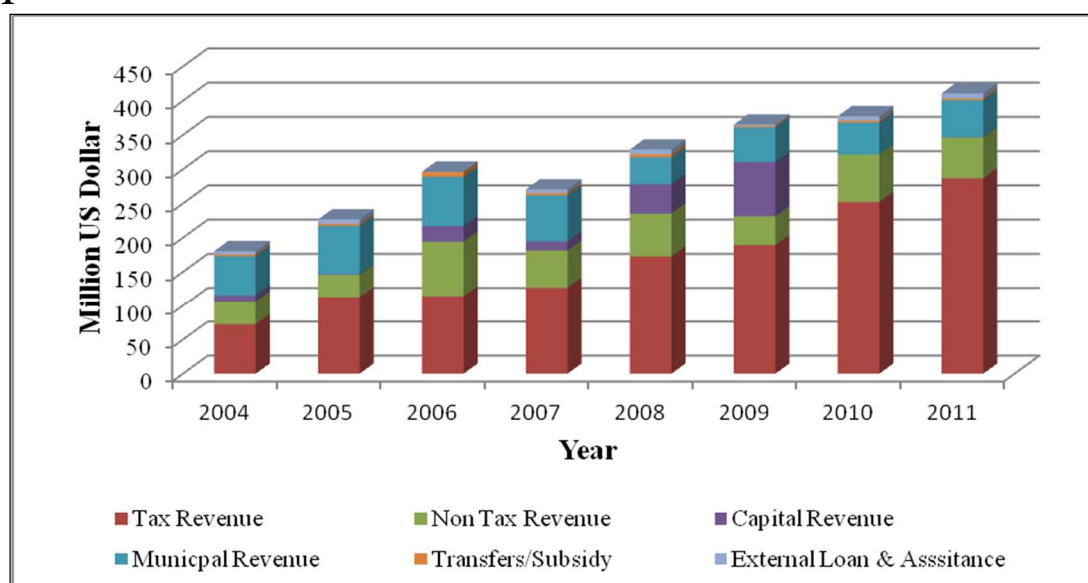
As self-governing chartered city, the city government of Addis Ababa is not entitled to get budget grant or transfer from the federal government. This puts the city in unique position relative to other regional state governments and the chartered city of Dire Dawa. The regional governments and Dire Dama get a substantial amount of their budgets from grants by the federal government according to transfer criteria approved annually by the government. The argument given for the exclusion of Addis Ababa as beneficiary from the federal government budget is the city's better financial position relative to other regional governments. Indeed according to BOFED (2010b) in the period between 2004 and 2009, the city's revenue was about 56% of the total revenue collected in the whole country.

2.6.1 Revenue

The charter has granted the city the right to directly borrow from local sources through issuing bonds but can only do so provided the federal government gives the city the authorization to sell bonds. The sub cities and the lowest local government are not authorized to borrow from any source. The city can also borrow from external sources but only through the federal government (FDRE, 2003). Addis Ababa, therefore, has to depend almost exclusively on its own internally generated revenue to finance its development programs. Subsidy from the government and external assistance and loan play a marginal role in the city's fiscal structure. Under this circumstance, it has become imperative for the city government to increase and diversify its revenue in order to finance the various programs and development projects directed at reducing poverty and unemployment and financing the growing demands for urban infrastructure, services and utilities. Successive city governments that came into power since 2002 have given the issue of increasing tax base and revenue as major development priority in their programs. To that end and within the framework of the power and authority given to the

city by the charter, various and fundamental reform measures were instituted including tax reform, modernization and automation of the revenue collection mechanism, decentralization of the revenue collecting agency down to the lowest level of government, improvement in municipal service charges and enhanced efficiency in municipal service delivery. These measures have led to continuous increment in revenue volumes and thus the City's total revenue has annually increased by 25% since 2000.

Figure 2.15: Revenue of Addis Ababa city government in Million US Dollar from 2004 to 2011



Source: BOFED, 2012

The total revenue increased from 181 million US Dollar in 2004 to 411 million US Dollar in 2011 (See also Figure 2.15). However, there was a drop in the total revenue volumes in 2007 mainly due to the decrease in non-tax revenue (land lease) caused by the non-functional land administration department which was not able to auction sufficient land for lease. Similarly, the revenue to GDP ratio has also successively increased in the same time period as shown in the Table 2.2. It is important to note that the tax to GDP ratio or percentage (the higher the better and more sustainable) has been on the increase over the years and is higher than the national tax to GDP ratio, which was 13%, 12.8%, 12.7%, 10.1%, 9.6%, 6.9% and 11.3% for the years 2004 through 2010 respectively (NBE, 2010, & BOFED, 2012).

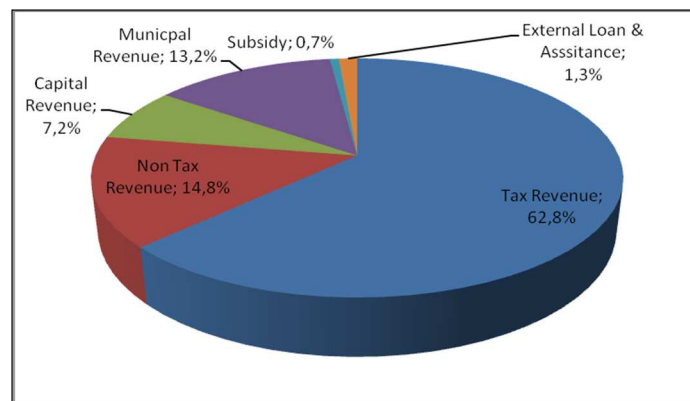
Table 2.2: Percentage of revenue as GDP of Addis Ababa between 2004 & 2011

Revenue Type	2004	2005	2006	2007	2008	2009	2010	2011
Tax Revenue	5,2%	7,5%	7,1%	7,4%	9,8%	12,0%	16,7%	21,8%
Non Tax Revenue	2,4%	2,2%	5,0%	3,2%	3,5%	2,7%	4,6%	4,5%
Capital Revenue	0,7%	0,1%	1,4%	0,8%	2,4%	5,0%	0,0%	0,0%
Municipal Revenue	4,2%	4,7%	4,5%	3,9%	2,2%	3,2%	3,1%	4,1%
Transfers/Subsidy	0,2%	0,2%	0,4%	0,2%	0,3%	0,1%	0,2%	0,2%
Total Domestic Revenue	12,7%	14,6%	18,5%	15,5%	18,2%	23,1%	24,6%	30,6%
External Loan & Assistance	0,4%	0,4%	0,0%	0,3%	0,4%	0,1%	0,4%	0,6%
Grand Total	13,0%	15,0%	18,6%	15,9%	18,6%	23,2%	25,1%	31,2%

Source: BOFED, 2012

Of the total revenue, about 99% was generated from own sources and the rest was subsidy from the federal government and marginal external loan and assistance. The city’s revenue distinguishes six major types of revenue and these according to their order of importance are tax revenue, non-tax revenue, municipal revenue, capital revenue, external loan and assistance and subsidy from federal government and the shares of each of these revenue types to the city’s total revenue is shown in Figure 2.16.

Figure 2.16: Average percentage shares of revenue types from the total revenue from 2009 to 2011



Source: BOFED, 2012

The importance of tax revenue as main source of revenue has steadily increased over the years and in 2011 its share was about 70% of the total revenue and 22% of the total GDP of Addis Ababa. The tax revenue to GDP ratio of Addis Ababa, which was about 17% in 2010, is higher

than national ratio of 11% for the same year (NBE, 2010). The lion share of the tax revenue is generated by tax on income, profit and capital gains mainly through taxes on wage, salaries, individual profits and value added tax (VAT). Tax on income and value added tax together contributes to 93% of the tax revenue and 65% of the total revenue in 2011. The role of VAT as source of revenue is likely to increase as capturing all VAT payers and automating all VAT transactions has become a top priority of the federal revenue authority.

Non-tax revenue, second in importance as a source of revenue, is generated through administrative fees and surcharges, sales of public goods and services and urban land lease. Land in rural and urban Ethiopia is state property and income through sell of public urban land is channeled to government treasury. Urban land lease contributed to about 64% of non-tax revenue and 9% of the total city revenue in 2011. Urban land lease revenue is unsustainable and has been very variable over the years as it depends on the total area of urban land auctioned for lease which in turn depends on the availability of serviced land in the “green” or new expansion areas and cleared land in “brown” or settled areas where relocation and compensation issues must be solved beforehand.

With potentials for higher revenue shares than at present, the main sources of municipal revenues in Addis Ababa are sales of goods and city services, municipal rent revenues, municipal taxes and municipal service charges. The largest single contributor of the group is sales of goods and service amounting to 53% of the non-tax revenue and 7% of the total revenue for 2011.

Lastly, the capital revenue is the revenue earned through the sell or transfer of condominiums to owners built by the Housing Development Administration Project Office. The program has been mainly financed mainly through tax payers’ money but since 2008 it being financed through bonds sold to the Commercial Bank of Ethiopia- a governmental Bank. The program started in 2002 and through the project office thousands of condo houses were built and transferred to individuals. Its share of the total revenue was 21% in 2009 and the volume of the revenue has been declining since 2010 for the income earned through the sell was directly transferred to the Commercial Bank to repay the principal and interest of the loan borrowed from the Bank.

2.6.2 Expenditure

A number of strategic plans prepared in the period since 2003, including the City's strategic plan of 2007 to 2010 and later revised by the strategic plan of 2009 to 2013, have all identified poor governance and limited implementation capacity, poverty and unemployment, housing shortages, poor transport infrastructure, environmental pollution and degradation, poor quality and low coverage of the social services and prevalence of HIV as major development challenges of the city (BOFED, 2010b). These strategic plans, which have also taken into account the targets set in the Millennium Development Goals (MDG) and the national development programs, have been designed at addressing and mitigating these key development problems of the city. It is worth noticing that the transport sector is neither mentioned as a development challenge nor remedial measures proposed. This is not because transport is not a key problem but rather because the transport authority having the city's transport agenda was simply absent in the city government structure. As a derivative of the strategic plans, the annual development plans formulated since then have set annual targets of achieving the set projected goals. The city's expenditure structure reflects the development priorities set in the strategic plans.

As the city's revenue has been on the increase over the years, so does the annual city expenditure budget. It increased from 167 million dollar in 2004 to 390 million in 2010. The share of the city's expenditure to the GDP, as shown in Table 2.4, rose from 12% in 2004 to 34% in 2009, whereas the ratio of national expenditures to national GDP decreased from about 24% in 2004 to 19% in 2010 (NBE, 2010).

Recurrent expenditures, though low, are on the increase due mainly to the increase in the number of sector bureaus and corresponding staff. The number of sector bureaus has increased from seven in 2006 to twelve in 2009 and the increment was also implemented at all tiers of the city government (AACG, 2009). Growth oriented, employment generating and poverty alleviating programs and projects, in line with the city's consecutive strategic plans, have been given priority in the city's expenditure budget. The share of capital project in the overall city budget, as is indicated in Table 2.4, was proportionally higher than the recurrent budget and is also projected to remain higher in the future, about 76% of the total city expenditure for the period 2012 to 2013 (BOFED, 2010a, & 2010b).

The share of infrastructure investment mainly road sector development and public housing program to the city's GDP was relatively higher. The two development programs accounted on

the average for about 8% of the GDP between 2004 and 2011 and as shown in Table 2.4, the two programs share peaked to about 14% of the GDP in 2009.

Table 2.3: Percentage shares of Addis Ababa city government expenditures between 2004 & 2011

Expenditure Category	2004	2005	2006	2007	2008	2009	2010	2011
Salary & Benefits	27,6%	24,5%	21,0%	20,1%	18,6%	16,2%	22,3%	22,3%
Purchase of Goods & Services	19,4%	14,1%	12,9%	11,3%	8,7%	10,7%	13,6%	13,6%
Fixed Assets & Construction	40,7%	51,3%	57,8%	58,9%	66,6%	65,2%	49,0%	47,4%
1. Public Housing	4,4%	24,3%	32,8%	20,2%	32,6%	20,8%	0,0%	0,0%
2. Road Infrastructure	27,4%	16,2%	14,1%	24,0%	23,9%	20,2%	24,5%	24,9%
3. Others	8,8%	10,9%	10,9%	14,7%	10,1%	24,1%	24,4%	22,4%
Others Payments	12,3%	10,1%	8,3%	9,6%	6,1%	7,9%	15,1%	16,8%
4. Subsidy to Anbessa City Bus	2,4%	4,2%	2,1%	1,9%	1,1%	0,5%	0,7%	1,7%
5. Public Debt Payment	0,1%	0,0%	0,0%	0,1%	0,3%	1,3%	5,1%	8,9%
6. Others	9,8%	5,9%	6,2%	7,6%	4,7%	6,2%	9,4%	6,2%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Source: BOFED, 2012

Table 2.4: Percentage of expenditure as GDP of Addis Ababa between 2004 & 2011

Expenditure Category	2004	2005	2006	2007	2008	2009	2010	2011
Salary & Benefits	3,3%	2,8%	3,4%	3,6%	4,3%	5,5%	5,8%	6,5%
Purchase of Goods & Services	2,3%	1,6%	2,1%	2,0%	2,0%	3,7%	3,5%	4,0%
Fixed Assets & Construction	4,9%	5,8%	9,4%	10,6%	15,5%	22,3%	12,7%	13,9%
7. Public Housing	0,5%	2,8%	5,3%	3,6%	7,6%	7,1%	0,0%	0,0%
8. Road Infrastructure	3,3%	1,8%	2,3%	4,3%	5,6%	6,9%	6,4%	7,3%
9. Others	1,1%	1,2%	1,8%	2,6%	2,3%	8,2%	6,3%	6,6%
Other Payments	1,5%	1,1%	1,3%	1,7%	1,4%	2,7%	3,9%	4,9%
10. Subsidy to Anbessa City Bus	0,3%	0,5%	0,3%	0,3%	0,2%	0,2%	0,2%	0,5%
11. Public Debt Payment	0,0%	0,0%	0,0%	0,0%	0,1%	0,4%	1,3%	2,6%
12. Others	1,2%	0,7%	1,0%	1,4%	1,1%	2,1%	2,4%	1,8%
Total	12,1%	11,4%	16,1%	18,0%	23,3%	34,2%	25,9%	29,4%

Source: BOFED, 2012

The integrated public housing development project was launched in 2004. Its main objective was the construction of low cost public houses or condominiums on a large scale so as to reduce the huge gap between housing demand and supply. The program was also designed to promote micro and small scale enterprises in the housing construction sector, create employment

opportunities and generate other multiplier effects in the city's economy as a whole. Accordingly, between 2004 and 2010, the city government constructed 78,000 housing units with total capital outlay of 392 million US Dollar. The city government has set a target of constructing a total of 150,000 housing units from 2011 to 2013 (BOFED, 2010b).

With increasing financial difficulties faced by the city government on financing this huge and ambitious mass housing program, the city government started in 2008 selling bond to Commercial Bank of Ethiopia. In an agreement reached between the city government and the Commercial Bank of Ethiopia, the loan from the issuing of the bond was to be repaid in three years period, it has a grace period of two years and the principal was to be paid in the third year. The federal government gave the collateral. Initially, the city government issued a bond worth of 1 Billion Ethiopian Birr (about 105 million USD at the 2008 exchange rate). A number of bonds have been sold to the commercial bank since then, although at the outset the bank has a put a ceiling of only buying a bond worth 1 Billion Ethiopian Birr and other further loans were to be granted on the full payment of the initial loan. The interest rate was lower (5%) than interest rate payable by other borrowers. Debt repayment of the public housing program to the commercial bank has, therefore, increased from less than 1% of the GDP in 2009 to about 3% in 2011 and its share of the overall city expenditure budget has increased from about 1 % to about 9% in the same time period.

It is important to note that the share of the public housing program from the total expenditure has fallen to zero since 2010. As of 2010, however, the program has started to be fully financed by bank loan through special agreement reached between the city government and the Commercial Bank of Ethiopia back in 2008 on one hand, and between the commercial bank and the owners of the condominium houses on the other. According to this arrangement, the principal and interest payment are to be directly collected from the owners on the transfer of the completed condominium houses to individuals. The loan and interest payment extends between 10 and 20 years and in case of default by individuals, the city government will take over the payment.

The city's strategic plan of 2010 to 2013 has set the target of increasing road density from 10% at present to 15% at the end of 2013 (BOFED, 2010b). The road infrastructure expansion program is the second major capital development priority of the city. Both its share of the city's GDP and the city's government expenditure has been increasing as is shown in Tables 2.3. The public expenditure on the transport sector, however, is significantly low. The share of the sector

to the city's GDP is less than 1% and accounted for 2% of the city total budget in 2011. The only visible investment to the transport sector is passenger terminal construction and subsidy given to the formal Anbessa City Bus Enterprise.

The transport sector development programs set in the city's development plan 2001 to 2010 that included projects in improving the public bus transportation service, introduction of new modes of public transportation, public transport priority schemes, and traffic management measures were hardly implemented. The institutional problem that emerged due to the transfer of the city's transport bureau to the federal ministry of transportation and consequent absence of own transport authority at the city government level explains the low budget share of the transport sector. Ultimately, this could have contributed to the current urban transport challenges in Addis Ababa as exemplified by widespread congestion along the major corridors, shortages and poor coordination of public transportation, parking shortages and wide spread on-street parking, poor traffic management, high traffic accident, and poor integration of land use and transport.

Poverty and unemployment are major development challenges of Addis Ababa. In 2010, about 50% of the total households were living in absolute poverty and 28% of the total city population is classified as unemployed. Female unemployment rate is about 38% and is much higher and almost twice as much as male unemployment (BOFED, 2010a). Much worse, inflation in Addis Ababa is a higher than the country (BOFED, 2010b, & NBE, 2010). It has been on upward trend since 2006 and the government seems handicapped to reverse the trend. The total annual average inflation in April, 2012 stands at 36%, with food inflation of 46% and non-food inflation of 23% (CSA, 2012). The vicious circle problems of high unemployment and poverty fuelled by high and rising double digit inflation will push the number of poor and unemployed to higher levels. Transportation charges for uses of the various modes of public transportation in the city have also risen so sharply that prices now are three to four times higher than the prices in 2008. Given the present incapability to control inflation with appropriative monetary and fiscal policy measures and resistance to recognize it, until very recently, as mainly internally generated problem (often defined as "imported inflation" caused by high global fuel price), the future is bleak and the question under this circumstance is "how does the urban poor cope with these problems and what other options are left for them in satisfying their basic needs?"

2.7 Urban development and planning

Addis Ababa, alike many major African cities, was born at the turn of the 19th century (Abeje, 2000) and its successive development happened mostly on the ground and vertical growth is a recent phenomenon. Yet the city is quite distinct from most of them for it was not founded by colonial powers. The dualistic settlement structure of the colonial African cities that continued after independence (Mukoko, 1996) is apparently lacking in Addis Ababa. The city original development was not guided by any master or physical plan, although in the ensuing period different physical plans with different objectives were prepared to guide and direct the spatial development of the city. Most of these plans were prepared by foreign consultants. These development plans of the different periods often reflect the political agenda of the ruling power.

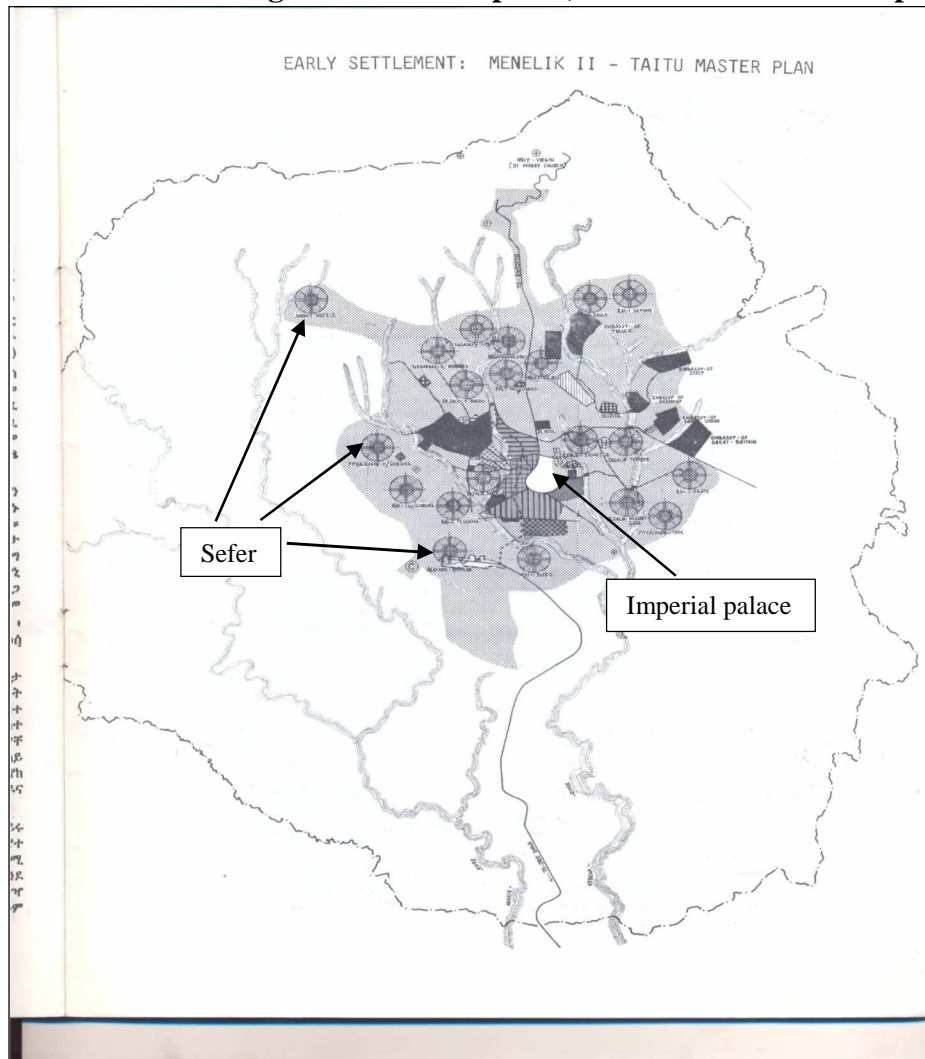
Addis Ababa's spatial development could be analyzed under five different and distinctive phases of urban development and planning. Each of these periods has left its mark in the urban landscape of the city. The first phase is the time between its foundation and the coming of the Italians in 1935, the next phase is the short period of the Italian occupation between 1936 and 1941, the third was the imperial times extending until the overthrow of the monarchy in 1974, fourth is the period of the military government which culminated with its overthrow by rebel forces in 1991, and the current phase since 1991 (Engelhard, n.d.; Tufa, n.d.; AACC, 1986; Abeje, 2000; ORAAMP, 2001; & Tolon, 2008).

In its earliest phase of origin and development, the city developed spontaneously from its original nucleus around the Finfine hot springs. The imperial palace served as the hub of the new settlement (colored white in Figure 2.17). The adjoining areas around the imperial palace were given to different war lords of the emperor (the circles in Menelik and Taitu Master plan in Figure 2.17), each of which also became focus of new development around them (Tufa, n.d.). These enclaves or "Sefers"⁵ got the names of those who established them and some of quarters in the oldest part of Addis Ababa still retain the names of their founders. During this period three centers, namely; "... the Menelik palace (the political and administrative center), the Arada St. George church (social and religious center), and the Arada area (business and market center)" (ORAAMP, 2001, p.6) were important in shaping future development of the city. The city grew outward to the north, northwest and south from these main focal areas with Sefers

⁵ These are neighborhoods.

further becoming a secondary node of development in the settlement hierarchy (ORRAMP, 2001).

Figure 2.17: Addis Ababa original settlement plan (Menelik - Taitu master plan)



Source: AACC, 1986

The second phase of urban development is the period from 1936 to 1941. The first attempt to guide the development of through some form of master plan started during this short lived Italian occupation of the Second World War. Le Corbusier was given the task of preparing the master plan for the city in 1936, a city he never saw. He proposed a major road structure plan for the city based on his radiant city concept but failed to get the approval of the Italians for it was far removed from reality (Addis Ababa City Council, 1986, & ORAAMP, 2001). Dissatisfied with the proposal of Le Corbusier, the Italians mandated the preparation of the master plan of the city to two Italian famous architects, I. Guidi, and C. Valle. In line with the

Italian colonial policy, they proposed a dualistic city structure, a native quarter and European quarter. Zoning was introduced and the main axis of the city development was to be oriented towards the south instead of the mountainous north. Merkato, the major current market center along with Addis Ketema with its grid pattern of streets along its western part and a quarter reserved for the natives, largely owe their origin to the master plan of Guidi and Valle. (Addis Ababa City Council, 1986).

In 1956, Sir Patrick Abercrombie prepared a land use plan for the city centered on the concept of neighborhood units. He proposed a green zone around the core of the city and a system of satellite towns around the core and which are to be linked by a system of ring and radial roads structure (AACC, 1986, & ORAAMP, 2001).

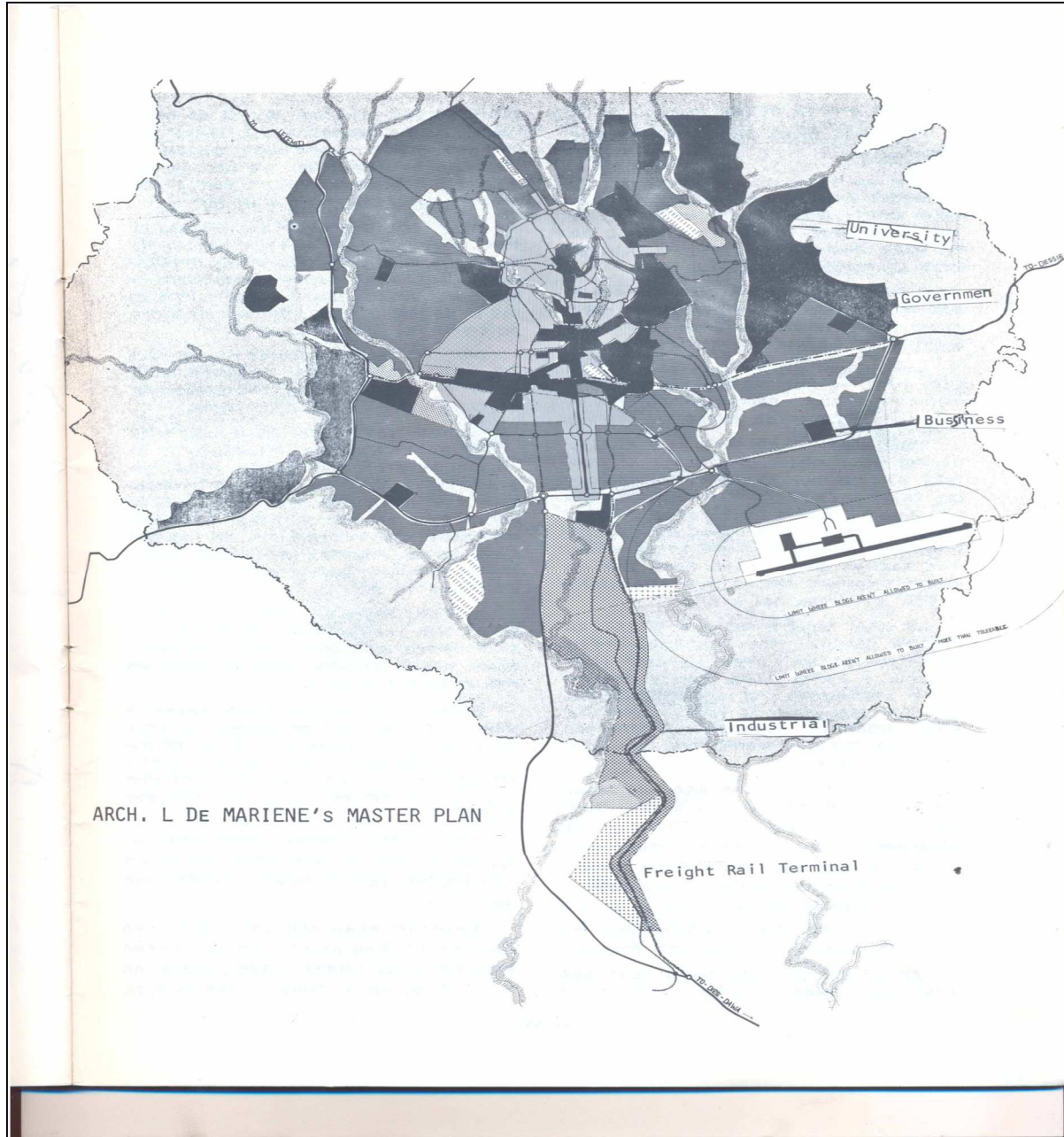
Three years after, a British urban planning consulting firm of Bolton Hennesy & Partners was given the task of preparing a new master plan based on the two earlier master plans of the city. Accordingly they refined the ring road structure of Abercrombie, proposed a hierarchical system of satellite towns around the city, the creation of a green buffer zone around the core of the city and the establishment of industrial zones in the southern section of the city and in all satellite towns. Their proposed street networks and satellite towns were partly implemented (Tufa, n.d., AACC, 1986, & ORAAMP, 2001).

In 1965, the city got plan (See Figure 2.18) by a French architect, L. De Marien. His main proposals include the development of the wide boulevard running in north-south direction from the current location of the municipality to the railway station and extending further south, making Piazza the main passenger transport terminal, the maintenance of the rail passenger terminal at Lagare and the relocation of the freight terminal from Lagare to Kaliti in the south, and the establishment of sub centers along strategic areas of the city (AACC, 1986). Many of the proposals were implemented, as the plan preparation coincided with large scale construction activity of the period (ORAAMP, 2001).

The major development that happened at the beginning of the military socialist government that stayed in power between 1974 and 1991 was the nationalization of all urban land and rental houses. With the famous proclamation No 47/75, all land (both in urban and rural Ethiopia) and rental houses became a public property, a legacy which is still in practice in Ethiopia. The nationalization of rental houses curtailed the development of private housing construction which in turn pushed the housing deficit to unprecedented degree. On the other hand sensing the magnitude of the problem, the government promoted the development of residential housing

development. Both the urban and rural local governments were empowered with the right to issue plots of land for those without own houses. This has a twofold effect on the development of Addis Ababa. First, the period saw the development of the major self-help cooperative housing program financed through subsidized bank loans and which enabled many city residents to own houses. Expansive agricultural lands in the east, west and southwest were converted into urban land uses which gave way to new cooperative residential areas of Gerji, Kotebe, Lafto, Mekanissa, and Keranio. Second, the period heralded the beginning of the explosive growth of informal settlements in mainly agricultural and peripheral areas of the city.

Figure 2.18: Addis Ababa master plan of 1965 by Luis De Marien

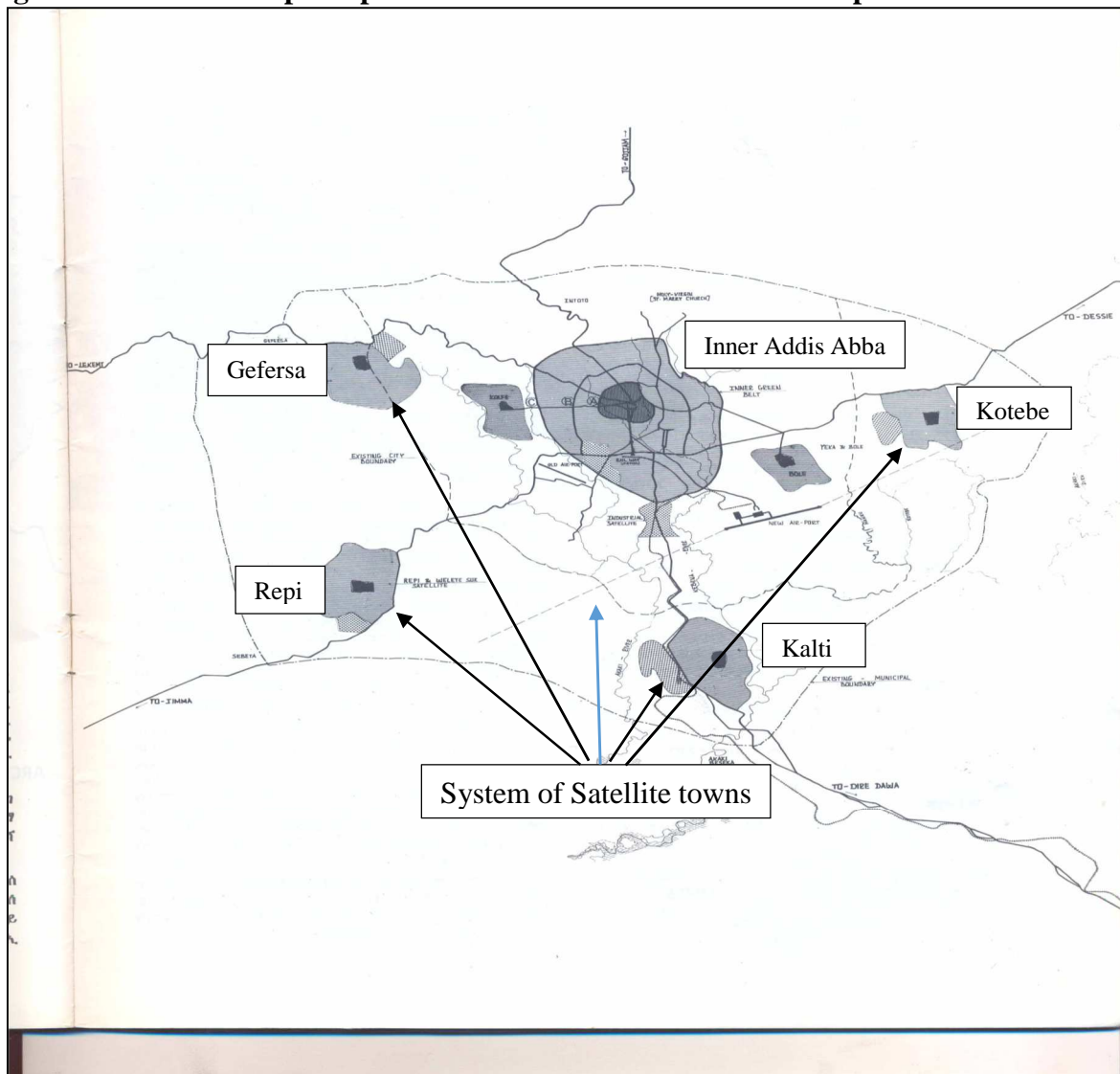


Source: AACC, 1986

During this period, two master plans were prepared to guide the development of the city in accordance with the socialist political and ideological policy of the government. In 1978, a Hungarian planner named C.K. Polony prepared the new master plan for the city whose main contributions included strengthening urban rural linkages of the city, and the development of a mega corridor and megalopolis between Addis Ababa and Nazareth, a corridor of about 100 km long. He also redesigned the Revolutionary Square to accommodate large public gatherings

and conduct military parade in line with the socialist practices of the day. He also prepared the design plan for the cooperative public housing programs (Tufa, n.d.; AACC, 1986; & ORAAMP, 2001). ORRAMP (2001) categorically emphasizes the implementation of the Revolutionary square proposal in that period as a major “spatial transformation”. Now renamed as Meskel Square, it is continuing to serve as a place for the major public gathering and religious celebrations.

Figure 2.19: The conceptual plan of the 1986 Addis Ababa master plan



Source: AACC, 1986

The Addis Ababa Master Plan Project Office (AAMPPO), established in 1984 under the framework of Ethio-Italian technical cooperation with Ethiopian and Italian professionals, prepared the last detailed master plan during the period of the military government. The plan

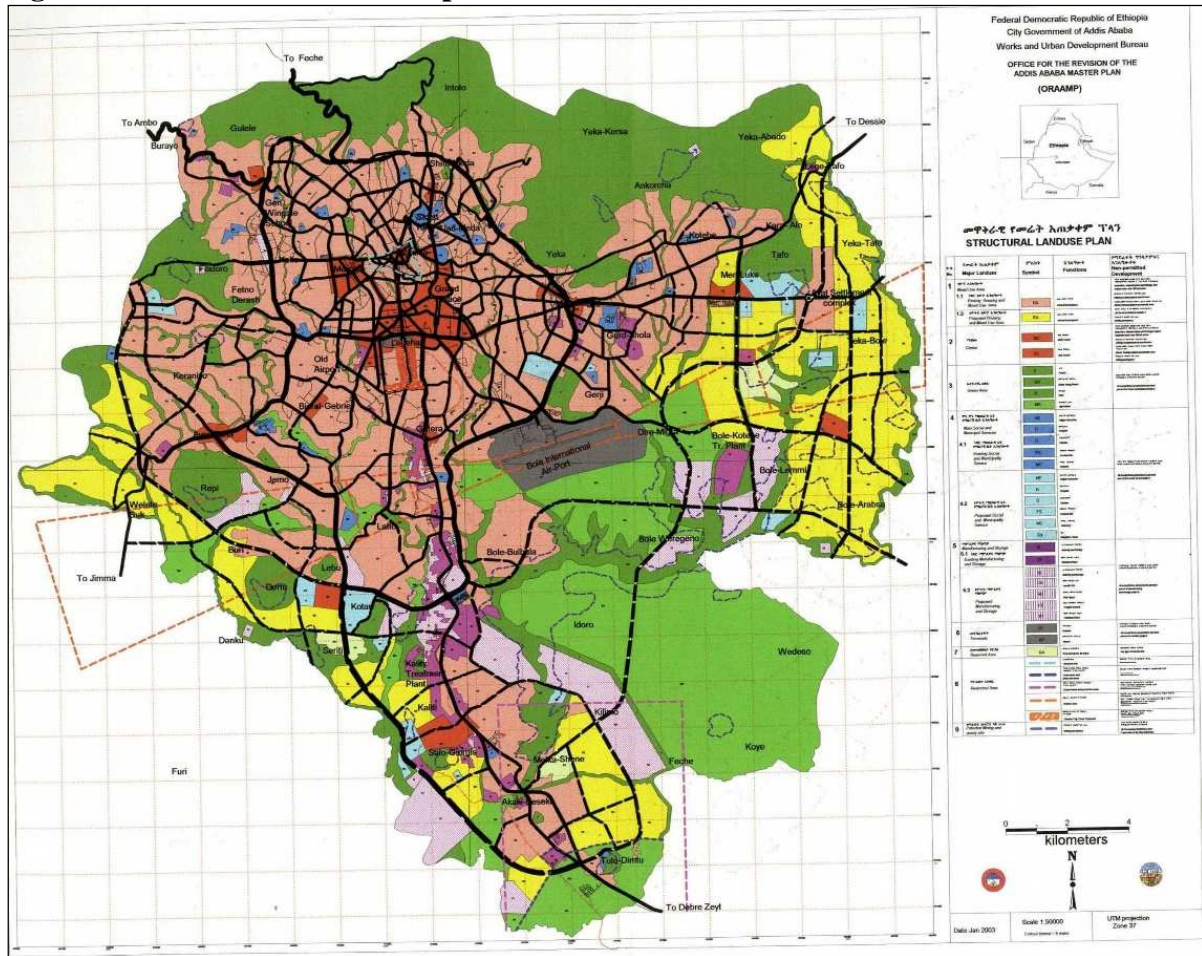
was one of the most exhaustive and detailed master plan the city ever had and was designed to guide the development of the city for 20 years. The plan had furthered the idea developed by Polony (ORRAMP, 2001). It envisaged therefore the development of a metropolis, a decentralized spatial structure centered on new sub centers or “Ketena⁶”, the promotion of industrial land uses in new residential development areas of the east, west and south (See Figure 2.19). The city was proposed to grow also southwards to incorporate Akaki as mainly industrial areas and freight terminal (AACC, 1986). The construction of the ring road as proposed in this master plan was a major feature that changed the structure of the city along with consequent impacts on accessibility and mobility. The 1986 plan was approved in 1994 eight years after its completion in 1986 (Tufa, n.d.). As a capacity building outcome of the cooperation project, the National Urban Planning Institute (NUPI) was established as national planning institute for the planning of urban centers in Ethiopia.

The city government established in 1998 the Office for the Revision of Addis Ababa Master Plan (ORAAMP) to revise the 1986 master plan. The need for the revision of the master plan was necessitated by change of the political and economic system of the country from strong centrally controlled socialist government and command economy of the military government to that of federally structured and market oriented economy of the current government. Moreover, it was argued (ORAAMP, 2001) that 1986 master plan had also technical problems in that it was too comprehensive, failed to indicate means of implementation, involved little community participation, lacked to identify compromising solutions and prioritization mechanisms among conflicting interests, failed to indicate how the proposed hierarchy of centers was to be implemented, exclusively assumed public investment as means of implementation and totally neglected the role of private investment and above all failed to propose the institutional set up required for the implementation of the master plan. Taking into account these major draw backs of the 1986 master plan, recognizing the changed role of the government from provider and controller to that of enabler and regulator and the increased importance given to the leading role of the private sector in urban development, the city government adopted the hybrid “Structural and Action Oriented Strategic Planning” approach to revise the 1986 master plan of the city. The 1986 master plan itself has also recommended the timely future revision of the plan in response to the new city dynamics caused by spatial

⁶ It is an administrative unit consisting of many local governments.

and socioeconomic changes. The revised master plan was to frame the development of the city from 1999 to 2010, and cognizant of the major failure of the traditional master planning approach, which according to McGill (1998, p.465) is ‘...the divorce of planning from budgeted implementation’; the revision process was founded on the principle of the inseparability of planning and implementation.

Figure 2.20: The 2001 structure plan of Addis Ababa



Source: ORAMP, 2001

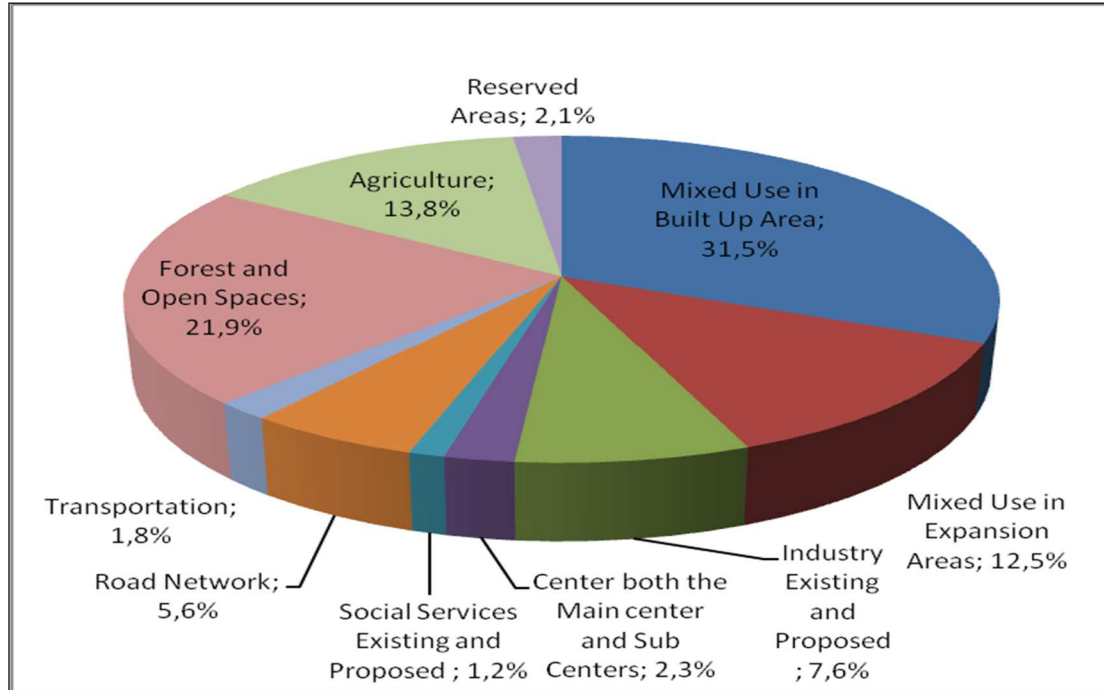
The structure plan, as portrayed in Figure 2.20, defined the long term spatial framework for future infrastructure development and investment, the action oriented strategic development framework, action plan provided the policy framework and instruments for prioritization and implementation of the proposed development projects for the planning period. The whole process was to be guided on principles of participatory planning. Four end outputs were expected at the onset of the revision process (ORAMP, 2001).

1. The structure plan and local development plans for strategic investment areas of the city;
2. The strategic development framework and action plan for six major and strategic sectors of housing, road and transport, industry and warehouse, redevelopment, upgrading and environment;
3. Pilot projects for testing some projects at smaller spatial scale before their large scale implementation; and
4. Urban management and capacity enhancement as a tool of decentralized city governance and institutional restructuring proposed in the revised master plan.

The plan proposed a compact city for 3.8 million by 2010. It envisioned “...a safe and livable city, an effective center for national economic growth and Africa’s diplomatic capital” (ORAAMP, 2001 p.14). The structure plan proposed a city to be founded on system of functional hierarchy of centers consisting of one main city center in the center, three sub centers in the east, west and south corresponding to the planned direction of growth and a number of tertiary centers. The structurally defining element of the master plan is a system of major roads composed of ring road and radial roads running in the east-west and north-south directions. Major housing developments were proposed in the east and southwest of the city, green areas in the mountainous areas of the north and west and urban agriculture in the plains of the southeast mainly to serve as buffer from settlements for the Addis Ababa international airport located close to the city center (See also Figure 2.20).

The distribution of proposed land uses among the different components of the structure plan is shown in Figure 2.21. Forest, open spaces, agricultural and reserved area accounting for about 38%, mixed uses for 44 % and road and transportation for 7% of the total area.

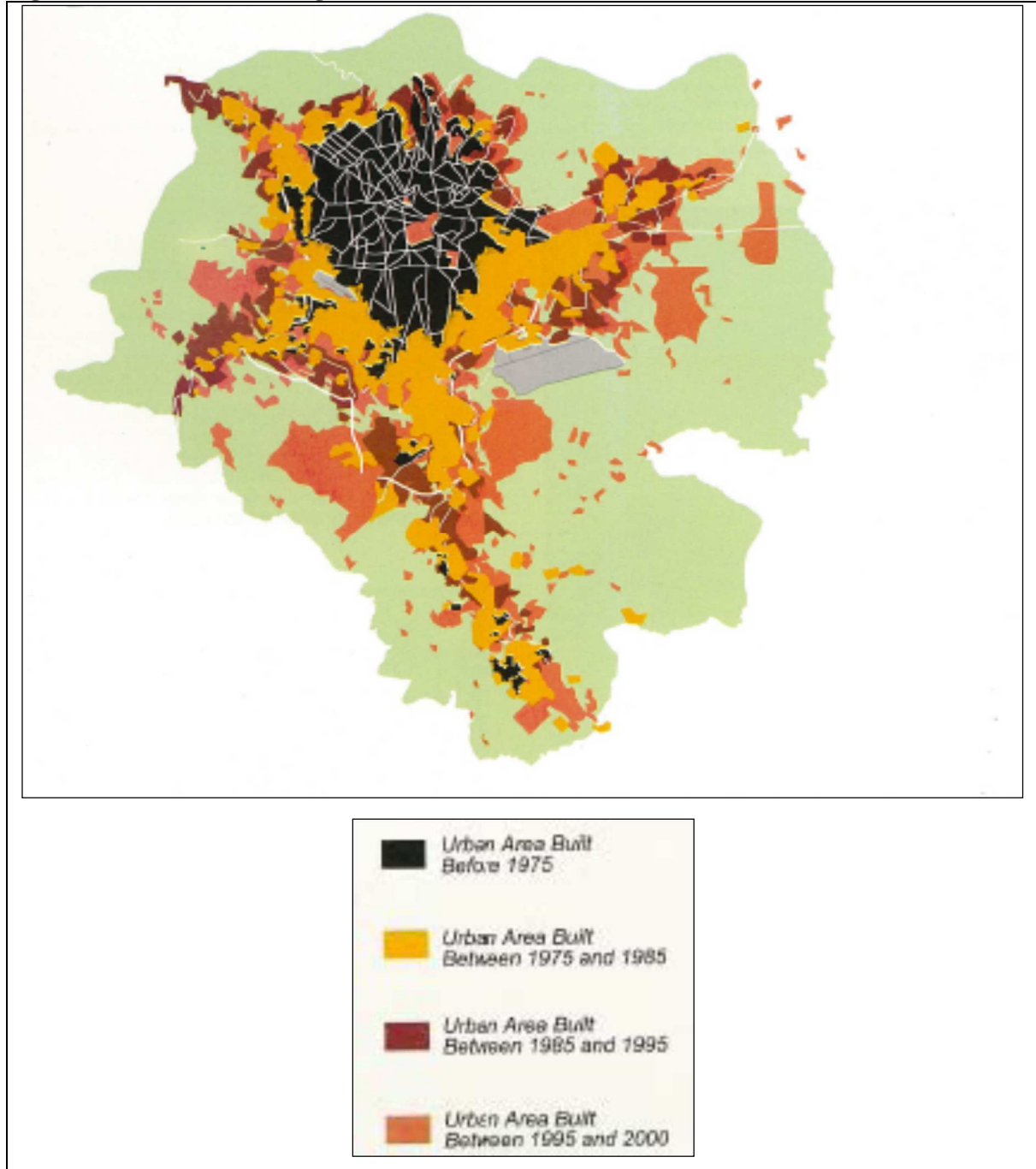
Figure 2.21: Major land uses of the 2001 city development plan



Source: ORAAMP, 2001

The current structure and morphology of the city is the outcome of both unplanned spontaneous and master plan guided development of the different periods. It had evolved as a small nucleus of settlement centered on the imperial palace and surrounded by different “Sefers” or neighborhood of the imperial war lords. Over the century, the city has grown and expanded along the major radial roads with Entoto Mountains in the north and northeast forming a natural barrier to its growth. The city’s expansion towards the west, southwest, east, and south, as displayed in Figure 2.22, has been quite significant.

Figure 2.22: Addis Ababa growth trends between 1975 and 2000.

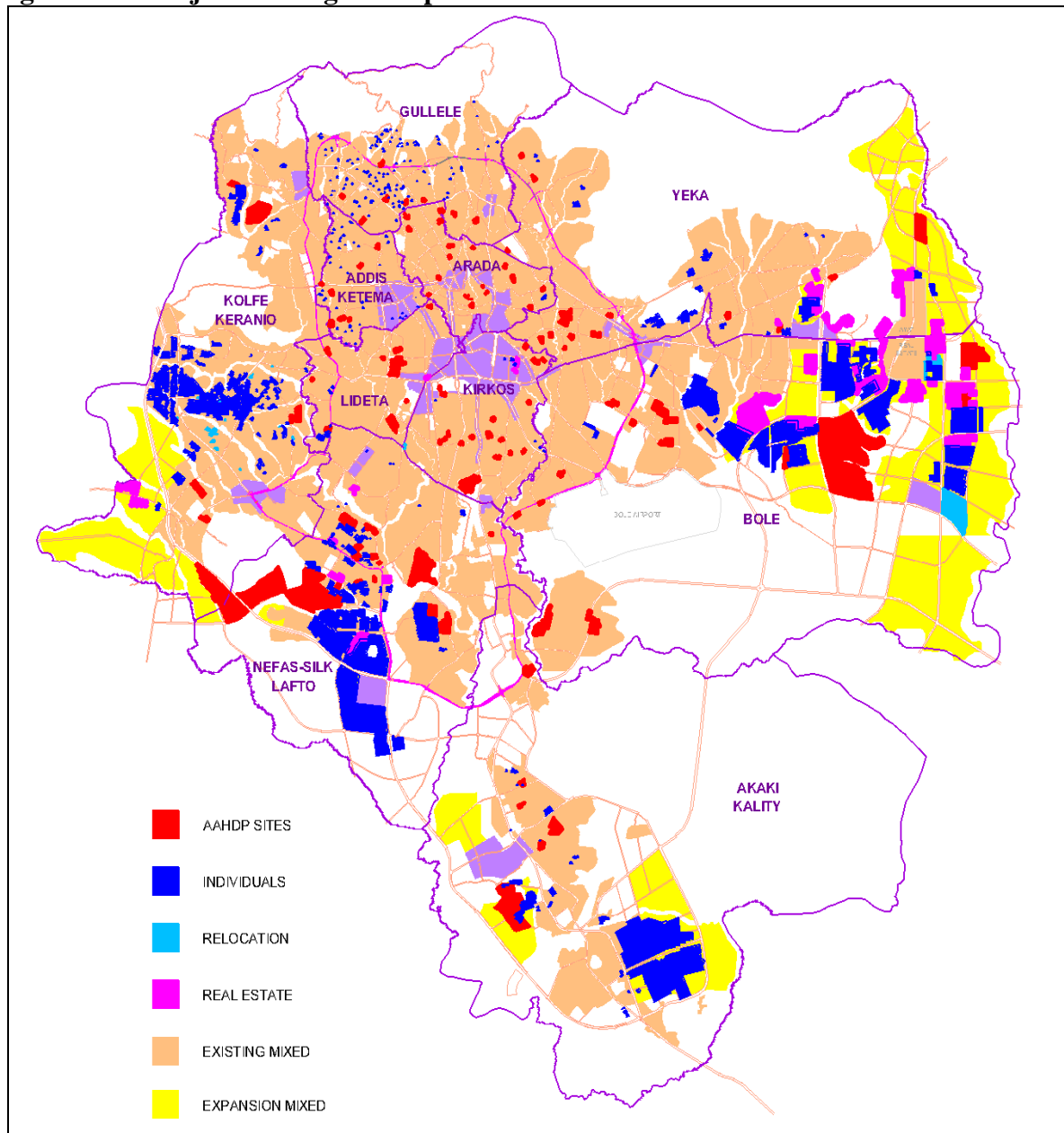


Source: ORAAMP, 2001

In the last decade, the city has embarked on ambitious public housing program and major road infrastructure development. Old city parts are now being demolished and are being replaced by new redevelopment process financed both by private and public resources. New road construction in the proposed expansion areas has enhanced the process of urban development in the east, west and southern part of the city.

The public housing program of the Addis Ababa Housing Development Project Office (AAHDPO) has shifted approach from its earlier scattered and small units housing construction in the inner parts of the city to complex housing development projects consisting of construction of thousands of units in the peripheral areas of the city where open and expansive land is easily available (See Figure 2.22).

Figure 2.23: Major Housing development Addis Ababa since 1999



Source: Yitbarek et al, 2011

Private real estate housing development has become significant actor in the housing sector. Indeed road sector and housing development are the main outcomes of the revised 2001 master plan. As foreseen in the revised master plan of 1999, this master plan is now also in the process of revision and a project office that will oversee the revision of the 2001 master plan has been already established by the city government.

Most of these physical plans but the last two were not supported by socioeconomic data, involved limited participation of professionals in the preparation of the plans as they were prepared by single individuals or two at most. Above all with the exception of the last two, most of these urban plans were prepared by foreign consultants with little or virtually no experience of the city (like Le Corbusier), absence of statutory laws to enhance the implementation of the proposed master plans and ill or poor consideration of urban rural linkages and regional and metropolitan planning dimensions (with the exception of that of the work of Polony). The earlier plans for the city were based on planning concepts that were developed for European cities with striking dissimilarity with Addis Ababa (AACC, 1986). Axial development was emphasized in plans of Le Corbusier, the Italians and the French master plans. Neighborhood units form the basis of the Abercrombie plan. Metropolitan urban and development with Adama (Nazareth) along the corridor was the proposal of the Polony. The 1986 master plan further promoted metropolitan planning with decentralized urban structure (Tufa, n.d.). The revised master plan of 2001 was a move to reflect the changed socioeconomic and political situation of the country and linking planning with implementation. Of the proposals of the 2001 master plan, the implementation of the road infrastructure proposal has been fundamental instrument shaping the city and bringing new and underdeveloped areas of the city to forces of rapid urban development. Large scale public housing program, real estate development and inner city building boom are also transforming the urban landscape of the city.

2.8 Transport planning

The city's road network has been an integral and a structurally defining element of all the spatial development plans of Addis Ababa. A system of axial (the plans of Le Corbusier, Guidi and Valle, Luis de Marien), ring and radial roads (the plans of Sr. Abercrombie, Bolton Hennessey and Partners) or a combination of both (the 1986 and 2001 master plans) were proposed in these spatial plans. As spontaneity and unplanned development is the hallmark the urban development of Addis Ababa, so does transport development. It is essential to evaluate the

transport plans of Addis Ababa against four major components of urban transport plan (Gakenheimer, 2011), namely; infrastructure plan, traffic and demand and management plan, public transport management plan and freight transport plan. The city's development plans were mainly focused on preparing an infrastructure plan and the other components were hardly or poorly addressed. Incomplete urban transport plans coupled with poor integrated approach to the development of transport and land use have attributed to the current seemingly insurmountable urban transport problems in Addis Ababa. Moreover, the lack of or poor institutional set up within the city government to handle urban transport problems and planning has aggravated the situation.

The need to systematically handle the city's transport problems through the instruments of urban transport planning was highlighted in the 1986 Addis Ababa Master Plan and since then a number of urban transport plans have been prepared. The 1986 City master plan attempted to integrate transport planning as a part of the city development plan (FDRE, 2008b). These transport plans (See Figures 2.24 through 2.31) that have shaped and are shaping the city's transport system are the Shawel-Transurb proposal of 1990; the Lyon – Semaly proposal of 2000; the ORAAMP proposal of 2001 and the Urban Transport Study proposal of 2005 (Source: FDRE, 2008b). Moreover, there are also currently Bus rapid Transit (BRT) study that was undertaken by the Lyon Urban Planning Agency and the proposal is now in the design phase. The Ethiopian Railway Corporation has almost completed the LRT construction. Most of the plans over emphasized transport infrastructure development and public transport and little focus has been given to freight traffic and traffic and demand management. By and large, the most recent transport plans have been more comprehensive in their coverage, technically sound in their approach and estimated the costs of implementation of the different modalities and technologies of public transportation. Alike the urban development plans, consultants, mostly expatriates, were employed to prepare the transport plans.

The transport plan proposal of 1986, as exhibited in Figure 2.24, has been the foundation of the latter transport plans (Figures 2.24 to Figure 2.31). Those subsequent plans have cumulatively developed this initial transport plan and have added new extensions and new public transport modes. The public transport corridors follow the general pattern of city development and expansion to the east, west and south. The mass transport corridors run in the east-west and north-south directions linking the major development areas. The La Gare railway station at the

center forms the hub of these high capacity public transport corridors. La Gare is planned to be developed as major hub of the public transport corridors and a major interchange terminal.

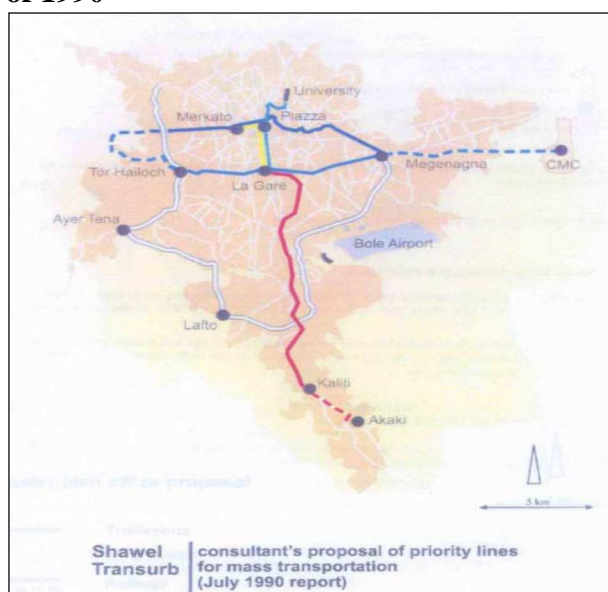
The major public transport corridor in the east-west direction runs from Meri Area in the east of the city through the Megnagna sub center, converges at the Lagare Station and then extends westwards to Ayertena. The North-south corridor runs from Sidist Kilo/Addis Ababa University through Arat Kilo with a branch westwards to Merkato, converge at Lagare station and continues southwards through the Debrezeit road to Akaki (See Figures 2.24 through 2.31).

Figure 2.24: The AAMP proposal of 1986



Source: FDRE, 2008b

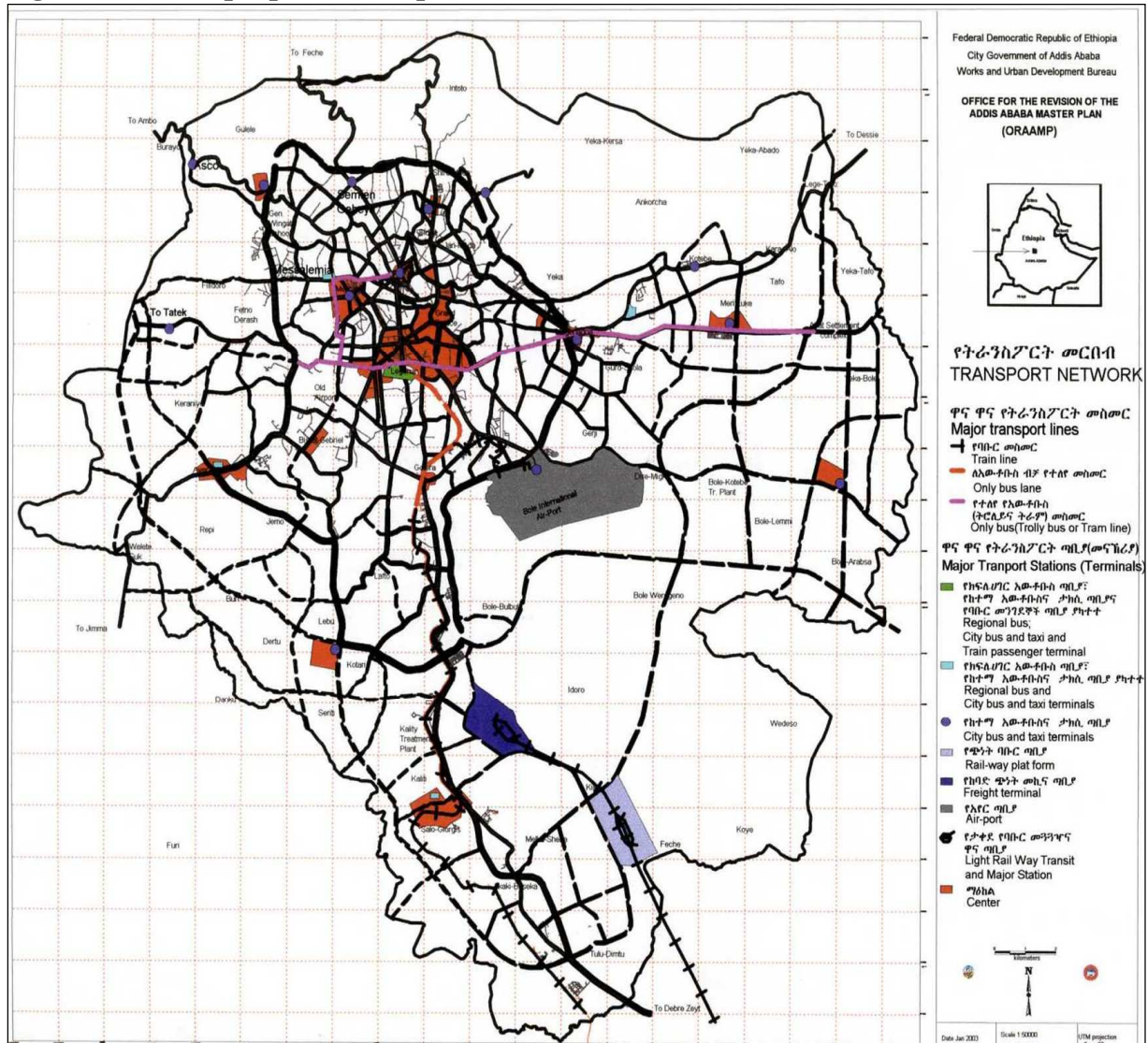
Figure 2.25: The Shawel-Transurb proposal of 1990



Source: FDRE, 2008b

These corridors, according to the proposal will be served by different public transport technologies including light rail transit, bus rapid transit, trams, and trolley buses. The bus system is to be supported by bus priority scheme in which segregated bus lanes are to be provided in major corridors. The plans were not supported by detail design proposal, estimation of the costs of the proposed system components and financing mechanism. Government changes, the lack of detailed design of the public transport system and right of way problems have further complicated the implementation process. It is not then surprising that for nearly three decades now since the first proposal, none of the proposals has been implemented.

Figure 2.26: The proposed transport network of 2001



Source: ORAAMP, 2001

Figure 2.27: The proposed road network of 2001



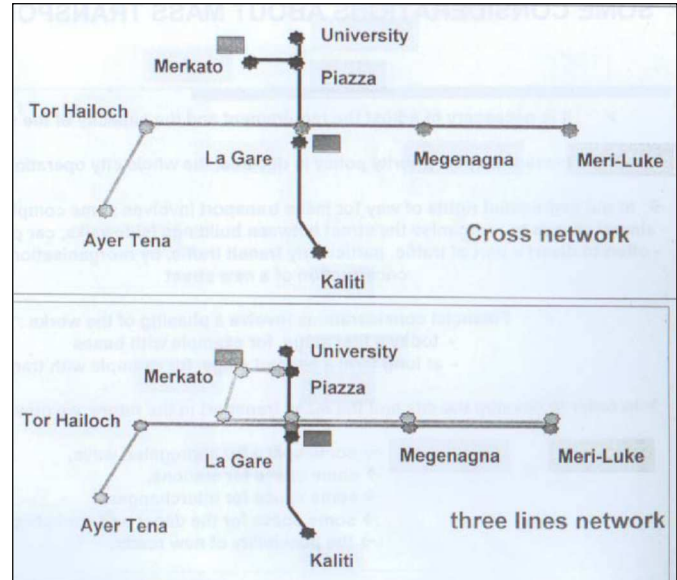
Source: ORAAMP, 2001

Figure 2.28: The Lyon–Semaly proposal of 2001



Source: FDRE, 2008b

Figure 2.29: Alternative network options for the east-west and north-south corridors

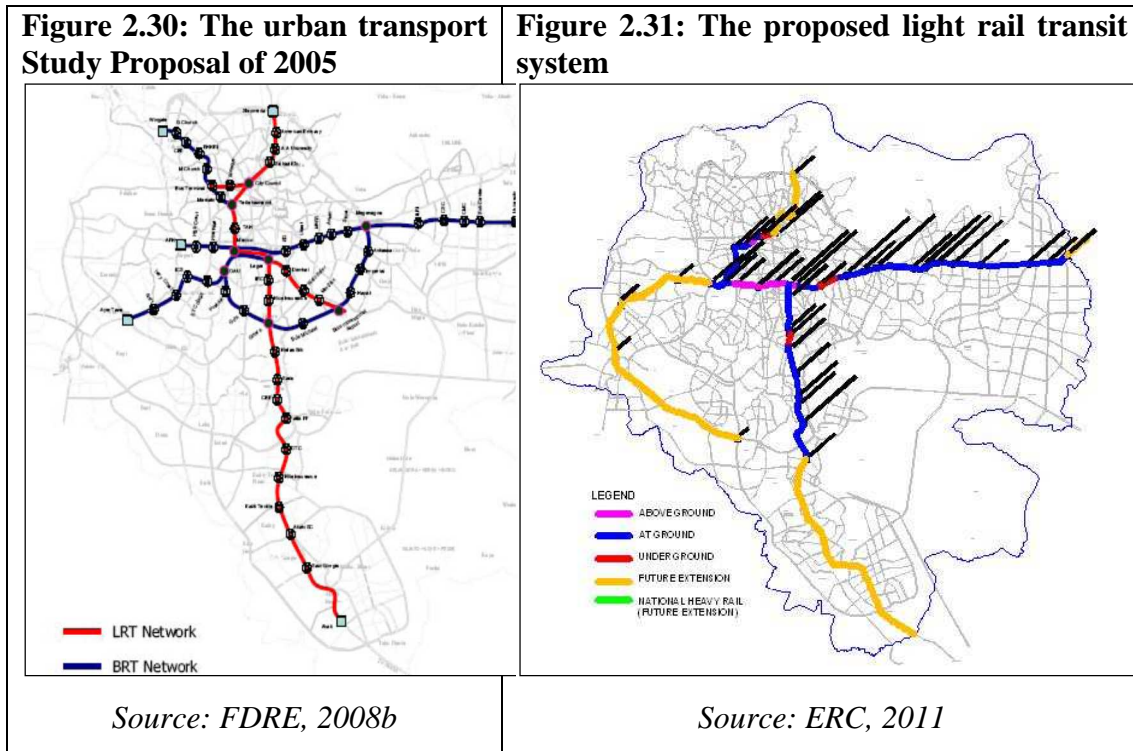


Source: FDRE, 2008b

The increasing recognition that the previous approaches to public transportation fall short of solving the complex transport problems of the city and that impeded mobility and accessibility could have an adverse effect on socioeconomic development and these could have undesired political outcomes, the governments approved the introduction of the light rail transit and bus rapid transit systems as new mass transit modes.

The Ethiopian Railway Corporation, a fully governmental institution, was established in 2007 as per decree No 141/2007. Its main functions include the construction of rail transport networks and provision of freight and passenger services in the country. The corporation is also responsible for the Addis Ababa light rail transport project. In 2011, the corporation completed the alignment and the detailed design phase of the LRT as shown in Figure 2.31. The total length of the LRT in the first phase is about 34.3 kilometers. The alignment is founded on earlier proposals and has two major corridors, namely; Meri Luke - Megenagna - Lagare - Tor Hailoch - Ayer Tena, and Kaliti - Lagare - Piazza - branching to Merkato - Sidist Kilo University (Woldetensae et al, 2011). The construction phase of the LRT is now completed and was funded by external loan. The loan and interest repayments are planned to be covered from internally

generated fare box revenues when the system becomes operational and investment returns from TOD around major stations (ERC, 2011).



In parallel, the Lyon Urban Planning Agency and SYTRAL are working the technical details for the introduction of bus rapid transit. The city road authority has just completed the construction of the first segregated bus lane running from Meskel Square to Saris to be used by the southern BRT system. Unfortunately, this has been lately removed for the LRT construction. Moreover, articulated buses intended to be used in the BRT system have been already added to the fleet of the city's Anbessa city bus enterprise.

However to date, managing growing intra urban freight traffic, streamlining and integrating the numerous paratransit and private operators into the formal public transportation system, park provision and parking management, containing congestion and designing and implementing traffic management schemes, promoting transit oriented development along the BRT and LRT corridors, providing affordable transportation and public transport service for underserved areas and low income groups, financing of fleet replacements and urban transport projects as well as establishing capable urban transport planning institutions are major tasks that urban transportation planning in Addis Ababa is confronted with.

2.9 Urban planning Institutions

The practice of urban planning as process and its institutional attachment is still at its infancy. Urban planning and transport planning included, as the foregoing analysis has shown, was mainly the domain of external consultants. Local planning institutions and local planners played virtually no role in the urban plan preparation until the mid-1980. The first master plan to be prepared locally and yet with the technical support of expatriates was in 1984, when the Addis Ababa Master Plan Project Office was established. Upon its inception, the project office has initially set the development of local capacity in urban planning as one of its top priorities. After the completion of the master plan project and the dissolution of the Addis Ababa Master Plan Project Office, the National Urban Planning Institute (NUPI) was established in 1987. NUPI was entrusted with the task of preparation of socioeconomic and spatial plans for all urban centres of the country. It has produced a number of master, development and action plans for many Ethiopian towns and cities. Following the decentralization process and introduction federal government structure in the country in early 1990's, NUPI has also been restructured to effectively execute its tasks and conform to the new system and was renamed as Federal Urban Planning Institute (FUPI). It is currently an institute under the Federal Ministry of Works and Urban Development. NUPI or now FUPI has substantially contributed in institutionalizing urban planning, building local capacity in urban planning and implementation and promoting urban studies in the country. Regional Planning Institutes have been established in the all the regional state governments and the two chartered cities of Dire Dawa and Addis Ababa.

The federal government approval of the revised charter of 2003 laid the legal foundation for the implementation of the revised master plan proposals of 2001. The charter, among others, empowers the city's government to approve and implement socioeconomic and development plans, establish different levels of government and set up executive organs of the city (FDRE, 2003). The new transitional city government that came into power in early 2000 approved and legalized the revised master plan and started immediately implementing it. Notably, it introduced radical decentralized governance and three tiers of government. The Addis Ababa city government executive and municipal service organs establishment proclamation of 2003 empowered the city government to introduce a number of new institutions and restructuring of the existing ones to suit the reform process and enhance the implementation of the master plan. Institutionalized urban planning in Addis Ababa is a recent phenomenon. Small scale urban planning and local land use planning used to be conducted by one department in the bureau of

works and urban development of the municipality of Addis Ababa. The department initiated the revision of the master plan in late 1990's. As the department lacked the technical capacity to undertake the revision task, the work was given to the Office for the Revision of Addis Ababa Master Plan. ORAAMP was established in 1998 as autonomous project office under the bureau of works and urban development by the city administration. It was entrusted with revising the 1986 master plan in alignment with the new socioeconomic and political conditions. In order to attract local staff for the task, the city administration approved a higher salary scale for the employees of the project office, a salary much higher than the normal civil servants of the city government. The project and the revision task were mainly managed by local staff with some technical, financial and advisory support from French government through the Lyon Town Planning agency and the German Government through the German Technical Cooperation or GTZ. The governmental supervisory board made ultimate political decisions on planning priorities and ensured the plan's conformity with the political interest of the city and the country. It had also a technical committee composed of representatives of the top management of important city government institutions and the private sector. The technical committee advised the project office on technical matters related to the revision tasks (ORAAMP, 2001).

ORAAMP opened a new chapter in building local capacity in urban planning. Between 1998 and 2003, ORAAMP undertook an intensive and detailed urban study supported by strong stakeholder participation through many workshops, exhibitions, consultations and international conference. It evaluated each sector of the 1986 master plan and at the end produced the strategic structure plan of Addis Ababa to guide the development of Addis Ababa from 2001 to 2010. After the endorsement of the master plan with its four outputs of the structure and local development plans, the strategic development framework and strategic development action plans, pilot projects and urban management and restructuring, ORAAMP was dissolved in 2003.

ORAAMP was an institutional breakthrough in urban planning. It developed a high technical and institutional capacity in urban planning and its closure as a semiautonomous project office was a hardly and well considered decision, as was later proved by rise and fall of the short lived body that replaced ORAAMP; namely; the policy study and plan commission under BOFED.

As successor of ORAAMP, the policy study and plan commission was set up as a body under the Bureau of Finance and Economic Development of the city government. The commission constituted four Departments, namely; policy study and analysis, development plan preparation

and population, urban land information and urban plan preparation. The commission was rather an artificial merger of the former ORAAMP, urban information project Office of the city government, socioeconomic development planning department of BOFED and autonomous population department with strong links to the federal population council. While the departments of policy study and analysis and development planning were suited to the already established function of BOFED, the other two departments were often performing physical planning related duties called upon by the office of the city manager and had less of work contact directly with BOFED for which it lacked the spatial planning experience. The traditional separation between spatial and socioeconomic and financial planning in the city's planning experience further strained the smooth functioning of the commission. Dual accountability problems augmented by insufficient management response to the problem became so grave that the city government dissolved the commission in 2004. The two departments of urban planning and land information with strong bias towards physical planning moved to the city manager office and the other two with strong inclination to socioeconomic and financial planning remained in BOFED. This arrangement is prevalent to this day and is contributing, on one hand, to the poor coordination between physical and socioeconomic planning and planning and budgeting on the other hand. The two departments within BOFED easily integrated but the other two departments of urban planning and information initially lacked clear organizational structure and accountability with in the office of the city manager. Moreover, the salary offered by the planning department was not competitive and high enough to attract qualified urban planners and architects. It faced grave difficulties in discharging its duties and salary adjustment and institutional reform were deemed necessary to the smooth functioning of the departments.

The city government approved 2009 proclamation No 15/2009 for re-establishment executive and municipal service organs. The Urban Planning and Information Institute was legally established as in autonomous institute under the office of the city manager. The institute focuses on spatial planning and establishing a sound and modern urban land data base and has decentralized structure down to the lowest level of the city government (AACG, 2009).

There are many city government institutions which directly and indirectly impact on urban planning. A closer examination of the proclamation No 15/2009 indicates (AACG, 2009, p9-67) that 16 institutions at the city level and with some having devolved structure down to lower levels, the sub cities and Weredas are directly or indirectly involved in urban planning process.

These are:

- The Mayor's office;
- Environmental Protection Authority;
- Trade and Industry Bureau;
- Bureau of Design and Construction Administration;
- Housing Development and Administration Project office;
- Construction Regulatory and Capacity Building Authority;
- Bureau of Finance and Economic Development;
- Land Development and Management Board;
- Land Administration and Licensing Authority (also present at Sub Cities and Weredas);
- Beautification, Parks and Cemetery Development and Administration Agency (also present at Sub Cities and Weredas)
- Solid Waste and Disposal Project Office;
- Land Development Bank and City Renewal Project Office (also present at Sub Cities and Weredas);
- Urban Plan and Information Institute (also present at Sub Cities and Weredas);
- Addis Ababa Road Authority;
- Addis Ababa Water and Sewerage Authority;
- Water Construction, Regulatory and Capacity Building office;
- Sub city Administration; and
- Weredas Administration.

The Oromia Regional Government, the federal utility institutions of Ethiopian Electric Power Authority and the Ethiopian Telecom and the Federal Ministry of Urban Works and Development also have stake in the city. The central concern here is on how to ensure synergy and integration mechanism in urban planning both horizontally among these sectors and vertically among the different levels of government and between sectors in the different levels of government.

2.10 Transport planning institutions

The institutional framework for transport planning is not either encouraging. Local transport planning institutions that are technically capable of producing transport plans directed at addressing the complex transport problems of the city are absent. The encouraging beginning in 2003 and 2004 to organize and establish a competent transport planning institution within the city's transport bureau was interrupted when in 2005 the federal government changed the

mandate of the bureau from city government to federal government institution. During those years, the bureau initiated the World Bank funded urban transport study of Addis Ababa, conducted studies and implemented measures to regulate on-street parking and control freight traffic. The bureau was renamed as Addis Ababa transport branch office under the federal ministry of transportation and communication. The branch office has special arrangement in terms of its budget administration. While, the revenue collected by the office went directly to the city's treasury, its expenditure budget was approved by the federal government but covered by the city government. The branch office was given the authority to engage in transport planning and traffic management, formulate transport regulations, provide transport related service and collect fees and charges from these services and manage freight traffic. Other city government institutions that were involved in transport planning include the Addis Ababa Road Authority, the Anbessa City Bus Enterprise and the urban planning and information institute.

The national transport master plan study (FDRE, 2008) emphasized that the loose coordination mechanisms among these institutions and usually done through ad hoc steering committees, lack of clarity as to which agency should play the lead role in the transport planning and management and absence or poorly defined prioritization framework that considers investment requirements and phases with available financial resources as major challenges encountered in transport planning process in Addis Ababa.

Road network development and management is the sole responsibility of the Addis Ababa City Road Authority. The authority is mainly focused on the operational aspects of implementing the master plan. It usually encounters operational problems with the infrastructure and utility companies, notably; water, electric power and telecommunication. Although there are general planning regulations outlining in plans where in the road sections (right of way) the utilities should lie, the actual practice shows to the contrary with each going its own way and wasting scarce financial resources. Furthermore, the ad hoc committees that have been formed to oversee the coordination of activities and reduce unnecessary wastages of resources had little success story.

Traffic management and parking functions are shared among the traffic control and management department of the city police commission, the transport branch office and the city road authority. There is no traffic management institution to play the lead role and committees have been formed to fill the institutional gap. Although the responsibility of the transport branch

office, freight traffic planning and control have been accorded insignificant attention in the activities of the office.

Institutions for the planning and management of public transport planning hardly exist in the city. Public transport is provided by the formal city bus enterprise and huge informal sector. The Anbessa city bus enterprise, the transport branch office, the federal transport authority, city road authority, the individual operators of the informal sectors who are currently encouraged to form association are the key actors in the sector. Competition, unregulated and unplanned transport services, poor and shortages of services are characteristics of the system.

Transport service provision and transport regulatory activities have been areas in which the Addis Ababa Transport Branch Office has been very active and successful. The branch office had attempted to decentralize its activities and enhance the delivery of transport related service by opening five sub branch offices. It also coordinated and financed the 2007 Addis Ababa transport sector strategy, the 2008 Addis Ababa transport master plan study and the 2008 urban transport and environment Study (Woldetensae et al., 2011). But despite these initiatives, the need for establishing transport bureau under city's jurisdiction so as to effectively handle transport challenges and integrate it with other city functions was gaining increasing importance and urgency in the city government. On the other hand, given the illogical position of the Addis Ababa transport branch office as federal government institution but serving Addis Ababa, the federal ministry of transport and communication was also interested in returning the office back to the city government. The ministry needed a legal framework to base its decision and eventually the approval of the Addis Ababa urban transport policy in 2011 by the federal government paved the way for the reestablishment of the transport bureau as an integral part of the city government organs.

The policy foresaw the establishment of a transport bureau by merging the Addis Ababa transport branch office, the Addis Ababa city road authority, the Anbessa city bus enterprise and traffic control and management department of the Addis Ababa police commission (Woldetensae, & Fanta, 2010). In 2011, despite resistance from the city police commission to join the bureau, the city government established the Addis Ababa Road and Transport Bureau (AARTB) that brought together the aforementioned institutions under one management structure⁷. The Addis Ababa city government proclamation No25/2010 has granted the bureau

⁷ The bureau has been lately reorganized into four autonomous units.

five major responsibilities, namely; road infrastructure construction, maintenance and management, transport planning and traffic management, provision of adequate supply of public transport services, monitoring and regulating the operation of transport system and ensuring safety of the system.

The bureau at present is in the process of setting up an institutional and organizational structure to realize the duties bestowed upon it. However, the severe shortage of qualified transport professionals, high staff turnover, reluctance in accepting the new organizational arrangement by the merged bodies for the fear that it will limit their autonomy, poor record of transport planning experience by the bureau and the severity of transport problems will impose limitations on the success of the bureau. Under this circumstance, the bureau will continue to depend on external consultants for the technical aspect of urban transport planning.

2.11 Transport demand and supply

Urban transport plays a fundamental role in fulfilling the mobility and accessibility needs of the city residents, facilitating the flow of goods and services in the production process, playing a catalytic role in urban development and shaping the physical structure of cities. In rapidly globalizing world, the availability of efficient transportation system increases the competitiveness of cities for attracting foreign investment critically needed for promoting socioeconomic development and mitigating poverty (World Bank, 2002a).

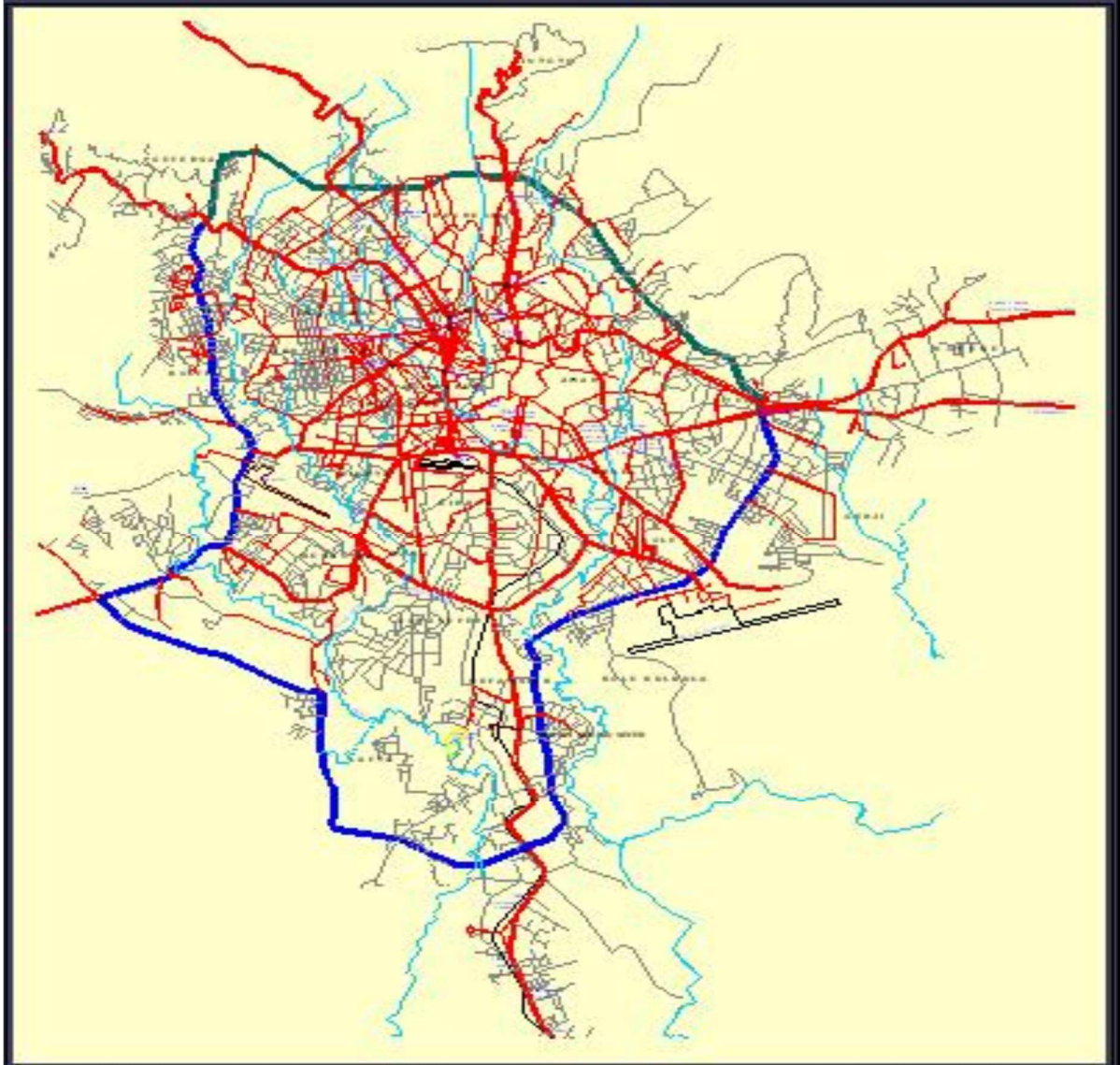
As there is no rail infrastructure, urban transport in Addis Ababa is exclusively dependent on the road network both for motorized and non-motorized movement. The city's urban transport infrastructure represents a significant proportion of the city's capital expenditure which was about 7% of the GDP and 25% of its total expenditure in 2011. In the city where car per capita ownership is low and access to car ownership is limited to very few fractions of the city population, the public transport provides the most important means of motorized means of mobility. A great volume of pedestrians, the vehicles of the formal public transport of the Anbessa City Bus Enterprise and the blue and white colored mini buses of the informal sector dominate the streets of Addis Ababa. The once functional Ethio-Djibouti rail-way line with terminal at La Gare forms a major landmark and is to be developed in the future to serve as major intracity rail transport terminal. The Merkato main intercity regional bus terminal along with five decentralized terminals on the five outlets of the city connects the Addis Ababa with other towns and regions in the country. The Bole international airport, found in very close

proximity to the city centre, is becoming a major hub of continental and intercontinental flight mainly due to the growing importance of the Ethiopian Airlines in African and international aviation.

2.11.1 Road network

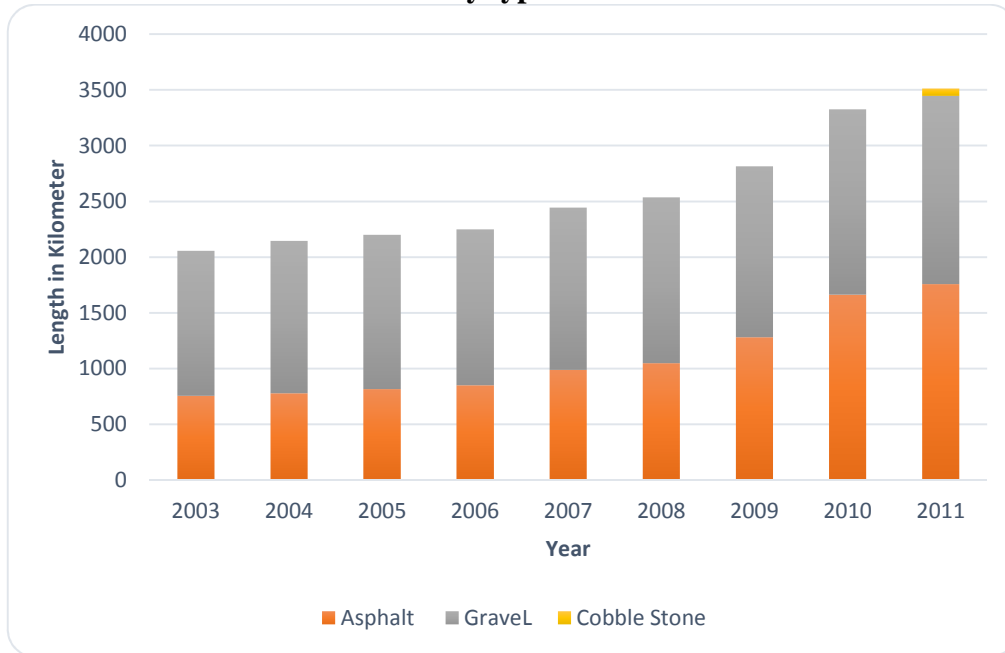
The road infrastructure in Addis Ababa is structurally defined by the five radial road systems which link the city with different areas of the country and the recently constructed the ring road system (See Figure 2.34). These major trunk roads are supplemented by low quality and poorly networked system of arterial, collector and local roads. The road system lacks clearly articulated hierarchy (ERA, 2005, & Kifle, 2011). Major road intersections, of which few of them are grade separated, are the weakest links in the system and form a major bottleneck for the smooth flow of traffic.

Figure 2.32: Addis Ababa road network



Source: ERA, 2005

The total road length of road at present is 3,512 kilometers and the road length has increased by about 71% between 2003 and 2011. Due to higher priority and preferential budget allocation given to the sector since 2007, the pace of construction of new roads has been rapid since 2007 (See Figure 2.35). Indeed about 87% of the total length of current road infrastructure was constructed between 2007 and 2011 (BOFED, 2010a, & AACRA, 2012).

Figure 2.33: Addis Ababa road surface by type from 2003 to 2011

Source: BOFED, 2007 & 2010; & AACRA, 2012.

The city's current strategic plan has set a target of increasing the total road surface to 4,100 kilometers (2,350 kilometers paved and 1,750 kilometers gravel roads) and the road density to 15% for 2013 (BOFED, 2010). The road density varies between cities in the developing and developed world. Cities in the developed world generally have higher road densities, as illustrated by Paris with 25%, New York with 22% and London 23%. Some cities in the higher income developing countries have also higher densities as exemplified by Sao Paulo with 21%, Seoul 20%, Delhi 21% (Vasconcellos, 2001). Table 2.9 summarizes the main feature of the city's road network. The road density for Addis Ababa is low, a city. At present, the city road density in terms of the built up area is 13%, up from 7% in 2006 (AACRA, 2012). The city's road density is not only much lower than the conventionally recommended urban land use norms for road infrastructure (ERA, 2005) but also the roads are quite narrow (AACRA, 2012). World Bank study (2002b) also indicates that road network in Addis Ababa is of very low standard in which about 70% of the total road network has a width of less than 9 meters. The widespread on street parking reduces the capacity of the already constrained narrow the road.

Road surface quality, as shown by the higher percentage share of gravel roads relative to paved ones, is also low. Almost half of the city's roads are unpaved, although the proportion of paved or asphalt roads have increased over time. Of the paved road surface, the principal arterial roads

have a higher representation. While the paved principal arterial roads shared about 51% of the total asphalted road, sub arterials, collector and local roads collectively accounted for the remaining 49% of paved road surface.

Table 2.5: Total length of road, road density and annual growth rate of new roads in Addis Ababa between 2005 and 2011

Type	2003	2004	2005	2006	2007	2008	2009	2010	2011
Asphalt in Kilometer	756	778	817	850	990	1049	1280	1663	1758
Gravel in Kilometer	1300	1368	1383	1400	1453	1488	1534	1662	1687
Cobble Stone in Kilometer	-	-	-	-	-	-	-	-	67
<i>Total</i>	<i>2056</i>	<i>2146</i>	<i>2200</i>	<i>2250</i>	<i>2443</i>	<i>2537</i>	<i>2814</i>	<i>3325</i>	<i>3512</i>
Percentage Asphalt	36,8	36,3	37,1	37,8	40,5	41,3	45,5	50,0	50,1
Percentage Gravel	63,2	63,7	62,9	62,2	59,5	58,7	54,5	50,0	48,0
Pedestrian Walkway in Kilometer	-	-	264	285	307	319	387	387	-
Percentage Pedestrian Walkway	-	-	12,0	12,7	12,6	12,6	13,8	11,6	-
Length of Drainage in Kilometer	559	615	815	874	950	1556	1630	-	-
Percentage of Drainage	27,2	28,7	37,0	38,8	38,9	61,3	57,9	-	-
Road Density in Percent	-	-	-	7,4	8,3	9,4	10,3	12,2	12,9
Annual Growth Rate of New Road	-	-	-	2,3	8,6	3,8	10,9	18,2	5,6

Source: BOFED, 2007 & 2010, & AACRA, 2012

About 42% of the roads have no drainage lines. The inadequacy of storm water drainage lines is also worsened by the common practice of discharging household solid wastes on the open drainages which then blocks the runoff water and causes it to flow on the road surfaces, as displayed in Figure 2.36. This is quite common during the rainy periods. On street flash flooding slows down vehicular and pedestrian traffic, leads to rapid deterioration of the road surface and in turn increasing the cost of road maintenance.

Despite the over proportional importance of non-motorized traffic in the modal share of Addis Ababa, the road infrastructure development program of the city has accorded very low priority to the non-motorized traffic. The total pedestrian walkway in 2010 was 387 kilometers and 88% of the city road network has no pedestrian facility. The situation for local roads is at its worst with about only 1% of them having a walkway (Table 2.10). Under this situation, non-motorized traffic has to mix with motorized traffic, compete for road space and increases its vulnerability to traffic accident.

Figure 2.34: Flood water on a major roundabout (A) and high profile ring road in Addis Ababa (B)



Source: Own picture

The city's road infrastructure bias for motorized private traffic is also apparent in the absolute absence of public transportation specific infrastructures. Public bus operation enhancing mechanisms like bus only dedicated lanes or bus priority at signalized intersections are lacking. Operation costs of the public transport will therefore increase as the public transportation has to operate in mixed traffic and at lower speeds particularly at the congestion prone morning and afternoon peak hours.

Table 2.6: Percentage of length of pedestrian walkway in Addis Ababa from 2005 to 2010

Road Hierarchy	2005	2006	2007	2008	2009	2010
Principal Arterial Road	2,7%	3,0%	3,2%	3,4%	4,7%	3,9%
Sub Arterial Road	3,6%	3,8%	3,8%	3,8%	4,3%	3,6%
Collector Road	4,5%	4,8%	4,5%	4,3%	3,9%	3,3%
Local Road	1,1%	1,1%	1,1%	1,0%	0,9%	0,8%
Total Length	12,0%	12,7%	12,6%	12,6%	13,8%	11,6%

Source: BOFED, 2010.

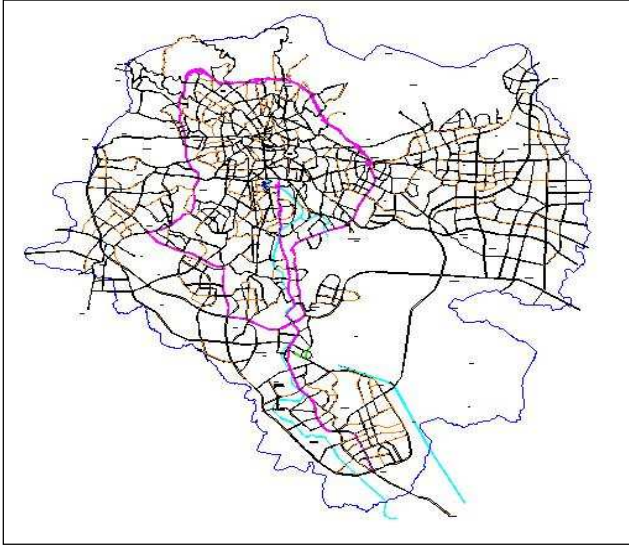
Traffic congestions at major intersections are quite frequent. The existing traffic signals are not only obsolete but also inadequate in number to handle the problem. There are 26 traffic signals

and most of them operate on fixed time phases as the signal cycles are not based on actual traffic count traffic. There are no coordinated system of traffic signals and hardly any of these has specific traffic signs for pedestrians (World Bank, 2002b, & Woldetensae et al., 2011).

The establishment of the Addis Ababa City Road Authority (AACRA) in 1998 has intensified the pace of road construction. Budget earmarked for road sector development has been steadily increasing since then. In 2011, expenditures for the road sector accounted for about 25% and 7% of the city's total expenditure and GDP respectively. The road sector expansion and improvement have been guided by the city development plan 2001 to 2010. A number of achievements have been made in the road expansion, including the ring road, major arterial roads (See Figure 2.37) and the grade separated Gottera interchange (See Figure 2.38) that have been constructed recently.

There are a number of shortcomings that are observed in the strategies of road infrastructure development. The bias towards cars and neglect of the NMT and public transport are obviously the major drawbacks of the road sector development in Addis Ababa. The city transport and road development plan proposal of 2001 that has envisaged measures to give priority to public transport and non-motorized transport has never been implemented (Kifle, 2011). Moreover, the city road sector development has given over proportional emphasis to major arterial and other high profile roads. Despite their important position in the road network hierarchy in which they should account be between 65% to 80% of the total road network in standard network planning, their importance in enhancing accessibility and mobility at a neighborhood level and linking with higher road hierarchies (Meyer and Miller, 2001), local road construction and maintenance have been totally left to the community and neighborhood associations. The city road authority rarely intervenes in constructing, upgrading or maintaining of local roads. As poor quality of local roads discourages the provision of feeder public transport services in many areas of the city, it is not then surprising to find the concentration of public transport along asphalted major and secondary corridors.

Figure 2.35: Addis Ababa main road networks: arterials and collector roads planned and actual excluding local roads



Source: AACRA, 2012.

Figure 2.36: The grade separated Gottera Interchange: A major landmark in the city



Source: AACRA, 2012.

2.11.2 Transport demand

The demand for transportation Addis Ababa has grown faster than the supply of transportation in terms of transportation infrastructure and public transportation. The mismatch between the demand and supply in the city is manifested by the shortage of public transportation, low road density and availability, chronic traffic congestion and travel delays and misuse of the road space. The demand for transportation services and infrastructure, as derived demand, is strongly linked with urban activity systems that are expressed in different urban land uses. The demand for transport, be it passenger or freight, will be influenced by the transport supply. Change in the transport supply will induce a change in the transport demand (Meyer & Miller, 2001).

Passenger travel demand expressed in number of trips along with its characteristic elements is a function of population increase, increase in trip rates and the physical growth of cities. Since its foundation, Addis Ababa's population has grown by annual average rate of about 5% and the absolute population size has increased by 104 fold to reach the current population of 3.1 million people. Although no historical data is available to support the increase in trip rates, the comparison of present and forecasted trip rates show an upward trend generally following growth in the city economy and income (ERA, 2005). Addis Ababa's development historically has been more horizontally than vertically. Trip lengths have generally increased following the

uncontrolled horizontal physical growth of the city. Findings from ORAAMP study (2001) shows that trip lengths have increased from 5 kilometers in 1986 to 11.4 kilometers in 2001.

2.11.2.1 Mobility

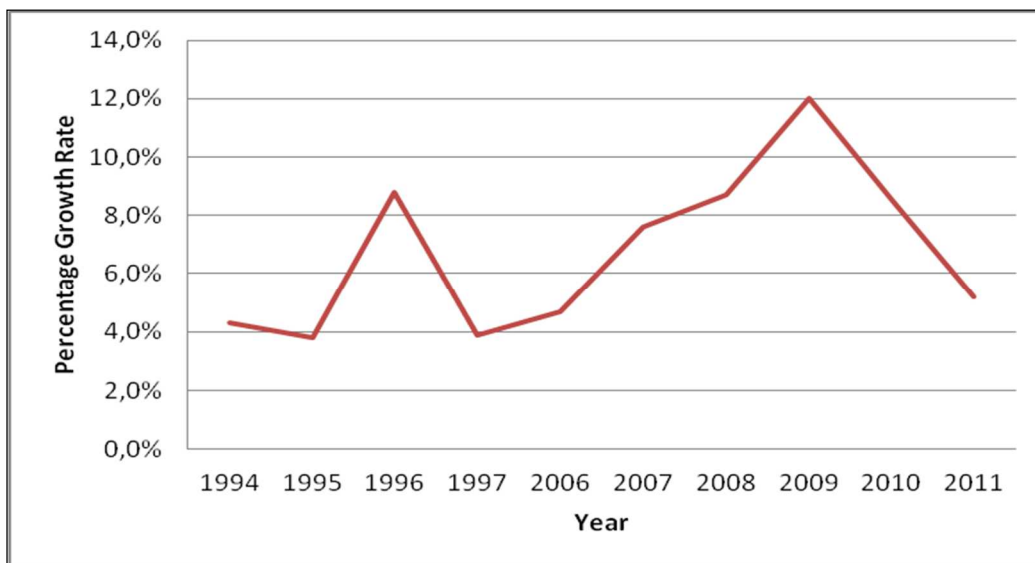
Urban population in the developing countries is characterized by lower mobility rates than in the richer countries. While the trips/person/day is higher than 2 for cities in developed countries and high income developing countries, the trip rates is just one for cities of very low income developing countries. Lower mobility rates are related to lower incomes of the cities of the developing countries (Vasconcellos, 2001). Mobility rate for Addis Ababa is low and the urban transport study report of Addis Ababa (ERA, 2005) estimated a trip rate of 1.07 trips/person/day for 2005 and projected a mobility rate of 1.4 trips/person/day for 2020. By and large, high poverty rates (50% of the population of Addis Ababa living in absolute poverty), high unemployment rate (28% of the total city's population being unemployed) and high proportion of people in the lower age groups (15% below the age of 10) characterized by weaker mobility could explain the low mobility rate for the city. The total daily volume of trips increased from 600,000 in 1986 to 2.1 million in 2001 (an increment of 250 % in just 13 years), 3.35 million trips in 2005 (an increment of 160% in 4 years) and projected to be 5.6 million daily trips in 2020 (ORRAMP, 2005, & FDRE, 2008b). Most of the trips are generated in the city and occur within the city. Trips to and from central areas of the city including the Sub Cities of Kirkos, Lideta, Arada and Addis Ketema are considerably high (ERA, 2005).

2.11.2.2 Motorization

Motorization level in Ethiopia is very low. In 2007, there were 0.8 cars and 2.8 vehicles for every 1000 people, as compared to 14 cars per 1000 people for Africa in 1993 (Vasconcellos, 2001). However, the actual motorization rate for the country as a whole will be much lower than the rates mentioned above as over 80% of the national vehicle fleet is registered in Addis Ababa (FDRE, 2008b).

Between 1993 and 2011, the city's average annual vehicle fleet grew by 5.2%. A maximum growth of 12% was observed in 2008 to 2009 (See Figure 2.32). Slower growth rates are related to periods of government's restriction of importation of private cars. Commercial vehicles, taxis and private cars have grown by 8.8%, 4.3% and 3.8% respectively. The total vehicle fleet, as displayed in Figure 2.33, rose from 80,347 in 1993 to 202,123 in 2011.

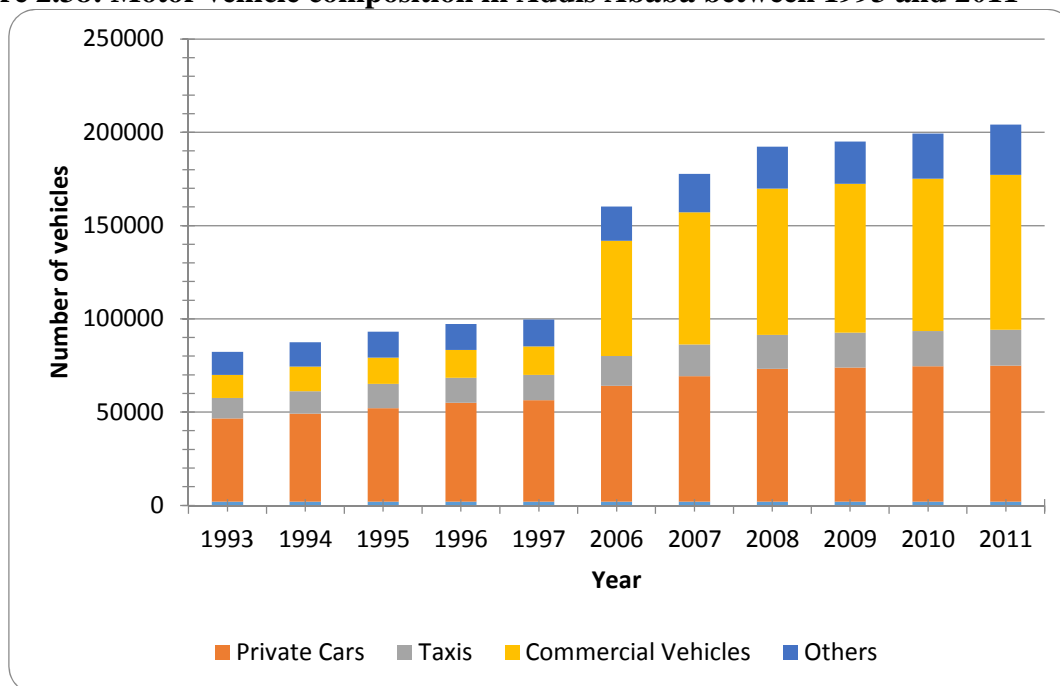
Figure 2.37: Motorization in Addis Ababa between 1993 and 2011



Source: Addis Ababa City Transport Branch Office, 2012

A look at the composition of the vehicles shows that private cars, commercial vehicles and taxis are significant and collectively account for about 87% of the city’s total vehicle fleet. Private cars are dominant, as exhibited in Figure 2.33, and account, on the average, for about 46%, commercial vehicles for 29% and taxis for 12% of the total vehicle fleet in the city.

Figure 2.38: Motor vehicle composition in Addis Ababa between 1993 and 2011



Source: Addis Ababa Transport Branch Office, 2012

The observation between 1993 and 2011 indicates that between 9 and 10% of the household of Addis Ababa owns a car. Car ownership per capita in Addis Ababa is thus low but much higher than the national per capita car ownership and much lower than the average for Africa (135 in 1995). Addis Ababa's average per capita ownership of 24 cars per 1000 inhabitants (See Table 2.5) is higher than some African cities like Dakar with 12.6 cars but also noticeably lower than cities like Johannesburg with 269, Tunis with 63 and Cairo with 52 cars per 1000 inhabitants (Kenworthy, 2011).

Available road space per vehicle or the vehicle density has slightly improved but remains very low (See Table 2.5). However, as only about 50% of the total road surface in Addis Ababa is asphalt, the actual vehicle density or vehicle number per asphalt road will be much higher than the vehicle densities shown in Table 2.5. The demand for road infrastructure, therefore, will likely be higher than the actual supply. Traffic congestion, as one of the manifestation of the mismatch between supply and demand as well as traffic mismanagement, is a critical problem along the main corridors and major intersections during the morning and afternoon peak hours.

Table 2.7: Motorization, car per capita and vehicle per kilometer in Addis Ababa from 1993 to 2011

Year	Private cars	Other Vehicles	Total Vehicles	Growth rates	Cars Per 1000 Persons	Vehicle per KM of Road (Density)
1993	44 667	35 680	80 347		22,4	—
1994	47 234	38 153	85 387	4,3%	22,9	—
1995	50 130	40 955	91 085	3,8%	23,5	—
1996	52 944	42 330	95 274	8,8%	24,3	—
1997	54 336	43 269	97 605	3,9%	24,4	
2006	62 061	96 191	158 252	4,7%	23,1	70
2007	67 190	108 578	175 768	7,6%	24,5	72
2008	71 174	119 105	190 279	8,7%	25,4	75
2009	71 896	121 229	193 125	12,0%	25,2	69
2010	72 543	124 812	197 355	8,6%	24,9	59
2011	72 901	129 222	202 123	5,2%	24,4	58

Source: Addis Ababa Transport Branch Office, 2012

2.11.2.3 Travel characteristics

Non-motorized forms of mobility are dominant modes of mobility in most African cities and low level of income is given as an explanation for preponderance of walking and cycling (Pendakur, 2011). In Addis Ababa, walking is particularly important as the city's topography imposes difficulty on the widespread usage of bicycles. The percentage share of walking was about 70 percent in 1984 and 55% in 2010 (See Table 2.6). Motorized mobility is mainly provided by the public transport and the use of private car is very limited.

Table 2.8: Modal share of Addis Ababa in 1984, 2005 and estimate for 2010

Type of Mode	Modal Share in Percent		
	1984	2005	2010
Walking	70	60	55
Buses	12	11	16
Taxis	10	21	24
Cars and others	8	8	5

Source: Woldetensae et al., 2011

Globally work and school trips are important trip purposes (Vasconcellos, 2001) and in Addis Ababa the “work” and “education” are also the most important trip purposes which accounted for about 32 and 46% of all trip purposes respectively (ERA, 2005). The daily temporal patterns of trips reflect the double peaking characters of school and work trips. Most offices and school open at the same time in the morning but in the afternoon schools close earlier than offices. In response, there is one major peak (6 to 9a.m.) and two minor ones (12 to 13p.m. and 16 to 18p.m.). Most of the trips or about 36 percent occur in the morning peak hours of 6 to 9 a.m. The number of trips significantly declines to a very low level of close to zero after 8p.m (Woldetensae, 1996).

Travel cost of motorized modes is rising following the increase in international fuel prices. Public transport fares have increased by over three fold since 2008. There is no data to determine how much people really spent on transport and the relationship between income levels and transport expenditures. Above all there is no study on how do people, particular the poor living at the city peripheries where house rent is comparatively lower and there is easier access to own houses in the informal housing sector, adjust to increasing costs of living relative to income not rising as proportionally as the costs of living.

Table 2.9: Percentage distribution of estimated private consumption expenditures in Addis Ababa from 1996 to 2005

Expenditure Item	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Food	52,8	52,8	43,7	43,2	43,3	43,9	43,6	43,7	40,4	40,4
Beverages	0,3	0,3	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4
Cigarettes & Tobacco	0,4	0,4	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3
Clothing & footwear	10,2	10,2	8,8	9,1	8,8	9,0	9,0	9,0	8,8	8,8
Rent, Fuels, Water and Construction	19,2	19,2	26,0	25,8	25,9	26,5	26,7	26,4	27,5	27,5
Furniture, Furnishing HH Equipment	5,6	5,6	7,7	8,0	7,9	7,8	7,9	8,1	6,2	6,2
Medical care & Health expenses	1,1	1,0	0,9	1,0	1,0	1,2	1,2	1,2	1,3	1,3
Transport and Communication	4,1	4,3	6,9	6,7	6,7	5,4	5,5	5,4	7,5	7,5
Recreation, Entertainment, Education	2,4	2,4	2,0	2,3	2,3	2,1	2,1	2,2	4,3	4,3
Personal care & effects	1,9	1,9	1,6	1,6	1,6	1,7	1,7	1,7	1,6	1,6
Miscellaneous Good services	1,9	1,9	1,6	1,6	1,6	1,7	1,7	1,7	1,7	1,7

Source: BOFED, 2008.

The trend between 1996 and 2005 for which data is available indicates that transport cost in Addis Ababa stands fourth in importance in the household expenditures and its share has increased since 2003 (See Table 2.7). Household expenditure on transport in Addis Ababa was about 8% (BOFED, 2008) and the World Bank (2002a) also reports that for major cities in Africa the percentage of household expenditures on transport is between 8 and 16 %. A similar percentage range of transport expenditure as of the total household expenditure was also observed for number of West African cities (Diaz Olvera et al., 2008).

Traffic accident is very high though recently declining. Addis Ababa fatality rates (only death), as shown in Table 2.8, are indeed higher than in cities of the developed countries which have fatality rates ranging between 3 and 6 (Vasconcellos, 2001). Poor driving behavior is the single most important causes of traffic accident (World Bank, 2002b) in the city. Pedestrian are highly vulnerable and more than 70% of those vulnerable are in the ages between 18 and 50. Vehicles with the age of 6 and above were mostly involved and cars, station wagons, and taxis accounted for 26.9%, 14.4% and 23.4% of the accidents respectively. Most of the fatal accidents occurred on straight sections (67%) and on two ways undivided carriageways (ERA, 2005).

Table 2.10: Traffic accident in Addis Ababa between 2000 and 2010

Year	Category in number					Fatalities per 10,00 vehicles
	Fatalities				Property damage	
	Deaths	Heavy Injury	Light Injury	Total		
2000	300	515	1,358	816	5 120	-
2001	288	499	1,394	788	5 089	-
2002	269	532	1,309	802	5 512	-
2003	319	528	1,36	848	6 429	-
2004	305	563	1,482	869	7 839	-
2005	320	731	1,381	1 052	8 111	-
2006	363	833	1,261	1 197	8 557	23
2007	347	640	850	1 837	7 112	20
2008	381	594	735	1 710	6 459	20
2009	371	731	576	1 678	5 845	19
2010	280	627	661	1 568	4818	14

Source: Addis Police Commission, 2010

2.12 Conclusion and discussion

Addis Ababa is a young city and has passed through distinctive phases of urban growth and development. It has horizontally spread in all geographical directions from its original nucleus at Emperor Menelik imperial palace. Its growth like many cities in Africa has been on the ground (Mukoko, 1996). Ethiopia has a low urbanization rate and alike many countries in Sub Saharan Africa, the country will go through a rapid process of urbanization in the coming decades. Addis Ababa, the primate city, will continue to dominate the urbanization process, although regional towns are also expected to experience high degree of urbanization. In most part of its history, the city's growth and development have been guided by spontaneous forces rather than conscious urban planning interventions. However, it worth noting that the different governments that were in power have all attempted to develop a modern metropolis whose development was to be framed through urban planning instruments. In most cases, the urban planning process was not tied with the budgetary process, in what is termed as the "divorce of planning from budgetary processes". Hence, estimating the investment costs of the proposed spatial plans and preparing the corresponding financing mechanisms were done rarely.

Moreover, until very recently, foreign individual consultants and planning firms were mostly employed to develop the city's master plan. The establishment of NUPI and ORAAMP in the 1990's altered this trend and substantially increased the contributions of local planners and architects in the preparation of urban development plans.

The city development plan of 2001 has been very instrumental in the radical transformation of Addis Ababa. The city is now experiencing a radical transformation process unparalleled in the previous periods. Inner city renewal programs, gentrification of old densely populated inner city areas, the mega public mass housing mainly at city edges, road infrastructure expansion, the LRT and real estate housing boom are radically changing the city. The new and controversial metropolitan plan of Addis Ababa is under completion and its approval will accelerate urban sprawl of Addis Abba into the neighbouring towns and fertile agricultural lands of Oromia regional government. The traditional Addis Ababa is being transformed into new city and is horizontally expanding faster. The consequences of such pattern of urban development both negative and positive remains to be seen. But it seems that the urban poor and rural communities are likely to lose most from the city's development path.

The city has been embarking on decentralization path since the early 2000. Power and responsibilities has been devolved down to the lowest levels of the city government. New institutions have been established and others have been made to wither away. The constant reshuffling of staff and institutional restructuring process is creating a greater hindrance to good urban governances and rapid service delivery. This lack of continuity in the institutional building process has been complicated by shortages of professionals and job placement policy that is based on political loyalty to the ruling party instead of merit and skill. It has been eroding the capacity of institutions to effectively discharging their responsibilities. The Addis Ababa transport bureau is a classic example of such ill-advised approach. The outcome is manifested in the incapability of the city to fully manage its transport system and develop appropriate strategies to address the complex transport problems the city faces. Frequent congestion, public transport shortages, high accident rates, environmental degradation and neglect of the non-motorized transport characterize the city's transport system. Increase in the road network coverage is not leading to reduction of congestion but on the contrary it is becoming more endemic. There is a need for Addis Ababa to look at examples of cities that have revised the focus on transport supply side approach and shifted to more successful transport demand management strategies, promoted public transport and non-motorized transport and put a

restraint on the use of private car. It should also endeavour to strengthen coordination among various institutions involved in infrastructure, planning and transport management, foster strong linkages between transport and land use planning process and invest in improving human resource in urban and transportation planning and management.

Chapter 3 The public transport system in Addis Ababa

Preliminary impressions

The daily travel experiences of users of public transport in Addis Ababa are full of nightmares, uncertainties, delays and physical hardships. Be it going to school or for work, the two important trip purposes, the question is whether one will be at school or place of work on time. The daily evil begins with the long walk from home located at the peripheries of the city (informal or big public housing complexes) to the nearest public transport stations (longer access time) where one has to wait for buses of various types or minibus taxi (longer waiting times) in poorly equipped or furnished “stations”, save there is no rain. There are lot of people there waiting for transport and one has to be very physically strong to board into the incoming bus or minibus, which happens to be already packed with passengers. In the process of boarding (pre board payment in Anbessa), hope one has not become victim of pocket theft or physical injury in the rush to board into bus/minibus/midibus. Inside the vehicle, it is not pleasant as well as it is very overcrowded and there is hardly any space to move one’s body but any way fortunate to be inside. The bus is not moving at all or travelling very slowly with frequent undesired stops for long queues of vehicles of various types are in front, each heading for the inner city destinations (longer drive time). This may be caused by on street parked cars, on street boarding and alighting of passengers by public transport fleets, or road construction underway, or poorly designed intersection, or malfunctioning traffic signal, or road blocked for an important foreign dignitary or high government official just passing by, or too many vehicles, or... . After one is through the delays and congestion, one reaches interim destination where it is necessary to change to another route or mode. One has to walk longer for transferring to the next line (longer transfer time) as the stations are found scattered around nodal areas adding inconveniences to one’s catalogue of problems. Once again, one expects to find the same long queues, longer waiting times at the stations and overcrowded vehicles and congestion delays on the route. At last one reaches the destination but has to walk or take a short taxi to reach

one's final destination (longer egress time). After spending one to two hours for covering a distance of less than 15 kms ("mobility deprivation"/"mobility poor") and with many trip legs, one is finally at the office or school but already late and physically exhausted ("energy poor") as usual. The return trip is not pleasant as well but the only difference is that there is no penalty for arriving home late. More public housing complexes are constructed at the periphery of the city and the inner city is being cleared to make way for high rise buildings, probably not affordable by former low income residents (gentrification). The city has no immediate solutions to increasing urban public transport crises and yet more road construction is going on, a preferential treatment of public transport along the main public transport corridors is totally absent but a bus rapid transit is being planned. A light rail transit project is under construction that is disrupting traffic along the north-south and east-west main traffic corridors. The trips are getting more inconvenient, longer and the cost of transport is rising. May it be better to walk or what else?

3.1 Introduction

The urban transport context in the cities of the developing countries has been conditioned by the ongoing phenomenal spatial growth, rapid urbanization process and a rapid growth in motorization, despite lower number of cars per capita (World Bank, 2002b). The physical expansion, increases in urban population and mobility rates of these cities have increased both the travel demand and the length of trips. Studies (World Bank, 2002b, & Transport Research Laboratory, 2002) on the impact of urbanization on public transport demand indicates that that an increment of population by 1,000 will generate 350 to 400 additional public transport trips and an increase in the physical area of city by one square kilometer will induce 500 new public transport trips.

Rapid urban growth has created a mismatch between transport demand and transport supply. The deficiency created by the excess transport demand over transport supply has been mentioned as root cause of transport problem of the cities of the developing countries and this has been thoroughly discussed in number of case study cities of the developing countries. Moreover, inner city urban development policies that displace the urban poor from the city centers to peripheries, the question of affordability of public transportation by the poor and road infrastructure programs in favor of cars have escalated the problem (World Bank, 2002b, Puchera et al.2005, Ahmed, 2008). The urban poor of the peripheral informal settlement and

other mega public housing programs at the city outskirts are most vulnerable to increasing trip lengths and rising costs of public transportation and thus reducing urban poor's access to jobs and services which in turn increases their social exclusion and poverty (World Bank, 2002b, Sohail et al. 2004).

Public transport forms the mainstay of motorized mobility for majority urban dwellers in cities across the developing countries. Private cars are insignificant modes of urban mobility particularly in African cities. For example the modal share of cars to total urban mobility was 4%, 6% and 10% for Addis Ababa, Dar es Salaam and Nairobi respectively, while the modal share of public transport in these three cities was significantly high; namely 26% in Addis Ababa, 43% in Dar es Salaam and 42 % in Nairobi. Moreover, these cities have a higher proportion of walking in their modal composition reaching as high as 60 to 70% in Addis Ababa (Transport Research Laboratory, 2002).

In cities of the developing countries, the public transport system is thus the fundamental element of the urban transport system and mobility. It provides urban residents with the motorized "...means by which citizens can effectively access goods and services across the expanse of today's cities" (Wright & Hook, 2007, p.1). The UIPT (2007) also emphasizes the important role of public transport in creating inclusive society as well as in promoting sustainable mobility and development. There are various rail and road based technologies of public transport found operating in cities across the World. It includes metro rail, light rapid transit (LRT), monorail, suburban rail, standard bus systems, bus rapid transit (BRT) and paratransit. They operate underground, on ground or over ground.

The role of the private sector in the public transport service provision in developing countries is significant in light of declining role of the public sector (Gwilliam, n.d., Kumar & Barrett, 2008, & Transport Research Laboratory, 2002). Public transportation in most cities in developing countries, especially in Africa, is dominantly road based where only few cities have a rail based public transport system. The dominantly road based urban transport service is provided both by the so called "...formal' bus (and rail) services, which are planned and regulated and 'paratransit', which sometimes called 'informal' transport, is often unregulated and may operate illicitly" (Halcrow Fox, 2002, p.9). The modal share of the two modes of operation in urban transport market varies between cities in the developing countries. Generally as Cerveroa & Golub (2007, p. 447) observe, there is an inverse relation between per capita

income of cities and modal share of the paratransit and therefore the modal share of the paratransit tends to increase as per capita income of the city falls.

Various combinations of public transport vehicles types are common including articulated and bi articulated buses, midi and minibuses, converted pick up, three-wheelers and motor bicycles. Non-motorized public transport modes such as bicycles, horse and hand drawn carts also supplement the motorized public transport mobility. In many cities of the developing countries, the road based public transport operates in mixed traffic situation with the exception of the bus rapid transit system of Latin American and some African cities (Cape Town & Lagos). Public transport preferential treatment measure, like bus ways and bus lanes that offer an operational advantage for public transport over other non-public transport vehicles are not widespread in African cities, although there is a rising interest to emulate and implement bus rapid transit in African cities (Addis Ababa & Der es Salaam). In the absence of bus priority infrastructure, the public bus transport faces intense inter-modal competition with cars for the road space in addition to intra-modal competition with the operators of informal public transport.

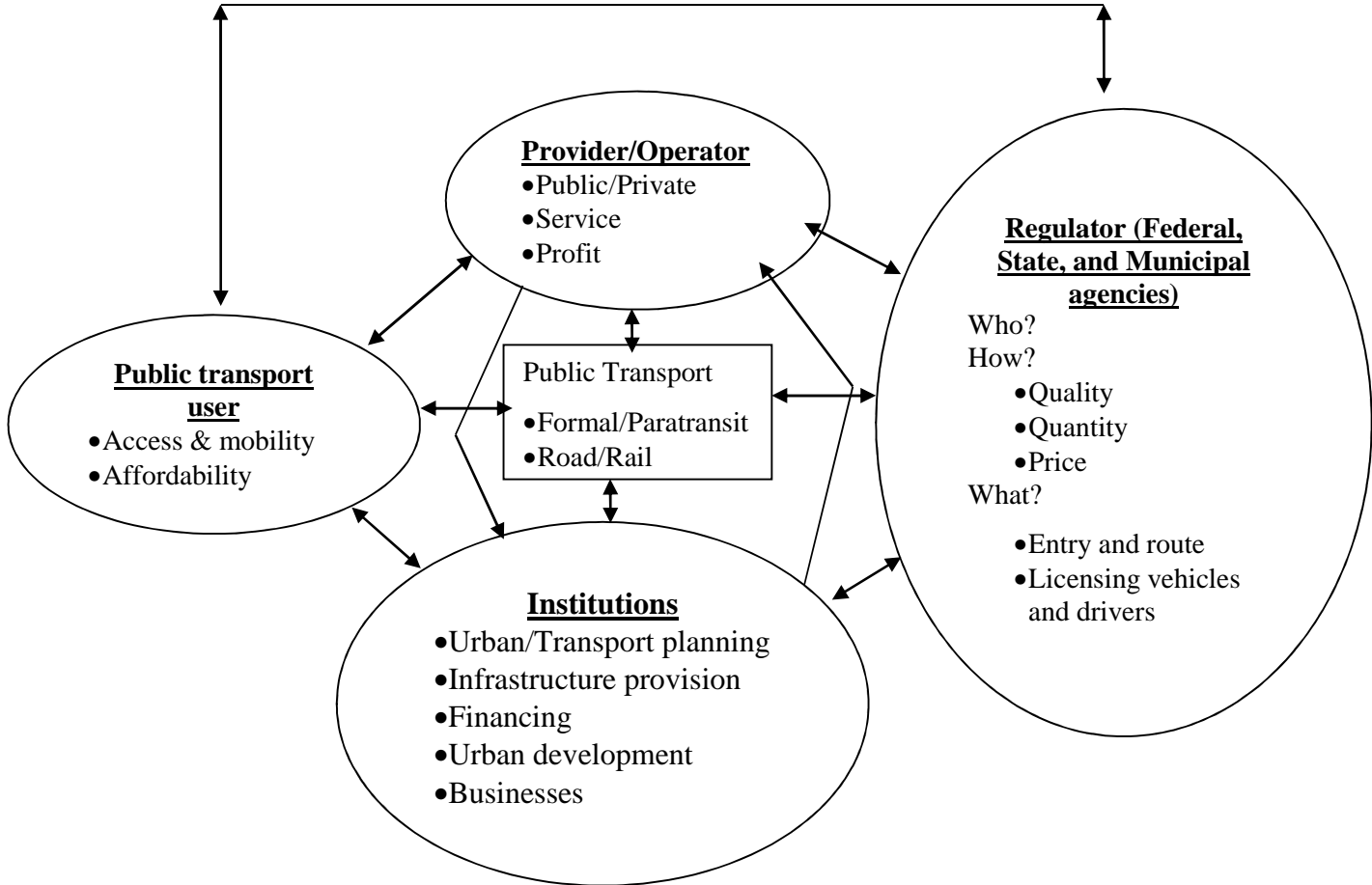
The urban public transport involves a number of institutions, actors and stakeholders with both varying and overlapping sometimes conflicting interests, responsibilities and relationships, the understanding of which is very fundamental in managing urban public transport in developing countries - a system characterized by fragmented and uncoordinated operation and management. The different actors include the regulatory agencies which could be the municipal, or the state or federal authorities that set the rules and regulatory framework, the provider of public transportation both public and private, the users of public transportation who stand to benefit or loss from the current public transportation system and governmental institutions responsible for planning, urban development, infrastructure provision and financing as well as the private businesses that directly or indirectly stand to gain or lose by the public transportation system (See also Figure 3.1). The clear delineation of the responsibilities, interests and expectations of these stakeholders and each city's specific context is crucial for setting up an urban transport institution necessary for the sound management of the urban transport system. Meakin (2002, p.1) lists four major responsibilities in the planning and management of urban transport

Which include: planning and development of transport infrastructure (road and rail network), management of road and road uses including the licensing of vehicles and

drivers, public transport organization, development and regulation, financing and investment, and an interface with land use and urban planning.

In case of public ownership of public transport, the operation of public transport is also added to the above responsibilities.

Figure 3.1: Actors in urban public transportation



Urban public transport in Addis Ababa shares many of the features of urban public transport system in Africa. Rail based urban transport service is completely absent and the system is exclusively road based. There is one formal public transport enterprise and thousands of individual private operators characterized by the prevalence of intense intermodal competition for the market and transport infrastructure. The private sector dominates the public transport market. The public transport operates in mixed traffic and bus priority measures including busways, bus lanes, bus priority at intersection and off-line bus and minibus stops are rare or almost nonexistent. Frequent congestions along major public transport corridors imposes limitations on the operational performance of public transport modes. Planning and coordination of the system is lacking, although there is an increasing interest in streamlining

the system and establishing appropriate urban transport institutions. Transport policy to guide the city's transport has been approved in 2011 but the modalities for its implementation have yet to be worked out.

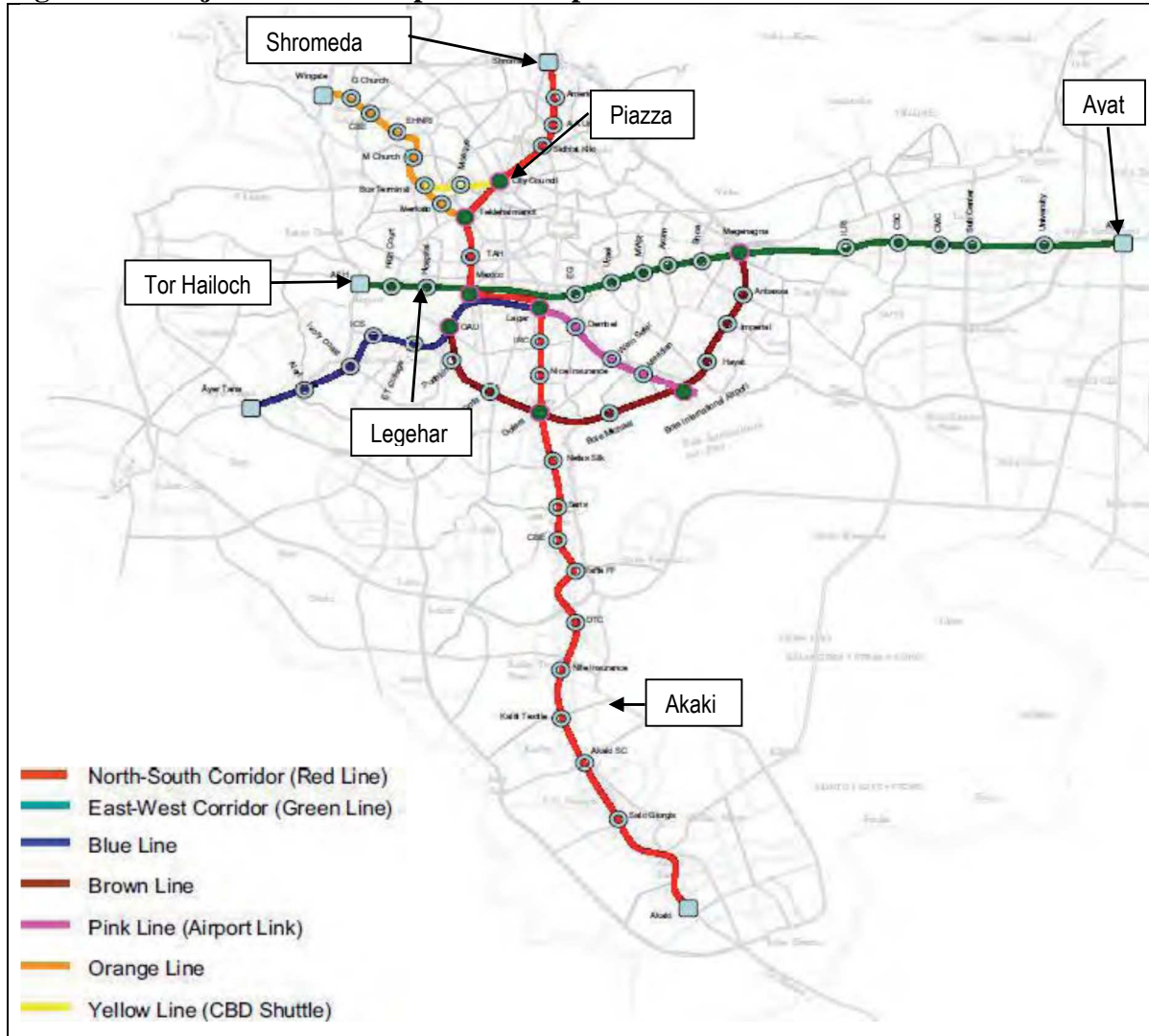
The exclusively road based Addis Ababa's public transport network is served by buses of various types, minibuses, midi buses, and taxies. Three-wheelers or "Bajajas" that have been added recently to the catalogues of modes of public transportation and horse drawn cart also provide transport services. But the city transport policy strictly restricts their service to areas of the city which are exclusively inaccessible by other conventional modes of public transportation (Woldetensae & Fanta, 2010). Bajajas are emerging as faster and cheaper modes of public transportation than conventional taxies in secondary towns and regional capital cities across the country and are displacing these from the market for they have simply become less competitive. Given its number and its labor focused operation, the formal and informal public transport sector is also significant in providing thousands of employment opportunities mainly for less skilled workers.

Addis Ababa's Public transport system plays a key role in providing motorized mobility for the majority of the city population, a city with characterized by low and yet rising motorization and automobile ownership. Furthermore, the increase in the city population, urban sprawl, inner city urban renewal programs and the consequent displacement of thousands of residents to peripheries and development of new dense settlements at the city peripheries ("edge city") will further push the demand for public transport based mobility as access to car ownership will be limited to insignificant fraction of the population. The public transport system accounts for about 35 % of all trips and about 88% of motorized trips (ERA, 2005), although another estimate by Transport Research laboratory (2002) lowers the share of public transport to 26% of all trips. These studies stress the importance of the minibus taxies. Minibus taxies form the pillar of the public transport system of the Addis Ababa and accounts for about 72% while the Anbessa city bus and the saloon taxies share for about 27% and 1% motorized public transport trips respectively (Transport Research laboratory, 2002).

As public transport has evolved and developed spontaneously, hierarchically structured, coordinated and integrated public transport service that is guided by rational public transport planning is lacking. The public transport services are mainly concentrated on the major radial roads and other major arterial roads that have been constructed recently to link the rapidly urbanizing expansion areas in the east, west, south and southwest, as shown on Figure 3.2. The

different operators of the public transport provide overlapping and often competing services along these major corridors of movement of the east – west (Ayat-Legehar-Tor Hailoch) and north - south axes (Shromeda-Legehar-Akaki).

Figure 3.2: Major corridors of public transport movement



Source: ERA, 2005

Urban transport study estimates (ERA, 2005) that the total load of public transport for 2020 to reach 16.3 million person trips per day along these seven main public transport trunk corridors shown in Figure 3.2. These major axes of public transport coincide with trunk routes earmarked for the new BRT and LRT lines. As shown in Table 3.1 and Figure 3.3, the north- south corridor running from Shromeda via Piazza and Legehar to Akaki and the east-west corridor extending

from Ayat via Legehar to Torch Hailoch are the two most important corridors accounting for 74% of the total public transport load.

Table 3.1: Trip estimates for the major public transport corridors of Addis Ababa for 2020.

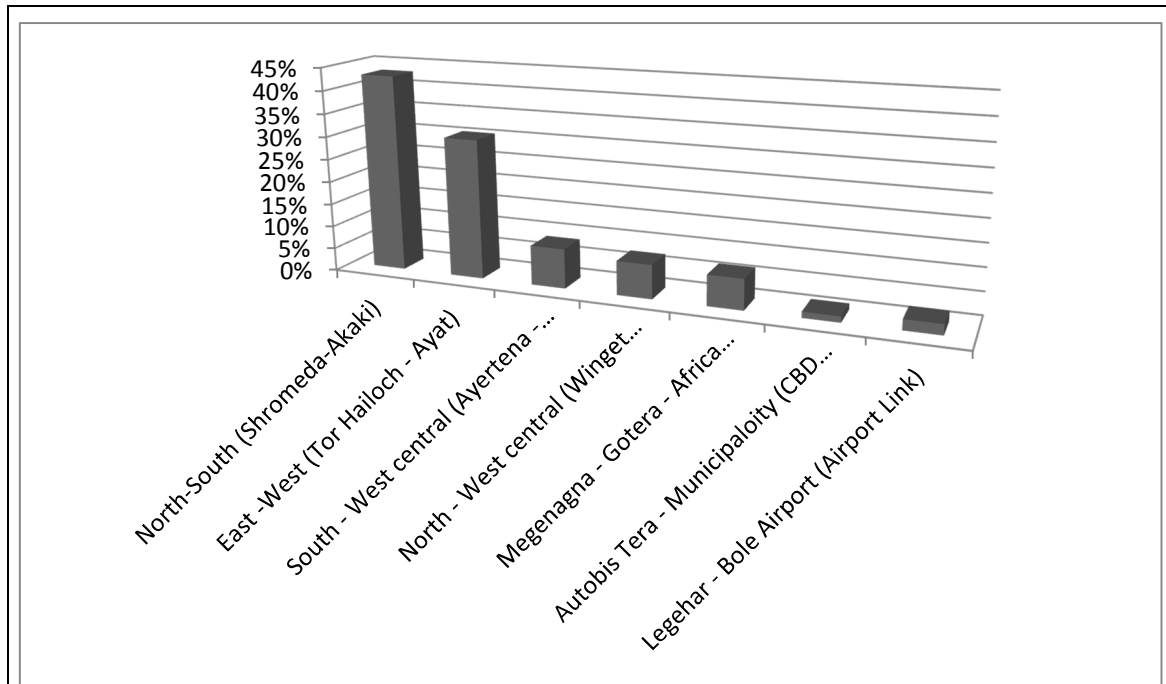
No. Name of route	Distance of route (km)	Person-trips/day in Million
North-South (Shromeda-Akaki) or red line	26.3	6.99
East -West (Tor Hailoch - Ayat) or green line	18.5	4.96
South - West central (Ayertena - Legehar) or blue line	7.7	1.41
North - West central (Wingate School - Tekilehaimanot) or orange line	5.8	1.21
Megenagna - Gotera - Africa Union loop or brown line	11.6	1.09
Autobis Tera - Municipality (CBD Shuttle) or yellow line	1.9	0.22
Legehar - Bole Airport (Airport Link) or pink line	5.0	0.37
Total	76.8	16.25

Source: ERA, 2005

It is along these major corridors where one observes a high concentration of all the public transport modes -the formal Anbessa bus, the midi buses, the minibuses and intercity buses- competing for passengers and available road space.

Intermodal competition among public transport modes is particularly pronounced during the morning and afternoon peak hours where congestion and long queues are the usual outcomes which profoundly reduce the number of trips can be made and the number of passengers that can be transported. Congestion and hence reduced commercial speeds of public transport modes increase costs of operation and air pollution. Gakenheimer (1999) emphasizes that the overall result of rising congestion and motorization is to reduce mobility and accessibility in the cities of these countries, an issue that urban and transport planner in these countries should seriously consider as to how to reverse this trend for congestion and traffic delays negatively cost the economy by reducing the gross domestic product.

Figure 3.3: Percentage of trip estimates for the major public transport corridors of Addis Ababa for 2020



Source: ERA, 2005

It is not only the presence of thousands of individual paratransit operators and hundreds of the Anbessa (formal) city buses running on the streets of Addis Ababa and operating in very uncoordinated manner that characterizes the system but also the fare system and payment modality that is also very haphazard and is in dire need of some sort of reform. Fare is paid in cash for each trip made. Fare payment occurs at each stop before boarding in Anbessa city buses and in vehicle in the paratransit operators. There are three different distance based tariffs structures for the three major modes of public transportation (Anbessa, midibuses, and minibuses). Fare for door-to-door service of saloon taxi is negotiated. The three-wheelers and horse drawn carts provide only short distances and they have fixed fares. Some prepaid tickets are available for Anbessa but are not widely used. Integrated tariff and tickets applicable across all modes of public transport and valid for the whole city are not available.

Bus and taxi stops are usually on the road and off street stops and taxi and bus bays are very rare. Surprisingly enough, even the new wider roads being constructed do not have these minimum facilities. The on-street bus, taxi stops and on-street parking are usually the main observed causes of traffic congestion along the major traffic corridors and junctions. The situation of major taxi and bus terminals is not different from that of stops where most are located on-street surfaces around major intersections and roundabouts. The poorly integrated

terminals for the various modes are found scattered long these nodes. They involve physical inconveniences and longer transfer walking for passenger interchanging modes and routes.

Addis Ababa's urban development and the transport system have evolved spontaneously, as the discussion in the previous chapter has shown. The city had little success story of planned intervention to guide and manage its growth and development throughout its short history. Currently, nevertheless, given the growing political and economic importance of the city and its role as international city housing the African Union and various international organizations, there is an ongoing process to rebuild the city. The present structure and management of the public transport system reflects the whole urban fabrics in which the close relation between transport and urban development had not been fully understood and exploited. Many overlapping routes are served by the informal and formal public transport operators mainly along the major roads as mentioned earlier. Overlapping services are also common with in each public transport modes. Hierarchical system of public transportation lines as exemplified by trunk-feeder arrangement is non-existent. In view of the current and future anticipated polycentric spatial development of the city, the increasing recognition of the importance of public transport as a mode of sustainable motorized mobility for the growing urban population and increasing travel demand, the whole public transport network requires restructuring. New operational and institutional setups are necessary to transform the city's spatial development and closely link it with public transportation in a direction that some Latin American cities, like Curitiba & Bogota, have achieved.

3.2 Modes and performances of public transport

Public transport is provided by the formal and governmental Anbessa City Bus enterprise and the numerous, privately and mostly individually owned modes of informal public transport collectively known as the paratransit. The Anbessa, the midi and minibuses collectively provide public transport service mostly on overlapping 507 routes (ACBSE, 2013a, & AARTB, 2011).

Various combinations of public transport vehicles types are used. The Anbessa city bus enterprise runs mainly standard buses but has also recently added some articulated buses to its fleet as displayed in Figure 3.4.

Figure 3.4: The Anbessa City Bus Enterprise fleet types: Articulated (top) and standard bus (bottom)



Source: Addis City Planning Project Office and Lyon Town Planning Agency, 2012.

Consisting as it is both motorized and non-motorized modes, the informal/paratransit public transport sector fleet is dominated by the 12- seater mini bus taxis but also includes the midi buses (named commonly as Higers), intercity buses, the exclusive-ride saloon taxis, the newer three- wheelers or “Bajajas” and traditional horse-carts (See Figures 3.5 and 3.6).

Figure 3.5: The Paratransit fleet: minibuses, saloon taxis and midibuses or Higers)



Source: Own Photos taken at Megenagna, 2011

Figure 3.6: A three-wheeler (Bajaj) giving service in newly completed public housing neighbourhood at the periphery of Addis Ababa



Source: Own photos, 2013

It is difficult to get reliable and accurate data on the demand and supply of public transport, trip rates, public transport modal share and trip distribution and distribution. Nevertheless, the Addis Ababa Transport Branch office estimate (2012) puts the daily public transport peak demand to be about 4.1 million passenger trips, of which only 87% of this demand could be

met by the existing public transport supply. A total of about 18,400 public transport vehicles of various types, models and ages operate in the city. Moreover, an increasing number of three wheelers 470 of them in 2011 (Woldetensae, Fanta, & Haile, 2011) and horse carts found mainly in Akai and in some parts of Yeka sub cities of Addis Ababa provide limited but cheap and fast public transport services in parts of the city that are totally inaccessible by any other mode of public transport and where there is no significant slope difference. But they are not included in this analysis for the lack of data on how many people they transport and their uncertain future imposed upon their use by the restrictive city's transport policy.

In confirmation with earlier studies and estimation (ERA, 2005; & FDRE, 2008), the mini buses and small taxis are very important modes that contribute for 92% of the total public transport fleet and carry about 69% of the total public transport passengers. On the other hand, the higher capacity buses of Anbessa, the midi and intercity buses with a fleet share of 8% carry about 31% of daily public transport passengers.

Table 3.2: Public transport modes and estimated daily passenger transported in Addis Ababa in 2012

Public Transport Mode	Number of Vehicles	Passengers carried per Day in thousands*	Percentage Share of	
			Fleet	Passengers
Anbessa City Bus	485	460	2,6%	13,0%
Midi -bus	446	264	2,4%	7,5%
Minibus	12 500	2 160	67,8%	61,2%
Saloon Taxi	4 500	288	24,4%	8,2%
Intercity buses	500	360	2,7%	10,2%
Total	18 431	3 532	100,0%	100,0%

Source: Addis Ababa Road and Transport Bureau, 2012, & Anbessa, 2013a

The AARTB (2012) estimates that 13% (or 528,000 passengers daily) of the current total public transport demand cannot be met by the existing public transport supply. This unmet demand is manifested in travel delays and very overcrowded public transport. The problem of overcrowdedness is very noticeable in the big and midi buses during the peak hours. However as the traffic police and the city transport authority's inspectors have stricter controls on passenger loads of minibus taxis, they are usually less overcrowded. Load violation by minibus taxi operators will result in paying high fines and eventual forfeit of driving licenses of the minibus drivers.

The shortfall in supply could be met both by increasing the performance of the public transport system and increasing its number. Assuming the current level of performance and proportion of each mode remain constant, about 2754 additional public transport fleets (83 Anbessa buses, 55 midibuses, 1.873 minibuses, 661 saloon taxis, and 83 intercity buses) are necessary to meet the demand (See Appendix 20). However, increasing the number alone will not solve the problem as it this will result in more congestion, and leading to vicious cycle problem of reduced speed, underperformance and lower level of service. Increase in number and capacity of public transport fleet should, therefore, be supported by public transport preferential treatment and performance enhancing measures.

All the public transport modes operate in mixed traffic. Although proposed in the city development plan 2001 to 2010, exclusive right of way for public transport along east-west and north-south axes has not been implemented. In the absence of public transport priority measures along the major corridors, frequent congestion during morning and afternoon peak hours reduces the performances of the public transport modes. The volume and availability of public transport modes and actual traffic situation on the road determines the headways. The practice of fare payment before boarding on Anbessa buses increases dwell times at stops. Real time information, arrivals and departures time schedules at each stop particularly for the formal public transport are not provided. In light of the uncertainty in the mixed traffic situation, scheduled transport service is difficult to maintain, though there were some attempts to introduce such transport service by Anbessa city bus enterprise in late 1980's.

3.2.1 The formal Anbessa city bus service

The Anbessa⁸ city bus enterprise was established as private share company in 1943. In 1963 it became a formal bus company and was given the right to provide "...an exclusive franchise for the provision of passenger transport service in Addis Ababa" (Trans-Africa Consortium, 2008a, p.24). It also used provides city bus service in town of Jimma in southern Ethiopia and used to give competitive intercity transport services along with other private transport companies. The company was nationalized in 1974 and came under the authority of the then passenger transport corporation of the ministry of transport.

⁸ Anbessa City Bus enterprise operates the red and yellow colored city buses

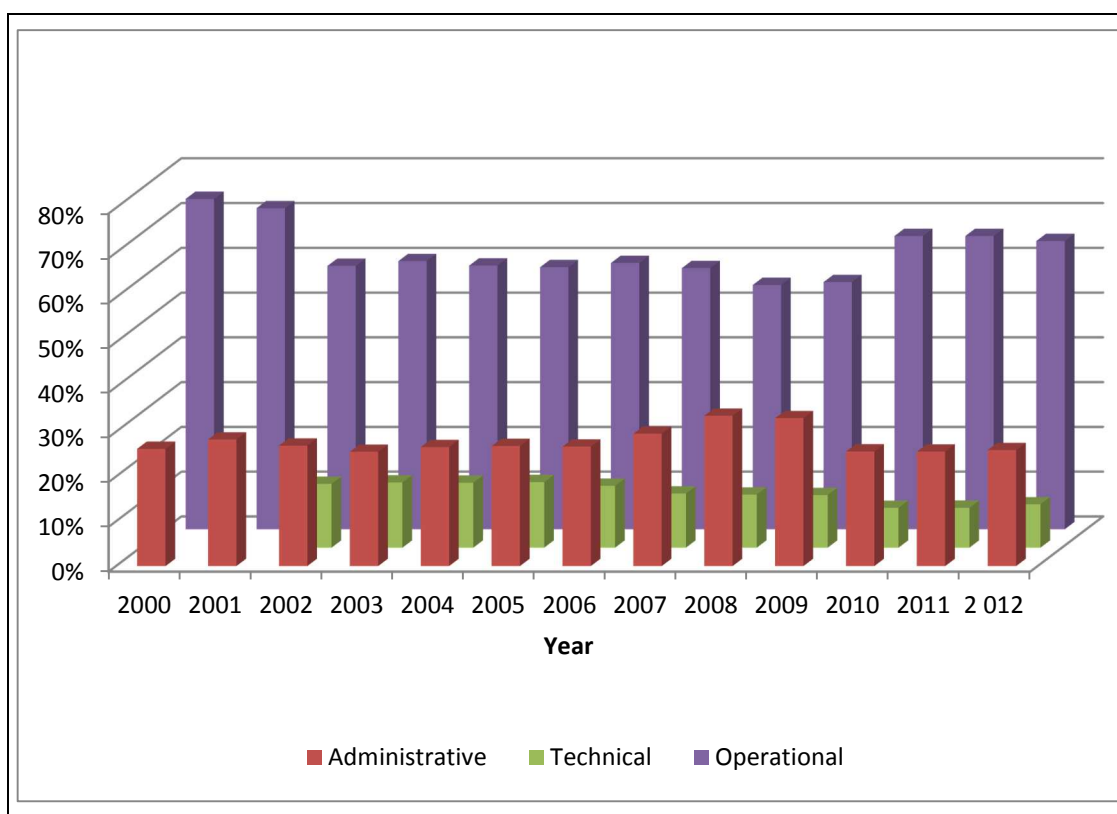
The company went through another reform process in 1994 when the company was reestablished as a commercial enterprise by the regulation No 187/86 to provide public transport services in Addis Ababa and its metropolitan region (AARTB, 2011). It also continued the provision of transport service in town of Jimma. However, Anbessa lost its intercity passenger transport service and intercity transport function was transferred to a newly organized sister enterprise named “Walia” intercity bus service. Between 1996 and 2011, the enterprise came under the administration of the Ethiopian privatization agency. The company was auctioned for privatization in 2000 but this never materialized as there was no offer made. In 1992 the legal right of Anbessa as a commercial enterprise to set fares was annulled in return for which the enterprise started getting compensations in form of financial support for vehicle replacements and subsidy from both the Federal Ethiopian and the Addis Ababa city governments (IBIS Transport Consultants Ltd., 2005).

A final milestone in the history of Anbessa was laid down by the Ababa transport policy approved in 2011. The policy merged the three independent institutions of the Addis Ababa transport branch office, the Addis Ababa City Road Authority and the Anbessa to form the Addis Ababa Road and Transport Bureau. The city government approved the proclamation legalizing the establishment of the AARTB (AACG, 2011). Anbessa became a budgetary institution of the city government of Addis Ababa and a semi-autonomous organ under the umbrella of the Addis Ababa Road and Transport Bureau. This decision finally ended years of institutional uncertainties and the financial and operational difficulties of the Anbessa city bus enterprise. The newly reorganized Anbessa has set the provision of rapid, safe and comfortable urban public transport service that satisfies the current and future public transport demands of the residents of Addis Ababa and the metropolitan region, its integration with other public transport modes, the delivery of reliable maintenance service for its fleet and external customers, the production of spare parts for own use and sell and diversification of its revenue as its core missions (ACBSE, 2013b).

In 2012, Anbessa City Bus Enterprise had a total employee of 3820, with females and males with percentages of 36 and 64 respectively. The data on educational status of the employees shows that most have low level of education. The great majority of the labor force, about 64%, are elementary school dropouts and high school graduates. Only about 1% of them are university graduates, a feature attributed to the character of the function of the enterprise that is more operational and little skill is required. The structure of the labor force by major job

groupings; namely: administrative and support, technical and operational services between 2000 and 2012, as shown in the Figure 3.7 (see also Appendix 21) also reflects Anbessa's main functions.

Figure 3.7: Percentage of employee of Anbessa City Bus Enterprise from 2000 to 2012 by major employment groupings



Source: ACBSE, 2013b

In the period between 2000 and 2012, the job group, operational consisting mainly drivers and conductors, had an average share of about 60% of the total employees of the enterprise and the technical division providing routine and periodical technical fleet maintenance services had an average share of 12%. The two core job groups together constituted for about 72%, and the rest 28% of the total work force was accounted by the administrative and management support staff (ACBSE, 2013a). The ratio of the three categories of employees and total staff to actually operational buses, as shown in Table 3.3, gives an indication on status of staffing and efficiency of the operation of the enterprise.

Table 3.3: Anbessa City Bus employees by major groups and ratios to operational buses from 2000 to 2012

Year	Employees of Anbessa by Categories			Total	Operational Buses	Ratio of Operational Buses to Employees			
	Administrative	Technical	Operational			Administrative	Technical	Operational	Total Staff
2000	682	—	1921	2603	401	1,70	—	4,79	6,5
2001	740	—	1877	2617	383	1,93	—	4,90	6,8
2002	732	388	1600	2720	405	1,81	0,96	3,95	6,7
2003	793	453	1861	3107	462	1,72	0,98	4,03	6,7
2004	818	447	1813	3078	463	1,77	0,97	3,92	6,6
2005	804	439	1755	2998	381	2,11	1,15	4,61	7,9
2006	806	418	1797	3021	360	2,24	1,16	4,99	8,4
2007	882	361	1740	2983	381	2,31	0,95	4,57	7,8
2008	968	342	1573	2883	355	2,73	0,96	4,43	8,1
2009	907	322	1515	2744	301	3,01	1,07	5,03	9,1
2010	696	242	1781	2719	313	2,22	0,77	5,69	8,7
2 011	737	257	1 888	2 882	295	2,50	0,87	6,40	9,8
2 012	990	370	2 460	3 820	485	2,04	0,76	5,07	7,9

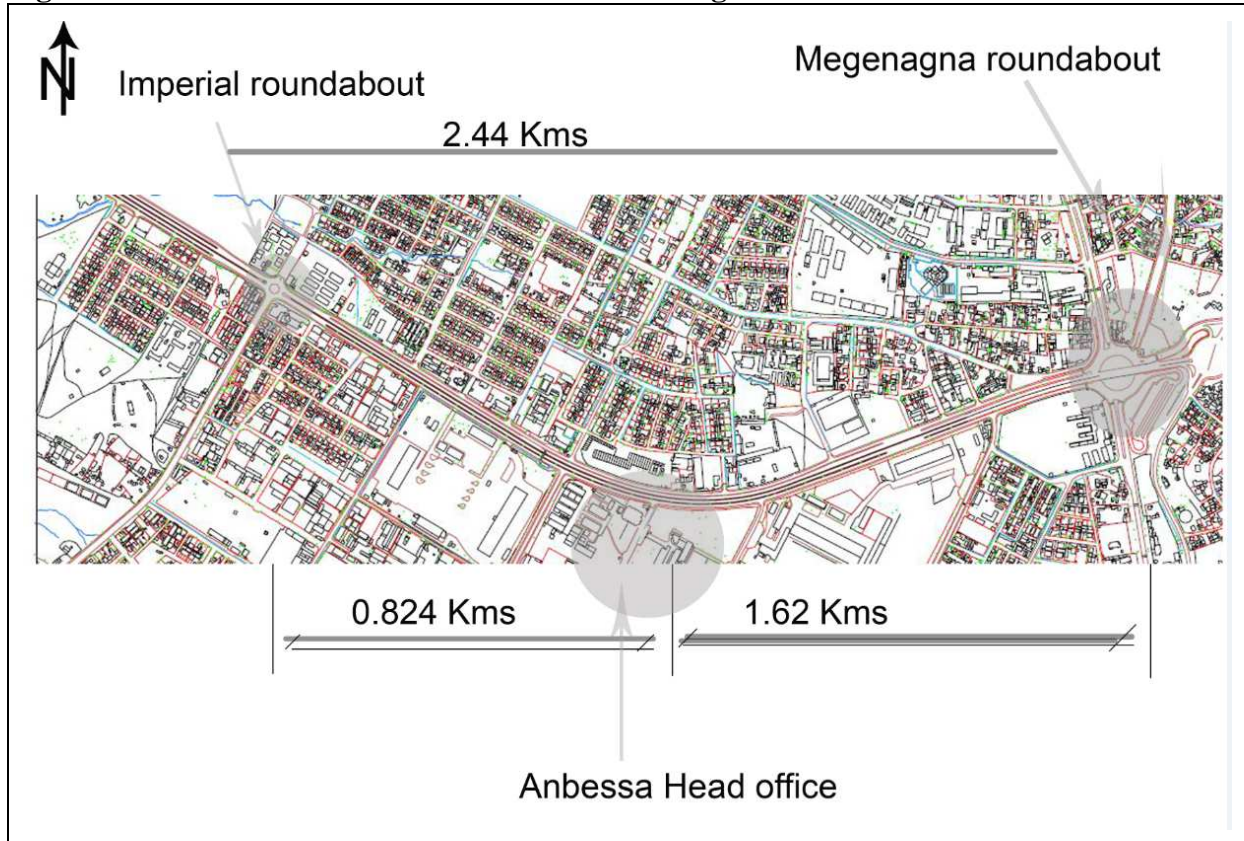
Source: ACBSE, 2010 & 2012c

Anbessa's performance can be evaluated using ranges of values and ratios using those suggested by Armstrong-Wright & Thiriez, S. (1987). They had developed some range of values within which a formal "well-run" bus operator is assumed to operate efficiently, although they emphasized the need for caution in interpreting these range of values as there is no standard benchmark of ratios of employees to buses applicable to all countries and operators. Generally, overstaffing, as shown in Table 3.3, has generally increased since 2005 mainly due to declining number of operational buses. The new buses that were added in 2012 improved the situation but this was overshadowed by employment of a large number of new employees. There is over proportional administrative staff, which is 4 to 10 fold the ideal range of 0.3 to .4 staff per bus. The problem of overstaffing is also apparent in the operational employees, in which the ratio has exceeded the minimum "ideal ratio" of 4 (2 drivers and 2 ticket seller per bus per day but no accounting for supplementary staff due to annual and sick leaves of employees). However, the technical staff is within the optimum efficiency range (0.5 to 1.5) but the ratio has been declining mainly due to high staff turnover and the unattractive salary scale of the enterprise to draw new technical staff. Finally, labor productivity of Anbessa in terms of vehicle kilometer per employee has declined by 27% between 2000 and 2011 and thus vehicle kilometer per employee has decreased from the peak of 8,569 in 2004 to a minimum of 5,603 vehicle kilometer per employee in 2011.

In October of 2012, Anbessa's total fleet reached 759 of which 412 were new standard and articulated Chinese buses assembled by Metals & Engineering Corporation (MetEC) of the

Ministry of Defense (See also Figure 3.4) and expected to increase to 500 in 2013(ASBCE, 2012a). Anbessa provides transport service from 5:30 am in the morning to 21:00 in the evening.

Figure 3.8: Anbessa head office location and the ring road



Source: Own work

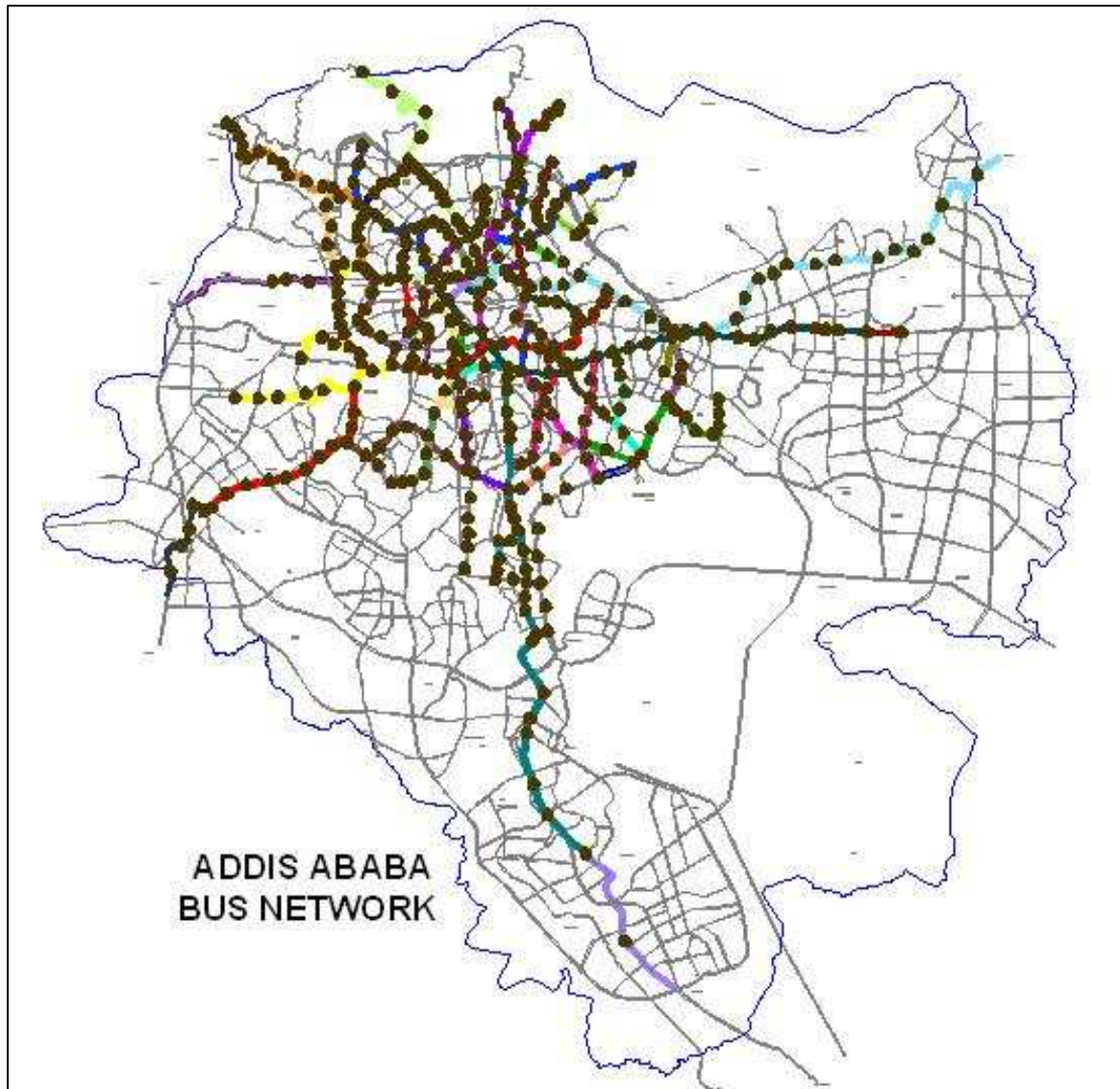
The enterprise has three major depots, repairs workshop and service centers at Yeka, Shegole, and Mekanissa with an area of about 20 hectares. The head quarter of the enterprise at Yeka located along the ring road near Megnagna houses the main maintenance facility of the enterprise (IBIS Transport Consultants Ltd. 2005, Tadele, Y., 2013, & ACBSE, 2013a). The location of the head quarter along the ring road has increased the dead mileage of ACBSE since the opening of the ring road. Incoming buses bound from the direction of Megnagna for overnight parking, have to travel a distance of about 3.3 kilometers to nearest roundabouts at the Imperial Hotel and back to access headquarter for parking and maintenance. Similarly south outbound buses in the morning have to travel north to Megnagna roundabout and back for a distance of 3.3 kilometers before taking their southerly courses (See Figure 3.8). The dead

mileage of increases the daily operational cost of the enterprise and this would have been avoided had the ring road construction considered the traffic generation and attraction of the depot. This is an evident example of the lack of foresight of the ring road designers, poor comprehension by the enterprise and urban planners on the importance of an integrated approach in transport and land use planning. Surprisingly enough, even at present there seems neither appreciation of problem and loss incurred and nor effort made to rectify the situation by the enterprise management and the city road authority.

The Anbessa, supported as it is by 1,400 bus stops and four major terminals at Merkato, Legahre, Megenagna and Menelik square-Piazza, gives an intra and intercity public transport services on 101 and 10 routes respectively (See Figure 3.9). Daily, 485 new and old standard and articulated buses provide service, achieving a fleet utilization level of about 64%. The buses make daily about 6.300 bus trips and transport about 460,000 bus passengers (ACBSE, 2013a). The regional public transport is limited to the adjoining towns of the so called “Finfine⁹ special zone” of the Oromia regional government. In addition to the regular scheduled transit services, the enterprise also provides contract and special occasion transport service to a number of private and public institutions when demanded (ACBSE, 2013a).

The Anbessa routes (See Figure 3.9), as so do the minibus and Higer midibus, are concentrated on the major corridors that have been identified in the urban transport study of Addis Ababa as major future public transport movements (ERA, 2005). These corridors are the east-west corridor that extends from Ayat via Megenagna to Trohailoch , the north-south corridor from Shromeda with two wings of via Piazza and Arat kilo through Lagare to Kalti terminal, the northwest-central corridor form ring road at Ambo intersection to Merkato/Addis Ketema, the southwest-central corridor from Ayer Tena via Alert and Mexico Square to Laghare terminal , the southern Loop corridor from Megenagna along ring road-via Bole airport to Gottera and the central corridor/airport Link from Bole Airport via Bole Road to Legahre (See Figure 3.2).

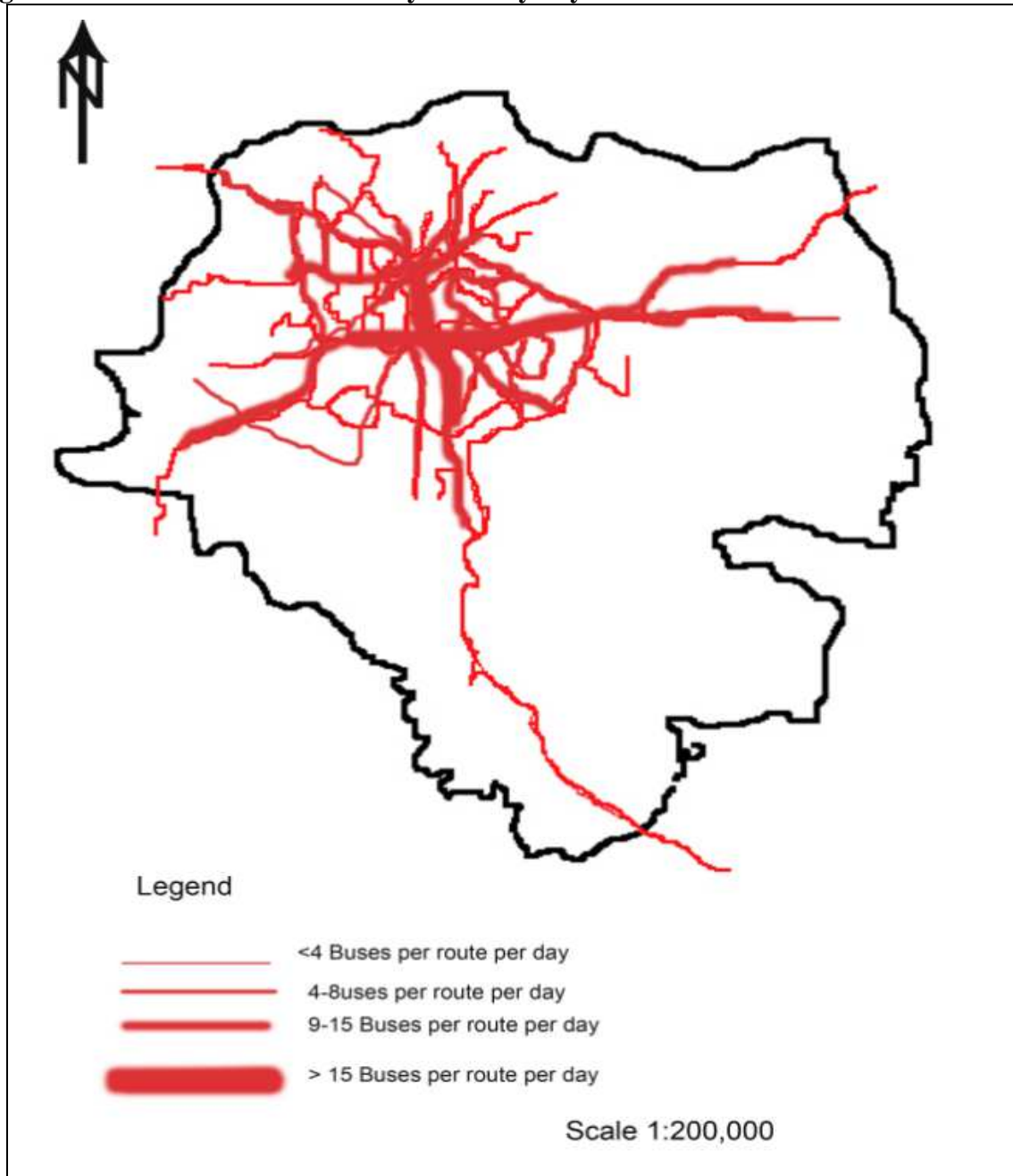
⁹ This is special zone in the Oromia regional government that immediately surrounds the city. The zone is now considered as functional and integral part of Metropolitan region of Addis Ababa in the newer city’s master plan under preparation

Figure 3.9: Anbessa bus route network and bus stops

Source: ACBSCE, 2012b

Most of Anbessa routes are overlapping and radial lines with origin/destination at the city's commercial business district of the Piazza/Menelik Square-Merkato/Addis Ketema - Legahre triangle. These three major hubs of the city bus network serves as origins and or destinations for 65% of the whole Anbessa routes. The sub centres of Megenagna and Ayer Tena are also emerging as secondary origin/destination nodes for the feeder and tangential lines connecting the peripheral expansion areas and neighborhoods along the ring road. This also holds true to number of buses the Anbessa assigns per route by which most of fleet are concentrated along these main corridors (See Figure 3.10).

The number of routes has doubled and length of the bus lines tripled between 1994 and 2003. The number of routes increased from 41 lines in 1994 to 93 lines in 2003. Similarly, the bus line increased from 418 kilometer in 1994 to 1187 kilometer in 2003. Between 2003 and 2011, the bus line length and number of routes has remained almost constant. However, the route numbers jumped sharply from 93 to 111 in 2012, which amounted to an increment of 18 new routes and 372 kilometer of new bus line just in one year bringing the total route length to 1612 kilometers (ACBSE, 2012c, & Berhan, Beshah, & Kitaw, 2013).

Figure 3.10: Number of Anbessa city buses by city bus routes

Source: own work

The Anbessa has always embarked on numerical increment of its route without any serious attempt to systematically reorganize the routes on hierarchal structure of trunk/line haul and feeder line arrangement. The decision by Anbessa to open new routes or extend the existing ones is made to meet the demands of organized communities of certain neighborhoods of the city for public transport service (ACBSE, 2013a) rather as an outcome of explicitly defined patronage or coverage goals. Walker (2008) stresses the importance of making a clear

delineation between the two goals of patronage and coverage in public transport decision making processes as critical for both short term service design and long-term network planning. However, Anbessa to date has been focusing on operational planning issues of vehicle and crew scheduling as well rostering and has much to learn in exercising the more technical aspects of strategic and tactical planning within the context of the conventional public transportation planning process (Guihaire & Hao, 2008).

Table 3.4: Number and percentage of Anbessa city buses per route of January 2013

Number of buses per route	Number of routes	Total number of buses	Percentage of buses per route
2	6	12	2,5%
3	39	117	24,1%
4	28	112	23,1%
5	2	10	2,1%
6	27	162	33,4%
8	9	72	14,8%
Total	111	485	100,0%

Source: ACBSE, 2013a

Anbessa bus routes are served by two to eight buses with an average of four buses per route. Routes with two to four buses per route are significant with 66% (73 routes) of the whole routes while only 9% of the routes are daily served by 8 buses. Table 3.4 shows the percentages of number of Anbessa buses and corresponding route numbers (See also Figure 3.10). Accordingly 66% of the routes with buses four and below each are served by 50% of the Anbessa fleet while 34% of the total routes (38 routes) with five to eight buses per route account for remaining 50% of the whole fleet.

The Anbessa network at present consists of 357 kilometers of regional transport routes and 1255 kilometers intracity routes. The route length ranges between the shortest route length of 3.8 kilometers and the longest route length of 52 kilometers. The average route length for the whole network is 14.5 kilometer, 11.6 kilometers for intracity routes and 38.5 kilometers for regional routes (See also Appendix 22). Table 3.5 shows that most of the Anbessa city routes (about 77%) have lengths between 5 to 15 kilometers. The regional routes have lengths above 25 kilometers.

Table 3.5: Percentage of length of routes of Anbessa city buses of January 2013

Route Length in Km	Number of routes	Percentage
Less than 5	1	0,9%
5 to 10	30	27,0%
10 to 15	55	49,5%
15 to 20	11	9,9%
20 to 25	2	1,8%
25 to 30	3	2,7%
30 to 35	2	1,8%
35 to 40	1	0,9%
40 to 45	1	0,9%
45 to 50	4	3,6%
50 to 55	1	0,9%
Total	111	100,0%

Source: ACBSE, 2013a

The frequency of service on each route is dependent number of buses serving the route and the trip duration, which in turn is determined by the trip length, travel speed, traffic condition, the distance between bus stops, the dwell and boarding times at bus stops. The dwell times are usually longer as fare payment takes place just on boarding the bus. Dwell and boarding times at the peak hour are likely to be longer than off peak hours.

The average operating or commercial speed for Anbessa buses is estimated to be about 20km/hour (FDRE, 2008) but with lower operating speeds at the peak hours. The travel time for the Anbessa routes is between 20 and 110 minutes averaging 52 minutes for the whole network (Berhan, Beshah, & Kitaw, 2013). According to national transport master plan study (FDRE, 2008), the headways ranges between 8 and 180 minutes with an average head way of 30 minutes. The shorter the head way, the shorter will be the waiting time and vice versa. Form the service quality perspective, longer headways are undesirable and results in longer waiting times (in similar ranges as the headways). They are likely to be longer for longer trips particularly for the regional public transport networks, for routes with less number of bus consignments and congested routes. According to the study made by ORAAMP (2001), the

average waiting time of Anbessa buses was half an hour and this could exceed 90 or more minutes for longer and congested routes. It is likely that the situation at present has not improved or even has increased given the worsening trends in congestions.

The Anbessa's patronage has been falling over a number of years and the decrease has been precipitous since 2004. This has two implications. Firstly, Anbessa has been losing its passengers to other modes including non-motorized modes mainly walking, the paratransit and probably also to private cars. Secondly, it is not even capturing new passengers despite the general observed trend of increasing mobility and rising demand for motorized public transport mobility. The picture is really disturbing in view of increase in the number of new buses of the enterprise and its importance in providing mass transport and promoting sustainable mobility and accessibility.

As presented in Table 3.6, Anbessa's peak passenger load was in 2004 and in 2011 passenger load decreased so much that it was 39% of the 2004 level.

Table 3.6: Anbessa's fleet availability, annual and daily passengers transported between 2000 and 2011

Year	Operational fleet	Percentage fleet availability	Passenger in 000's in a Year	Passenger transported daily
2000	401	84.6%	209473	573 899
2001	383	80.8%	210492	576 690
2002	405	57.9%	187472	513 622
2003	462	68.5%	210635	577 082
2004	463	68.7%	249144	682 586
2005	381	68.7%	232257	636 321
2006	360	68.8%	201730	552 685
2007	381	57.0%	185763	508 940
2008	355	52.3%	154460	423 178
2009	301	44.2%	102338	280 378
2010	313	56.1%	107886	295 578
2011	295	53,2%	98335	269 411

Source: ACBSE, 2010 &2012c

Moreover, the most recent data on passenger volume for the month of January 2013 also shows that the enterprise has been unable to reach the peak passenger volume of 2004. The passenger volume of Anbessa for the month of January 2013, therefore, was only 67% of that of 2004 despite an addition of 500 new standard and articulated buses in 2012 and 2013 (ACBSE, 2013a). Anbessa's operational performance and productivity as measured in terms of levels of fleet utilization, passenger transported per operational bus, distance covered and vehicle-kilometer also reveal the same progressively decreasing patterns of performances (See also Table 3.6, Table 3.7, Figure 3.11 and Figure 3.12).

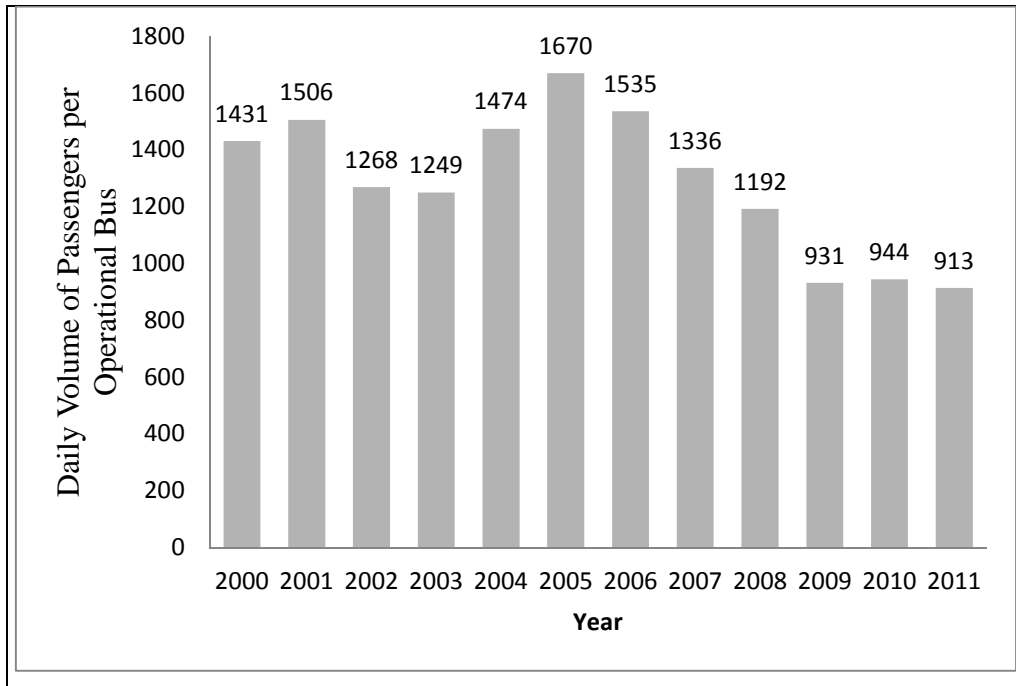
Fleet utilization level, as measured by the proportion of number of buses actually available for service during the peak hours, declined from a high of 85% in 2000 to 53% in 2011. The availability of operational buses slightly improved in 2003 and 2004 when Anbessa then added a fleet of 200 new buses to the existing aging fleet but again started to fall reaching a record low of 44% in 2009. The situation has since then improved with the acquisition of new buses in 2012 and 2013 and is about 66% at present (ACBSE, 2013a).

Anbessa's level of fleet availability is unsatisfactory when compared with the ideal fleet utilization level of "well-run bus company" in cities of the developing countries which lie in the range of 80% to 90% (Armstrong-Wright & Thiriez, 1987). Aging buses, shortages of spare parts and other accessories mainly due to financial shortfalls, high staff turnover of drivers and technicians, poor maintenance standards, high vehicle break downs, poor road conditions, traffic congestion and poor technical standards of the locally assembled new Chinese buses are often mentioned as causes of lower fleet utilization of Anbessa (ACBSE, 2012a, & Tadele, 2013).

The number of buses that are actually available for transit service potentially determines the volume of passengers to be carried, the frequency of the services and the number of trips be made. The lower the frequency than anticipated, the lower will be the number of trips made, the lower the number of passengers transported and the longer will be the waiting times at stations and stops (Meyer & Miller, 2001). The longer the waiting time, the lower will be the reliability of buses and the lesser the number of ridership. Highlighting the importance of reliability in bus markets, Currie & Wallis (2008, p.420) defined two indicators of reliability "...where scheduled services are not run ('lost' bus kilometers), and where services vary from the timetable (late or early running)". The former will result in cutting services and the latter in forced deviation from scheduled services which will eventually result in decrease of patronage.

In their study and under the given assumptions, they found out that the decrease in patronage was in the range of 10 to 15%.

Figure 3.11: Anbessa’s daily volume of passenger per operational bus between 2000 and 2011



Source: ACBSE, 2010 & 2012c

Not only has the level of fleet utilization been declining but also the average number of daily passengers carried per operating bus. Anbessa’s standard bus with total seating and standing capacity of 100 and an average 13 daily trips (ACBSE, 2013a) are expected to carry about 1,300 passengers daily without the occurrence of overcrowding. Armstrong-Wright & Thiriez (1987) give a range of 1,200 to 1,500 passengers per operating bus as the ideal performance level for a bus with a capacity of 100 passengers. As displayed in Figure 3.11, the number of ridership has progressively fallen since 2005. It can be inferred from Figure 3.11 that Anbessa’s ridership is not only falling but also the buses are transporting below their standard load capacities.

Distance covered per operational bus has again decreased from a high of 179 kilometers in 2006 to 150 kilometers in 2011. Anbessa is performing below the standard performance range of 210 to 260 kilometers per operational bus per day (Armstrong-Wright & Thiriez, 1987). The combined operational performance indicator of passengers per vehicle kilometer shows a declining trend as well in which the number of passengers nearly dropped by half so that it

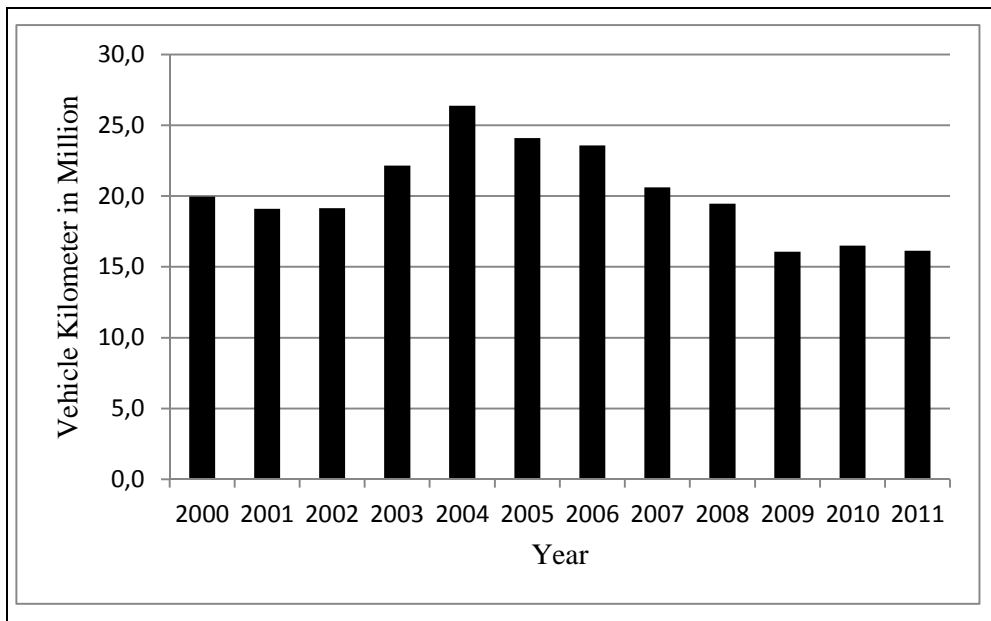
decreased from 10 in 2000 to 6 passengers per vehicle kilometer in 2011(ACBSE, 2010 & 2012). This is mainly attributed to declining ridership coupled with the worsening congestion in the city and the consequent reduction of commercial speeds of the Anbessa's buses which exclusively operate in mixed traffic.

Table 3.7: Anbessa's fleet availability, total daily and per capita distance covered per operational bus between 2000 and 2011

Year	Operational fleet	Percentage fleet availability	Distance covered daily in km	Distance in km/ operational bus/day
2000	401	84.6%	54 666	136
2001	383	80.8%	52 337	137
2002	405	57.9%	52 447	129
2003	462	68.5%	60 690	131
2004	463	68.7%	72 260	156
2005	381	68.7%	66 022	173
2006	360	68.8%	64 605	179
2007	381	57.0%	56 463	148
2008	355	52.3%	53 315	150
2009	301	44.2%	44 036	146
2010	313	56.1%	45 233	145
2011	295	53,2%	44 241	150

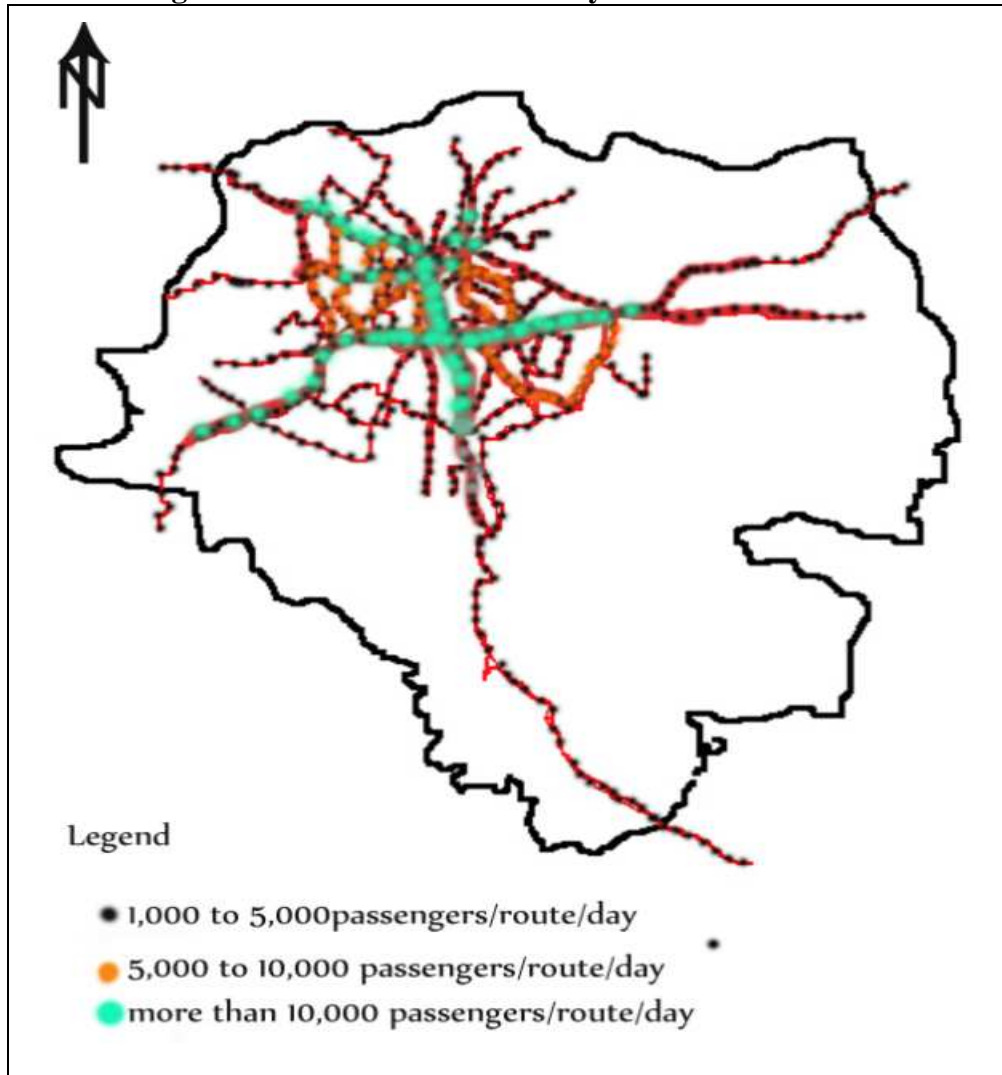
Source: ACBSE, 2010 &2012c

Finally the aggregated annual vehicle kilometer performance indicator, as explicitly presented in Figure 3.12, has declined so dramatically that in 2011 Anbessa was performing only 61% of the level of that was achieved in 2004.

Figure 3.12: Anbessa's annual vehicle kilometer in million kilometers between 2000 and 2011

Source: ACBSE, 2010 & 2012c

A detailed data at each route level is available for the month of January, 2013 from which a number of observations and some generalization can be made on the operational performance of Anbessa (See also the detailed data per route on Appendix 22). The aggregated volume of passenger for the whole routes is shown in Figure 3.13. The east-west (Megangna-Lagahare-Trohailoch-Ayertena corridor) and north and northwest-south corridors (Asco - Piazza and Shromeda – Piazza via Laghare to Kalti) have the highest passenger loads.

Figure 3.13: Passenger volume of Anbessa buses by routes

Source: Own work

Two performance indicators are used, namely: daily volume of passengers per operational bus per route and daily volume of passengers per operational bus per route kilometer and the results are presented in Table 3.8 and Table 3.9. When the first performance indicator is used and taking 1,250 passengers daily as the benchmark, it is observed that 95 routes of the total 111 routes (86%) are underperforming and only 16 routes (14%) are considered to be well performing (See Table 3.8). Of the top ten best performing routes with daily passenger volume of 1,500 and above, six of them generally run along the north-south corridor passing through Mexico square and Laghare and two of them are feeder lines with terminus at the ring road. It is not easy to draw any pattern on the worst performing routes. The worst ten performing routes

with daily passenger volume of less than 500 include regional lines and tangential lines providing connection between secondary nodes and newly built up areas.

Table 3.8: Daily passenger volume per operational Anbessa city buses per route of January 2013

Passenger per bus per day	Number of routes	Percentage
Less than 250	1	0,9%
250 - 500	9	8,1%
500 - 750	42	37,8%
750 - 1000	28	25,2%
1000 - 1250	15	13,5%
1250 - 1500	6	5,4%
1500 - 1750	6	5,4%
1750 - 2000	-	-
2000 - 2250	-	-
2250 - 2500	2	1,8%
2500 - 2750	-	-
2750 - 3000	1	0,9%
Above 3000	1	0,9%
Total	111	100,0%

Source: ACBSE, 2013a

When the additional factor of distance is used to filter the degree of intensity of use of routes, it is observed that 72% of Anbessa routes carry less than 400 passengers per route kilometer. The best performing routes with passengers above 1,000 per route kilometer include the same group of routes with high volume of passengers per operational buses and higher number of buses. As expected, all the regional lines with passengers of less than 100 per route kilometer, are worst performing. This is not surprising as the decisions to open most of these regional routes have been largely influenced not by mass transit performance objective but rather than by the social equity objective of providing transit access to towns surrounding Addis Ababa¹⁰.

¹⁰ The author of this thesis used to work in Anbessa in late 1990's as a head of the planning department and the question of opening new routes within the city and to neighboring towns used to be very contentious issue in the management discussion

Table 3.9: Daily passenger volume of per operational Anbessa City buses per route kilometer of January 2013

Passenger per route Km	Number of Routes	Percentage
Less than 100	14	12,6%
100 - 200	24	21,6%
200 - 300	20	18,0%
300 - 400	22	19,8%
400 - 500	6	5,4%
500 - 600	8	7,2%
600 - 700	3	2,7%
700 - 800	3	2,7%
800 - 900	5	4,5%
900 - 1000	1	0,9%
1000 - 1100	-	-
1100 - 1200	-	-
1200 - 1300	1	0,9%
1300 - 1400	-	-
1400 - 1500	-	-
1500 - 1600	2	1,8%
Above 1600	2	1,8%
Total	111	100,0%

Source: ACBSE, 2013a

The preceding analysis has shown that Anbessa's performance records by all indicators are not only below satisfactory and but also declining. Anbessa is becoming less competitive and attractive. Anbessa is losing its riders to the other modes and is not gaining new passengers despite additions of new buses to its existing fleet and the expected general increase in transport demand in response to rapid urbanization, urban sprawl and increasing mobility.

The questions are what factors are causing the decline in patronage and performance, whether or not these have been recognized as problems by the authorities and what measures have been taken or are being considered to reverse the trend. It is not easy here to provide an easy tailor cut and exhaustive answers to these questions as this requires a further investigation involving all the actors and the operator mainly in terms of quality and quality of services provided, the users socio-demographic makeup along with their expectations and preferences, service

qualities that are not easy to quantify, marketing strategy of the operator, the city planning context and the political decision making process.

Despite these, some remarks can be made on declining patronage. Anbessa has been always considered as “poor man’s” mode of public transport that provides affordable public transport for the lower income brackets of the city’s population. It is this image of the Anbessa that is deterring the relatively middle income groups from using Anbessa. Stradling, Carreno, Rye, & Noble (2007), in their study about ideal urban bus journey, stress the importance of perceived images of bus services as factors of change in patronage. They site examples from UK in which bus transport service “...has become associated with young people, elderly people and people on low incomes i.e. a mode of last resort’ and in Germany in which public transport in the 1970’s (the period coinciding with rising car ownership) was “...stigmatized as catering for the three A’s (Auslander, Auszubilende und Arme) (foreigners, pupils and the poor) (pp., 283-284)”. Indeed it is very usual to see in Addis Ababa Anbessa buses running empty or below capacity in off-peak periods while the midibuses are full and overcrowded despite their higher fares than Anbessa’s. Anbessa, as city government organ financed by tax payer’s money, should work on improving its images, in-vehicle safety and security, designing and implementing more aggressive marketing strategy in order to capture more of the transit market and providing competitive and diversified services catering for the needs of the middle income groups.

3.2.2 Informal/Paratransit public transport modes

The performance of the formal public transport sector in Addis Ababa, as discussed in the preceding analysis, has been steadily declining. The downward trend in Anbessa’s bus patronage is happening in a context in which there is an opposite process of raising travel demand and increasing trips lengths caused by the general growth in mobility rates, rapid urbanization and physical expansion of Addis Ababa. On the other hand, although motorization is increasing, private car ownership and automobile use remains very limited. Moreover, non-motorized form of mobility still accounts for the great share of the modal split, although its share has been declining as the available estimate indicates (ERA, 2005). Inevitably, all these processes are leading to the situation in which the demand for motorized public transport mobility is increasing and that the public transport sector is expected to meet this rising travel demand. However, the actual response has been very unsatisfactory. The performance of the formal public transport in Addis Ababa has not been encouraging and up to expectation and

that the levels and coverage of public transport services provided by the formal sector have not kept pace with the city's dynamics of mobility and urban growth.

The unsatisfactory and even further declining performance of the formal public transport and the emerging widening gap between demand and supply has created the ideal condition for the rapid growth of the "informal" public transport sector. Indeed as a "notable gap filler" (Cervero, 2000, p. 3), the informal public transport is significantly contributing to closing the deficit in public transport demand left unmet by the failure of big governmental formal public transport sector. The privately run informal public transport sector, also named variously as "paratransit", "low-cost transport", "intermediate technologies", and "third-world transport" (Cervero, 2000, p. 3), has become a frontrunner in which it is increasingly becoming an important mode of motorized mobility that provides viable mobility options for city dwellers.

Cervero & Golub (2007, p.445) best describe the informal public transport system as "..., small-scale [private] operators, [that] legally or illegally, enter the market to fill these [market] gaps, complementing regular transit services, entering neighborhoods poorly served by formal operators, and responding promptly to shifting market demands". There are various motorized and non-motorized modes of informal public transport that are operating under different regulatory and/or non-regulatory frameworks in many large cities of the Developing Countries. Here no attempt will be made to enter into wider and technical discussion of what is formal and informal as well as delineate and demarcate the boundary between the two in Addis Ababa but it suffices to point out that the informal public transport sector of Addis Ababa shares many of the global characteristics of the informal sector.

The informal sector is profit driven and is run by private operators, which include the driver and his assistance. The operators are not necessarily the owners. Large monopolies of operators of informal transport hardly exists and there as many individual operators as many as the paratransit vehicles. The low capacity and the poor quality vehicles exemplify the scale of operation of the system. It offers line haul, feeder and distribution transportation services usually in competition with the formal sector and mainly concentrating along major public transport corridors frequented by the formal public transport. It also provides a paratransit service and generally a higher and better level of service than the formal one. Finally, the sector is almost not beneficiary of the formal commercial financing mechanisms and has to depend on informal means and family financial sources for fleet replacement and maintenances (Halcrow Fox in association with Traffic and Transport Consultants, 2000; Cervero, 2000; IBIS Transport

Consultants Ltd., 2005; & Cervero & Golub, 2007). Informal source of finance in form of periodic contributions of private operators to informal saving associations known as “Equib”¹¹ is rather very widespread and important financing mechanisms in Ethiopia.

It is not possible to strictly apply the technical connotation of the term “informal” as discussed by Cervero (2000) and Cervero & Golub (2007) to describe the informal or the paratransit sector of Addis Ababa, although it shares many of aforementioned operational features. Firstly, private “informal” transport operator must have a valid license that proves the technical fitness of the vehicle and that the driver has the required technical qualification to drive the vehicle. This is known as “quality licensing” whose introduction followed the deregulation of passenger transport service in 1992. The operator is also required to have a supplementary business permit (IBIS Transport Consultants Ltd., 2005). Secondly, while the exclusive –ride saloon taxis that provide paratransit service are permitted to operate freely in any part of the city, all other private operators must own a route license for operating in the designated parts of the city. During peak hours and long passenger queues, temporary route licenses valid for round trips and shorter periods are issued to irregular operators by the frontline workers of the transport authority. These route licenses must be clearly visible and are posted on the roof of the minibus taxis or in the front windows of the Higer and intercity buses. The city’s transport authority has recently reformed the minibus taxi and midibus routes to manage the informal transport and mitigate transport problems. This has gone hand in hand with the reform in the organization and operation of informal public transportation that primarily requires membership to minibus taxi and Higer midibus route associations as prerequisite to entry into the transport market. Thirdly, fares are fixed by the transport authority and are non-negotiable. However, this does not apply to saloon taxis in which prices are negotiated. Finally, in accordance with the third party insurance law which has been enforced since 2011 in the country, the private informal transport operators are also required to have third party insurances for their vehicles.

Nevertheless there are three main features of informality that makes informal transport operation distinct from the formal one. Unlike the formal sector, the informal sector does not

¹¹ Equib is a traditional saving association widely practiced in Ethiopia. Member of the “Equib” contribute a fixed amount of money per fixed time period usually weekly, the amount of which depends on the income of the members. The collected money or the “Equib” is given to a member on the basis of a lottery draw or other agreed draw mechanisms. The periodical collection and distribution of the “Equib” ends when each and every member has got the “Equib”. The “Equib” is also instrumental in fostering strong social linkages and trust among members.

maintain a formal accounting of the financial transactions of its operations. Labor relations between owners and operators are not defined in terms of legally binding agreements in cases in which operators are not at the same time owners of the vehicles. It is not unusual to hire the operators (driver and conductor) on a daily basis. The sector does not provide scheduled services and decision when to operate is based on the agreement reached between the owner and operator, although the transport authority expects them to give service all throughout the day and early evening. It is in this framework that the informal or the paratransit sector is understood and it includes all private operators of the public transportation which are outside of the formal Anbessa city bus. It consists of various types of vehicles including minibuses, converted pickups or “Weyeyet”¹², saloon taxis, midibuses, intercity buses, three-wheelers or Bajajas and horse-carts. The informal sector provides unscheduled transport services and generally operational decisions of the informal public transport regarding when and how to operate are made independently at unit and individual vehicle level, although where to operate are regulated by the city transport authority. The informal transport vehicles are usually old and have lower seat capacities: with 4 seats for Saloon taxis and three-wheelers, and 12 for “Weyeyet” and minibuses.

The informal public transport is as old as the formal public transport. Two general patterns characterize the growth and development of informal and formal public transport in Addis Ababa. Firstly, the growth of the informal public transport vis-à-vis the formal transport sector, both in terms of its absolute vehicle number and modal share of motorized public transport, has been faster than the formal public transport. Secondly, within the informal transport sector, the growth in number of minibuses taxis and their intramodal contribution has been faster and greater than four-seater saloon taxis.

The fleet of the informal sector grew by seven fold between 1977 and 1994 and quadrupled between 1987 and 2012. In 1987, there were 4323 informal transport vehicles in Addis Ababa and this increased to 8847 in 2001 and is estimated to be 18000 at present (Woldetensae, 1996; & AARTB, 2012). Similarly the modal share of the informal public transport from the total modal distribution rose from 10% in 1984, to 21% in 2005 (ERA, 2005), and 40% in 2008,

¹² These are the first generation of higher capacity taxis and the word in Amharic/Ethiopian language implies discussion, reflecting the face-to-face seating arrangement of the taxis which was ideal for discussion and talking while travelling. These taxis are gradually disappearing from streets of Addis Ababa.

while the formal public transport modal share declined from 12% in 1984 to 7% in 2008 (UITP &UATP, 2010). The overall gain in the modal share of informal public transport is attributed to the decline in the modal share of walking and the formal public transport. The composition of the informal transport vehicles has also changed dramatically in which higher capacity minibuses have become more important than saloon taxis. The share of the saloon taxis from total vehicles of the informal sector dropped from 74% in 1987 to of 26% in 2012 (Woldetensae, 1996; & AARTB, 2012).

The informal public transport sector is a private undertaking with the main goal of maximizing income from the provision of public transport service. It is typically characterized by small scale of operation in which there are nearly as equally as many single owners/operators as does the number of vehicles. Monopolies of operators are absent and even are officially discouraged and indeed the vast majority of the minibus owners (88%) in Addis Ababa own only single vehicle (ERA, 2005; & IBIS Transport Consultants Ltd, 2005). The operators maximize profit through increasing trip turnovers by making as many trips as possible particularly during the morning and late afternoon peak hours, shortening of routes usually in contravention of the route licenses, avoiding congested route segments and working long hours. The profit maximization goal and high intramodal competitions for passengers have undesired consequences on safety and comfort of passengers on one hand and over utilization and rapid depreciation of the vehicles on the other hand. Sohail, Maunder, & Miles (2004, p. 149-150) in their study of managing public transport in Developing Countries note that

The drive for profitability can be achieved by increasing efficiency and cutting bloated costs, but may also adversely affect passenger safety and comfort. For example, in a totally unregulated environment, driver behavior may deteriorate as vehicles “race” each other to stops along the route to either pick up passengers or complete their trip to pick up more passengers for the return journey. Operators (drivers and conductors) often hire small or midi capacity vehicle on a daily basis, having to guarantee the owner an agreed sum. The result is that the vehicle is worked as long as possible to maximize earnings for the operators, with scant regard for the longer term maintenance.

During off peak hours, the cost reduction and profit maximizing goals of the informal transport results in lower levels of services in which waiting times at stations and stops becomes longer as the vehicles will not depart unless filled to the load capacity.

The informal transport sector provides direct and indirect employment to thousands of low skilled workers as the sector requires minimum qualification. Utmost, what required is an appropriate driving license that depends on the size and capacity of the vehicle. For instance in 2008, the minibuses only provided 25,000 direct and 12.500 indirect employment opportunities mainly as wardens on main taxi stops and terminals (EAR, 2005, & FDRE, 2008b).

The saloon taxis, three-wheelers and the horse carts are operated by one operator who is the driver and at the same time collects fares and bargains transport tariffs. The higher capacity mini, midi and intercity buses are operated by the driver and the conductor or fare collector. The conductors known as “Delalas¹³” in Addis Ababa load and unload passengers’ goods, negotiate tariffs for passengers and goods, announce the destination of the vehicle and determine the passenger they carry along the route to final destination. The operator (driver and conductor) fix the time and duration of operation of the vehicle as routes where he operates are already fixed by the route licenses of the transport authorities. Unlike the formal bus in which there are two work shifts for the operators, the operators of the informal sector work the whole day but normally taking some break during off-peak hours or subleasing the vehicle to other freelance operators for a shorter period.

The informal operators, of course, are not beneficiaries of any social benefits including retirement benefits and paid annual holidays. The type of ownership-working relationships between the driver vis-à-vis the vehicle he drives and between the conductor vis-à-vis the absentee owner of the vehicle and driver defines the type of remuneration arrangements. Firstly, the driver is at the same time the owner of the vehicle. Secondly, the driver is not owner and is directly employed by the owner. Thirdly, the driver is hired temporary as a substitute by non-owner driver. The urban transport study (ERA, 2005) indicated that the second type of ownership- working relation is significant in the informal transport market in Addis Ababa in which 79% of the minibuses are run by hired operators. The conductor could be a member of the family of the absentee owner or owner-driver or the hired driver. The conductor could also be directly recruited and employed by the driver.

¹³ The « Delalas » of Addis Ababa are known for their aggressive behaviors. They provide assistance to the driver and are the human replica of real time information: announcing to waiting passengers where the vehicle is heading for. They play a critical role in the amount of revenue collected. They are usually employed by the driver on a daily basis in cases they are not family members of the driver or the owner.

There are two widely practiced modalities of salary and allowance payment to the operators. Firstly, a fixed amount monthly salary and a daily allowance is paid for the driver and daily allowance for the conductor by the absentee owner in return for which the driver or/and conductor is and/or are expected to deliver a “reasonable” amount of net income (total revenue less operation costs mainly fuel costs) to the absentee owner at the end of the day. Secondly, the driver agrees with the absentee owner to pay a fixed amount of daily payments to the owner. In this case the driver is responsible for paying his own and the conductor’s salary and daily allowances and should cover all the necessary operational expenditures. Finally, the owner who is also at the same the driver pays only an agreed and standard daily allowance to the conductor given that conductor is not an immediate family member. In this case, the net income is his wage plus the vehicle’s opportunity costs including depreciation (Woldetensae, 1996).

The analysis of the informal public transport is often limited by the difficulty of getting a reliable, time series, consistence and detailed data on the operational and financial performances of the sector. This has to do with the nature of the informal sector in which the task of documenting all operational information, costs, and revenues is considered irrelevant and what counts important for the informal operator is the amount of net income collected at the end of each individual trip. The most reliable and exhaustive study on urban transport was made in 2005 (ERA, 2005) and later study on the national transport master plan which also deals on urban transport in Addis Ababa (FDRE, 2008b). The recent data on informal transport are estimates made by the city transport authority (AARTB, 2011; AARTB, 2012a; AARTB, 2102b; & AARTB, 2012c). But there is an observed data inconsistency among these estimates and figures. Good example of such inconsistency is the actual number of informal public transport fleet that operates in the city and the number of passengers transported by the different modes of the informal sector. It is worth to note such limitations on the subsequent analysis of the informal transport sector.

3.2.2.1 Minibus taxis

The city transport authority introduced in 2010 some reforms on the organization and operation of the informal public transport. The reform was mainly inspired by the need for urgently mitigating the worsening city’s transport problems which was causing much public discontent. The popular belief that the government was not doing enough to contain the city’s transport problem and the political repercussion of such a view was a concern for the city government. This was concern for the central government as well given the importance of the city in the

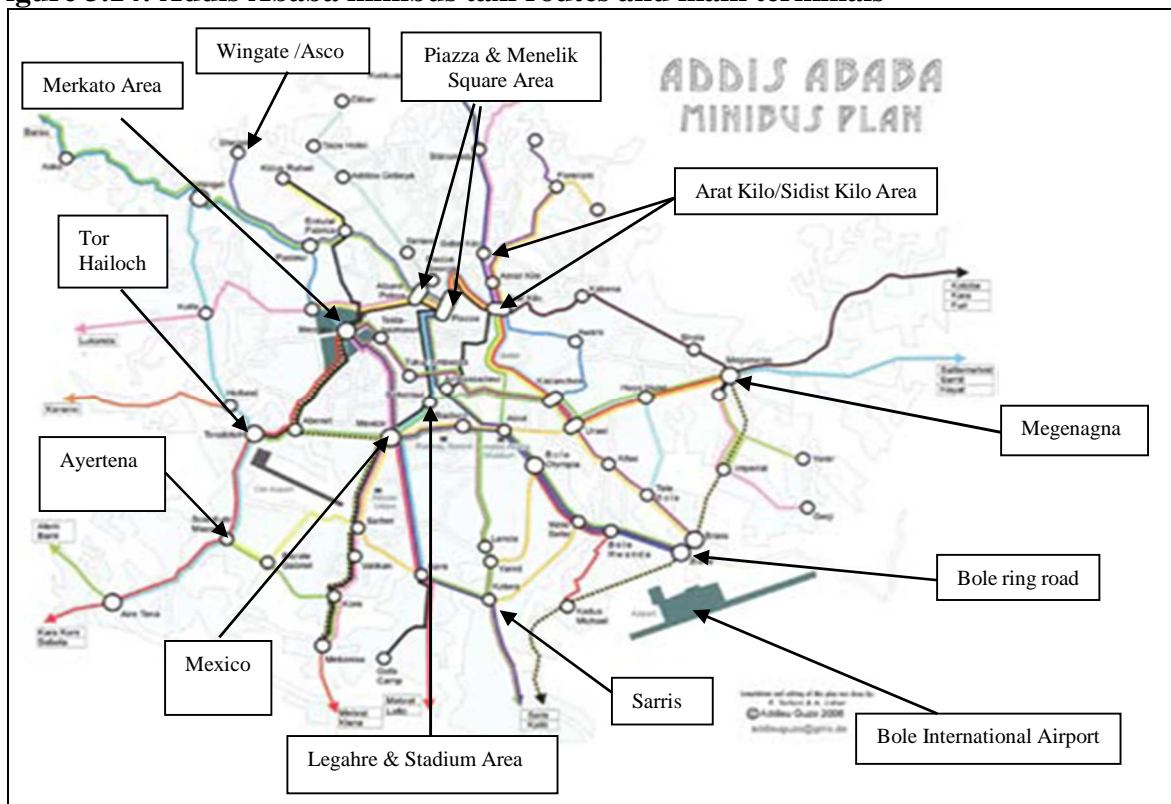
country's politics and economy. On the other hand, historically the minibus taxis have always presented a strong political opponent for the government during times of change and political crisis. The strikes organized by the minibuses have always crippled the city's transport system. A sort of control of the sector was deemed necessary and the reform was believed to provide such a means. The reform regulated the hitherto unregulated public transport market. Accordingly, the routes to be operated by minibus taxis and the fares to be charged were fixed and that minibuses need specific route licenses to operate in the city. Membership in one of the route associations became a prerequisite for getting the route franchises. Initially the minibus operators showed a strong resistance to the implementation of the reform.

The minibus taxis provide passenger transport services on 316 radial and tangential routes (AARTB, 2012c, & Addis Ababa City Planning Project Office and Lyon Town Planning Agency, 2012). Although there is a strong overlap of minibus taxi routes with that of the Anbessa city bus, the minibus taxi networks (see Figure 3.14) are denser and wider in coverage than Anbessa's. The minibuses provide public transport service in parts of the city that are inaccessible or poorly served by the formal public transport in addition to the main services along the major corridors. The less congestion prone tangential routes along the ring road and extending from Megenagna via Bole to Saris/Kalti and further west to Ayertena is emerging as important minibus and Higer bus routes that are providing faster transport services between the rapidly developing the east, south and southwestern parts of Addis Ababa.

Unlike the Anbessa bus and the Higer midibuses where boarding and alighting of passengers' takes place at designate bus stops, passenger loading and unloading in minibuses is demand-responsive. It takes place anywhere along the route and is on-street as there are few off-street taxi bays. The minibuses routes converge and diverge at the main public transport terminals located at the main city nodes. Most of the terminals and interchanges are found on-street and lack minimum terminal facilities. These on-street terminals are scattered around the nodes for the lack of proper and standard off-street parking spaces. The minibus terminals at the main busiest market center of Merkato are the worst examples of planning failure where the detailed master plan of Merkato (Woldetensae, Giorghis, Bekele, & Knebel, 2002) failed to properly address it. However, the only exception is the off-street Megenagna terminal which has developed according to the local development plan of the Megenagna sub center of 2001 and where physical integration has been partially achieved (Woldetensae, Zeberga & Beyene, 2001).

The location of the major minibus terminals coincide with the city's hierarchy of center and subcentres. They include Megenagna, Bole ring road, Sarris, Ayertena, the Legahare-Stadium-National Theater area, Piazza-Menelik square axis, Arat kilo- Sidist Kilo axis, Merkato area and Wingate-Asco (See Figure 3.14). The terminals share and compete for space with moving vehicles. On-road passenger loading and unloading often hinder traffic flow and often blocking traffic circulations and creating localized congestion. Poor physical integration of public transport terminals involves long walking and results in physical inconveniencies for passengers transferring and changing route directions.

Figure 3.14: Addis Ababa minibus taxi routes and main terminals



Source: Addis Ababa City Planning Project Office and Lyon Town Planning Agency, 2012

The administration and monitoring of minibuses taxi operation on the 316 routes is done through 11 route associations. The associations have been organized under five major geographical groupings that are closely related to the major outlets and public transport hubs of the city. These major taxi association groups are the association of Asko for the northern and northwestern, Megenagna for the eastern and northeastern, Trohailoch for the western and southwestern, Bole for the southern and southeastern and Saris for the southern part of Addis

Ababa. The minibus taxi associations of Asko and Megenagna, as shown in Table 3.10, have the most extensive taxi route networks. These two minibus taxi associations administer about 49% of the total city taxi routes.

The average length of minibus taxi route at the city level is about 7 kilometer, although the average route length ranges between 5.1 and 8.8 kilometers at the level of each taxi association. There are some variations in the lengths of routes among the associations. While the Tor Hailoch based routes have the longest average length, Asko zone taxi association has the lowest average route length and the highest range as it has the shortest and the longest routes (see Table 3.10). On the other hand, on individual route level, the 316 taxi routes have lengths varying between 1.9 and 19.7 kilometers.

Table 3.10: Minibus taxi associations, zones of operations, number and length of taxi routes in 2012

Minibus Taxi Associations and zone of operation	Minibus Taxi Route		Taxi Route Length in Kilometer		
	Number	Percentage	Shortest	Longest	Average
Asko Zone Taxi Association	76	24,0%	1,50	19,70	5,09
Tor Hailoch Zone Bruhe Tesfa Taxi Association	22	6,9%	1,70	14,70	8,84
Tor Hailoch Zone Gohe Taxi Association	21	6,6%	2,60	14,00	7,91
Bole Zone Nesire Taxi Association	18	5,7%	2,00	10,00	5,83
Bole Zone Belen Taxi Association	18	5,7%	2,40	9,80	6,44
Megenagna Zone Tsehaye Taxi Association	17	5,4%	2,40	10,00	7,06
Megenagna Zebra Taxi Association	19	6,0%	2,00	11,80	6,11
Megenagna Zone General Taxi Association	79	24,9%	2,00	11,80	6,32
Sarris Zone Walta Taxi Association	15	4,7%	1,80	14,50	7,16
Sarris Zone Belichta Taxi Association	14	4,4%	2,10	11,70	7,36
Sarris Zone Metebaber Taxi Association	17	5,4%	3,20	13,60	7,57
Total/Average	316	100,0%	2,15	12,87	6,89

Source: AARTB, 2012c

Most of the minibus taxi routes are radial connecting the city center with sub centers and there no cross city routes are rare. The minibus taxi routes lengths, as shown in detail in Table 3.11, are relatively shorter in which about 38% of the routes are less than 5 kilometers, 69% less than 7.5 kilometer and about 92% less than 10 kilometers in length. Only few routes (about 9%) have length of above 10 kilometers. The minibus taxi routes are also shorter than that of

Anbessa in which the average minibus taxi route is nearly as half as the average route length of Anbessa (for comparison see also Table 3.5).

Table 3.11: Percentage of minibus taxi routes by length in Kilometer and taxi association in 2012

Length in Kilometer	Taxi Associations											Total
	Asco	Bruhe Tesfa	Gohe	Nesire	Belen	Tsehaye	Zebra	Megenagna	Walta	Belichta	Metebaber	
Less than 2,5	2,5%	0,3%	0,3%	0,6%	0,3%	0,3%	0,3%	0,9%	0,3%	0,3%	0,0%	6,3%
2,5 - 5,00	12,3%	0,6%	0,9%	1,9%	1,6%	0,6%	1,9%	8,2%	1,6%	1,6%	0,6%	32,0%
5,00 - 7,50	6,0%	1,9%	1,9%	1,9%	1,3%	2,5%	2,2%	8,9%	1,3%	0,3%	2,8%	31,0%
7,50 - 10,00	2,5%	0,9%	1,6%	1,3%	2,5%	1,9%	1,3%	6,6%	0,6%	1,6%	1,3%	22,2%
10,00 - 12,50	0,0%	2,2%	1,6%	0,0%	0,0%	0,0%	0,3%	0,3%	0,6%	0,6%	0,3%	6,0%
12,50 - 15,00	0,3%	0,9%	0,3%	0,0%	0,0%	0,0%	0,0%	0,0%	0,3%	0,0%	0,3%	2,2%
15,00 - 17,50	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
17,50 - 20,00	0,3%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,3%
Total	24,1%	7,0%	6,6%	5,7%	5,7%	5,4%	6,0%	25,0%	4,7%	4,4%	5,4%	100,0%

Source: AARTB, 2012c

Each of the 316 minibus taxi routes has a number of distance based route legs which on the average is between 3 and 15 legs (see Table 3.12). The segmentation of the whole route into number of route legs has been used for the fixing tariff rates and the corresponding fares. It has also been designed to systematize and rationalize fare administration by minibus operators as well as facilitate and increase transparency in fare payment by minibus passengers. However in practice, the minibus operators usually cut the route legs and make shorter trips in violation of the tariff zones. This will increase the revenues of the minibus operators but increase the transport costs for passengers as they are forced to make more trip legs and pay more than the fixed rates. There is hardly any control mechanism that has been developed by the city's transport authority in order to enforce adherence to the official tariff zones and corresponding minibus fare rates.

Table 3.12: Number of minibus taxi route legs and tariff zones by taxi association in 2012

Minibus Taxi Associations and zone of operation	Route Legs			Tariff Zones		
	Maximum	Minimum	Average	Minimum	Maximum	Average
Asko Zone Taxi Association	2	16	6	1	6	2
Tor Hailoch Zone Bruhe Tesfa Taxi Association	2	14	9	1	5	3
Tor Hailoch Zone Gohe Taxi Association	2	16	9	1	5	3
Bole Zone Nesire Taxi Association	3	14	8	1	3	2
Bole Zone Belen Taxi Association	5	15	9	1	3	2
Megenagna Zone Tsehaye Taxi Association	4	14	10	1	3	2
Megenagna Zebra Taxi Association	3	13	9	1	6	2
Megenagna Zone General Taxi Association	2	14	9	1	4	2
Sarris Zone Walta Taxi Association	4	14	10	1	5	3
Sarris Zone Belichta Taxi Association	4	16	10	1	4	3
Sarris Zone Metebabab Taxi Association	5	16	10	2	5	3
City Average	3	15	9	1	4	2

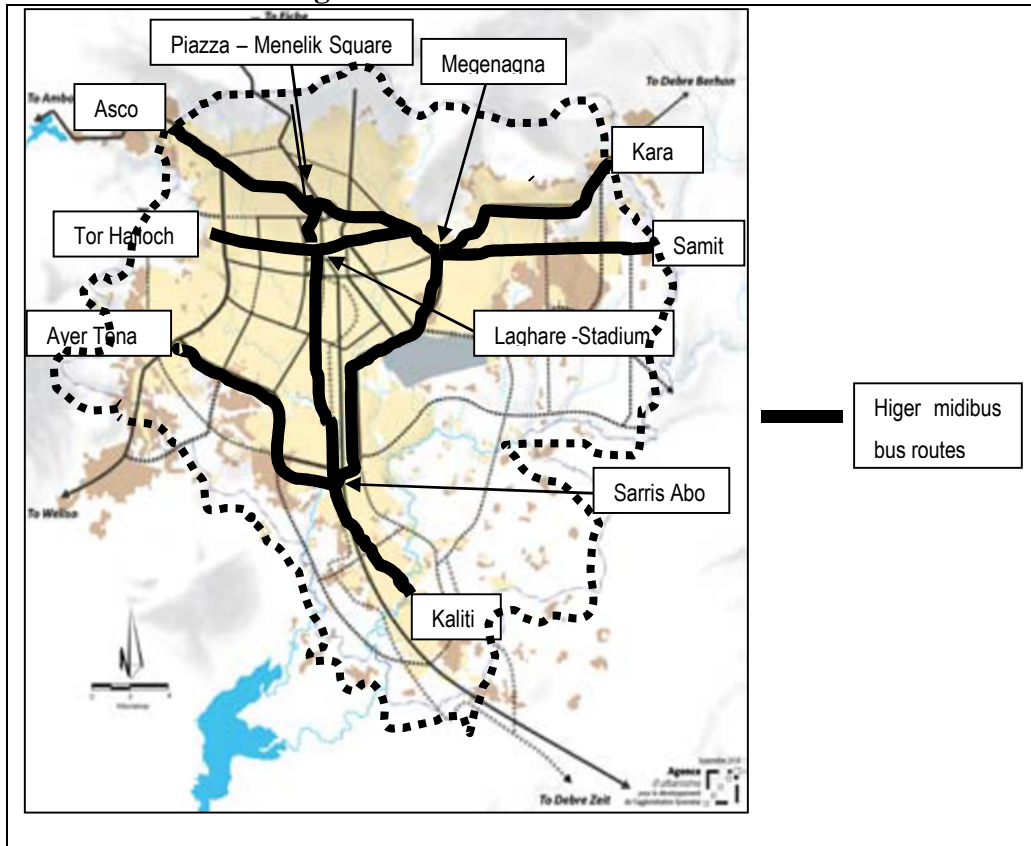
Source: AARTB, 2012c

Detailed and time series data on the various indicators of the operational performance of the informal transport is not readily available which makes it difficult to analyze the informal public transport and draw some comparative assessments with the formal sector. As the comparative data on fleet utilization and distance covered by the formal and informal transport sectors indicates, the informal transport, in contrast to the declining operational performance of the formal public transport, is performing better. In 2005, the distances daily covered by Anbessa and minibus were 173 and 180 kilometers respectively. The AARTB study on tariff revision (2011) shows that in 2011 the minibus, despite worsening traffic congestion in Addis Ababa, were able to maintain the performance level of 2005 and thus covering the same daily distance 180 kilometers. But Anbessa's performance declined to 150 kilometers in 2011 (see also Table 3.7). Fleet utilization of minibuses was not only higher than that of Anbessa but also improved over the same period. Percentage of fleet utilization of minibuses increased from 75 % in 2005 to about 91% in 2011 whereas that of Anbessa decreased to 53% in 2011 (ERA, 2005; ACBSE, 2010; & AARTB, 2011). The relatively better of performance of the minibus taxis is surprising despite the fact that most of the minibus vehicles are old which have reached or even bypassed their deprecation periods and need to be replaced (AARTB, 2011).

3.2.2.2 Midibuses

The escalating transport problem in Addis Ababa with the consequent growing dissatisfaction among the city population, the incapability of the existing public transport modes of Anbessa and minibus taxis to satisfy the public transport demand and the undecided ownership and accountability of Anbessa public transport vis-à-vis the federal and the city governments provided the Federal ministry of transport and communication the incentive to intervene and find alternative public transport solutions. As one of the intervention, the government in 2008 decided to increase the fleet of medium capacity public transport vehicles through the importation of Chinese manufactured Higer midibuses. In the same year, the government, with capital outlay of Euro 10 million, purchased 500 Higer midibuses through bank loans and leased those buses to private operators on a basis of loan to be repaid back in five years period. The midibuses have been giving very competitive public transport services since January of 2008 (AARTB, 2011; & Trans-Africa Consortium, 2008b). Initially, there was ceiling on maximum passenger load of midibuses. The midibuses were only allowed to carry 27 seated and some standing passengers but this has been waived following complains by midibus owners.

Currently 461 midibuses are estimated to provide a line-haul public transport services along 32 midi bus routes having a total length of 379 kilometers. The radial and tangential routes, as portrayed in Figure 3.15, are on the main transport corridors and overlap with most Anbessa and minibus routes. They connect important, dense and rapidly urbanizing sub urban nodes and subcentres with the city's center. In contrast to the minibus operator who decides the time of operation and can load and unload passengers anywhere along the route, the midibuses must provide transport service at least between 7:00 am in the morning and 8:30 pm in the evening and should load and unload passengers only on bus stops, although deviations from these rules are not unusual. Moreover, medium and large intercity buses with seats between 27 and 44 and numbering daily as high as 500 also supplement the midibuses (AARTB, 2012). These buses are more frequent during peak hours and use the same midibus routes and require route licenses. Usually temporary route licenses are given to these buses as they have regional plate numbers and are assumed to give transport services in regions of the country where they are registered.

Figure 3.15: Addis Ababa Higer midibus routes

Source: Own work

The midibus operators, alike the minibus operators both in terms of facilitating route administration and promoting public private partnership, are required to have route franchises for the routes they serve. They should also belong to one of the three zones of operators associations. Similar to the minibus taxis, the midibus operators associations have been organized under major areas of operations; namely: the Tor Hailoch – Asco association (See Table 3.14) for the western and north-western, the Megenaqna associations for the eastern and south-eastern parts (See Table 3.15) and the Bole – Sarris association for the southern and south-western parts of Addis Ababa (See table 3.16).

The length of the midibus routes varies between 5.5 and 14.8 kilometers as shown in tables 3.14 through table 3.16. The average midibus route length is 11.8 kilometers which is higher than minibus's (7 kilometers) and slightly lower than Anbessa's (12.4 kilometers). Higer midibuses have a higher rate of fleet utilizations. Indeed with 92% availability of operational fleet of Higer midibuses, fleet utilization of midibuses is much higher than that of Anbessa and a little above

that of minibus (AARTB, 2012b). Repayments of bank loans principals and interests and maximization of revenues are the main drives for higher levels of fleet utilization.

Table 3.13: Higer midibus and routes, length in kilometer and number of midibuses for Trohailoch Asco zone Engudaye association

Route	Length in Km	Number of buses
Aleme Bank- Total -Lideta - Legahre	11,2	22
Ayer Tena - Kelebet - Lebu Mebrathaile - Sarris Abo	11,8	3
Karakore - Total - Trohailoch - Merkato	10,1	26
Merkato - Trohailoch - Bethel	12,0	7
Karakore - Ayertena - Ledeta - Laghare	10,3	16
Alembank - Bethel - Total - Torhialoch - Merkato	12,0	15
Bethel - Weyra - Total - Ledeta - Laghare	11,9	9
Alembank - Total - Ledeta - Shebele - Piazza	13,9	6
Kota - Asco- Wingate - Yohannes - Piazza	11,7	24
Asco - Wingate - Yohannes - Piazza	8,9	15
Total	113,8	143
Average	11,4	14

Source: AARTB, 201b

Table 3.14: Higer midibus routes, length in kilometer and number of midibuses for Megenagna zone Negate association

Route	Length in Km	Number of buses
Megenagna - Urael - Stadium - Balecha - Ledeta	7,2	20
Kara - Kotebe - Lamberet - Kebena - Aratkilo - Piazza	14,8	36
Meri - Megenagna - Stadium - Laghare	12,9	32
Megenagna -Kebena - Aratkilo - Piazza	7,8	18
Samit - Megenagna - Urael - Laghare	13,0	17
Kara - Kotebe -Megenagna - Urael - Laghare	13,5	8
Piazza - Megenagna - Imperial - Gerji - 52 Matoria	13,7	11
Gerji Mebratehaile - Anbessa Garage - Megenagna - Merkato	12,0	11
Ayat - Megenagna - Urael - Laghare	14,3	9
Megenagna - Urael - Legahre	5,5	10
Total	114,7	172
Average	11,5	17,2

Source: AARTB, 201b

Table 3.15: Higer midibus routes, length in kilometer and number of midibuses for Sarris zone Dejne association

Route	Length in Km	Number of buses
Sarris Abo - Gottera - Kera - Sare Bet - Ayertena	11,3	8
Sarris Abo - Gottera - Ambassador - Piazza	11,6	14
Kaliti terminal - Gottera - Lancha - Laghare	14,8	20
Sarris Abo - Gottera - Laghare - Piazza	11,6	10
Sarris Abo - Bole - Imperial - Megenagna	11,6	33
Kaliti Total - Gottera - Lancha - Laghare	14,9	10
Sarris Abo - Hana Mariam - Lebu Mebrathaile - Ayertena	11,9	8
Lafto Mesalemia - Gofa - Kera - Legahre	7,8	8
Sefera Dildeye - Hamesahulete - Imperial - Megenagna	8,0	10
Kaliti terminal - Legahre - Teclahimanot - Autobus Terra	18,6	10
Kaliti terminal - Gottera - Kera Abenet - Autobus Terra	18,7	10
Hana Mariam - Adeye Ababa - Gottera - Legahre	9,7	5
Total	150,5	146
Average	12,5	12

Source: AARTB, 201b

Higer midibuses are providing better, faster and more direct public transport mobility alternatives with all the attendant advantages. The routes of midibuses are longer than the minibuses and provide direct connections between suburban areas and the city centre at fares lower than that of minibuses. In contrast to minibus taxis, the longer and more direct routes of midibuses reduce the number of transfers and interchange and thereby increasing passengers' savings in travel and transfer times. These advantages of the midibuses are making their services attractive to all captive riders of different income groups and even a viable transport option for private car user. However, overloading during peak hours, long waiting times at stations and the boarding and alighting of passengers anywhere along the route during off peak hours are problems that are observed in midibus transport operations.

As a way of conclusion on the subject of operation of public transport modes in Addis Ababa, some sort of qualitative evaluation of the system can be made as the discussion so far was based on quantitative description and analysis. To that end, Litman (2013) enumerates a number of qualitative indicators for the evaluation of services provided by the public transport. Based on his qualitative parameters and number of studies made on the public transportation of Addis

Ababa (ACBSE, 2012; Berhan, Beshah, & Kitaw, 2013; IBIS Transport Consultants Ltd., 2005; Kumar & Barrett, 2008, Tadele, 2013, Trans-Africa Consortium, 2008a & b, Trans-Africa Consortium, 2010, Transport Research Laboratory, 2002, UITP & UATP, 2010, & Woldetensae, Fanta, & Haile, 2011) and the writer's experience of public transport modes, the following observations as shown in Table 3.16 are made on the qualities of services provided by the three modes of public transportation which, however, should be further investigated as a part of specific mode assessment and customer preference study.

Table 3.16: Some service quality indicators of formal and informal public transport services

Service Quality Indicators	Anbessa City Buses	Minibuses Taxis	Higer Midibuses
Availability and coverage	Limited to main arterial roads	Most dense networks	Limited to main arterial roads
Frequency	Lower frequencies due to availability of fewer vehicles and unpredictable traffic situation. Least waiting times on stations during off peak periods for buses departs according to schedule.	Most frequent but long waiting time during off peak hours for the minibus departs when full.	More frequent than Anbessa but long waiting time on off peak hours for the midibus departs when only almost full.
Travel speed	Higher operating speed than Midibuses especially during off peak hours	High travel speed as it makes fewer stops between origin & destination.	Lower travel speed due to many stops
Reliability	No posted schedules on stops and very unreliable.	Unscheduled service	No posted schedules on stops but more reliable than Anbessa.
Integration	No fare and poor physical integration.	No fare and poor physical integration.	No fare and poor physical integration.
Price structure and payment options	Fixed rate, pre board and cash payment for each bus trip made & limited use of prepaid tickets.	Fixed rate, on board and cash payment for each trip made & no use of prepaid tickets	Fixed rate, on board and cash payment for each trip made.& no use of prepaid tickets
User comfort and security	In vehicle insecurity, discomfort, overcrowded during peak hours, more unsheltered bus stops, longer waiting at stations on peak periods, & longer access times.	Most secure, comfortable, longer waiting on peak and off peak periods,	In vehicle insecurity, discomfort, overcrowded during peak hours, more unsheltered bus stops, longer waiting times on peak periods & longer access times.
Accessibility	Generally poor accessibility as bus lines are mainly on major arterial roads and involve long walking and therefore longer access times.	Better accessibility as minibus routes denser but generally involve long walking and long access time	Generally poor accessibility as midibus lines are mainly on major arterial roads and involve longer access time
Universal design	The platforms at stops are not on the same level with the bus floor. Anbessa buses with high steps make it too difficult to climb particularly for under aged and people with handicaps and difficulties. Baggage cannot be carried	The platforms at stops are not on the same level with the minibus floor but less inconvenient than Anbessa and midi buses. Baggage allowed against payment.	The platforms at stops are not on the same level with the bus floor but less difficult than Anbessa. Baggage could be carried but restricted.
Affordability	Affordable, fares are appreciably lower than other modes and subsidized.	Least affordable	Unaffordable for the poor.
Information	Poor route information in which route origins and destinations not written on buses	Route origin and destination displayed on the minibus	Route origin and destination displayed on the midibus

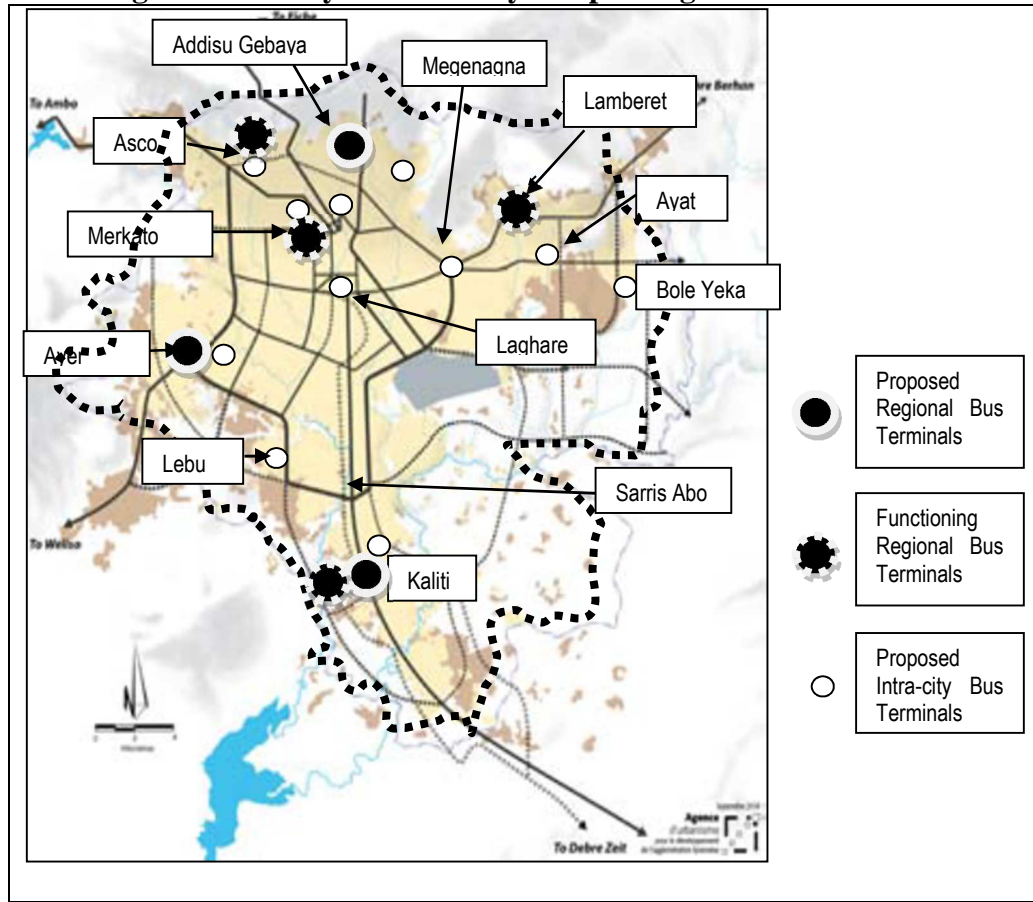
	and stations. Only numbers are indicated. No display of network map on stations. No real time information on arrivals, departures and delays. No posting of schedules in bus stops and stations	windows or roofs, conductor frequently announces final destination.	windows, conductor frequently announces next stop and final destination.
Aesthetics	Stations unattractive, buses usually unclean but conductor friendlier.	Conductors usually very aggressive and impolite. Relatively cleaner than other modes but old vehicles more common than other modes.	Conductors usually aggressive and impolite. Midibuses cleaner than Anbessa.
Amenity	No innovative effort to diversify services despite the availability of options, be competitive and attract more passengers.	No effort to make service more attractive and enjoyable	No laudable effort to make service more attractive and enjoyable.

3.3 Terminals and interchanges

The intermodal connections consisting terminals, interchanges and stations are fundamental elements of urban multimodal transportation system (Meyer & Miller, 2001) and the urban built up environment. Terminals are the focal points of rail and/or road based passengers and goods movement where collection and distribution of passengers and goods take place. As points of interchange, they also enable and facilitate the convenient transfer of passenger and goods within the same mode or between different modes (intermodal integration). Collection, distribution and interchange functions of terminals could be either geographical limited to the urban area (intraurban/intracity) or could extend to other regions connecting the city to regional centers and urban settlements (interurban/intracity).

Recognizing the importance of terminals in the urban public transport system, a number of city development plans of Addis Ababa have proposed the development of a system of terminals that corresponded to the planned mode of public transport system. The city development plan of 2001 (ORAAMP, 2001) has proposed the development of the major mass transport terminal at the main center of Laghare, the integration of city bus terminals with city main centers at Legahare and Merkato as well with the subcentres at Megenagna, Ayer Tena and Kalti . The proposal also includes the functional relocation of the Merkato regional bus terminal to Ayer Tena, Asco, Lambert, and Kalti. As the decentralized regional bus terminals were designed to relieve the inner city from traffic congestion caused by the Merkato intercity bus terminal, they were to be developed along the five major city outlets located at the city peripheries, as shown in Figure 3.16.

Another more recent and detailed study, the 2005 urban transport study, has improved the proposals of ORAAMP and other previous studies as well as added its own new proposals. The study (ERA, 2005) identified four major types of passenger terminals that consisted a two intercity rail terminals at Legahare and Akakai, the integrated rail and road terminal at Legahare, five intercity passenger bus terminals at Asco, Ayer Tena, Lamberet, Kalti and Addisu Gebaya, a number of intra-city bus terminals at main subcentres of Ayer Tena, Megenagna, Kalti, Ayat, Bole/Yeka, Mekanissa, Lebu, Wingate/Asco, Merkato, Legahare and Piazza (See also Figure 3.16).

Figure 3.16: Regional intercity and intracity bus passengers' terminals

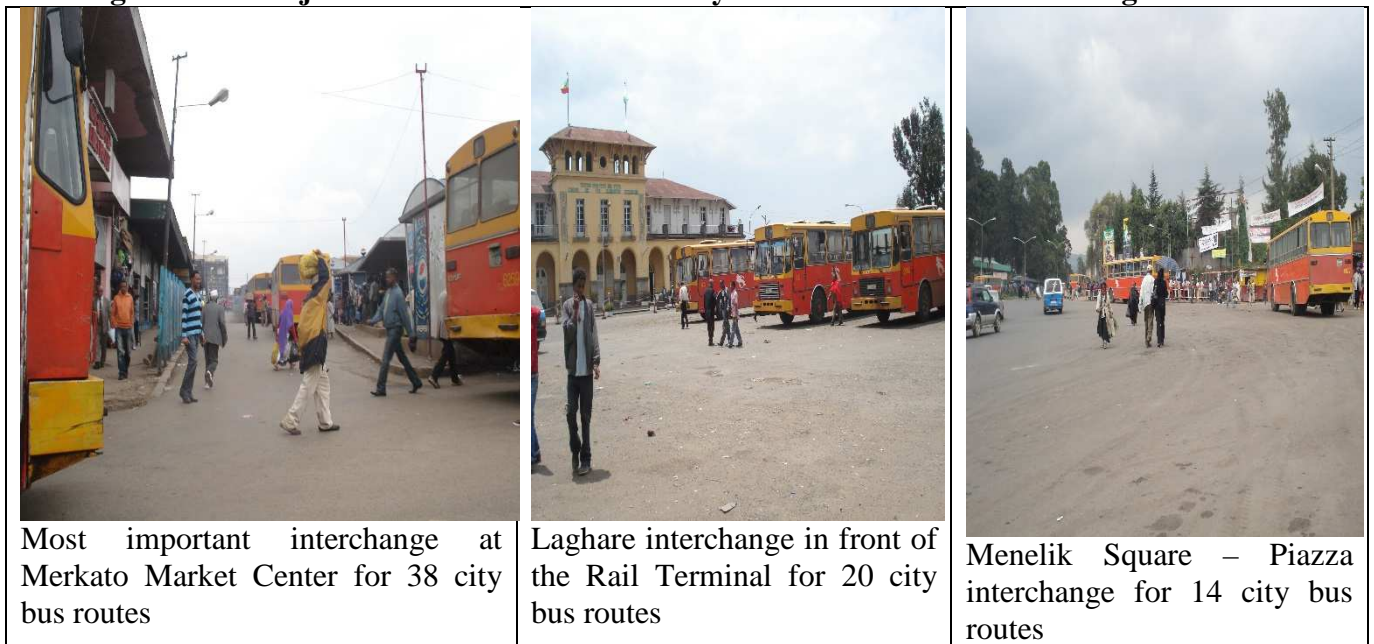
Source: Own work

While the proposed regional bus terminals at Lamberet, Ayer Tena, Asco and Kalti have been already constructed, the Addisu Gebaya terminal is under construction. However of the completed terminals, Asco, Kalti and very recently Lamberet terminals have started offering services. Administrative and procedural difficulties to the handover of the completed terminal facility to the transport authority and technical problems related to exit and entrance of vehicles have delayed the functioning of Lamberet and Ayer Tena terminals respectively (Woldetensae, Fanta, & Haile, 2011). The Merkato bus terminal is serving east and northeast bound regional buses. The regional bus terminal at Legahare has been relocated to Kalti and the proposed integrated rail and road based terminal at Laghare awaits detail design and the completion of the ongoing construction of LRT and BRT systems.

A closer look at some of the recent city's development plans and supporting documents reveal that the questions of allocation of sufficient off street spaces for the proposed intracity bus terminals corresponding to expected number of buses that will use it, their equipment with

minimum terminal infrastructure and their integrating role in transit oriented urban development have indeed attracted little attention from city planners and transport authority. Hence, it can be concluded that the 2001 city development plan (ORRAMP, 2001) and the urban transport study of 2005 (ERA, 2005) have overlooked the importance of intra city bus terminals and failed to recommend concrete and detailed technical proposals of public transport terminals and their modalities of implementation. As there lacks explicit and detailed plan proposals and accountable institution which has the task of terminal development as its main responsibility, the city bus terminals and bus stops have been given low priorities in transport infrastructure development program of the city. Ultimately most of the city bus terminals including mini and midibus terminals operate on-street spaces and some left over open spaces along roads and roundabouts and lack basic terminal and supplementary facilities, as shown in the examples of three major Anbessa city bus interchanges in the Figure 3.17.

Figure 3.17: Major on-street main Anbessa city bus terminals and interchanges



Source: Own photo collection

An examination of the overlap of the public transport networks and nodes portrayed in Figures 3.14, 3.15, and 3.16 shows that Merkato, Megenagna, Laghare-Stadium, Menelik Square - Piazza, Bole ring road, Saris Abo, Tor Hailoch, Arat Kilo, Sidist Kilo, Kaliti and Ayertena are major terminals and transfer stations of the different public transport modes. Not only are most

of these terminals on-street and as in the case of Bole is under the ring road overpass but also the terminals and stops are found dispersed along these nodes. As the stops are on-street, the number of stops in each node is mainly determined by the number of major roads converging on them.

The need for physical integration of terminals becomes more evident when one investigates the number of stops found and the distance between these scattered stops in each of these major hubs of public transportation. Changing routes or mode usually involves long walking between stops as presented in Table 3.17. The estimated longest walking distance for changing routes and mode within each node could reach as high as one kilometer as in Merkato market center.

Table 3.17: Number of scattered Anbessa city, midi and minibus stops at major public transport nodes and the longest walking distance

Public transport node	Number of city, midi and minibus stops at the node	Approximate longest walking distance for route change
Merkato	7	One kilometer
Megenagna	7	500 to 700 meters
Laghare-Stadium	6	300 to 500 meters
Menelik Square – Piazza	7	300 meters
Saris Abo	3	200 meters
Tor Hailoch	4	200 meters
Arat Kilo	6	400 meters
Sidist Kilo	4	300 meters
Kaliti	3	400 meters
Ayertena	4	400 meters

On-street stops and physical inconveniences due to long walking between the scattered stop to another for switching mode or route and longer transfer time are indeed a critical bottleneck in the city's public transport system. As the only example in Addis Ababa, the planned physical integration of city bus and taxis terminals has been partially implemented at the Megenagna sub center as shown in Figure 3.18. However the Megenagna terminal still does not accommodate all routes converging at the node. Moreover, the terminal lacks basic passenger terminal facilities like tickets sell offices, information boxes on routes and schedules, toilets and sheltered waiting facilities that provide protection from rain and sun.

Figure 3.18: The Megenagna intracity public transport terminal



The preceding analysis has highlighted the scale of the problem of public transport terminals in the city. The intercity transport terminal has now been almost relocated from the most accessible Merkato area to the city five major outlets located at the city outskirts. Although further study is necessary to substantiate the argument, the decision to relocate the main intercity public transport terminal assessed in terms of the criteria of centrality is very questionable. It is quite noticeable that these terminals have poor accessibility and the terminals are not integrated with main intracity public transport terminals. As the result, the cost of transport to reach these terminals from any location in the city measured both in monetary values and travel time has increased.

The intracity public transport terminals and bus stops in Addis Ababa are unique in that they are located on-roads and the boarding and alighting of passengers takes place on-street. There is hardly any appreciable planning intervention and the highly budgeted transport infrastructure development program of the city is not actively and visibly involved in terminal construction and provision of off-line bus stops. As access, wait, transfer and egress are weakest links in multimodal public transportation trip chains (Krygsman, Dijst, & Arentze, 2004), shortening the time required for each of these critical elements increases the attractiveness of public transport and thereby creating a more” seamless public transport”. Though important as linking elements in the public transport chain, the interchanges and terminals incur additional effort and cost measured in terms of additional transfer and waiting times as well as physical inconveniences associated with inter terminal walking. Consequently reducing transfer, waiting

times and physical inconveniences of long walking in interchanges and terminals and better internal organization of the terminal space improves the attractiveness of public transport (Hine & Scott, 2000). This calls for better physical integration of interchanges to facilitate multimodal public transport transfers as well as wider integration with land use to facilitate access and egress.

As measures to increase the role of public transport in urban mobility and contribute to curtailing worsening traffic congestions, it is imperative that the public transport be given more priority on the roads, the organization and management of city's public transport terminals be newly worked out and terminals, bus and minibus stops be relocated out of the road and given proper spaces and with all the minimal terminal facilities. The new mass transport programs of bus rapid and light rail transit will form the backbone of integration of the future public transport in Addis Ababa. The physical integration of the scattered on-street terminals will likely shorten passengers' transfer times and reduce long walking for route transfer and change. The new terminals for the fast and high capacity public transport modes should have all the necessary facilities that will make public transport more attractive to all captive and choice users of public transport including car owners. These terminals should be future oriented with Park & Ride and Bike & Ride facilities, have good connections with networks of non-motorized infrastructure and form a cluster around which mixed land use and high density urban development takes place.

3.4 Fares, subsidy and financial performances public transport

3.4.1 Fares structures

The fragmented organizational structure of the public transport in Addis Ababa is also reflected in the fare structure of the public transport modes where there are three system of different fares that correspond for each of the three major modes of public transport. A mix of policy and financial objectives are used in setting fares by the federal transport authority, an organ of the federal ministry of transport responsible for setting inter and intracity public transport fares in the country. While the political agenda of ensuring the affordability Anbessa by low income groups is the main policy objective in setting the fare for Anbessa city bus enterprise, ensuring

reasonable revenues and profits that is compatible with the users' income level is the goal for fixing the fare structures of the mini and mid buses (AARTB, 2011). In all the three modes, fixed and distance based fare system is applied except the saloon taxis in which fares are variable and agreed between the user and the operator. These fares are uniformly valid all throughout the day and the week. The transport authority regularly revises and adjusts fares consistent with the trends in the international oil prices and makes it known to the public through the government media. The fare policy has no differentiated fare structures with inbuilt fare discounts for trips during off peak periods that are designed as marketing strategy to increase patronage, maximize fleet use and occupancy particularly that of Anbessa's. Moreover, the system does not have a unitary fare system for all linked trips deigned to make public transport more convenient and attractive for users.

Fares are paid in cash and for every leg of the trip made. In the minibus taxis and midibuses fare payment is made in the vehicle itself, while in the Anbessa city buses fares are collected from boarding passengers at every bus station before they embark on the journey. This practice of fare collection of Anbessa calls for reform as it increase dwell times at stations, increase the overall travel times and cumulatively reduces its operational performances. Longer period tickets like weekly, monthly and annual tickets that could boost patronage are not used by Anbessa, although it issues free travel passes for its workers and some war veterans (ACBSE, 2013a).

Private provision of minibus public transport is becoming less attractive and the operators often site low fare rates with no subsidy from the government as a main deterrence and emphasize that fares should be consistent with rising costs of operation. To offset this declining trend of private sector participation and make fares compatible with the operational expenditures and ensure some margins of profits (in the range of 10 to 15%), the AARTB (2011) undertook a survey to determine the real operational costs incurred by the three modes of public transport the result of which is shown in Table 3.18. As it can be seen in the table, variable operating expenditures on fuel are major cost items for all the three modes followed by salaries for minibus and midibuses and depreciation and interest payments for Anbessa. It follows then as sustainable instrument, reducing congestions and improving the commercial speed of public transport modes through physical improvements of main public transport corridors and major intersections could reduce fuel consumption and wear and tear of vehicles that eventually lower fuel and maintenance expenditures and thus overall operation costs.

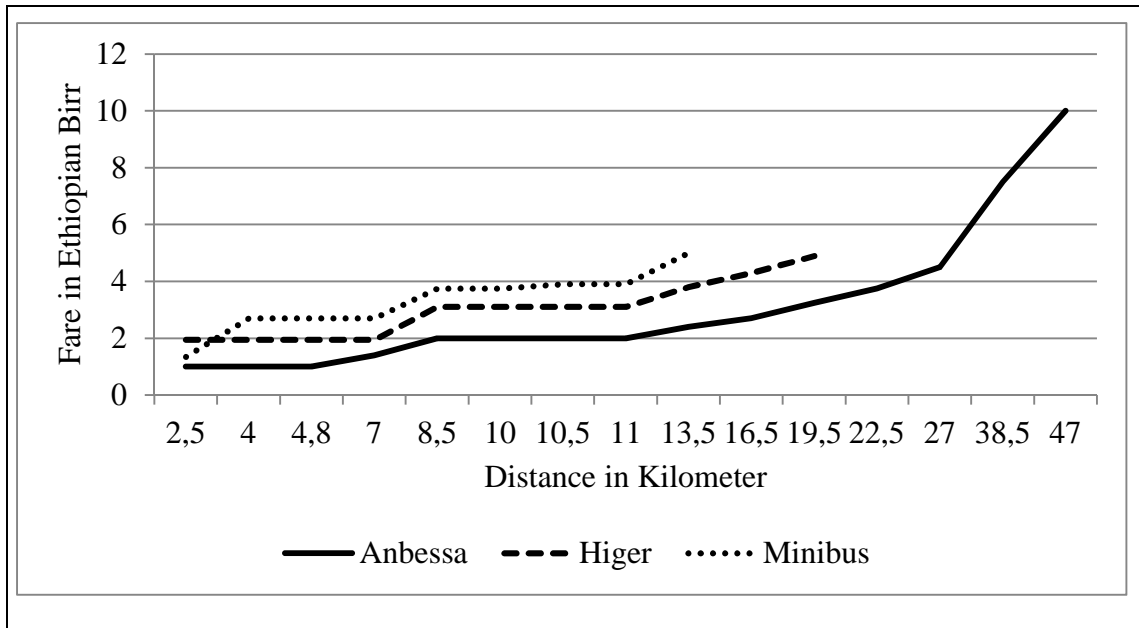
Table 3.18: Total annual operational cost and cost /passenger/kilometer per minibus taxi, Higer midibus and Anbessa bus in Ethiopian Birr

Cost Item	Minibus Taxi		Higer Midibus		Anbessa Bus	
	Amount	Percentage	Amount	Percentage	Amount	Percentage
Salary and Allowances	41 400	13,4%	68 400	14,0%	82 620	2,6%
Insurance	-	0,0%	7 500	1,5%	11 186	0,3%
Taxes	1 061	0,3%	474	0,1%	2 409	0,1%
Fuel	198 379	64,1%	253 286	52,0%	1 560 406	48,3%
Oil and Lubricants	10 000	3,2%	14 340	2,9%	93 625	2,9%
Tire	7 150	2,3%	18 327	3,8%	249 917	7,7%
Maintenance	20 983	6,8%	63 600	13,0%	225669	7,0%
Depreciation	20 670	6,7%	40 535	8,3%	497 678	15,4%
Interest Payments	-	0,0%	12 775	2,6%	451 768	14,0%
Administrative Costs	10 050	3,2%	8 150	1,7%	58 500	1,8%
Total	309 693	100,0%	487 387	100,0%	3 233 778	100,0%
Operational cost/passenger/km	0,52137		0,33747		0,15778	

Source: AARTB, 2011

The cost per passenger per kilometer is the lowest for Anbessa (0.16 Ethiopian Birr) and highest for minibus taxis (0.52 Ethiopian Birr). AARTB used it as a benchmark to fix new fares structures and increase fares which were assumed to have negligible financial impacts on the users of public transport modes. In all the three modes distance based tariff zones are used as presented in in Figure 3.20 and Appendixes 23 to 25. As ensuring the affordability of Anbessa city buses and financial viability of private operators are fare policy objectives, Anbessa is the cheapest mode and serves longer distances while minibus taxis are the most expensive mode with relatively shorter routes. The Anbessa is 40 to 60% cheaper than minibus taxi and midibus for roughly the same distance travelled.

Figure 3.19: The fare structures of Anbessa, Higer midibuses and minibus taxis in Addis Ababa



Source: AARTB, 2012b, & ACBSE, 2013a

3.4.2 Financial performance of the Anbessa City Bus Service Enterprise

While the Anbessa city Bus Service Enterprise is partly financed by fare revenue and partly by subsidy, the informal transport modes are solely financed through fare box revenues. As data on the financial performances of the informal public transport is unavailable, the analysis of financial performance will be limited to the Anbessa City Bus Service Enterprise. The data was provided by the enterprise and covers the period between 2000 and 2011/2012. The data investigated include cost and revenue structure, subsidy, profit/loss operating costs, total revenue per passenger and operating cost per passenger.

The Anbessa gets subsidy from the city government. Moreover, both the federal and city governments have provided over the years some capital support for fleet acquisition and granted collateral for bank loans for fleet purchased by the enterprise. The current arrangement of the enterprise under the city government provides it guaranteed and easy access to the city government's treasury. However, this could be a disincentive for the enterprise to make efforts to reduce costs and improve operational efficiency.

The operating costs of Anbessa increased by 170%, the total revenue including both fare box revenue and subsidies grew by 148% and the differences between operating costs and revenues widened by 471% between 2000 and 2012. Overall, the financial viability or cost recovery status of Anbessa as indicated by the ratio between revenue and operating cost has deteriorated since 2000, although it has slightly improved since 2008. Had this cost included depreciation, then the ratio would have been far lower than the one shown in Table 3.19. It is suggested that for any public enterprise to recover its operating costs and depreciation as well make some profits necessary for further expansion and improvements, the operating ratio should lie in the range of 1.05:1 to 1.08:1 (Armstrong-Wright & Thiriez, 1987). Anbessa is underperforming in terms of this indicator as shown in Table 3.19. Although Anbessa is nonprofit making public enterprise, it could yet improve its financial productivity by reducing costs and increasing fare box revenues through diversifying services and increasing ridership.

Table 3.19: Anbessa City Bus Service Enterprise financial performance between 2000 and 2012

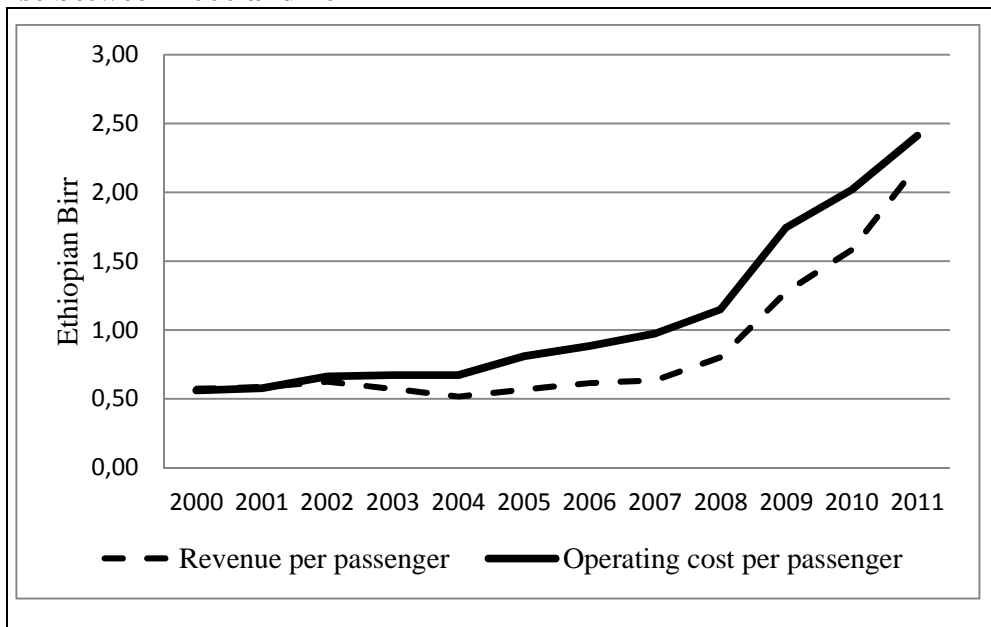
Year	Cost in '000' Ethiopian Birr	Revenue in '000' Ethiopian Birr			Profit/Loss	Ratio of Revenue to Operating cost
		Fare box	Subsidy	Total		
2000	117 144	65 339	54 903	120 242	3 098	1,03
2001	121 162	81 255	42 313	123 568	2 406	1,02
2002	124 437	85 125	31 870	116 995	-7 442	0,94
2003	141 461	84 791	35 808	120 599	-20 862	0,85
2004	167 515	103 735	24 914	128 649	-38 866	0,77
2005	188 100	113 291	18 581	131 872	-56 228	0,70
2006	178 404	110 028	14 121	124 149	-54 255	0,70
2007	181 083	106 710	11 416	118 126	-62 957	0,65
2008	177 310	103 574	20 617	124 191	-53 119	0,70
2009	178 487	109 416	21 695	131 111	-47 376	0,73
2010	217 639	142 873	27 813	170 686	-46 953	0,78
2011	237 101	165 032	51 244	216 276	-20 825	0,91
2012	433 081	261 022	157 470	418 492	-14 589	0,97

Source: ACBSE: 2010, & 2013a

The examination of trends in revenue and operating costs per passenger reveals that both have increased between 2000 and 2011 as shown in Figure 3.20. A comparison of cost and revenue per passenger shows that operating cost per passenger both in terms of absolute value and

percentage has grown faster than the revenue per passenger. The cost per passenger grew by 231% between 2000 and 2011 and it increased from Ethiopian Birr 0.56 in 2000 to 2.41 in 2011. Revenue per passenger increased but at slower rate than cost per passenger. It grew by 183% between 2000 and 2011 and indeed revenue per passenger increased from Ethiopian Birr 0.57 in 2000 to 2.41 in 2011. Operating loss averaged Ethiopian Birr 0.24 for the period with the highest operating loss per passenger of Ethiopian Birr 0.46 in 2009, although in absolute term, the highest loss was recorded in 2007 as shown in Table 3.19 (ACBSE, 2010, & 2013a). A higher volume of ridership and lower per capita operating cost in 2007 than in 2009 account for lower per capita operating loss in 2007.

Figure 3.20: Revenue and operating cost per passenger of Anbessa City Bus Service Enterprise between 2000 and 2011

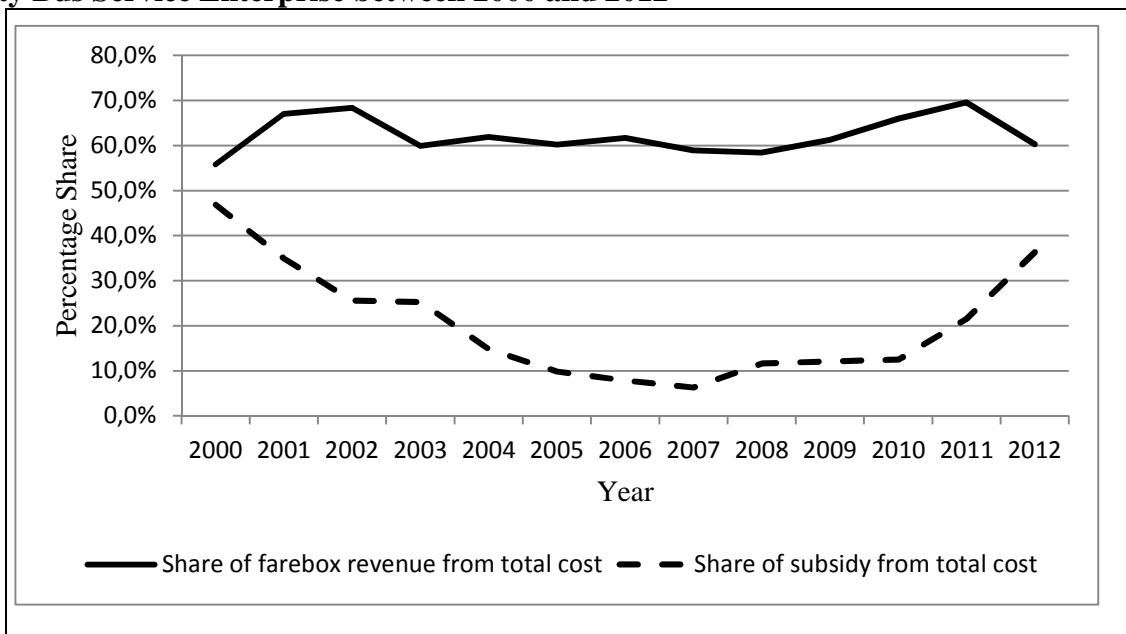


Source: ANSBSE, 2010, 1 2013a

The fare box ratio indicates the degree of financial efficiency of public transport service providers (Buehler & Pucher, 2011) and shows the percentage of the operating expenditures covered by fare box. The higher the value and the closer to one, the healthier and the higher is the financial efficiency of the enterprise and vice versa. Low cost recovery of public transport is often mentioned as a problem for many operators of public transport. In Europe, the French public transport systems have a low cost recovery of 22 %, Germany and Scandinavian countries have a ratio of between 50 to 60% (SPUTNIC, 2009). Buehler & Pucher (2011)

highlight the case of the Germany city of Freiburg with 90% fare box ratio in 2011 as one of the most financially sustainable public transport operator in Europe. Anbessa has modestly improved its financial sustainability. The percentage of operating expenditures covered by fare box revenue of Anbessa, as displayed in Figure 3.21, has fairly improved in the study period. Anbessa's cost recovery has averaged 62% for the period, which reached to a peak of about 70% in 2011. However as depreciation is not included in the operating cost of Anbessa, the inclusion of it as operating cost will make Anbessa less financially sustainable than the above percentages indicate.

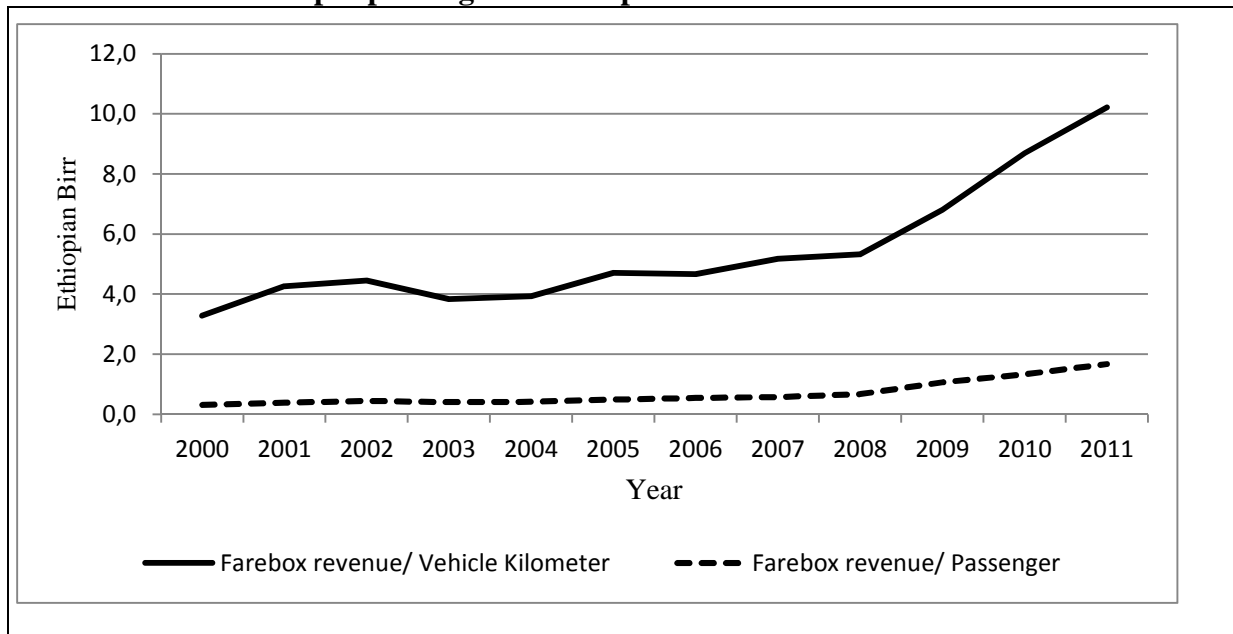
Figure 3.21: Percentage shares of fare box revenue and subsidy from total cost of Anbessa City Bus Service Enterprise between 2000 and 2012



Source: ACBSE, 2010, & 2013a

The increment in the fare box ratio is explained by the increase in fare box revenue per passenger as shown in Figure 3.22. Generally, the fare box per passenger has increased by 5.4 fold between 2000 and 2011 jumping from Ethiopian Birr 0.31 in 2000 to Ethiopian Birr 1.68 in 2011. Similarly, fare box revenue per vehicle kilometer has also shown an upward trend, increasing as it is from Ethiopian Birr 3.3 in 2000 to Ethiopian Birr 10.2 in 2011. The fare increment that was implemented in 2008 (AARTB, 2011) and the decreasing vehicle kilometer of Anbessa explain the rise in fare box revenue per vehicle kilometer that has been observed since 2009.

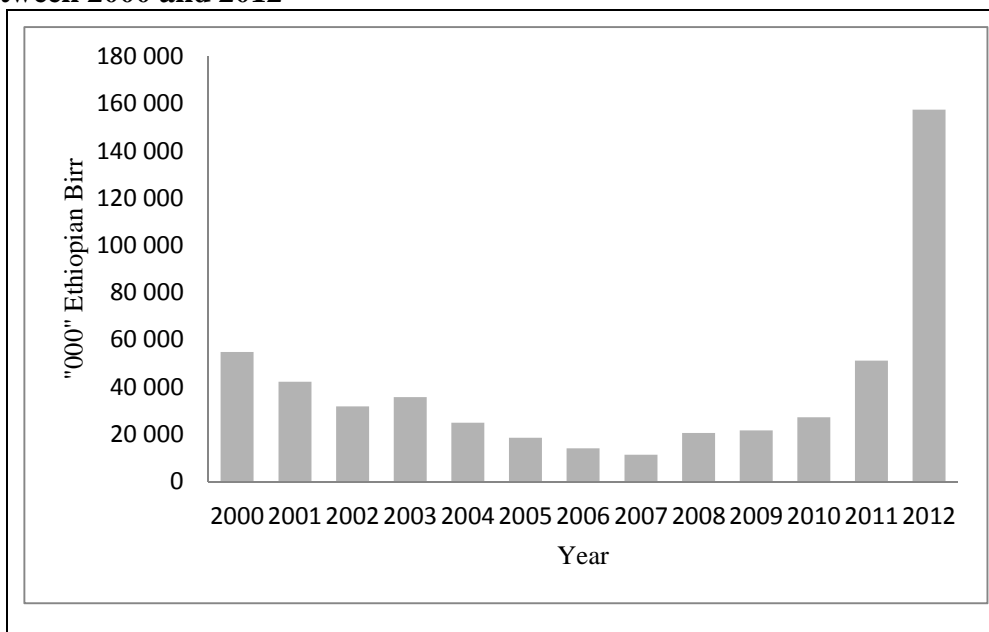
Figure 3.22: Anbessa City Bus Service Enterprise’s fare box revenue per vehicle kilometer and fare box revenue per passenger in Ethiopian Birr between 2000 and 2012



Source: ACBSE, 2010, & 2013a

3.4.3 Subsidy

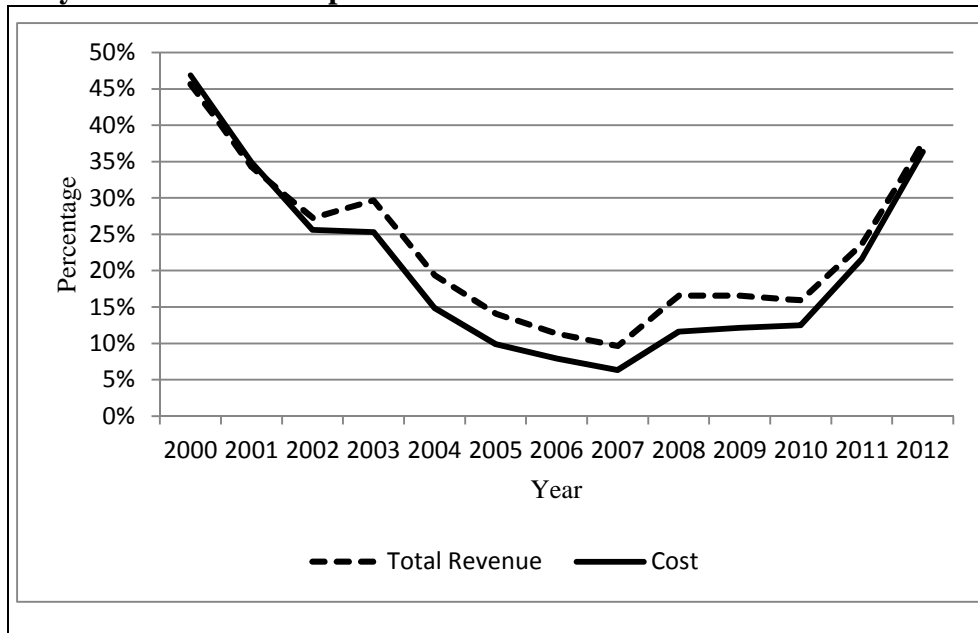
As nonprofit making public transport enterprise and provider of affordable transport to the poor, the Anbessa gets supplier side subsidy from the government and through that the enterprise has waived its right to increase fares to the level of full cost recovery. This has been in effect since 1992 and as compensation both the federal and city government have been granting Anbessa capital and operating subsidies. These take the form of financial support for fleet replacement and accessories as well as nondiscriminatory subsidy for every passenger transported. The city government granted subsidy of Ethiopian Birr 0.26 per passenger in 2000 but this decreased to record low of Ethiopian Birr 0.06 in 2007. However since 2008, it has steadily increased to reach Ethiopian Birr 0.52 in 2011.

Figure 3.23: Volume of subsidy given to Anbessa City Bus Service Enterprise in Ethiopian Birr between 2000 and 2012

Source: ACBSE: 2010, & 2013a

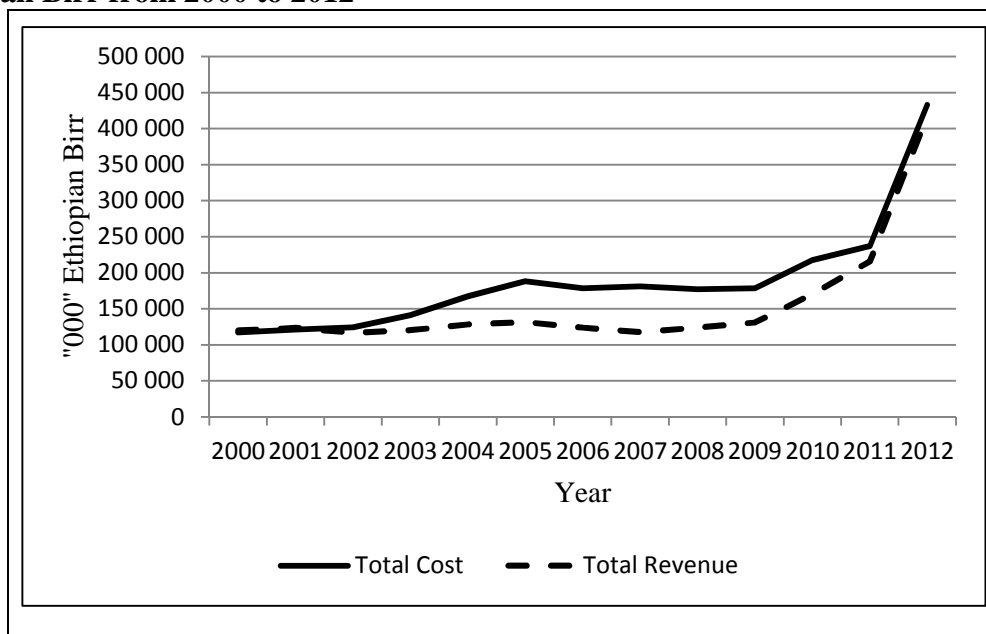
Correspondingly, the volume of subsidy grant given to Anbessa as presented in Figure 3.23 has continuously fallen reaching the lowest point in 2007 but has increased since then. It sharply increased from 11.4 million in 2007 to 157.5 million Ethiopian Birr in 2012, an increment of 1280% in just five years.

Similarly as shown in Figure 3.24, the shares of subsidy from the total revenue and total cost dropped from 46% and 47% in 2000 to 10% and 6% in 2007 respectively. These have again increased to over 36% in 2012. The fall in the volume of subsidy is explained by the transitional city government's decision in early 2000's to gradually withdraw governmental fiscal support to Anbessa. It was then believed that Anbessa could improve its productivity, increase its financial efficiency, become financially autonomous and relieve the city government from financial burdens. This process also continued during the caretaker city government administration in the years between 2006.

Figure 3.24: Percentage share of subsidy from the total revenue and operating cost of Anbessa City Bus Service Enterprise between 2000 and 2012

Source: ACBSE: 2010, & 2013a

Nevertheless in the absence of the right to increase fares, the enterprise went through periods of financial difficulties and experienced widening financial gap between revenue and cost. In the years before 2011, these financial problems were further augmented by the undecided position of Anbessa as to whether to continue as a public enterprise and its dual accountability both to federal and city governments. In the period between 2000 and 2012, the total operating loss of Anbessa accounting for 17% of the total operating cost of the whole period and amounted to a total of Ethiopia Birr 418 Million. The Enterprise made the highest volume of operating deficit in 2007, during when the financial deficit amounted to 35% of the operating cost. The operating deficit has been falling down and the deficit was about 3% of the operating cost in 2012. This is presented in Figure 3.25 and Table 3.19. Anbessa financed the deficit by consuming its depreciation capital saved up for fleet replacements. (ACBSE, 2010, & 2013a).

Figure 3.25: Operating cost and total revenue of Anbessa City Bus Service Enterprise in Ethiopian Birr from 2000 to 2012

Source: ACBSE: 2010, & 2013a

3.5 New public transportation systems: Light Rail and Bus Rapid Transit

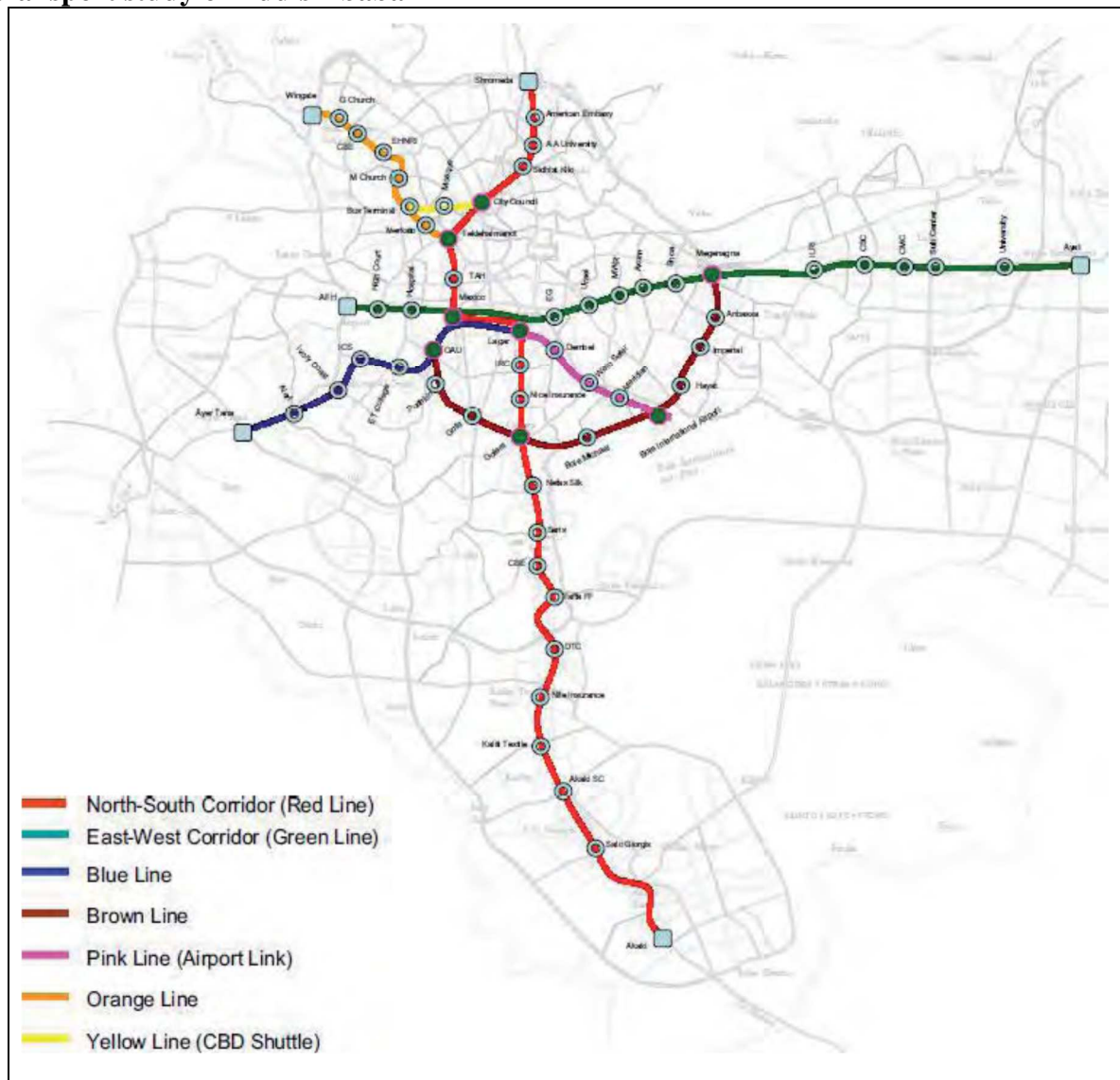
The importance of introducing a high capacity mass transit system has been discussed since 1980's in many of the former city master plans. All the studies have identified the two main corridors of the east-west and north-south of the city as main mass transit corridors and have proposed a combination of tram lines and segregated bus lanes for the corridors. The Addis Ababa master plan of 1986 has proposed a light rail transit running north-south and a trolley bus system running in the east-west direction. The Shawel- Transurb study of 1990 has proposed public mass transportation in the same corridors but extending further east and west than the 1986 study in line with the anticipated city expansion. The Lyon and Semaly study of 2001 has proposed a bus based transit system for two major transport lines and also added a new line running west-centre-south/west. The city development plan of 2001 has proposed a system of segregated bus lanes, tramways and city bus services along the main corridors and the urban transport study of 2005 has similarly proposed a mass transit system along the main corridors and primary road links that consisted LRT, BRT and bus and minibus. Finally the

study in 2007 by Menckhoff commissioned by Lyon town planning agency has dealt with the implementation of BRT on the east-west axis (Lyon town planning agency, 2007, FDRE, 2008, & ergsrail & Lyon town panning agency, 2010). The studies partly either as a component of comprehensive city wide master plans or as an independent transport master plan study were motivated by the need to address the city's transport problems and link transport with overall urban development. The studies specifically have the objectives of improving public transportation through mass transport systems, promoting high density urban development along the main corridors, link the expansion areas of the city and reduce congestion and environmental pollution.

The World Bank financed urban transport study of 2005, the most comprehensive study on public mass transport, has proposed seven main public transport corridors consisting of LRT and BRT mass transit technologies. The study has estimated the total cost (capital, operation and maintenance), made a cost benefit analysis and proposed the phases of implementation these two LRT (red and green lines) and five BRT networks (blue, brown, pink, orange and yellow) as shown in Figure 3.26. The study has stipulated that the implementation will commence in 2005 and be completed in 2020 (ERA, 2005).

For a number of reasons mainly due to financing shortages, lack of detailed design plans and indecision on the choice of mass transport technology, it took sometimes before some of the proposal could be implemented. Now with the intervention of the federal government and external financing, the city has embarked on the construction of two proposed networks of LRT. It is expected to start operation in 2015. A detailed design study for one BRT line prioritized by the Lyon Town Planning Agency (2010) has been completed and construction of it is expected to commence soon.

Figure 3.26: Mass transport corridors of Addis Ababa proposed by the 2005 urban transport study of Addis Ababa



Source: Urban transport study, 2005

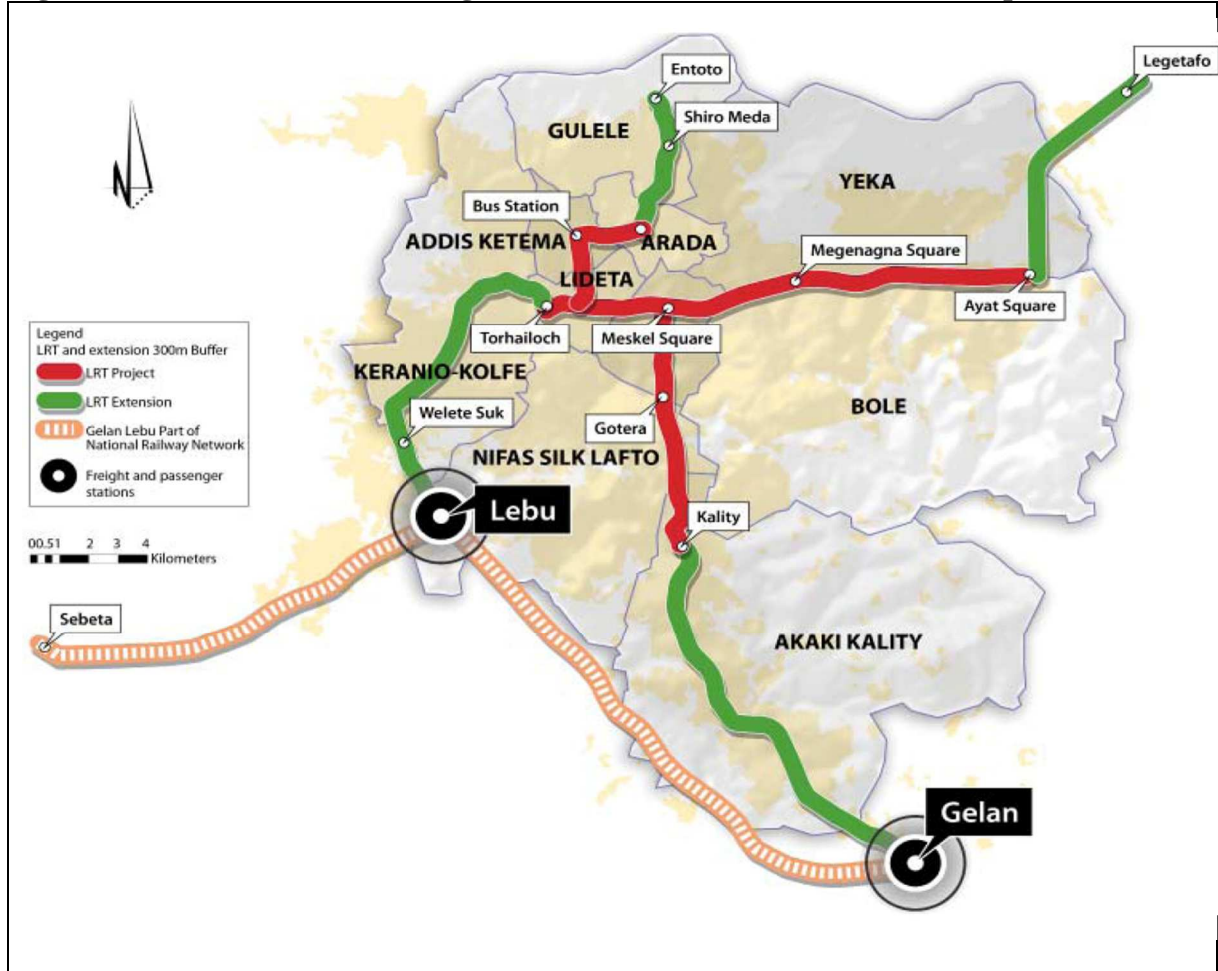
3.5.1 Addis Ababa Light Rail Transit

The two light rail networks of the east-west and north-south corridors proposed and modified in the previous city development plans are now being implemented by the Ethiopian rail way corporation. The Ethiopian railway corporation, a federal government institution and public enterprise, was established in 2008 by the decree of the federal government. The enterprise has been entrusted with two tasks of the construction of rail infrastructure and provision of rail passenger and cargo services in the country. The corporation has set up the Addis Ababa light

rail project office to administer and manage the implantation of the proposed LRT networks. The project is estimated to cost Ethiopian Birr 3 billion (500 million USD at current price) and is being finance through own fund and external loan (ERC, 2011, & Woldetensae, Fanta & Haile, 2011). Although it remains to be seen, the project's financial analysis shows that the project is cost recovery and will pay back in 10 years after the project starts giving transport service. The ERC has outsourced the construction of the LRT to China Railway Group Limited. The Addis Ababa LRT project envisages to

- provide reliable, fast and comfortable passenger transport service in Addis Ababa and the metropolitan region,
- reduce congestion, accident and pollution and
- reduce the need for carbon fuels by using renewable energy (ERC, 2011)

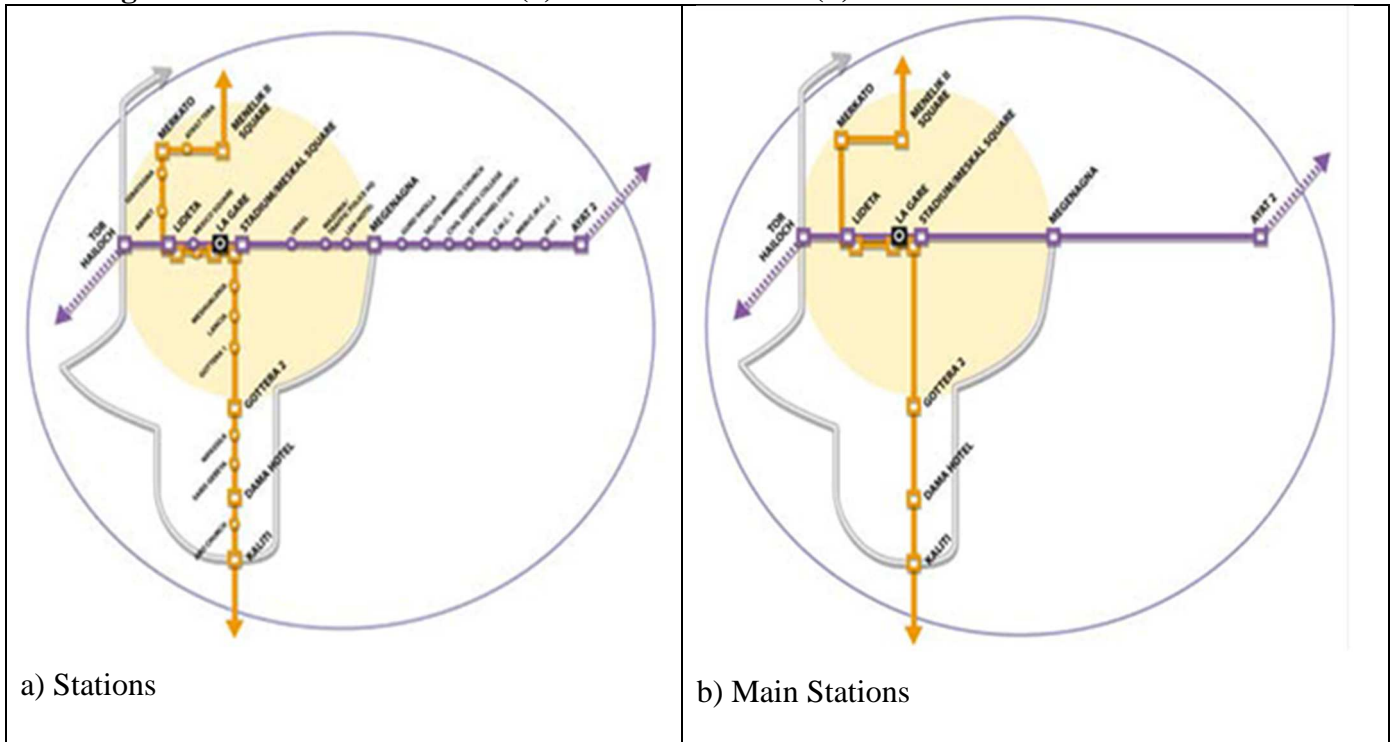
The two east-west and north-south LRT networks that are under construction as a part of the first phase of the project have a total length of 34.25 kilometer. In the second phase, as is shown in Figure 3:27, there will be a future extension of the LRT to Entoto and Shromeda in the north and to Lebu in the west and Gelan in the south which will link the LRT with the future national railway networks.

Figure 3.27: The Addis Ababa Light Rail Transit networks and future expansion

Source: ERC, 2011

The east-west LRT line runs a distance of 17.35 kilometers between Ayat in the east and Torhailoch in the west via Megenagna and Mexico square. The north-south LRT network runs for a distance of 16.9 kilometers from Menelik square in the north to Kalti in the south via Merkato, Lideta, Legahre, Meskel square and Gotera. The two lines overlap for a distance of 2.7 kilometers between Meskel square and Lideta. The LRT system will have 32 a total of stations of which 10 will be main station, as shown in Figure 3.28. Although the networks were originally designed to run mostly at surface as presented on Figure 2.31, there has been now alteration of this original plan. The technical description of the LRT system is shown in Table 3.20.

Figure 3.28: LRT's all stations (a) and main stations (b)



Source: ERC, 2011

Table 3.20: The Addis Ababa LRT technical features

System component	Description
Total number of Stations	32
Main Stations	10
Power: 1500V-DC	Electricity
Wheels	Electric powered and made of steel
Passenger load capacity of per car	286
Passenger load capacity per hour and direction	20,000
Daily Public transport passenger demand on the two corridors in 2008	1,271,328
Maximum speed	80 kilometer
Track type	Double track
Track width	1435 mm

Source: ERC, 2011

3.5.2 Addis Ababa Bus Rapid Transit

Latin America's response to rapid urbanization, the increasing need for providing mass transport, rising vehicle ownership and dwindling financial resources of municipal governments was the innovation of the "surface metro" or the bus rapid transit system. The low-cost and innovative BRT, initially developed in Curitiba, Brazil in the 1970's, has since then spread to

other cities across the globe (Wright, 2001). The former mayor of Curitiba and later the president of the state of Parana, Jaime Lerner and his team, were responsible for developing the surface metro, the predecessor of BRT. Mayor Enrique Penalosa of Bogota in Colombia advanced the BRT system which eventually led to the establishment of Transmilênio in 1990's—the largest BRT in the world (Menckhoff, 2005 & Wright & Hook, 2007).

The unique feature of BRT system is that it was originally not an outcome of transport planning but rather an urban planning exercise intended to maximize urban development along major corridors. For many cities where financial constraints and city budget imposes limitation to construction of a metro like rail system, the BRT system has become a financially viable option for providing a mass transit by using rail like infrastructure and operations to bus systems (Menckhoff, 2005, & Currie & Delbosc, 2011) at a cost of “4 to 20 times less than a tram or LRT and 10 to 100 times less than a metro system” (Wright & Hook, 2007, p.1).

BRT described as a surface metro system that utilizes exclusive right-of-way bus lane, “can create a more attractive image of road based public transport” (Menckhoff, 2005, p. 15). The BRT system integrates transport and land use by promoting high density mixed use development around stations and bus corridors. The salient features of BRT system are little waiting time through the availability off-vehicle payment (tube stations as in Curitiba), user friendly station platforms, shorter travel times, easy transfer between trunk and feeder lines and unified fare system. BRT system in many Brazilian cities is operated by the private sector with municipal governments setting the standards, providing and maintaining the bus infrastructure and station and in some cases, as in Curitiba collecting revenues and distributing to the private operators on the basis of distance travelled. It is cost recovery and operates without subsidy from government (Wright, 2001, & Wright & Hook, 2007).

BRT has seven major components: runways, stations and plat forms, vehicles, services, route structure, fare collection and intelligent transportation system. As to the main infrastructure of the runways, Wright & Hook (2007, p. 3) note that

A standard BRT lane requires approximately 3.5 meters of width while stations are generally 2.5 meters to 5.0 meters wide. A standard busway with a single lane in each direction will require from 10 to 13 meters of road width. A system utilizing express services and therefore passing lanes at stations may require 20 meters of road width just for BRT usage.

The network could be either a closed system in which there is restriction to access or an open system in which any operator can use the network but this limits its quality. The BRT system consists of a service on major corridors with exclusive bus ways and feeder services. Operating at a commercial speed of 20 to 30 kms per hour, BRT can carry between 13,000 to 45,000 passengers per hour per direction as in the most advanced BRT of Transmilénio in Bogota. BRT system costs between US\$ 1 and US\$ 8 million per kilometer. A successful BRT must be complemented by other packages including integration with NMT facilities, land use and traffic management schemes particularly car restraint measures (Wright, 2001, & Wright & Hook, 2007).

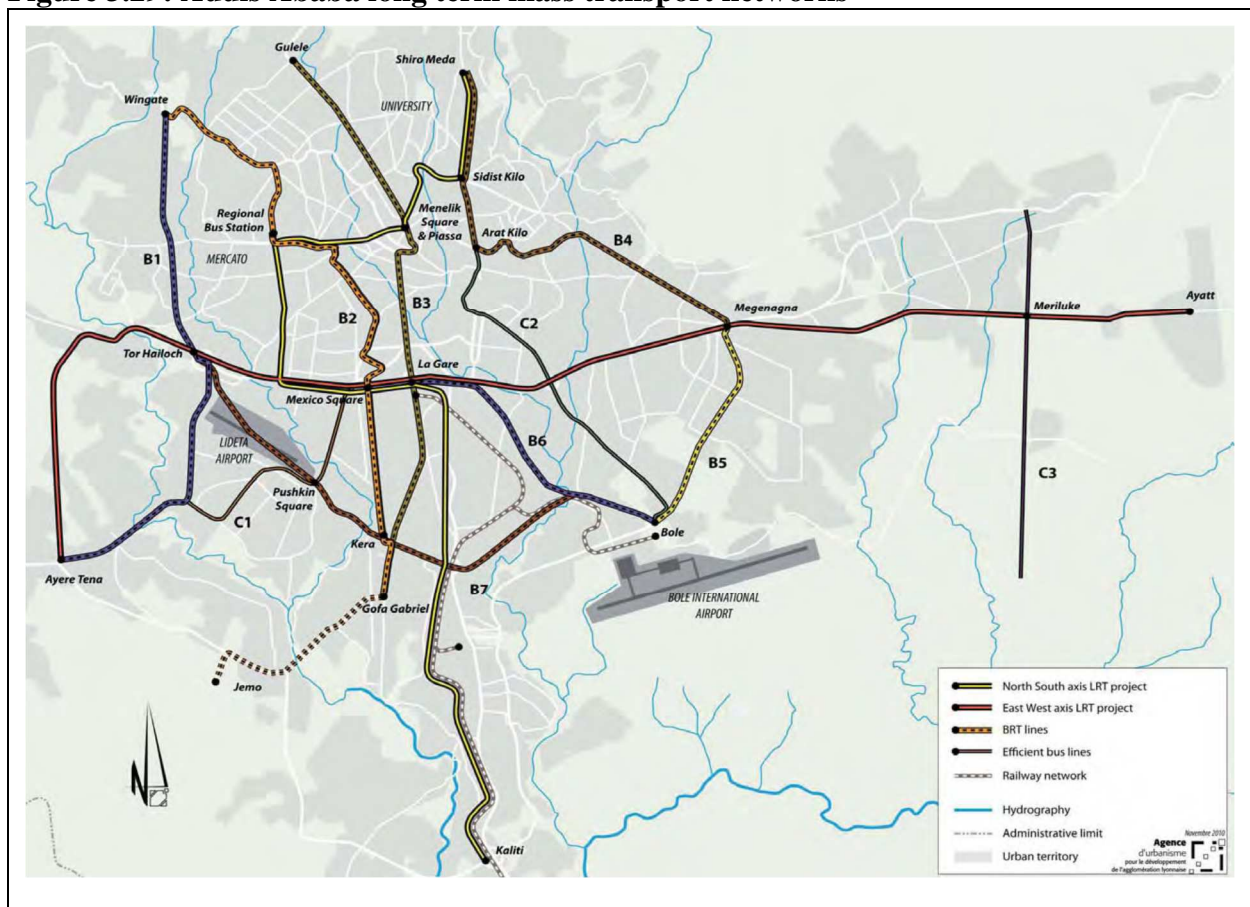
Menckhoff (2005) emphasizes that the implementation of BRT system in any city must consider the peculiarity of the city as BRT has many dimensions. These operational, institutional, financial, social, environmental and political features will vary from city to city. Furthermore, Menckhoff enumerates lessons from Latin America BRT's that cities elsewhere can use as a yardsticks in choosing alternative mass transit technologies. These advantages of the BRT system are the low public investment cost of BRT often less than one-tenth of other mass rapid technologies, self-financing of BRT through fare box with no requirement of recurrent subsidy from the public sector, higher commercial speeds of BRT due to segregated busways, high line-haul capacity, reduced travel times by express services with overtaking possibilities at stops, flexibility of BRT for alignment in even in narrow streets as in the example of old inner city streets in Bogota, sound planning and committed political leadership in BRT planning and implementation and marked impact on land –use development (Menckhoff, 2005).

The importance of the east-west and north-south corridors as major public transport corridors have not been questioned, although there has been no unanimity on the mass transit technology choice, specifically on the choice between BRT and LRT (Lyon City Town Planning Agency, 2007). However, there are some divergences on the number of BRT routes and the corresponding BRT route alignments between the urban transport study (ERA, 2005) which has proposed five BRT networks as shown on Figure 3.26 and the study by Egisrail & Lyon town planning (2010) which has proposed seven BRT networks as shown on Figure 3.29.

The BRT line feasibility study by Egisrail and Lyon town planning agency (2010) was commissioned by the city government of Addis Ababa with the objective of identifying and prioritizing mass transit corridors that will be served by BRT system and feeding into the LRT system under construction. Based on the proposals of ORAAMP's city development plan

(2001) and urban transport study (ERA, 2005), the study by Egisrail & Lyon town planning agency (2010) has proposed a long term and comprehensive mass transport network consisting three levels of mass transport technologies as shown in Figure 3.29. The long-term network consists of a total of twelve mass transport networks consisting two LRT, seven BRT and three main bus lines. The three bus lines are planned to operate in mixed traffic situation. Regular bus lines were not considered but the study mentions the need for reforming the existing Anbessa and mini and midi bus lines to fit into and integrate with these networks, although how and when that is to be realized is not stated at all.

Figure 3.29: Addis Ababa long term mass transport networks



Source: Egisrail & Lyon town planning agency. (2010)

The proposed BRT lines of Egisrail and Lyon town planning agency are mostly dissimilar with those of the urban transport study. As shown in Figure 3.29, the seven BRT lines are:

1. B1: Ayertena–Tor Hailoch–Wingate;

2. B2: Gofagibriel– Mexico–Merkato–Wingate;
3. B3: Gofagibriel–La Gare–Guelele;
4. B4: Megenagna–Arat Kilo–Shromeda;
5. B5: Megenagna–Bole;
6. B6: Bole Air port–La Gare; and
7. B7: Tor Hailoch–Lideta–Kara–Bole

The study also identified three main bus lines

1. C1: Total–Pushkin–Mexico
2. C2: Bole–Urael–Kasacnchis
3. C3: North–Meriluke–South

As the study by the Egisrail & Lyon town planning agency (2010) was initiated to come up with a quick proposal of a BRT network that is easy to implement, it is not a comprehensive study that indicates the lengths of the networks, the potential passenger load for each network, the cost and financing, mechanism and modalities of integration with each other and with other modes. Nevertheless on the basis of certain qualitative screening criteria particularly the ease of implementation, the study has prioritized B2 for first phase of implementation. The BRT corridor has a length of 12 kilometers and will have 17 stations with average spacing of 700 meters. The BRT will have a head way of 2 minutes and will carry a peak load of 5,400 to 7,500 passengers per hour per direction. The BRT line converges with the LRT system at Merkato and Mexico square. The construction will be implemented in phases commencing in 2011 and become “full BRT” in the final phase in 2013. The total cost of the project including infrastructure and vehicle acquisition but excluding the cost of securing the right-of-way is estimated at Ethiopian Birr 680 million (35.82 million USD¹⁴ or to 3 million US per kilometer) and is to be financed by the city government and external loan possibly from the French development agency (Egisrail & Lyon town planning agency, 2010). The construction of the segregated busway along with other BRT infrastructure for the B2 is planned to start once the detailed design of the section is completed.

Addis Ababa, unlike the last master plan of 2001 which for political reason was limited within the boundary of the city, is now updating and revising the master plan at the metropolitan level. The plan includes Addis Ababa and the surrounding conurbation which falls under the

¹⁴ On October 29, 2013 United State Dollar (USD) was trading at Ethiopian Birr 18.98

jurisdiction of the Oromia state government. Both the city government and the Oromia state government have decided to have an integrated regional development plan and urban structure plan that will guide the future development Addis Ababa and the surrounding Oromia special zone. The plan covers the period from 2014 to 2038 and is expected to be finalized in 2014. The draft plan document (AASZDPPO, 2013) proposes the extension of the LRT lines as proposed on Figure 3.27, the increment of the BRT to 12 lines of which some are planned to extend into the Oromia special zone (See also Figure 6.1), improvement of Anbessa, development of Legahare as city, regional and national passenger terminal, provision of park and ride facilities at some of the regional bus terminals and the new proposed national rail passenger terminal at Lebu. A new metro line in the city centre is also proposed. The proposals have to be developed, details of modalities of implementation worked out and the central role of public transport in bringing about transit oriented development be fully exploited. However, the difficult task of as to how to provide integrated multimodal public transportation services that extends into the city's hinterland remains to be investigated by new integrated regional development plan of Addis Ababa.

3.6 Conclusion and discussion

In a move to mitigate the negative consequences of rapid motorization and enhance sustainable urban development, many cities are attempting to promote non-motorized movement, public transport use and transit oriented urban development. It is widely recognized that global warming has negative consequences and it is projected that this is to be more damaging for cities of the developing countries. Increasing motorization in these cities is accelerating the process. The cost of global warming is estimated to be between 5 and 9 % of Gross Domestic Product of the Developing Countries (World Bank, 2002b). The provision of public transport that is affordable, accessible, sustainable, integrated and cost effective, however remains to be a huge task to be achieved by sustainable cities. Despite the pivotal role of public transportation in this process, it is beleaguered with a number of problems. Decreasing financial and operational productivity, increasing operational and capital costs, widening gap between revenue and expenditures calling for increased public subsidy are fundamental challenges of the formal public transport sector (Transport research board 2001 study cited in Buehler and Pucher 2010, p. 126). The formal public transport service of Addis Ababa has been deteriorating over the years as operational and financial analysis of the Anbessa city bus service shows. The

informal transport sector has moved in to fill the deficit that has been created by less attractive and less efficient formal public transport. The rapid growth in number of low capacity and old vehicles of the informal sector is contributing to rising congestion, environmental pollution and traffic accidents, although they are providing remarkable public transport services along main corridors and areas out of the reach of formal public transport and employment opportunities (Halcrow Fox in association with Traffic and Transport Consultants, 2000, Cervera & Golub, 2007).

Public transport in Addis Ababa is characterized by shortages, overcrowding and longer travel times during peak hours and poor quality of service and longer waiting times during off peak hours. Recurrent congestion and the absence of mass transport priority schemes significantly reduce the operational efficiency of the public transport. Unhealthy intramodal and intermodal competition both between formal and informal modes is quite common. This phenomenon is particularly more pronounced along the main routes frequented by both formal and informal transport and during the morning and afternoon peak hours. As most intracity terminals and bus stops are on-street, boarding and alighting of passengers that take place on the road is the main cause of congestion along main roads and junctions. The poorly integrated and dispersedly found terminals involve long walking and transfer times.

The new mass transit systems of LRT and BRT, which have been proposed in a number of previous urban and transport studies, are in the process of implementation, although their implication in terms of the city's financial resources have been hardly investigated as so do the cost recovery strategies and the impacts of the new public transport fares of these systems on household income and household expenditures patterns. The World Bank (2002b) cautions cities to be careful in choosing mass transit technologies and emphasizes the importance of critical assessment of available financial resources and performances of each system before choosing specific mass transit technology. In Addis Ababa example, the option of deciding BRT or LRT along the north-south and east-west corridors from the dimension of cost and performance comparisons was not without controversy among planners and politicians. The final choice was more of a political decision and the LRT is being financed and built by foreign loan, by a foreign contractor and by foreign labor. Furthermore, the operation of the LRT is to be run by a foreign firm. However, as it is envisaged that the loan is to be repaid back from fare box revenue and revenues from TOD around major stations, ensuring the affordability of the LRT must be critically investigated and tradeoffs reached. The questions of how these new and

old systems of public transport are to be integrated between themselves and with non-motorized facilities (Wright, 2001, & Hensher, 2007) and how these new public transport systems could form the axis of high density urban development remain to be answered by city planners, transport experts and transport authorities.

The exercise of providing affordable transport to the poor poses a serious threat to the financial sustainability of public transport operators. Increased subsidy to compensate for the loss puts a strain on city public finances. There is a need to find a balance between the affordability goals of public authorities and the cost recovery goal of public transport operators. The operational difficulties on the congestion prone major public transport corridors are the major obstacles for public transport operators to recover costs from the fare and become more financially sustainable. In the absence of some form of subsidy and financial support from the government, the informal public transport exclusively depends on fare revenues to recover operation costs and depreciations. Access to bank loan for fleet acquisition and replacement by the informal public transport is limited as it is usually difficult to meet the collateral requirements of the banks and the sector is considered as risky by banks.

Planning for the public transport is not well developed and is done in fragmented and independent manner by the bodies concerned. The Anbessa city bus enterprise is responsible for the overall management and planning of the city buses. The newly established road and transport bureau is attempting to introduce a planned and regulated operation of the informal public transport sector. There is adamant need for increasing the technical planning competency of the transport authority which by any standard now can be considered to be very rudimentary. New institutional arrangement that will facilitate coordination between different actors involved in urban public transport, enhance integration between transport and urban development and promote cooperation instead of competition among public transport operators is critically important in improving the Addis public transport system.

Chapter 4 Integration of Public transportation: A literature review

4.1 Introduction

Travelling by public transportation in many European cities and metropolitan areas is a lively experience. Fully integrated public transport system facilitates public transport mobility within cities and the metropolitan regions. Integrated fares allow travelling by all modes and involve no transfer penalties and transfer payments. The different ticket types and prepaid season passes provide the user with multiple options. The physically integrated networks with supporting interchange facilities of P&R and B&R facilitate transfers, incur little walking and waiting and make travelling by public transport convenient and attractive. Faster commercial speeds, regularity and reliability of public transport in mixed traffic situation has been ensured through priorities given at roads and intersections for public transport modes. The system is supported by information technology and wide applications of real time information system on-board vehicles, at the stations and stops. Some cities also have integrated public transport networks into their spatial development programs. Achieving fully integrated public transport integration system with "one network, one timetable, one ticket, one fare" is probably a distant dream for many African cities. African cities have a greater share of public transport in their motorised modal distribution. Public transport integration is beneficial and it is time now for city transport authorities and local governments to initiate the process of integration. They should review preconditions for integration. The choices of which forms of public transport integration to start with will depend on their specific urban transport contexts and decision frameworks. Their ultimate goals, nevertheless, should be the achievement of greater public transport integration that gradually ensures seamless travel and enhances sustainable urban development.

Public transport integration has evolved and developed in cities of the developed countries where high level of motorization, widespread use of private cars, declining public transport ridership and presence of many public transport operators were seen as undesirable and unsustainable (Pucher & Kurth, 1995, NEA, OGM & TSU, 2003, & Potter and Skinner, 2000).

Disintegrated provision of public transportation has undesired consequences in terms of comfort, information, travel time and cost for the captive and choice riders of public transport (SPUTNIC, 2009b). Integration of public transportation enables a seamless travel through chaining of public transport journeys. Integration of public transportation seeks to make public transport more attractive and avail itself as viable alternative to private car use. Moreover, integration that promotes public transport use and strongly link public transport with land use development is assumed to contribute to more sustainable pattern of urban development.

In developed cities, public transport integration aims at making public transport faster, more reliable, more comfortable and seamless so that it can provide a higher level of service that is competitive to the one given by cars. However, the impact of public transport integration on changes in public transport ridership and modal shift is not clear. Although earlier studies (FitzRoy & Smith, 1998) shows that public transportation integration had reversed the downward trend and even increased public transport ridership, Stead (2010) argues that there is no sufficient evidence to support that the implementation of integration has led to decline in car ridership or modal shift from cars to other modes notably to public transport in the UK and Europe.

In the cities of the developing countries, on the other hand, motorization is on the increase but per capita ownership is very low. There is much dependency on non-motorised mode of mobility, mainly walking. Most city dwellers depend on public transport for mechanized mobility. However, in most of these cities, there is shortage of public transportation and service is provided in fragmented and uncoordinated manner way by many and overwhelmingly private operators that run low capacity public transport vehicles. Inevitably, there is a strong competition both for the passenger market and road that contributes to more frequent road congestion, pollution and traffic accidents. Here, the challenge for public transport integration is how to provide accessible, reliable and affordable public transport service to urban dwellers particularly the majority urban poor. It seems imperative that in the cities of the developing countries, particularly African cities that virtually lack integration practices, to reform their urban transport system and start the long path towards integrating their transport system for making these cities more lively, sustainable and competitive in rapidly globalizing world. A public transport system that is well integrated in broader perspective, accessible, reliable and affordable could bring these cities back to the right path by promoting sustainable urban development and economic growth. It will also be instrumental in the building of an inclusive

society through increasing the accessibility of the urban poor at edge cities and informal peripheral settlements and integrating them into the urban economy (UN-HABITAT, 2010). Carefully designed integration strategies that takes into account the institutional and financial impediments of these cities will aid in optimizing service, reduce the costs for public transport operators and negative externalities related to energy use, emissions and congestion (Hidalgo, 2008).

Fully integrated public transportation system is a perfectly desired model to be reached by cities and metropolis across the globe. Sustainable urban development paradigm has added more leverage to the importance of public transport integration. But this aspiration seems complex and difficult to be achieved by rapidly growing African cities and metropolis. However complex and difficult the process of public transport integration may be, it should be set as a long term goal by city planners, transport authorities and public transport planners and providers.

Public transport integration is worth pursuing and provides a number of advantages. Public transport integration enhances the coordination of the planning, operation and management of the public transport system, it is instrumental in avoiding wasteful inter and intra modal competition and increases the attractiveness and ridership of public transport modes. Public transport integration brings systematic framework for setting tariffs and tariff zones acceptable by all public transport providers and offers the platform for providing affordable transport for the low income urban communities. The management public transport integration process promotes public private partnership between local and regional governments, transport authorities and public transport providers. The institution that will be created through the partnership serves as a medium for the channeling of public finances for subsidy purposes and long term public transport infrastructure development. Public transport integration that extends beyond the city boundary into the metropolitan area, makes commuting more convenient, easier, more efficient and affordable. Public transportation networks serve as corridors of high density urban development if they become an integral part of city's spatial development process.

Public integration process in African cities should proceed stage by stage. The phased process should begin from the easiest and advance to the most complex public integration forms. It will be prudent to start with traffic management programs that gives mass public transport modes more priority along the roads and at junctions, and then proceed to public transport network restructuring that is based on the principle of trunk-feeder arrangement. Network restructuring

needs to be developed in line with the city current and anticipated future urban development patterns and trends. Hierarchically structured networks makes the process of franchising of routes for operators much easier and manageable. The framework of integration that takes into consideration the city's specific situation lays the ground for the selection and phased implementation of integration modes, although the ultimate goal is to have fully integrated public transport system.

The purpose of the literature review is to investigate from the literature the broad issue of public transport integration with ultimate objective of laying the theoretical foundation and a framework for implementation of affordable, efficient, sustainable and integrated multimodal public transport in Addis Ababa. It also draws lessons from case studies cities from Europe, Latin America, Asia and Africa (though almost none) which had an effective and successful integration. The literature review draws on a combination of three main sources: journals, books, and internet. A review of the publications on public transport integration indicates that there seems to be a fading interest of academic research on public transport integration by scientific community. Much of the work on public transport integration is rather coming from those planning, operating, coordinating and managing public transport. Indeed local governments, planning agencies, transport authorities, public transport providers and transport associations are making important contributions in the field. There are a number of constraints to the literature review. Moreover, the literature on public transport integration is mostly about cities of the developed countries where the practice of integration has been developed. The review will try to bridge the knowledge and practice gap by developing a framework of integration that fits the context of African cities in general and Addis Ababa in particular. It specifically seeks to provide answers to the following general questions:

1. What are the rationales for cities motivating them to engage in integration? What is integration and types or forms of integration? Are there differences in rationales between the cities of the north and south?
2. What are the major challenges/barriers in adopting an integrated approach? Which strategies are available to overcome these challenges?
3. What is the institutional framework for implementation? How do the different operators – private and public – come under one governing associations? What should be the legal framework? How can public sector financing programs in terms

of subsidy grants and fleet replacement be channeled into publicly and privately operated public transport sector?

4. What is the experience of cities in implementing integrated public transport system? How can cities in Developing Countries with different context learn from this process and develop their own integrated system of public transportation taking into account their own specific condition?

The review is organized under the following issues; namely; definition and approaches in integration, challenges and barriers to integration, forms of integration including physical integration, fare integration, other forms of integration and public transport integration with urban planning, case study cities in integration from Europe, Asia, Latin America and Africa, challenges in integration, strategies for implementing integration, framework of integration and conclusion and recommendations.

4.2 What is integration?

There are in the literature a number of different answers on what integration is, how it should be approached with respect to forms, levels (strategic and operational levels) and dimensions of integration. There is no unanimity, however, on what transport integration or integrated transport policy is and how best it can be achieved (Banister and Givoni, 2010b, May, Kelly, & Shepherd, 2006, Feitelson & Gamlieli, 2010, & Stead, 2010). Potter and Skinner (2000) emphasize that integrated transport has become important issue in transport policies in many countries and that it can contribute to sustainable development, although there is no universally accepted notion of what integrated transport is. NEA et al. (2003) notes that the term integration is used widely in the fields of public transport, urban transport, public transport operations, transport policy, urban planning, urban infrastructure and land use planning and it could mean different for different disciplines and there is no unanimity on what it is. The issue of whether transport integration is an objective or means is contentious as well. May et al. (2006) remarks that the notion integration is vaguely defined and that integration should serve transport policy and is not an objective by itself. Similarly, Davidson and Lindfield (as cited in NEA et.al, 2003, p.32) remarks that "...integration is often seen as an end in itself rather than a means towards producing better services". Nevertheless, irrespective of these conceptual differences, transport integration can be viewed from the narrower and wider perspectives. Equally important is the

system perception of transportation. Transport as a system is composed of different elements; namely; transport network, the users, the operators and the institutions. The system perspective of transportation highlights the importance of bringing together those elements in a complementary manner (integration) so as to provide transport needs at minimal cost and little environmental damage. Meyer and Miller (2001) emphasize that as multimodal transportation system consists of the user, mode of transportation, infrastructure, intermodal connections and stakeholders, multimodal transportation planning must address all these elements. It should adopt comprehensive and integrated approaches for solving transport problems of major cities as there is no single solution to their transportation problems. In this respect, integration is then an act or process in which the different transport systems or subsystems are brought together under one transport network. Anderton (2010) defines integration as “an act or instance of combining into an integral whole” (p. 58). Integration indicates “intermodality” or multimodality (Banister and Givoni, 2010). Szyliowicz (2010) also points the increasing importance of viewing transport from system perspective and the need to formulate policies and projects that take into account the closer connections between modes: the so called intermodalism; which he redefined the system as

One in which the individual modes are linked, governed, and managed in a manner that creates a seamless and sustainable transportation system. Such a system should be economically efficient, environmentally sound, safe and secure and ethically based (p. 320).

Fox (2000) views transport integration from two levels. The wider strategic level at the city level focuses on the task of the integration of land use with transport. At operational level, integration between transport modes is thought to improve public transport modes that will results in increased efficiency and little inconveniency. May et al. (2006) also makes a distinction between integration at the operational level that includes integration of fares, service and information integration and integration at a higher strategic levels which implies

integration between policy instruments involving different modes, integration between policy instruments involving infrastructure provision, management, information and pricing, integration between transport and land use planning measures and integration with policy areas such as health and education” (p. 320).

Furthermore, three different types of integration are distinguished based on agencies involved in the specification and implementation of wide range of possible instruments. These are

horizontal integration between agencies and departments within city administration, spatial integration between adjacent local administrations and vertical integration between local, regional, national and supranational administrations (May et al., 2006). In addition to the horizontal, spatial and vertical integration, Stead (2010) also adds temporal and modal dimensions to transport policy integration. The pursuit of synergy through reinforcing policy instruments and removal of barriers to integration are mentioned as basic principles of strategic integration. May et al.(2006) list four key concepts that best describe how the different policy instruments combine with each other namely; complementarity which ensures greater total benefits than is provided by individual elements, additivity in which combined welfare gain equal to the sum of each individual gains, synergy that results in greater benefits than the sum of benefits using either one of them alone, and perfect substitutability in which using one of the welfare gain eliminates entirely the welfare gain from using another instrument. Synergy is understood as special case of complementarity through which benefits from the sum of elements are greater than the sum of their individual benefits. Four main groups of impediments to integration are identified: legal and institutional barriers that emerge due to lack of legal power and responsibilities, financial barriers related to budget constraints for financing a wide range of instruments, political and cultural barriers and practical and technological barriers such as lack of skill and expertise (May et.al, 2006). In conclusion, the writers highlight the issue that integration should be designed to serve agreed objectives rather than be an objective by itself and that most integration strategies are designed to promote either synergy or as a means of overcoming barriers or both.

Potter and Skinner (2000) perceive integrated transport as scalar in which the higher orders (wider) include all the elements if the lower ones (narrower) and these in increasing degree of complexities are (1) functional or modal integration such as ticketing and easy transfer between modes respectively; (2) transport planning and integration such as the use of land use planning to reduce the need for travel and travel demand management; (3) social integration such as coordinating and involving all those with stake in and transport and (4) environmental, economic and transport policy integration. The higher the level, the higher is the degree of integration and sustainability. Potter et al. (2000) remark that integration at lower levels is widely practiced and emphasize the need for a holistic approach at higher level of integration and that technical solutions only could not lead to higher sustainability. Banister and Givoni (2010b) also reiterate that physical, operational/modal integration, the two lowest levels of integration as described in the integration ladder developed by Hull, have been largely

implemented and with considerable success. Preston (2010) furthers the ladders (rungs) of integration specifically tailored towards transport. The rungs with increasing degree of difficulties are:

1. The integration of fares, service patterns, terminals/stops and information within public transport.
2. The integration of infrastructure provision, management and pricing for public and private transport.
3. The integration of passenger and freight transport.
4. The integration of (transport) authorities.
5. The integration between transport measures and land use planning policies.
6. Integration between general transport policy and transport policies concerning the education, healthcare and social services sectors.
7. The integration between transport policies and policies for the environment and for economic development. (p. 207)

May (1993) and Hine (2000) as cited in Hull (2005) enumerates the six domains in which integration can contribute towards transportation planning and transport service delivery:

1. Integration between authorities;
2. Integration between measures involving different modes;
3. Integration between measures involving infrastructure provision, management and pricing;
4. Integration between transport measures and land use planning policies;
5. Integration between transport measures and policies for the environment; and
6. Integration between transport measures and policies for education, health and wealth creation. (p. 320)

The literature also provides perception of integration from specific public transport perspective. Integration in public transportation enables public transport riders to use the whole public transport system in cities and city regions regardless of “transport modes, tariffs, fares,

schedules, ticket systems, etc.” (SPUTNIC, 2009b, p. 1). Rivaspalta (2008b) defines public transportation integration as

.... comprehensive planning of services within an urban market for the purposes of facilitating seamless, multi-operator journeys. It entails the organisation of modes and services into a rational system of operational features in terms of routes, frequencies, timetables, fares and ticketing, as well as policy aspects, such as planning, marketing and development. (p. 2)

In a study on “Integration and regulatory structures in public transport” (NEA et al., 2003), public transport integration is defined from two perspectives: one from the perspectives of “good practice” and other from the “abstract definition”. The definition of integration from good practice point of view distinguishes three levels. These are the minimal form of integration that constitutes integrated information of non-integrated services, the traditional public transport integration of integrated tickets, fares and public transport services and the broader level of integration with other modes of transport and policies like land use. An abstract definition of public transport integration views integration as a means to bring together parts of the transport system in the whole mobility chain and define it is as...

The organization process through which elements of the passenger transport system (network and infrastructure, tariffs and ticketing, information and marketing etc.) are, across modes and operators, brought into closer and more efficient interaction, resulting in an overall positive enhancement to the overall state and quality of the services linked to the individual travel components. (p. 17)

The NEA et al (2003) and Preston (2010) provide four different perspectives on integration of public transportation. The first is the engineering perspective which views integration as an efficient use of resources (vehicles and services) to be achieved through a design of “optimal network” and thus leading to “more attractive services”. The second micro-economics perspective emphasizes market failures and the need to redress it through intervention so as to maximize welfare. The third management (public) perspective addresses the question of integration by focusing on “institutional aspects and behavior of public and private actors within their setting” (NEA et al., 2003, p. 32). The institutional and/or evolutionary economics perspective emphasizes the importance of institutions in public transport integration.

Finally, different hierarchies of “working together” within public transport integration are distinguished. These from lower to successively higher levels in which the higher level also

include the elements of the lower levels are coordination such as “mutual agreements” on services, tickets and schedules, cooperation such as scheduling and route planning and integration or evolving “into one”. Strong stakeholder participation, clarity of objectives of the forms of “working together” and benefits to be accrued from them are mentioned as a prerequisites for successful of integration (NEA et al., 2003, & Stead, 2008).

The preceding analysis has shown that transport integration is defined differently depending on the disciplinary perspective. There is no universally acceptable definition of transport integration and the means to achieve it, although there is unanimity that it is beneficial. Furthermore, there is a general consensus that it is necessary to adopt transport integration policies and instruments and that transport integration should not be an objective by itself but a means to achieve higher levels of service. Measuring the benefits and costs of integration forms that have been already implemented or proposed for future implementation has been rarely done. The difficulty of measuring that costs and benefits of integration programs a priori or ex post increases with the complexity of integration. The great difficult in determining the costs and benefits of integration calls for more research on defining and quantifying costs and benefits of integration projects implemented or proposed for future implementation.

Integration of public transportation is perceived as a comprehensive planning of services that results in a rationally organized public transport modes and services. Here it is implicitly necessary to consider other policy issues, urban planning and development dimensions into the planning of public transport system. The system perspective of public transportation permits to define integration an organizational process by which all the elements of public transportation are brought into one system for the purpose of improving services. The system view of transportation makes it imperative to approach transportation issues and planning from an integration perspective. Integration is then an act or process that brings all the elements of the transport system and the interrelationship into one. From public transportation integration perspective, this will imply the decision processes and the integration forms that ultimately result in seamless and sustainable public transportation. But the literature does not explicitly state how that to be achieved is, what the preconditions are and what supplementary measures are necessary that facilitate the process.

The complexity of integration increases as the scale and level of integration moves up from lower operational levels to higher and wider strategic levels. The higher the level of integration in the ladder of integration, the greater is the difficulty of achieving the desired outcomes. Specifically, public transport integration has also different levels and the difficulty increases as

one moves from narrower and public transport specific goals to wider and more general policy issues. Although integration of public transportation is assumed to bring synergy and enhances seamless travel, the literature does not provide an easy answer to what should be an “ideal” or “optimum” level of public transport integration nor what instruments or combination of instruments are available to achieve it. Cooperation and coordination between local, regional and national governmental institutions in policy formulation and implementation likely increases the success of transport integration in narrower and wider perspectives. Transport integration is an institutional process which involve different actors within local governments, actors at different tiers of governments and those between neighbouring local governments. The objectives, roles and responsibilities each of these agencies should be clearly articulated so that integration achieves the desired objectives. The cooperation between neighbouring local governments for the purpose of regional planning in general and regional public transportation planning in particular is a controversial issue. In countries and cities where regional planning is no mandatory, lengthy negotiation between local governments are necessary in order to arrive at a commonly agreed objectives regarding regional public transportation and regional planning issues that cross local government boundaries. Regional plans that are not based on consensus, active partition of the each of the constituencies and hastily arrived decisions could have a catastrophic repercussions as in the recent mass protests and costly damages that followed the disclosure of the new integrated regional plan of Addis Ababa and the neighbouring Oromia towns testifies.

There are a number of impediments to integration pertaining to legal and institutional framework, finance, political and cultural contexts, technical and skill constraints. Integration strategies should ensure a higher performance levels and synergies and at the same time devise mechanisms to contain the impacts of the barriers to greater integration. So it is very essential to know at the outset the barriers of integration which could vary depending on the scale of transport integration and city context. It is also useful to know and make use of enabling legal and institutional frameworks and opportunities that promote integration. As a dynamic process that involve different agencies and levels, the task of integrating public transportation is not an easy one for emerging and rapidly growing African cities which exhibit poor planning experiences, highly deregulated and fragmented public transport provisions, limited autonomies and weak institutions. Its success depends on the number, type and ownership of public transport modes, status and degree of cooperation and coordination of activities between institutions, capacity to identify and prioritize public transport modalities, existence of urban

and public transport planning capabilities, existence of awareness on importance of integration and presence of commitment for greater public transport integration. Despite diverging notions, integration is an organizational process and should be perceived as a means to achieve seamless public transport travel and sustainable urban development. The task involves the development of an integration framework which will build on a number of variables and criteria. It will require the identification of preconditions for integration, barriers to integration, policy instruments of integration, forms of integration and institution necessary for successful integration. Above all it needs committed body that has the successful implementation of public transport integration as its ultimate goal.

4.3 Forms of public transport integration

Public transport integration is practiced in different forms and it can be approached from narrower and broader perspectives. The commonest forms of public transport integration are physical integration, network integration, fare integration, information integration and institutional (operational) integration (Hidalgo & Carrigan, 2010, Rivasplata, 2008, Parti and Katoch, 2009 and NEA et al., 2003). Wider integration with the other transport systems (including cars and non-motorized transport) and other policy domains are also mentioned in the literature as forms of public transport integration (Holvad, 2010 and NEA et al., 2003). The features of each of the theses forms of public transport integration are discussed in the following.

4.3.1 Physical Integration

Public transport integration seeks to provide seamless travel through chaining multimodal or intermodal trips as it is not possible to provide direct public transport service between numerous trip origins and destinations. Moreover, it could also be to the advantage of the user to change modes in order to have a faster transport service (Rivasplata, 2008a). Transferring between modes to reach final destinations are therefore inevitable and common in public transportation. Most public transport trips involve at least one transfer as Guo & Wilson (2011) illustrate by taking the examples some major cities. Indeed

In London, about 70% of underground trips and 30% of bus trips involve at least one transfer (Transport for London, 2001). In New York City, about 30% of subway and bus trips and 80% of commuter rail trips involve at least one transfer

(NYMTC, 1998). In Munich and Paris, 70% and 40% of all public transport trips, respectively, include one or more transfers (GUIDE, 2000). (p. 91)

Furthermore Guo et al. (2011) distinguish three elements of transfer experience: transfer walking, transfer waiting and transfer environment (penalty) and note that

Despite their popularity, transfers often are seen as a necessary evil in public transport. On the one hand, they support enlarged service areas and hierarchical, multimodal networks; on the other hand, they disrupt the travel experience and reduce public transport's competitiveness with automobiles that provide door-to-door service. Inconvenient transfers could deter potential customers (CTPS, 1997; Gleave, 1998; Wardman, 2001), reduce the satisfaction of existing customers (Hine and Scott, 2000), and affect customers' use of public transport systems in terms of their paths and destinations (Lam and Xie, 2002). (pp. 91-92)

Physical integration of public transportation, also referred to as infrastructure integration (Miller, 2004), seeks to make public transport more convenient to user by focusing on improving transfer and waiting times and experiences as well as by integrating the routes (network integration). Physical integration is found at the lowest level in the ladder of integration (Givoni and Banister, 2011) and is the most widely practiced and the least expensive form of public transport integration. Physical integration and interchanges facilitates seamless travel through provision of accessible and convenient interchanges (terminals, stations) for multimodal transportation (Diaz Olvera et al, 2014, & Hine and Scott, 2000). Krygsman et al. (2004) in the study on travel time elements and interconnectivity in multimodal public transportation state that transfer, wait, access and egress time are weakest links in public transportation trip chains and improving them through integration measures could led to overall reduction in public transport trip times. Physical integration is also mentioned as a precondition for effectiveness of a news mass transit projects in which physical integration together with fare integration will reduce the inconveniences associated with intermodal exchange (World Bank, 2000b).

Physical integration involves the provision of infrastructure and facilities to promote seamless travel and facilitate passenger transfers (Givoni and Rietveld, 2010, & Hidalgo, 2010). Physical integration links the public transport networks and modes through the provision of interchange facilities. Physical integration, therefore, can be thought of as an instrument to increase public transport ridership for the non-seamless stages and connections (access, egress, wait and

transfer) are assumed to be critical factor for the decline in public transport patronage. It generally involves the provision of interchange facilities as a transition area in the public transport network (Henry, 1990 as cited in Rivasplata, 2008b). As transition points in public transport system, the interchange facilities chain multimodal trips and enhance inter and intramodal passenger transfers (NEA et al., 2003). Transport for London (2000) underlines the importance of interchange facilities as knots in forming a network through their function of linking the different public transport services and that “if transfers between these services can be made easier, quicker, and more convenient, the overall integration and the flexibility of the network will be greatly improved”. (p. 3)

Interchanges found at strategic locations of the public transport network are physical spaces which are equipped with standard services and capacities depending on the importance of the interchange and the availability of intermodal facilities (like Park & Ride, and Bike & Ride). Interchange services and facilities facilitates intermodal trip chaining (Priemus, Nijkamp, & Banister, 2001). Interchanges perform three main functions: to transfer between public transport services or modes, wait for the next service and use the time spend waiting or transferring to carry out other activities such as shopping, reading, taking a break, etc.(Transport for London: Integration department, 2000). As Preston (2010) notes “the waiting environment, level of facilities, level of information, physical linkage for the next stage of the journey, and connection time and the risk of missing a connection” (p. 210) are factors of very high importance for public transport passengers. Guo & Wilson (2011) highlight the importance of approaching the transfer walking, transfer waiting and the transfer environment holistically in interchange design and planning as transfer experiences involve cost to the public transport system. Comprehensive approaches that includes network design, service control and station and interior design for transfer walking, transfer waiting and transfer environment respectively will minimize the cost incurred and makes transfers more convenient.

Interchanges have different hierarchies. They are found at varying intervals in the public transport networks, perform integrative functions (inter and intra-modal transfer) and are equipped with necessary facilities (information, signage, shelters, shops, entertainment, Park & Ride, Bike & Ride, and pedestrian facilities). The functions performed and the physical extent and layout of the interchanges will depend on the position of the interchange in the hierarchy of the public transportation network (Parti & Katoch, 2009, UITP, 2002). For example, the classical Curitiba’s BRT system recognizes three different hierarchy of interchange facilities;

namely; tube stops located every 450 to 500 meters along the busways, mid –route smaller terminals at 2-km spacing and interchange–integration terminals at the outer end of the major BRT corridors (Curitiba, Brazil: BRT case study, n.d.). Similarly, PROCEED (2009) distinguishes three levels or hierarchies of bus stops: level 1, 2 and 3 in which “level 1 are main stops / interchanges with high demand with regional importance (e.g. rail station), level 2 stops with high local importance and interchanges to other buses or other modes (e.g. local sub-centres, major stop in city center), and level 3 are bus stops of only one line” (p. 111). The major interchanges are hubs in which public transportation and urban land uses overlap and in which there is high density urban development (PROCEED, 2009).

It has been discussed that travel by public transport involves transfers. Firstly, public transportation network cannot provide direct service between all trips origins and destinations in urban and metropolitan areas. It inevitably involves a number of trips legs that will be done by using a combination of public transport modes. Secondly, it is sometimes necessary to change mode for the reason of travel time saving. Physical integration through the provision of interchange facilities, therefore, facilitates the linking of the different public transport trip legs and modes. It minimizes the inconveniences and costs resulting from transfers and enhances seamless public transport travel. Interchange design and interchange facilities, thus, should attempt to minimize the costs and inconveniences they impose on the users of public transportation. Major interchanges and the adjoining areas could also become focus of high density and mixed urban development by utilizing the comparative advantage of higher accessibility provided by their closer proximity to major public transport corridors and intersections. There are a number of problems that will be encountered in the implementation of physical integration through the provision of interchange facilities and services. Firstly, there is a need for network restructuring of the whole public transport network which will be based on the importance of the public transport corridors. Such hierarchical system of the network will be very helpful in defining the hierarchy and functions of interchanges. Cities need to have public transport network plans. This is a difficult task as most African cities lack general public transport network plans. This calls for the development of planning capacity and competent transport institutions in Africa. Secondly, interchange requires a considerable amount of financial investment. In this connection the view that physical integration is the least expensive form of public transport integration is questionable as the acquisition of land and equipping interchanges with necessary facilities could be expensive in well-established city centres and inner city areas where free space is difficult to acquire and compensation costs could be

substantially higher. Thirdly, the administration and financing of interchanges requires the designing of appropriate modality of public private partnership. In this process, the municipalities as lead actors and working in closer cooperation with private sector, private and public operators should find acceptable, financially feasible and cost recovery alternatives for managing and financing interchanges. Cities that already have policy of public private partnership are at an advantage and those lacking should work to develop such policies.

Although there are differences in size and scale, African cities in general and Ethiopian cities in particular should strive to promote sustainable urban development by concentrating their development around current and anticipated future public transport networks and interchanges. The fundamental question here is whether or not Ethiopian cities (also African cities) have the authority and institutions necessary for guiding their development on the path of complex and technical development plans. Nevertheless, most cities face a number of political and institutional impediments that poses great difficulties in following such pattern of urban development. The situation for other African cities could not be different. The federal system of governance in Ethiopia has at least enabled most Ethiopia cities, Addis Ababa included, to have an autonomous status with the authority to make decisions in all matters within their territories. Most cities, however, lack the institutional capacities for formulating and implementing urban development plans. This is rather the outcome of the political ideology of the local, regional and federal governments through which placements to civil service positions in regional and federal government institutions are based on political locality rather than merit. This has been practiced for too long and is causing an irreparable and lasting damage on institutional building process. The demand for reforming the current civil service recruitment practices, ensuring greater autonomy for municipalities and strengthening urban institutions is getting more pronounced as Ethiopian cities are becoming more helpless in the face of rapid urbanization and attendant urban problems of transport, housing shortages, environmental degradations, rising unemployment and poverty.

4.3.2 Fare Integration

It is argued the success of physical integration is closely related with the complementary fare integration measures both of which are considered to be the most important instruments of public transport integration. Moreover, fare integration is assumed as a precondition for a success of new public transport system without which there could be lower than the projected

ridership levels (Fouracre, Allport and Thomson, 1990). Nonintegrated fare system that is manifested in terms of non-unified tickets and complicated tariff system results in passenger inconveniences and decline in public transport ridership (SPUTNIC, 2009 b). Integrated ticketing, as examples from the literature show, leads to increase in public transport ridership (Preston, 2010, Public Transport Executive Group, 2009, & PROCEED, 2009). It is prudent to distinguish at the outset two concepts in fare integration; integrated ticketing and integrated fares. According Holvad (2010).

Integrated ticketing, in the context of railways, refers to the case(s) where the same ticket will be accepted by more than one operator (in principle both intra and intermodal journeys) and will allow passengers to use a single ticket for all journeys. It also addresses the physical appearance of the ticket. Integrated ticketing should be considered distinct from integrated fares, as the latter refers to a system in which a journey involving several trips, regardless of mode or operator, is 'integrated' into a single fare for the journey without any transfer penalties. Integrated ticketing and fares systems are often introduced jointly as part of the same package. (p. 242)

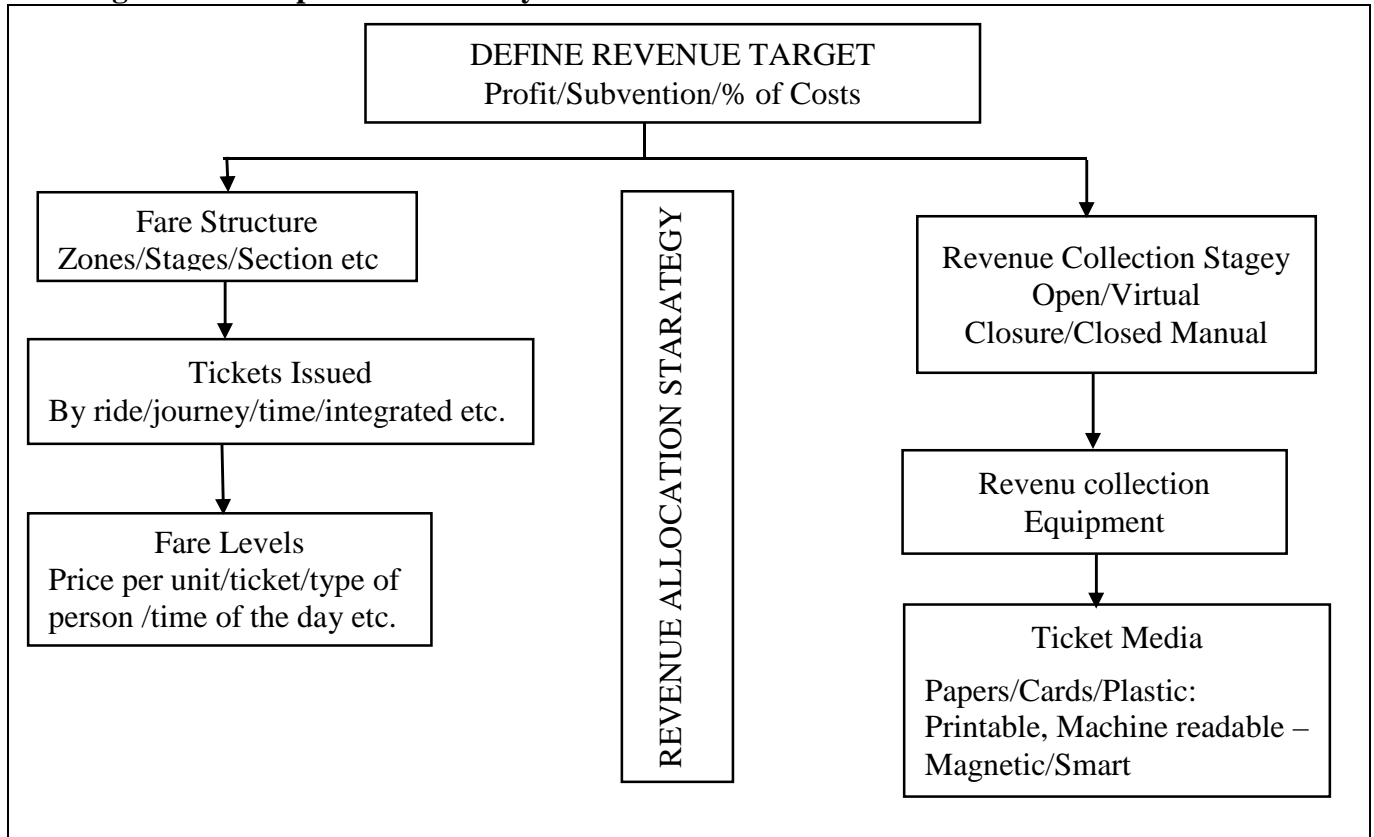
Both fare and ticket integration are designed to improve travelling by public transport through partially or fully removing the obstacles of the presence of different tariffs and tickets for multiple leg journeys provided by different operators and modes. Central to fare integration is through ticketing which enables the use of a single ticket for multiple leg trips involving different public transport modes and different operators (NEA et al., 2003, SPUTNIC, 2009b, & Fouracre, Allport & Thomson, 1990). It should be noted that the introduction of integrated ticketing and unified tariff system leads to revenue losses for participating operators. The revenue loss is known as check-through and harmonization losses. These losses must be compensated for by the transport authorities, local and regional governments (SPUTNIC, 2009b). Therefore, the key issues of fare revenue loss that will be incurred by through-ticketing arising from implementation of integrated ticketing measures and the instruments to compensate for it should be critically considered early in the fare integration process (PROCEED, 2009).

Fare integration decreases the inconveniences and costs that will otherwise be incurred in non-integrated system involving transfers between different modes and operators. It enables public transport passengers to use the same fare media for the whole trip despite different modes and operators, allows for free transfers between services and provides benefits from transfer

discounts (Hidalgo, 2008). Accordingly, fare integration should address three major components of fare integration. These are transfer fares which arise from lack of seamless public transport journey and use of different modes of public transportation between origin and destination, integrated fare collection or integrated ticketing that involve the methods of fare collection used between different lines, modes or agencies, and integrated fare structure that refers to the pricing structure that is applicable to multiple lines/routes, modes and agencies by which transfer does not involve additional payment (Ong, 2008). Barr (1997) also defines three elements of fare integration: fare policies, fare structures and fare technology within a single operator and between different operators of public and privately operated public transportation system. He highlights the major challenges in fare integration namely; price integration, revenue allocation, role of the private sector (knowledge of the cost and revenue structure so as to participate in fare integration process) and technological integration (use of compatible fare technologies). In view of these, Rink (as cited in Barr, 2008, p. 91) enumerates the three major tasks to be taken into account in the development of integrated fare system, namely: the methodology for pricing integrated transit trips; methodology for collecting fares for integrated transit trips; and methodology for allocating revenue collected from integrated transit trips. Similarly, the Scottish government report on integrated ticketing (2008) while emphasizing the importance of integrated fare and ticketing in improving public transport and stating the key challenges of costing, pricing, marketing and administrating integration, expands the elements of fare integration defined by Rink and lists eight interrelated components of fare integration system as shown in Figure 4.1.

Fare payment in an integrated public transport system requires

The establishment of a universal transit fare card (conventional paper card or computer-chip embedded Smart card) or passes that provides transit customers the ability to use a single media with which to pay and, pay only once, for transit services regardless of the transit service provider within the boundaries of the regional jurisdiction overseeing the implementation of such a regional card (Miller, 2004, p. 4).

Figure 4.1 Components of fare systems

Source: Scottish Government, 2008.

Smart cards automated fare collection media is increasingly being used for revenue collection in addition to their importance in providing supplementary travel information on the user. However, there are a number of challenges to its use. These are technological improvements and interoperability between operators, data validation challenges (geographical location and operational information), economic feasibility (benefits accruing their use), journey validation process (particularly generating information on alighting passenger and points) and task of development of new modeling methods to handle huge data generated by smart cards (Pelletier, Trépanier, & Morency, 2011). Smart card wide use in the cities of the Developing countries could be a difficulty at initial stages but its use will inevitably increase due to rapid technological advances and fast knowledge transfer to these countries.

Fare integration can be implemented at different levels. SPUTNIC (2009b) distinguishes four levels of tariff and fare integration within the context of Europe. These from the lowest to the highest levels are “mutual acceptance of tickets on the same route, mutual acceptance of tickets

within the same network, tariff unions (integral or for passes only) and public transport associations/public transport authorities”. (p. 4)

Choice of fare revenue allocation method is a fundamental task in fare integration implementation process. Fare integration should, therefore, design appropriate pricing mechanism to overcome the financial gap that will emerge following through ticketing and develop appropriate methods to distribute revenue (and also costs) among the participating operators and agencies of the integrated public transport system. There are three alternative methods for fare revenue distribution from the common tariff pool. These are the reimbursement method that is based on some measure of performances of the participating public transport operators, the accounting method by which the participating operators share from revenue pool the amount that corresponds to the services they offered as indicated by their registered ticket sales, and external user method by which fare revenue collected through own service are maintained but revenue for transferring passengers are collected from operators which issued the tickets (PROCEED, 2009). Other methods of revenue redistribution are also available. These include revenue distribution based on revenues of operators on the basis of revenue volume that was collected prior to fare integration, public transport demand and supply (SPUTNIC, 2009b). Performance based revenue distribution and quality of service offered are becoming more viable criteria for revenue redistribution methods in an integrated and multimodal public transport system. Many of the Latin American BRT uses the mixture of performance and quality of service in revenue allocation (Estache & Gómez-lobo, 2005). It is important, therefore, for the participating operators to come to common strategy on revenue as well as cost redistributions at the initial stage of the integration process and in that respect the city transport authorities have an important role to play.

Governance structure of the integrated system is critical for the success of fare and ticket integration. There are three institutional arrangements for managing of integrated ticketing and these are

A transit authority which mandates integrated ticketing, manages the system and pays operators from the proceeds – the authority takes any revenue risk (e.g. TfL/Transport for London); a statutory framework for co-operation between operators, where the joint organisation has the power to instruct the participants (e.g. the Verkhersverbund in Germany); and a company/organisation which is a joint subsidiary of the main

participants and which implements agreed actions (e.g. Greater Manchester Tickets Ltd)” (Scottish government, 2008, p. 7).

The main purpose of fare integration is to promote seamless urban travel by overcoming the barriers imposed by the presence of multiple tariffs and tickets of a non-integrated and multimodal public transportation. It is expected to result in increased patronage in public transportation. Nevertheless, fare integration cannot bring any significant change in ridership and attractiveness of public transportation when implemented as standalone instrument. But rather it must be supplemented by other public transportation integration instruments. The tasks of developing a fare structure and integrated tickets for the whole urban region and acceptable by all actors is not an easy one. Nor are the tasks of fare collection of integrated public transport trips and distribution of the collected revenue from integrated trips among the participating public transport operators. Decision on the fare payment media and technology required to use the media (that is payment and ticket validation system) must be arrived on the basis of local contexts and previous experiences in the fare payments and validations.

There are a number of options for phasing fare integration process. It will be advisable to start fare integration at the route and mode level, then gradually advance to integration at the network level, then move to tariff unions and ultimately reach full fare integration of all modes providing services in the city and the metropolitan region. The planning, implementation and management of fare integration requires the setting up of an appropriate institution and there are different models of management of an integrated public transport system. To that end municipal, regional and national governments and urban transport institutions have to play a lead role. The public sector has to provide subsidies and other financial incentives to compensate for losses (such as harmonization and check-trough losses) incurred due to fare integration.

Fare integration, as the preceding analysis shows, is a complex process and the magnitude of the task of fare integration becomes more complicated in cities where there are thousands of providers of public transportation and where there are multiple tariff systems. There are also challenges that are related to the decision making process on the elements of fare integration (See Figure 4.1). Hence cities have to make decision regarding fare structures and pricing, fare collection and control of fare payment and fare revenue allocation strategies. Decision has also to be made on the question of as to whether to provide special and discounted fares for some disadvantaged or underprivileged social groups. Choices of fare collection media (prepaid tickets and season passes) and fare ticket validation technology on boarding public transport

vehicles and on entering major stations and interchange facilities should be contingent upon infrastructure available, experiences in fare collection and ticketing media.

However desirable it is, the major African cities' urban public transport system that is characterized by the presence of thousands of single operators and various public transport modes, virtual absence of high capacity mass transit and various mode specific tariff systems will complicate the process. The introduction of fare integration admittedly is difficult task. Moreover, it is beyond the administrative and technical capacity of these cities to develop a framework for the integration of the paratransit sector and there is no successful paratransit fare integration experience to learn from. It would also be too early to think of applying advanced technologies for tickets and ticket validation. Ticket validation can be done manually on boarding on buses and trains and on entering major stations. The example of the tube stations of Curitiba could be taken as a good example where preboarding payment and ticket processing reduces the time wasted selling tickets at each station while the vehicle is standing as is the case of Anbessa city buses in Addis Ababa (or longer dwell times). Although the long-term vision should be to reach fully integrated fare system in the cities and their metropolitan areas, it is necessary for major African cities to start fare integration in a phased manner. It would be then recommendable to start fare integration with publicly owned large operators. Fare integration can also include the large and well-organized private operator. Decisions have to be made regarding fare structure and fare pricing. It would be advantageous to adopt simple flat fare system for its simplicity in implementation, monitoring and controlling. Once the integration process has been agreed, then revenue allocation methods among the participating operators have to be agreed upon. The fewer the operators, the easier it is. It is recommendable to base revenue allocation on the basis of performance and quality of service provided by each operator. Cities that have a relatively strong presence of publicly owned public transport services can start fare integration on routes operated by the governmentally owned enterprises. If there are different modes such as rail and big buses and there are problems of working together (such as differentiated fare pricing and quality of services) between these publicly owned service providers, then fare integration can be implemented initially on the routes operated by each mode. Transport authorities should intervene to facilitate fare integration process. However, network and physical integration that ensure systematic arrangement of routes and smooth transfer between modes should precede fare integration. Integrated fare system for regional public transportation in the metropolitan areas needs the active involvement of the different local governments that benefit from the services and the operators. Common agreement

between the local governments and operators should be reached on issues like infrastructure development, financial grants, contributions, quality and frequency of service. Political commitment, provision of financial incentives, active role of transport institutions and articulated transport visions are key preconditions for the success of fare integration. Certainly, appropriate urban transport institutions that bring together the needs of the local governments, transport authorities and public transport providers are also critical instruments that ensure success of integration tasks. These institutions, however, are missing or just evolving in many African cities.

4.3.3 Other forms of integration

Although physical and fare integration are the commonest type of public transport integration, other forms of integration are also available. Modal integration, information integration, service integration, institutional and operational integration are usually mentioned in the literature on public transport integration. Of particular importance in institutional integration is the different models of institutional arrangements for planning, coordinating and managing urban transport and public transport. Good examples of urban transport institutions are also mentioned in the literature. Here the works of Costa (1996), Groenewald (2003) and Meakin (2002) on urban transport institutions are quite interesting. Strong and autonomous metropolitan transport authorities that interactively work in closer cooperation with all stakeholders play a fundamental role in ensuring desired service standards and achieving higher levels of integration (Rivasplata, 2003). There are good examples of urban and public transport institutions. These studies could offer some lessons for African cities aspiring to build strong and viable urban transport institutions.

Miller (2004) distinguishes three types of service integration; route, schedule and fare payment integration. Service integration increases the performances of public transport by facilitating transfers, increasing public transport ridership, providing travel time savings, reducing operational costs and enhancing customer conveniences. Wright and Hook (2007) emphasize the importance of service integration of a public transport system that is characterized by trunk-feeder structure in which the trunk line (line haul) using higher capacity vehicles provides public transport along main corridors and feeder lines provide services in lower density areas and use smaller vehicles.

Information integration offers current data on route, fare and time table. It provides real time information on arrivals and delays and helps in planning individual trips given a set of trip origins and destinations. Miller (2004) defines schedule integration as the “coordination and synchronization” of arrivals and departures involving various modal and operators arrangements whose objective is to facilitate the smooth flow of passengers. Shrivastava and O’Mahony (2009) also underline the need for modal coordination through two components of operational integration: development of feeder routes and schedule coordination. Effective operational integration, as Priemus and Konings (2001) point out, requires harmonization of the multimodal trip chaining that is provided by various public and private operators. There is harmonization between feeder and interconnecting networks (vertical interconnectivity) and mutual connections of networks at the same level (horizontal connectivity).

Parti and Katoch (2009) indicate that physical, operational and institutional integration are elements of transport system integration which jointly increase the performance of public transport system. Of the three levels of integration as mentioned by Givoni and Rietveld (2010), two of them explicitly relate to operational and institutional levels. Thus while operational level involves the coordination of time tables and through ticketing and the like, the highest level of integration at institutional level involves the integration between service operators and authorities responsible for contracting, regulating and influencing land use decision around stations. Operational integration is a broad integration concept that has many applications. It is about the coordination of routes, itineraries and frequencies, information provisions and efficiency enhancing measures for public transport. Operational integration is multifaceted (Parti et al., 2009) and it basically

Involves the application of management techniques to optimize the allocation of transit resources and co-ordinate services. The techniques of operational integration include: rationalization of redundant services, matching modes to service requirements, unification of fare structure, fare discounts, coordinated public information systems, reserved bus lanes and streets, development of feeder routes, development of coordinated schedules and parking controls etc. Development of feeder routes and schedule co-ordination for feeder services is the most important aspect of operational integration. (p. 281)

Institutional integration provides the platform for public sector productive engagement with the multiple public transport operators. It “...refers to the creation of an organizational framework

within which joint planning and operation of transit services can be carried out” (Parti et al., 2009, p. 281).

There are various models of organization of urban transport institutions. In the context of institutional arrangements, Costa (1996) discusses the organization forms of urban public transportation of West European cities. The organizational classification of public transport focuses on two features: service coordination and competition between operators. Four organization models are identified. The first is organizational form on the basis of modal services or modes that includes bus and rail services in urban and suburban regions. The second is authority and operator model in which the authority is responsible for defining the areas of responsibility, setting fare recovery ratio and the parameter for evaluation of the operator. The operator is responsible for vehicle operation and maintenance, service and planning the operation and labor force management. This is the case in Lyon in which SYTRAL is the authority and TCL is the operator. The third form is the existence of a policy setting authority and numerous operators of public transport but with integrated fare system. Service are awarded through tendering process. The fourth model is deregulation in which there is competition and authority intervenes to set safety standards and other institutional regulations. Having compared these four organizational forms of public transportation in terms of market structure (sellers, buyers and integration), market conduct (management and pricing), and market performance (efficiency and technological innovations), Costa (1996) concludes by indicating that emerging organizational models favor competition with service coordination.

Groenewald (2003) explores the models of transportation authorities and institutions but focusing on South Africa. Various forms of institutions are described. In the USA, they are known as the Metropolitan Planning Organizations which are multifunctional bodies that operate as planning and decision making bodies for roads, public transport, safety, traffic congestion and inter-modal transport matters. In Singapore, public transport, transport infrastructure, financing and pricing of roads, traffic safety, traffic management, road protection and other regulatory functions are managed by single authority: the Singapore Land transport Authority. In Germany as so do in Austria and Switzerland, it is the *Verkehrsbund*. So does the transport department at the city level in the Netherlands. In France, it is the “*Syndicat des Transport Parisiens*” (STP) and *Communautés Urbaine* (a cooperation among municipal governments in conurbations) for provincial France and other French cities which form the public transport authority. This is also true in Sweden, Italy and Denmark. In many European

cities unlike the USA, public transport is managed separately from road function. In some European countries, service ownership and service operation are separate entities. Groenewald (2003) generally distinguishes four models of urban transport institutions. (1) Passenger transport authority that is separated from local government authorities and focus only on public transport function and its spatial boundary could extend beyond the municipal boundary. Example could be found in the UK, Germany and France. (2) Metropolitan transport authorities have all the entire transport function including public transport and their jurisdiction is limited to municipal boundaries. Examples are Amsterdam, Italian municipalities, Swedish counties. (3) Integrated transport planning organizations are planning and decision making bodies that have all the representatives of various government institutions. Example include USA, Canada and Paris transport models. (4) Integrated land transport authorities having the planning, decision making and executing responsibilities and their domain include public transport and road function, traffic control, law enforcement and other regulatory tasks as in Singapore. The writer investigates the two options of establishment of transport institution whose authority could overlap with local government boundary or could extend beyond the local government boundary to include many local governments. In the second case, it may complicate the management as this regional unit does not have a political entity (regional planning problem). He then concludes by questioning as to whether transport authority's jurisdiction should include road or focus on transport or both and whether its authority's domain should overlap with municipal boundaries or not. Similarly Meakin (2002) investigates the various types of transport authorities found around the globe and mentions some good examples. In addition to the institutions and arrangements explained above, Meakin also mentions Hong Kong, Singapore, Bangkok, Transmilénio of Bogotá, and URBS (Urbanização de Curitiba) as good examples of governmentally administered public transport. The Verkhersverbund in German speaking countries and Communauté Urbaine in France are cited as successful examples of institutional arrangements for integration of fares and schedules at a regional level (Priemus and Konings, 2001).

Institutions are key instruments of public transport integration and there are various models of urban transport institutions. The main criteria for different institutional arrangements are whether to amalgamate various functions of urban transport under one body or not, whether transport authority's jurisdiction should overlap with local government boundary or not and determining the role of government in public transport service coordination under competitive public transport market. The organizational forms and functions of urban transport institutions

will, therefore, be dependent upon the decisions to separate or merge public transport and road functions, integrate land use and transport planning functions under one authority or not and define the boundary of the jurisdiction of the transport authority. Moreover, decisions on public transport service forms, setting the jurisdiction and powers of the transport authorities and determining the role of the government in urban public transport market also affect the type and functions of urban transport institutions to be established. There are various options of urban transport institutions and African cities should choose the best institutional arrangements that fits their local conditions. Most of these cities face shortage of skilled manpower and this creates impediments for the success of transport authorities. In the absence of mutual understanding of the issue, long term strategic framework, real decentralization of authority and political commitment, integrating public transport and road functions under one authority, though ideal, could be difficult to maintain. Thus at least, African cities should strive to develop framework that facilitate integration between transport and land use planning functions so that transport and land use development can go side by side. Neighbouring local governments should work together in order to address cross boundary transport problems and develop common transport and financing strategy. The French and German cases of common provisions of public transport services, urban and regional public transportation planning, managing and financing are good examples on the benefits of greater cooperation between local governments and between public and private public transport operators. It is generally recommendable, as Meakin (2002) highlights, that transport authorities in cities in developing countries should be organized to manage public funds for investment and subsidy distribution, plan and manage intermodal transport with full fare and service integration and have sufficient institutional capacity with qualified staff, sound legal basis and finance to manage metropolitan level functions. The existing urban transport institutions should be strengthened through capacity building, reducing technical staff turnover, offering better working environment and pay for technical staff. Higher educational institutions in Africa could contribute in this process by developing transport curricula that best addresses African transport contexts, promote research on transport solutions relevant to African cities and provide the platform for dialogue among the academia, the practitioners, planners and the public.

4.4 Public transportation integration with urban planning and development

The notion of integration of transport measures with land use planning policies in which the transport impact of land use development (through changes in travel characteristics) and the land use impact of transport development (through changes in accessibility and mobility) should be investigated in holistic manner is discussed in the literature on transport, land use planning and integration (Meyer and Miller, 2001, Potter and Skinner, 2002, Preston, 2010 & Hull, 2005). The aim here is not to open a wider academic debate on transport and land use integration but rather to indicate the importance of integration of public transport and urban development. There is a consensus on the importance of public transportation as the sustainable mode of motorized mobility relative to individual motorized mobility. It is within this framework that public transport is gaining growing acceptance as one of the means to achieving sustainable urban development. Sustainable urban development strategy is of vital importance in developing cities because here for many urban dwellers public transport is the single most important mode of motorized mobility. Sustainable development concept has its origin from the UN conference on environment and development known as the “Earth summit” of Rio de Janeiro in 1992 and was further developed by the World summit on sustainable development held in Johannesburg in 2002. From the earth summit of 1992 emerged Agenda 21. It has chapters on “promoting sustainable human settlement development” and “protection of the atmosphere”. It is argued that lack of adequate transport infrastructure and affordable transportation services have increased poverty and social exclusion particularly in the cities of the Developing World. The growth and development of cities on sustainable urban development pattern thus requires the linking of road infrastructure improvement with enhanced public transport and non-motorized transport facilities which will shift the modal share in favor of these two sustainable modes (UN-HABITAT, 2010).

Black (2000), Steg and Gifford (2005) and Richardson as cited in Han (2010, p. 320) define sustainability in transport as “...satisfying the need of transport resources for the current generation without jeopardizing the availability of resources to satisfy the need of transport for future generations”. Moreover in addition to this classical conception of sustainability, the new dimension of reducing greenhouse gas emission (GHG) to the level that will not trigger climatic changes is gaining momentum in the discussion on sustainable development pattern (Han,

2010). Banister (2008) discusses the concept of sustainable mobility, sustainable city and urban form. He points out two fundamental principles in transportation planning practices: firstly, travel is a derived demand and secondly, people minimize their cost of travel through savings in the cost of travel and time taken for travel. Such objectives have led to increase in speed and the ability to cover longer distances in shorter time periods. The increased speed of travel has outweighed the increased cost of travel. Car has become more attractive in comparison to cycling and walking. This process has in turn increased car dependence, increased decentralization of cities and urban sprawl. Such “transport-led future” needs to be contained by a new paradigm of sustainable mobility. On the basis of empirical evidences, Banister (2008) defines the features of the sustainable city with

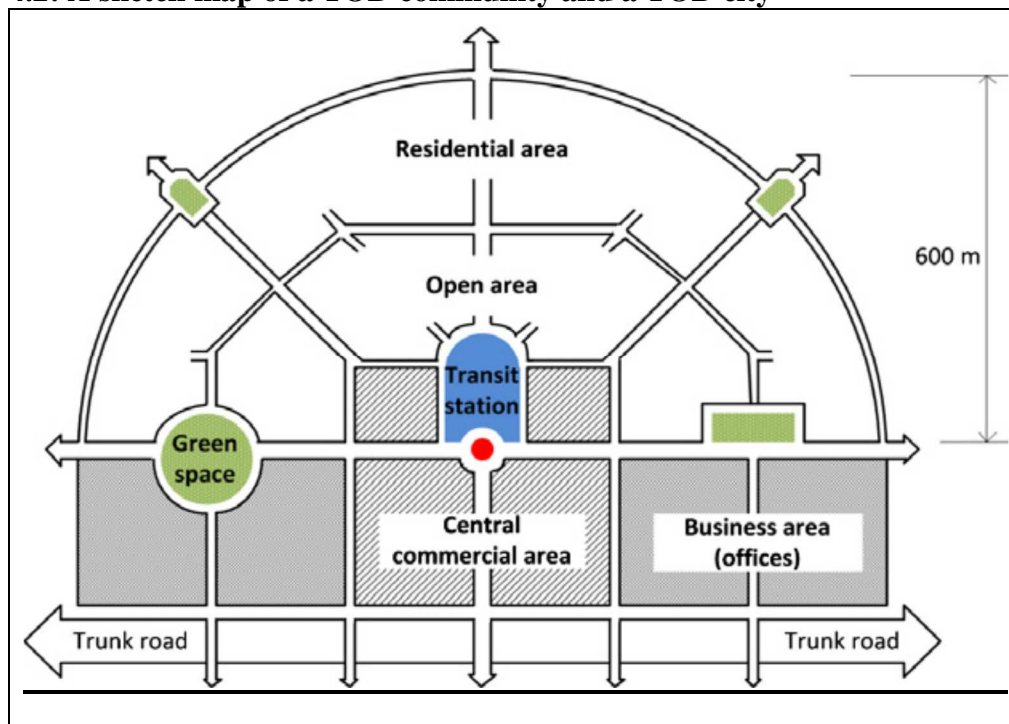
Population over 25,000 (preferably over 50,000, with medium densities (over 40 persons per hectare), with mixed use developments, and with preference given to developments in public transport accessible corridors and near to highly public transport accessible interchanges (Banister, 2005, 2006) (p.73).

This system of urban settlements will be linked together to form an agglomeration of a hierarchically arranged polycentric cities. The settlement structure ensures proximity and greater degree of accessibility to basic and higher ranges of goods and services. The urban form will keep trip lengths shorter, promote walking, give preferential treatment of public transport and reduce car dependency. Moreover, this ideal urban form should be complemented by sustainable mobility approach which reduces the need to travel (fewer trips), reduce trip lengths, encourage modal shift in favor of sustainable modes and encourage greater efficiency in transport systems. Szymanska (2007) also emphasizes the importance of sustainable mobility that is strongly centered at improving public transport, integrating urban planning and transport and favoring non-motorized modes. The implementation of sustainable mobility requires the active collaboration of key stakeholders as reduction of car dependency and sustainable mobility for future sustainable cities needs wider public acceptance.

The concept of transit oriented development (TOD) is also emerging as an important tool in enhancing sustainable urban transport through integrating public transport and land use. TOD was originally conceived by an American architect and planner Calthrope, P. in 1993. TOD was initially developed to reduce the negative impacts of rapid motorization and car use through improving public transportation systems and encouraging transit oriented urban development. It was an American innovation that later spread to other countries (Mua and de Jong, 2012).

Morris (2002) characterize transit oriented development as cluster of housing, commercial and office surrounding a commuter rail station or intersection of many bus routes (See also Figure 4.2). TOD combines high density housing with shops, work places and transit access and has high density around stations. The density generally declines as one moves away from the center. Its supportive goals are “enhancing neighborhood livability, reducing automobile dependence and supporting transit through development” (Morris, 2002, p. 3). TOD discourages urban sprawl and promotes pedestrian friendly high density and yet compact urban development combining housing, employment, commercial activities and public services around public transport stations (Knowles, 2012, Oлару, Smith and Taplin, 2011, & Sung, 2011).

Figure 4.2: A sketch map of a TOD community and a TOD city



Source: Jiang and Han (2009) as cited Mua and de Jong, 2012.

The implementation of TOD requires a combination of factors and on the basis of literature evidence, Mua and de Jong (2012) highlights that

Urban design (including architecture aesthetics, public space and pedestrian friendliness), governance (including transport service coordination and pro-active town planning), land use (including factors such as density and diversity), strategies on restricting automobile use (for instance, congestion pricing and parking restriction),

transit service quality and management of the real estate market rank high as essential TOD preconditions.(p. 236).

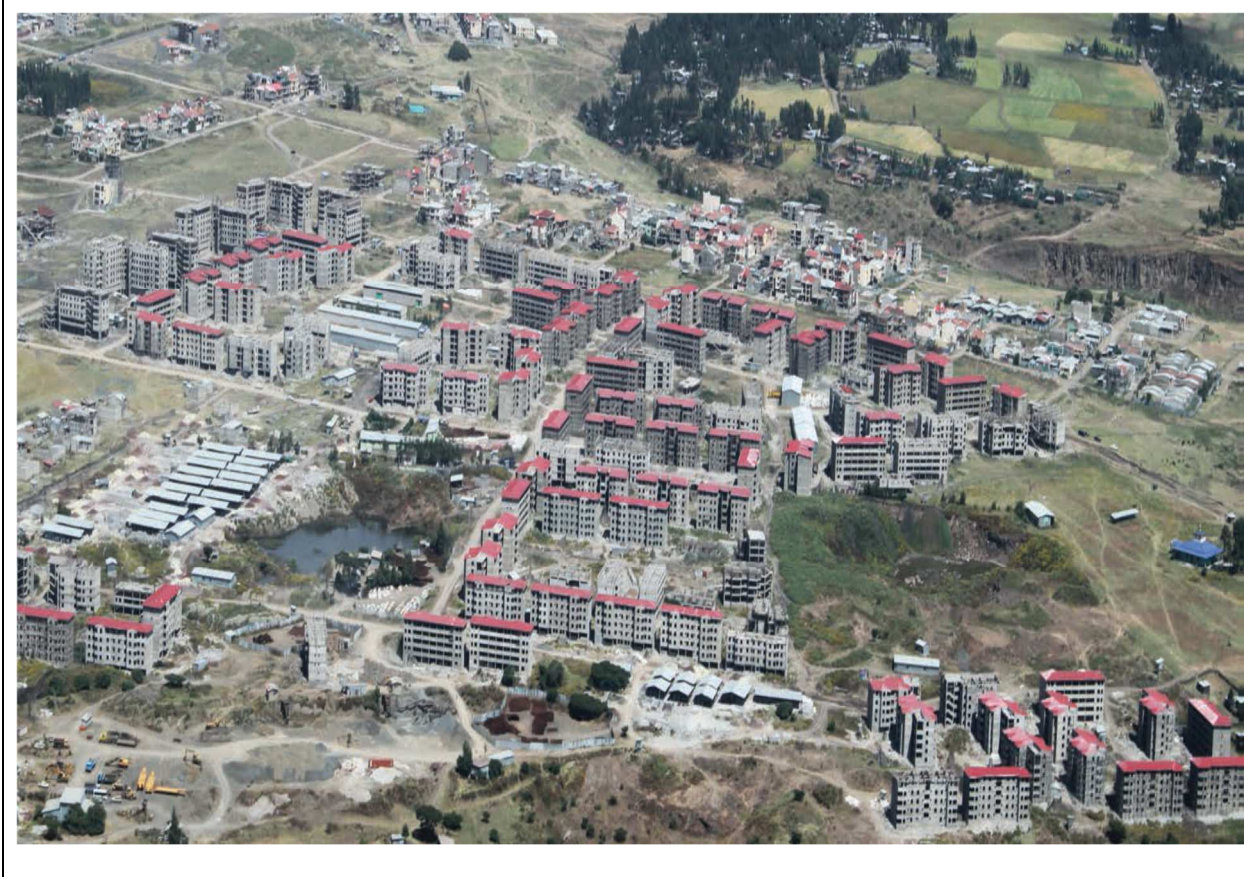
The literature provides many successful examples of TOD strategies that have been implemented in many cities (Mua and de Jong, 2012). In this regard, the famous finger plan (Egnsplan) of Copenhagen dating back to 1947 and the Latin America's BRT system notably that of Curitiba are some best TOD examples (Wright, 2001, Menckhoff, 2005, International Association of Public Transport, 2009, & Knowles, 2012).

Land use and transport integration is also at the core of the "network city" concept of Curtis (2008) that was conceived in 2003 and was applied to develop the 25 years urban development strategy for the city of Perth in Australia. The "network city" concept has more regional dimension and also includes freight transport, issues that are not addressed by TOD. The network city envisages the reorientation of urban development along most accessible locations in order to effectively utilize public and private transport systems and promote the shift away from the "predict and provide" approaches in transport planning. Curtis advocates the notion of "sustainable accessibility" by giving more emphasis to accessibility rather than mobility and stresses the need for changes in the planning practices. Three strategies are considered important: public transport planning and city development changes to go side by side, road network planning and road design to take land use-transport integration as main objective instead of traffic efficiency and phased development in accordance with future population and employment forecasts. The "network city strategy" aims at developing an interdependent system of sub centers, the so called "decentralized concentration", that are linked by high quality public transport system. The network city strategy is guided by principle of integration of land use transport. The polycentric type of urban development has three structures: activity corridors (at main arterials or suburban railway line), activity centers (to be located at intervals along the activity corridor) and transport corridors (for inter-urban travel in metropolitan context. Three necessary conditions for the successful implementation of the network city are mentioned and these are: a strong regional planning system, an institutional setting that is focused at the integration of transport and land use at state level and a stakeholder participation at the regional level for the formulation of an all-inclusive regional development strategy (Curtis, 2008).

The integration of transport planning and land use development has been widely advocated. There is no doubt on its importance, though the methods and tools required for an integrative

approach could be difficult to implement in the emerging African cities. As these instruments have been developed and used in developed cities, adoption of these instruments in the Africa context poses a real challenge for African transport and land use planners. The application of these unabridged Western Cities models in African cities has been widely criticized. African transport and land use planners should strive more to develop models that best suit and address African cities. African cities indeed with their high dependency on public transport and non-motorized mode, the pursuit of public transport based urban land use development is a laudable and sustainable urban development strategy. The network city strategy and transit oriented development approach are illustrative of this path of urban development. Both strategies in sum capitalize on public transport networks to promote mixed, high density and polycentric pattern of urban development. African cities could draw some lessons from these approaches. Developing new large scale dormitory urban settlements at the edge of cities and far away from existing public transport corridors is unsustainable. Most public housing programs in Addis Ababa are examples of such undesirable urban expansion (see Figure 4.3). The new settlements located at the fringe of the city hardly provide job opportunities and have poor access to public transport. They generate peaked and long trips as people commit to city center for jobs and services. Most of the new residents will face the problems of long trips and high transport costs. As most of the new residents are already low income groups, such pattern of urban development will increase poverty and residential segregation. This in turn will limit the mobility of people and enhances social exclusion. It thus is necessary to provide feeder public transport services that will link with main LRT corridors. However, the peaked nature of these trips requires government subsidy to offset for low passenger volumes outside the morning and evening peak hours.

Figure 4.3: Example of public mass housing project at city periphery in Addis Ababa



Source: Ethiopian Reporter, 2015b

Generally, African cities should be careful in making future urban development decisions. They should promote major urban development along existing and anticipated main public transport corridors and terminals. Moreover, they should include the criteria of availability of public transport service now or in the future as mandatory requirement in making major urban development decisions. Of course, this depends on the availability of political commitment, public transport master plan and capable and innovative urban transport and planning institutions to guide the city's development.

4.5 Case studies in integration

The provision of integrated public transport services is not a recent phenomenon and it has been practiced in many cities for over half a century now. The initial process of public transport integration started in some European cities and later diffused to other non-European cities. The implementation of public transport integration programs is not an easy task and the

investigation of the practice in cities that were successful in public transport integration will enable one to draw some lessons on the process of public transport integration. Much can be learnt from these examples on question pertaining to how integration was launched, who initiated it, which institutions and what processes were involved, which public transport modes were involved and which actor played the lead role, which public transport mode(s) formed the backbone of integration, how was fare pricing, fare collection and fare revenue distribution conducted, what was the institutional set up of the integration, what was the role of the government and how was the wider integration between public transportation and urban planning achieved.

Case study cities were taken from Europe and Latin America and some examples from Asia and Africa have been included for the case study. The case study cities are the cities of Paris and Hamburg from Europe, Singapore from Asia, Curitiba and Sao Paulo from Latin America and Cape Town and Lagos from Africa. In the reviewed cities, the rail mode is the backbone for the integration in European and Asian cities and so does the bus rapid transit in Latin American cities. Africa has little experience on public transport integration and here integration of the paratransit and many independent private operators with the bus system or evolving new rail mode is likely to be a major difficulty in the integration process.

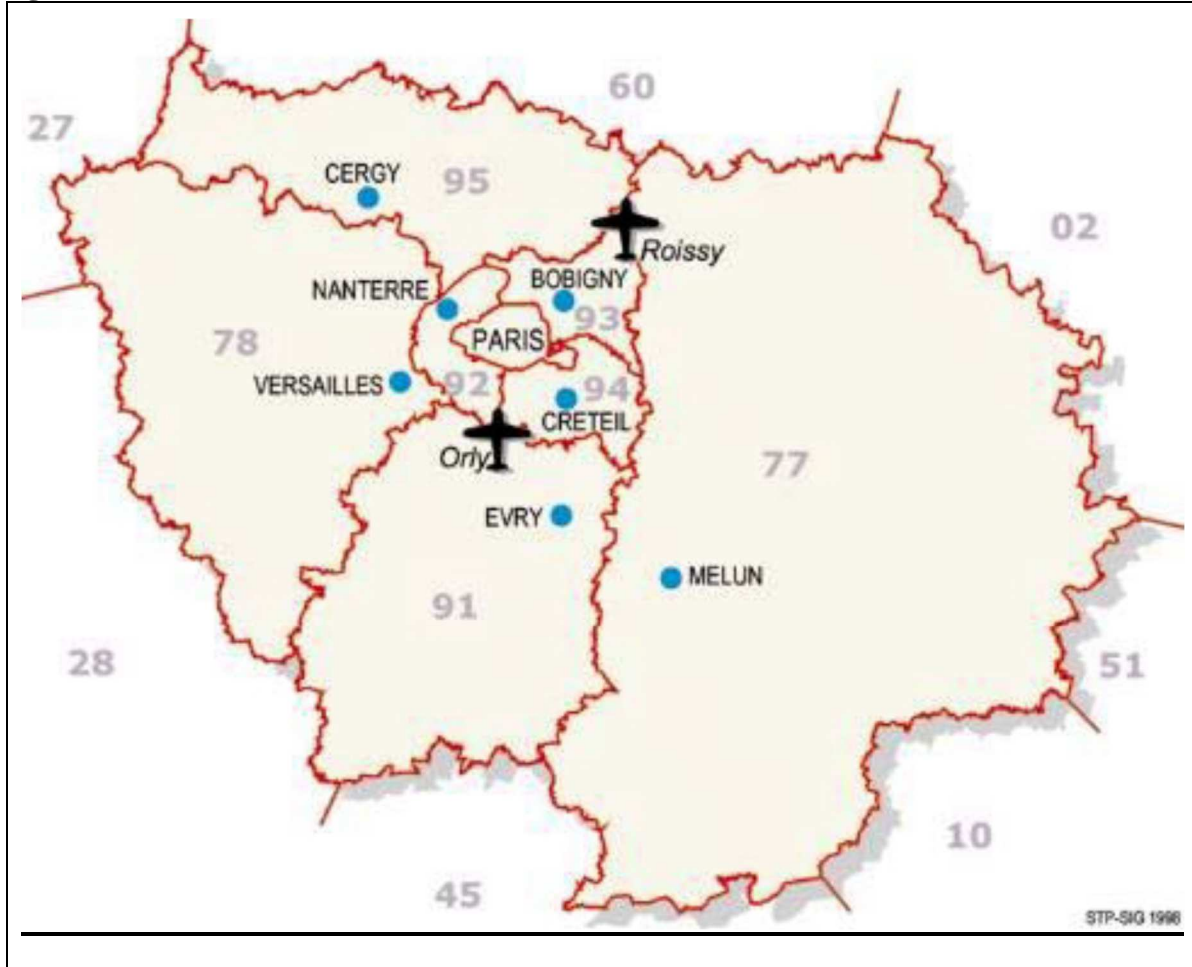
4.5.1 Europe

The case studies are Paris and Hamburg from Europe. The review draws from NEA et al. (2003) and the original work on Verkhersverbund by Pucher and Kurth (1995).

4.5.1.1 Paris

The STIF was established in 1959 and provides an integrated transport system for Ile-de-France. It includes Paris and the surrounding region with an area of 12,000 km² (See Figure 4.4) and estimated to be one of the largest integrated public transport system with more than 80 participating companies. It is mentioned as a good example of a public transport network with a high level of integration on a wide territory and with a large number of transport operating companies.

Figure 4.4: Ile de France



Source: NEA et al, 2003

The process of integration, an integration process inspired by the objective of increasing the attractiveness of the public transport system, started in 1948 with a law that enabled the establishment of the

Office Regional des Transports Parisiens (ORTP), a public agency bringing together the national government and the counties and responsible for the coordination of transport systems, and RATP, the state-owned company in charge of operating public transport in the Paris urban area (merger of the former company responsible for metro CMP, and of the company responsible for bus services STCRP) (NEA et al., 2003, p. 7).

The establishment of STIF in 1959 was a milestone in the integration process. It was given the authority to coordinate public transportation in accordance with the law that was approved in 1949. The introduction of the transport tax law (“Versement de transport) in 1971 enabled the collection of taxes from organization employing more than 9 employees. This law applies to

other French towns and is used to fund public transport. Introduction of the zonal monthly pass of Carte Orange in 1975 that was valid for all modes and enable unlimited number of trips was another important landmark in the integration process. The Carte Orange has been improved to include also weekly passes in 1982 and daily passes in 1985. In 1991, the SIIF area of operation was made to extend outside the Paris urban area into the administrative territory of Ile-de-France.

The STIF oversees the overall integration tasks, provides fare compensation for operators for the integrated fare system and fare subsidy for special category of passengers. Basically,

The organisation of all public transport networks of the Paris-Ile de France region is a responsibility of Syndicat des Transports d'Ile-de-France (STIF), which is a public body bringing together the French government, the regional council and the eight “départements” (counties) making up the region (including the city of Paris, which is both a municipality and a county). Transport services are operated by more than 80 companies chosen and authorised by STIF, two of them public monopolies (RATP and SNCF), the other ones private companies (NEA et al., 2003, p.2).

The STIF provides the participating companies with subsidies and also fix the fare level. These companies have endless rights for the operation of their services. STIF is linked to Régie Autonome des Transports Parisiens (RATP) and Société Nationale des Chemins de Fer Français (SNCF) through service contracts, which define the quantity and quality of services which the two companies have to provide and the public funds which they will be granted by STIF in exchange for that service.

Three public transport operators are found in the region: the state owned Régie Autonome des Transports Parisiens (RATP) which was established in 1948 with Metro, heavy rail, tramway and bus services, the rail network for suburban and regional service owned by Société Nationale des Chemins de Fer Français (SNCF) and the OPTILE federation with 80 private bus companies operating in the outer rings of the suburbs. The STIF manages the public transport in Ile de France. Such responsibility of STIF also includes involvement in the planning of services, setting fare policy, financial management, coordination of services and conducting planning studies. The top management of STIF is made up of board of directors that include thirty four (34). It is composed of representatives from the national government (17), the Ile de France -

Paris region (5), the city of Paris (5) and other counties (7). The national government plays an important role in the public transport system as the

(1) The government has the majority in STIF's board of directors, (2) the government is the shareholder of the two main transport companies (RATP and SNCF), (3) it contributes half of the total public subsidies granted to STIF and (4) it is still responsible for the definition of the urban mobility plan for the Ile-de-France region. The ministries of transport and finance are more especially involved. The regional department of the ministry of transport is also a very close partner of STIF, since it prepares the urban mobility plan for the region." (NEA et al., 2003, p. 4).

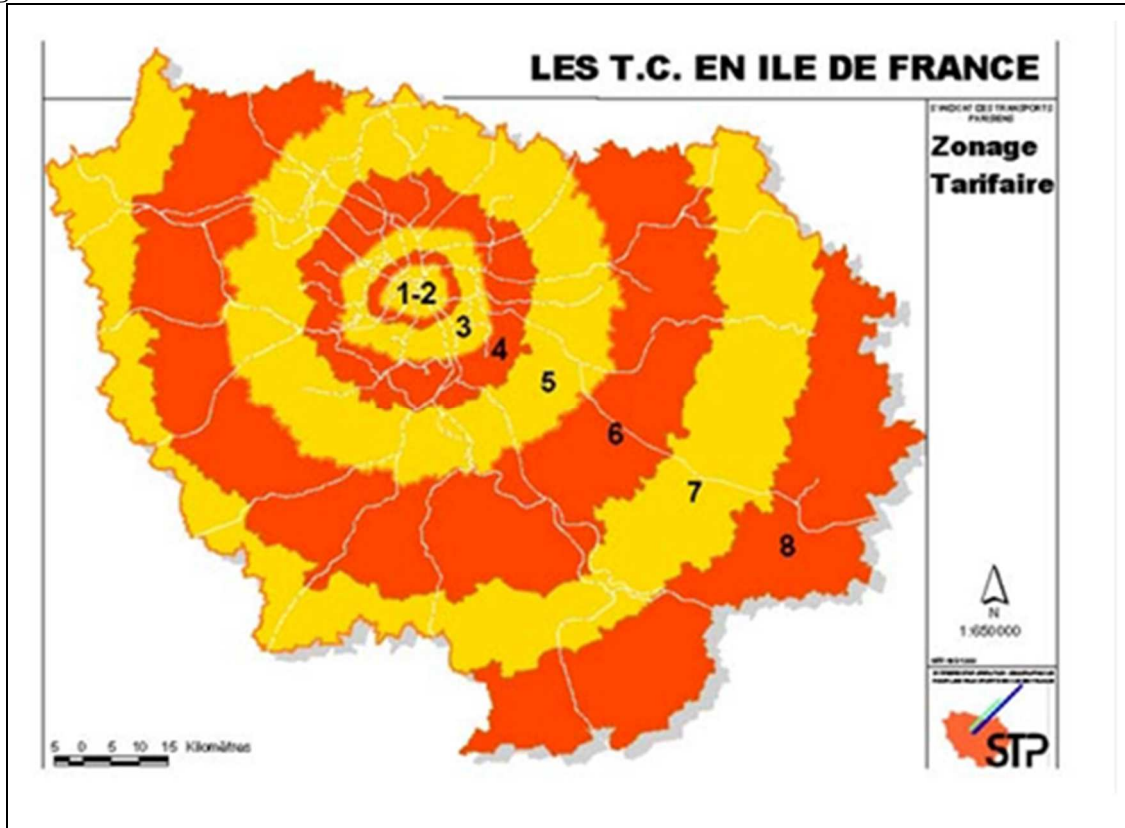
This arrangement have changed as the central government that was elected in 2002 decided to withdraw from STIF in 2005 and leave the matter to the local government as a package of decentralization measures. In addition counties within the region are responsible for the regional master plan including transport infrastructure and urban development, granting of subsidies for operating companies and special care for handicapped and students. The municipalities are not member of the STIF and they have the authority for local development, street management, parking polices and granting of subsidies for public transport operators in their own jurisdiction.

In respect to fare integration and fare structure, it is worth noting that the season passes (daily, weekly, monthly, yearly, student passes) are fully integrated tickets and can be used in all the public transport modes for the zones they are valid. However, the single tickets are not integrated and allows interchange only between heavy rail and metro and between metro. Such ticket do not entitle to use a bus after metro or change buses with the same ticket. The fare structure is based on the division of the Ile de France into 8 (See also Figure 4.5) concentric zones with different types of tickets (single, 10-ticket book, daily, weekly, monthly, yearly passes students included) and with corresponding prices depending on the zones. Paris center includes zones 1 to 2 and whole region is subdivided into 8 zones. The prices generally fall as the period of duration of the pass increases and therefore single tickets and yearly passes are the most expensive and cheapest respectively.

The process of integration has developed progressively since 1949. The integration process has been comprehensive and included physical interchanges and physical integration, fare integration, facilitated intermodal connections, tickets (electronic contactless Navigo smartcard

yearly passes since 2001), public transport integration with town planning, facilitated physical connection between different regions and part of Paris, information integration about trips and integration with other modes through measures like P&R, B&R.

Figure 4.5: The Zones of Ile de France



Source: NEA et al., 2003

The public authorities, particularly the national government, have played the key roles for the success of public transport integration and integration with land use and other modes. The outcome of integration has been the steady increase in public transport patronage since 1973 with exception of decline in the period between 1995 and 1998. The increase in public transport ridership was attributed to increase in the supply of public transport service, improvement in service integration which enabled passengers to use different modes with no penalty of transfer and increased trips on public transport due to modal shift from walking and bicycling for short distances as the result of season passes which offered unlimited trips for no additional payments. Integrated information is not available as each company (80) provides information in its own.

There are a number of lessons that could be drawn from the process of integration of public transport in Ile de France.

- Firstly, an enabling legislation and a legal framework that laid the framework for the establishment of a public body for the coordination of public transportation in the urban and suburban regions is a key factor facilitating integration.
- Secondly, the greater authority and involvement of the public body (STIF) in terms of investment, fare policy decision, financing and planning ensured success in integration.
- Thirdly, the particular institutional setting enabled the closer integration of public transport with land use early in the planning phase. At the planning stage, the long term “regional master plan (“schema directeur”) prepared by the regional council together with regional agency of the ministry of transport ensures that future urban developments have good access to public transport.
- Fourthly, the presence of many public and private operators is the driving factor for fare and ticket integration. In this example, there were numerous private operators (80 companies) and public ones (RATP and SNCF) which required the provision of integrated services, fares and tickets for passengers.
- Fifthly, innovative financing decisions play a positive and key role for funding the public transport sector. This is the case of “Versement de transport” law which gave the public transport bodies the authority to collect transport taxes from employers.
- Finally, integration as a process extends over number of years progressing from the simplest to the more complex integration forms.

4.5.1.2 Hamburg

The origin of the Verkhersverbund model of urban and regional public transportation is closely associated with the need to provide a coordinated regional transportation for a metropolitan region in light of rapid suburbanization and rising car ownership. It is a model for the coordination of public transport services and fares for all modes and in all parts of the metropolitan region. The Verkhersverbund model of regional public transportation has been successful in improving the quality of public transport and increasing ridership above the pre-Verkhersverbund levels. The ingredients of the success were attractive fares, service expansion in the suburban regions, increased quality in services and marketing promotions. The

Verkhersverbund model for the provision of coordinated urban and regional public transportation initially started in 1967 in Hamburg. The Verbund model has later spread to other German cities as well as to other cities outside of Germany notably to Austria and Switzerland. Prior to the establishment of the Verbund, the public transport in Hamburg was very much disorganized and provided by different public and private operators. It was characterized by poor coordination of routes, fare and time tables, transferring between modes and lines was inconvenient and expensive and many tickets were needed to complete journeys. The low and declining quality of public transport in addition together with rising car ownership, urban sprawl and demographic factors had resulted in decline in public transport ridership by 16% between 1956 and 1965. There was an increasing concern to contain this undesirable trend of declining public transport patronage and quality. In 1967 the regional governments, local governments in the Hamburg metropolitan region and public transport providers came together and established the Hamburgerverkehrsverbund (HVV). Organizationally, the HVV was made up of the representatives from the state government, the local governments and public transport firms. The representatives participate in the decision making process of the HVV. The HVV is

A special transport body that fully coordinates public transportation services in the region while preserving the individual identities of the component firms, which are still responsible for actually supplying the services (Pucher and Kurth, 1995, p. 280).

The HVV makes overall decisions on the planning, operation and management of public transport in the Verbund region (Hamburg region), although individual operators have the freedom to define the type of service they offer, decide on technical and administrative matters related to day-to-day operations and increase efficiency of service as that is the criteria for determining the amount of subsidy they get from the Verkhersverbund. Therefore, the main decisions on the planning and marketing of public transport services in the Verbund region, routes design, fare structure, service frequencies and time tables, revenue distribution and subsidy grants are made by the HVV. The Verkhersverbund is a simplified system of public transportation characterized by “one integrated route network, one coordinated time table and one unified fare structure and ticketing system for the entire metropolitan region” (p. 280). Although the verbund has one objective of coordinated and integrated services and fare structure, the roles of different tiers of government and the systems of revenue and cost accounting varies from country to country where the Verkhersverbund model has been applied.

Generally in the Verkhersverbund system of German, Swiss and Austrian cities, the rail system forms the backbone of the public transport system and diesel buses, trolley and van services provide feeder and distribution services. The service is supported by use of information technology, provision of priority for public transport vehicles at signalized intersections, improvement of inter-modal and inter-route connection and provision of park-and-ride and bike-and-ride facilities at terminals and stations. Bus stations have been improved and modernized. All these measures have contributed to improvement in service quality and intermodal coordination. The other salient features of the Verbund system is the unified fare structure from origin to destination and valid for all transport modes, the availability of seasoned tickets at far cheaper prices than the single one-way tickets. The Verbund, however, depends on a substantial amount of subsidy from the government which has been declining as the result of austerity measures. The system of distribution of subsidies and revenues among participating firms that is based on vehicle kilometers not on passenger kilometers has contributed to more financial difficulties as such system of revenue distribution does not provide an incentive for firms to maximize the efficiency of their service provisions. Moreover, the costly provision of public transport infrastructure in low density suburbs has augmented the operating costs. Faced with these financial difficulties, the Verkhersverbund has been forced to take austerity and efficiency enhancing measures that decrease costs through reducing workforce, increasing efficiency of public transport by transferring vehicles from lower occupancy and less productive to that of higher occupancy and more productive routes and freezing new expansion programs. Measures were also taken to increase productivity of buses and employees. Speed of buses and trams was increased through bus lanes, reserved right-of-way and priority at signalized intersection.

The Verkhersverbund provides high quality regional public transport service but is highly dependent on government financial support. It is then necessary to supplement the government financing of the public transport through other source like higher taxes, user charges and fees on automobile ownership and use. Some remarks can be made on the Verkhersverbund in general and Hamburgerverkehrsverbund in particular.

- Declining public transport ridership provided the impetus for the establishment of the Verkhersverbund and the state and local governments played a key role in the establishment of the Verkhersverbund. The government also provided a substantial amount of funding for financing investment and covering financial deficit of public transport operations.

- As a model of public private partnership, the Verkehrsverbund is managed by the representatives of local, state governments and public transport operators.
- Urban and regional public transport service in the Verkehrsverbund is provided by combination of public transport modes (both rail and road based) that is founded on well-coordinated trunk-feeder route system.
- Urban planning and transport are only integrated in the city of Hamburg but not in the whole Verbund region (NEA et al., 2003).
- Public transport integration has been accompanied by measures to increase speed of buses and trams. This has been achieved through construction of more bus lanes, a shift from shared to more reserved right-of-way for trams in street medians and priority for buses and trams at signalized intersection.
- Wide use of marketing strategies to increase ticket sales through use of discounted monthly tickets and monthly or annual pass for employees.

4.5.2 Asia: Singapore

In Asia, the city of Singapore is taken as case study. As an island state, the city has limitation of land for development and therefore have to maximize the use of this scarce resource through land development strategies that are closely linked with transport policies. Singapore has been very successful in restraining the use of private car and promoting the use of public transport and public transport guided urban development. The review is based on the work of Ibrahim (2003).

Singapore has been successfully promoting seamless travel through set of policy measures directed at improving public transport, limiting car use and promoting wider integration. The Land Transport Authority (LTA) is responsible for all transport related development in the city. The authority works in closer collaboration with other government agencies so as to ensure that the transport systems are planned and fully integrated with urban development. Singapore has an integrated system of public transportation: fare integration through electronic fare card, information integration through transit guide and traveler information system, network integration through centralized planning of public transport that avoids unnecessary competition and physical integration through better transfer facilities that enhances seamless travel. The city gives greater importance to integration of land use and transport planning and

intensive coordination of activities between the transport authority and other governmental agencies. Urban development in Singapore has been linked to higher quality and more attractive public transportation networks. Despite higher income per capita, Singapore is a classic example of city which has been able to curb the ownership and use of cars through a combination of ownership control measures and traffic management schemes. The process of improving public transport has been progressive and is likely to continue in the future. It will be supported by greater integration of land use and transport as well as more control on the use and ownership of car.

4.5.3 Latin America

The process of public transport integration in Latin American was mainly engineered by the Bus Rapid Transit system. Menckhoff (2005) describes the BRT system as Latin American invention which was exported to the developed north. It started in Curitiba in 1974, moved to Quito in 1995 and reached its highest development in Transmilénio of Bogota in 2000. It is now a worldwide phenomenon. Originally, the BRT was not an outcome of transport planning but rather an outcome of urban planning process that was directed at maximizing urban development along major corridors. There are a number of lessons that can be drawn from the BRT system of Latin America. Here two examples are taken: the world class BRT of Curitiba that was important in integrating transport and land use development and the Interligado of the city of Sao Paulo. The review is based on the Curitiba (n.d.) by unknown author and Hidalgo (2008) on Sao Paulo.

4.5.3.1 Curitiba

The BRT of Curitiba, Brazil known as RIT, was initially developed as an integral part of the master plan whose basic objectives included the radial expansion of the city along five corridors or the so called structural axes, integrating land use and transport and protecting the traditional city center. Transport and land use have been integrated through a system of controls and incentives. The BRT was launched in 1972 and started operation in 1974. The BRT system includes a trunk line that provides express service on busways, a direct service on adjacent one-way arterial-street and feeder bus lines on the arterial trunk operating in a mixed traffic condition. The bi-articulated five-door buses and tube stations allow off-vehicle fare collection and floor-level boarding. Bus speed reaches 20 KPH along bus way and 30 KPH on “direct” express route and buses carry up to 11,000 PPHD. About 70% of commuters use buses despite

high automobile ownership of 500 per 1000 in 1999. The system has an integrated fare system and public transport networks are physically integrated through integration terminal which allows convenient and fare-free transfer and on-street bus stops. The BRT has a hierarchy of integration terminals:

“Tube” stops, which equate to conventional bus stops and are located at spacing of about 450 to 500 m along the 58 km of busways; interchange-integration terminals at the out-of-city end of each of the five structural axis/corridors spaced every 4 km and permit trunk-feeder bus interchange and mid route smaller terminals at key points, about 2 km spaced along the bus way corridors”. (Curitiba, Brazil: BRT case study, n.d., p. 6)

The buses are operated privately but controlled by municipal company- URBS (Urbanizacao de Curitiba SA) – which controls taxis, parking, bus terminals, shopping areas and markets. In terms of bus transport, the company defines routes, capacity and schedules, and collects all fares. Payment to the operators that includes operating and capital replacement cost plus some margins of profit is made by URBS. The reimbursement is based on a formula including kilometer travelled, type of service and bus provided. Fare setting takes into account the costs and some margins of profit. It is also founded on the principle that an average worker does not spend more than 10% his/her income on transport. The city follows a flat fare system and no subsidy is given by the government as the system functions cost effectively and with profit. Generally, securing the right-of-way for the busways is the key to the success of the BRT system. The system will further benefit from the application of Intelligent Transportation System (ITS) in respect to vehicle location, real time information and signal control. (Curitiba, Brazil: BRT case study. (n.d.).

4.5.3.2 Sao Paulo

Hidalgo, (2008) documents the experience and processes of integration of the public transport system of the city - the Interligado of the city of Sao Paulo, Brazil. Indeed,

The Interligado System is a large scale transit modernization plan for the Municipality of São Paulo, which optimized bus routes and services, through featuring advanced technologies for fare integration, bus fleet renovations, new requirements to the companies delivering transit services, and support infrastructure for buses (priority and exclusive lanes, bus stops, integration terminals, and user information and control systems). The implementation of the Interligado System constitutes a very large

planning and implementation effort, involving 39 private bus providers, cooperatives of 6,000 self-employed van operators; and 13,700 vehicles. Electronic fare cards (Bilhete Unico) allow the combination of lines within a 2 hour time period. Integration of municipal bus services was completed in May 2004. Integration with Metro and state buses was completed in 2006. The name Interligado is no longer used to brand the transit reform, but the project components not only remain in place, but have been upgraded over time (p.1).

The major outcome of the reform has been an increase in public transportation ridership in the city in which transit trips grew by 15% and boardings by 49% between 2002 and 2006. The implementation of Interligado was conducted in gradual and phased manner starting with bus priority introduction and advancing to more complex fare and fuller integration with regional transport authority. Hidalgo (2008) summarizes the key lesson to be learnt from Interligado of Sao Paulo.

The São Paulo experience can be considered a good practice in implementation of transport reform in developing cities: transit services became more attractive as user cost and travel time was reduced; fleet was renewed and several operational inefficiencies trimmed down. Integration efforts continue, including coordination with the Metro and regional rail and bus services. Key elements of success were political commitment, coordinated effort of several agencies, technical preparation, and inclusion of existing companies as well as informal operators (pp. 17-18).

4.5.4 Africa

Very few cities in Africa have a rail based urban public transport. The public transport system in many African cities is dominated by public bus services and many independent private paratransit operators. African cities face the challenge of integrating the informal sector and no recipe is yet available on how to integrate it. Latin American cities have also little success in integrating the private operators outside the BRT system. There exists hardly any appreciable public transport integration projects that have been implemented in African cities. The Lagos BRT-Lite is the first BRT in the continent, although it fails to qualify as full BRT system. Some efforts were underway to integrate public transport in Cape Town where the integration process was prompted by the 2010 World Football Cup conducted in South Africa. The review

investigates the works of Mobereola (2009), Mason-Jones and Cohen (2012) for Lagos BRT, and the city of Cape Town (2008) for Cape Town BRT.

4.5.4.1 Lagos

Lagos is one of the largest Africa city. Lagos and its metropolitan area is estimated to have population of 15 to 18 million in 2009 and is projected to reach 25 million by year 2025 which will then make it the third largest metropolitan area in the world. Prior to the introduction of BRT, public transport in Lagos was provided in disorganized manner by mainly private operators. It was mainly provided by minibus taxis numbering 75,000 together with smaller numbers of midibuses, shared taxis and motor-cycle taxis. Public transport service was then very unreliable, uncomfortable and fluctuating fares.

As the first BRT scheme in Sub Saharan Africa and drawing from best practices from the BRTs' of the Latin American cities of Curitiba and Bogota, the BRT of Lagos known as BRT-Lite system started operation in 2008. The origin of the BRT goes back to 1999, when with the assistance from the World Bank, the Lagos state government started the Lagos urban transport project (LUTP). In the long term, the project foresaw a rail based public transport system to be complemented by bus service. The project emphasized the importance of controlling and regulating the private operators and ensuring greater coordination between government agencies that have stake on transport. As integral part of that legal and institutional reform processes, decision was arrived at bringing transport planning, implementation and transport regulatory functions in Lagos Metropolitan area under one institution. As an outcome of that reform, the Lagos Metropolitan Area Transport Authority (LAMATA) was established in 2002. It merged different government functions and was given greater authority for pursuing transport planning and implementation activities. LAMATA

... was given jurisdiction over the conurbation in Lagos State and a declared network of primary and secondary roads that carried the large bulk of road traffic, as well as the power to plan and coordinate public transport and make recommendations on route planning. LAMATA was staffed with highly motivated professionals, many former residents of Nigeria, who had experience worldwide in transport and management (Mobereola, 2009, p. 6).

The law that was enacted in 2006 provided LAMATA with more regulatory authority in addition to the planning and coordination role as stated in the law of 2002. Hence it was given the function to “plan, regulate and co-ordinate the supply of adequate and effective public

transport in all travel modes and supporting infrastructure within metropolitan Lagos” (Mobereola, 2009 p.15). This law anchored LAMATA’s role in planning, coordinating and regulating passenger transport and transport infrastructure in Lagos metropolitan area. It is also important to note that during the planning phase of the BRT, representatives of the master plan department were members of the BRT steering committee which ensured the integration of land use and spatial development in the BRT’s concept.

The BRT of Lagos, which is not a full BRT system but planned to provide high performance transport service, was the outcome of LAMATA. The success of the Lagos BRT is closely associated with the institutional restructuring and the continuous political support of the two successive Lagos State governments which were in power since 1999.

The Lagos BRT was planned to provide high quality and affordable public transport service. It is not exactly similar to Latin American’s full BRT systems. While maintaining many of the operational features of a full BRT system, the Lagos BRT has been modified to fit local situation which attempted to find a compromising solution by taking into account budget constraints, engineering limitation imposed by existing roads and goal of maximization of benefits of infrastructure. The BRT has a corridor of 22-kilometere from which only 65% is fully and physically segregated, 20% is exclusive bus lane that is only separated by road markings and the rest 15% is mixed with other traffic. The bus lane position along the road, station layout and boarding arrangements makes the Lagos BRT Lite different from full BRT system of Latin American cities. The cost of the BRT was relatively lower amounting to USD 1.4 million per kilometer but which permitted only lower vehicle speeds of 20km/h. In comparison, the Rea Vaya BRT in Johannesburg costs about USD 8 to 10 million per kilometer but enabling a higher speed of 28km/h or USD 6 million per kilometer for Transmilénio in Bogota. The government was responsible for the construction and maintenance of the BRT infrastructure and the private operators which franchised the BRT corridor were responsible for the purchase and maintenance of their vehicles as well as ensuring the profitability of their operations. The system transports 200,000 passengers daily and 10,000 passengers per direction in peak hour. Since the introduction of the BRT in Lagos, there has been a considerable reduction in fare levels, travel and waiting times. The reason for such success are discipline in operation that was made possible by route franchising, an increase in the speed of the BRT and more government commitment and support in infrastructure investment. LAMATA worked proactively with important stakeholders including transport operators right from the beginning of the Lagos BRT project. LAMATA had built a strong partnership with the legally recognized association of

public transport providers for the Lagos region, the National Union of Road Transport Workers (NURTW) which is mainly responsible for bus transport in urban areas. Founded on the principles of public private partnership, the inclusion of NURTW in the BRT planning and implementation processes played a positive role for its success. Mason-Jones & Cohen (2012) describe the public private partnership between LAMATA and NURTW regarding the management of the infrastructure and financing of the fleet for the BRT Lite system as follows.

LAMATA provided the traffic management systems in the corridor, developed the stops and stations, and provided bus depot and workshop facilities. In return, the private operators, represented through NURTW structures, agreed to accept regulation and enforcement over their operations and make their own purchases of vehicles to operate on the corridor (Mobereola, 2009). In practice, 100 buses were purchased by NURTW operators, while 120 buses were bought by a state-owned company, Lagbus, and leased to private-sector operators, and 40 further buses were operated by Lagbus itself (ITP / IBIS, 2009) (p. 4).

Moreover, LAMATA had developed strategy for including other public transport operators which were not a part of the BRT Lite system. Those bus operators were not totally banned from giving transport services in Lagos. Instead they have been permitted to continue giving transport service in Lagos but were restricted to service lanes outside of the BRT corridor and main roadways. They provided supplementary and short route services and absorbed the excess passenger demand that was generated above the capacity of the BRT. Generally, the whole project

Success stems not solely from its infrastructure but from a holistic approach that has included reorganizing the bus industry, financing new buses, creating a new institutional structure and regulatory framework to support the system, and training the personnel needed to drive, maintain, enforce, and manage it. While meeting these technical and organizational challenges, BRT officials were also engaging the public and promoting the new system (Mobereola, 2009, p. 1).

The Lagos BRT Lite provides a classical example of a modified version of BRT in African context. The BRT planning and design process considered local road conditions, financial constraints and the process itself was very participatory. It was founded on the principle of maximizing the benefits of BRT infrastructure at minimum costs. The continuous political support from the Lagos state government, comprehensive institutional reforms to address

transport challenges, the establishment of LAMATA with vested authority on transport planning, coordinating and regulating functions in Lagos metropolitan area, the inclusion of private operators in the BRT decision making process and adherence to public private partnership on infrastructure and fleet management of the BRT are the key lessons from the Lagos BRT Lite system. It accommodated private transport operators that were not a part of the BRT Lite system and allowed them to continue providing public transport services outside of the BRT networks and main roads. Nevertheless, the tasks of public transport integration particularly fare integration between BRT and non-BRT networks as well as between private and public operators in the whole of Lagos Metropolitan area seem to have been given low profile in the Lagos BRT Lite long-term goals.

4.5.4.2 Cape Town

The need for introducing Integrated Rapid Transit (IRT) in Cape Town (City of Cape Town, 2008) was mainly inspired by the unsustainability of the fragmented and non-integrated public transportation services. The uncoordinated public transportation of the city was assumed to have created hardship for poorer communities living far from the city center and impeded economic growth and development. Driven as it was by the 2010 World Cup game in South Africa and designed to provide a seamless public transport travel, the IRT was a comprehensive package of measures including priority rail plan, BRT improvement to conventional bus and minibus operations, bicycle ways and bicycle parking, pedestrian and urban space upgrading, metered taxis integration and park & ride facilities. The package also envisaged to integrate the different public transport service provided by the metrorail, buses and minibus taxis. The IRT was implemented in 2010 and the BRT formed the core of the IRT. Infrastructure is owned by the government and participating public transport operators will be reimbursed on the basis of kilometer covered not passengers transported. The system operates on public partnership model (PPP) in which the private operators are given concession contract. Working with private operators in a participative manner is the basic principle in positively engaging the operators in provision of public transport.

4.6 Paratransit integration

Paratransit integration is taken as a special case in public transport integration as this sector will pose greater challenge in the process of integration of public transportation in Africa and other

cities in Developing countries. The review is based on the study by Tangphaisankun, Okamura, Nakamura, & Wang, (2010), and Schalekamp, Mfinanga, Wilkinson, Behrens (n.d.) on the paratransit integration.

As Tangphaisankun, Okamura, Nakamura, & Wang, (2010) point out motorized paratransit is becoming an increasingly important mode of public transportation in many developing countries. Admittedly, the integration of the paratransit as feeder into urban transport system increases the choices and performance of public transportation. Tangphaisankun et al. (2010) pose the fundamental question of how to integrate this mode as a feeder system in urban public transportation while taking into account commuter's choice consideration, influence of personal behavior and attitudes towards services provided by paratransit and public transportation. The process for integrating the paratransit sector should also include a package of complementary measures that will improve travel time reliability, safety, security, comfort and convenience of the paratransit sector. However, the major challenge in integrating the paratransit sector is the presence of thousands of owners that operate in completely deregulated and highly uncoordinated public transport market of many African cities.

As Latin America example shows, a new BRT system provided the opportunity for integrating the paratransit. In Latin America, the introduction of a new system of public transport, mainly BRT, gave the city authorities the incentive to integrate the paratransit operators. The operators were offered to the chance to become contracted service providers alongside bus and rail companies. Schalekamp, Mfinanga, Wilkinson Behrens (n.d.) investigated the experiences of the Bogota, Mexico city and Santiago in the in integration of the paratransit in order to draw some lessons for developing an integration framework for Cape Town and Dar es Salaam. The proposed Integrated Rapid Transit (IRT) in Cape Town stipulated that the paratransit and bus operators will be encouraged to form companies so that they will be able to tender for trunk or feeder routes. In Tanzania, paratransit operators were expected to form consortia and form bigger companies. They were expected to bid for operating contracts alone or in association with international bidders.

The case of Dakar where attempts were made to integrate the paratransit sector by encouraging them to join cooperatives could be taken as lesson for other African cities. The private operators that included over 1,200 minibus and converted vans operators were encouraged in 2001 by "Conseil Executif des Transports" (CETUD- the urban transport authority for Dakar) to form cooperatives (446 of private operators formed 13 cooperative) known as "Groupements

d'Intérêt Economic". They were then to provide franchise transport services. The government supported by the World Bank provided the private operators who joined the cooperative financial incentives. The cooperatives were thus able to benefit from the vehicle replacement program by scrapping old vehicles. New minibuses and buses were bought with loans that were payable in 3 to 5 years period. As the outcome of this pilot project, the market share of informal transport operators dropped from about 95% to 66% and private buses shares' increased from 3 to 13%. Although the scale of integration was not large enough, this could be taken as an example of an initiative to integrate the paratransit sector which could contribute to reducing the number of operators, encourage the shift from smaller to higher capacity paratransit operators, facilitate coordination between actors and permit area wide ticketing and information provisions (UN-HABITAT, 2010).

Successful implementation of the integration of the paratransit, as experiences from Latin America's bus reform show, should however have a longer time frame and the scale of intervention (city wide or corridor based) should reflect the needs and capabilities of those involved institutions, operators and the public. As Schalekamp, Mfinanga, Wilkinson, Behrens (n.d.) observe

The problem (integration of the paratransit) is likely to be less that of a lack of the 'technical' capability required to undertake systematic demand analysis, network design and operational planning than that of deficiency in institutional capacity to address the 'governance' issues involved in negotiating an accepted framework for the incorporation of paratransit operators into rationalized and regulated public transport systems in an appropriate and sustainable way. (p. 9)

Some form of government financial support for fleet replacement of the paratransit vehicles and institutionalized public private partnership will certainly facilitate the process of integration.

4.7 Challenges of and strategies for integration

The forgoing discussion has shown that public transport integration brings greater benefits to the community at large. Integration is expected to result in more attractive and efficient public

transport system, increased ridership and more seamless public transport travel. It will also generate higher revenues, provide savings in cost and promote sustainable urban development. However, integration is a complex process and important decisions have to be made. The frameworks of integration have to be formulated, the public transport networks have to be thoroughly investigated from which shortcomings have to be identified and remedial measures have to be developed, the forms of integration have to be selected, actors have to be identified, institutional set up has to be agreed upon, implementation and monitoring mechanisms have to be developed and financing and legal frameworks have to be decided. These decisions are multifaceted and need intensive discussion and negotiations with different governmental agencies and public transport providers. Although not exhaustive, some challenges to the integration of public transport integration include:

- Establishing institutions that include all the parties (operators and local government authorities) and arriving at mutual agreements in respect to the scopes, roles and responsibilities of public transport integration.
- Integration leads to the restructuring of the existing uncoordinated public transport network into a hierarchical system of trunk –feeder lines. Such an arrangement in the absence of fare integration and multimodal through ticketing could increase trip legs and transport cost for the user (World Bank, 2002B).
- Multimodal public transport integration is difficult to achieve when there are numerous private operators as in the many cities in Developing countries. The fewer the operators and the modes, the better the integration and the lower the need for transfers between operators (Rivasplata, 2008a, World Bank, 2002b, & SPUTNIC, 2009a).
- Revenue sharing and subsidy grant in an integrated public transport system with many operators is a difficult task and this is particularly more difficult for cities of the developing countries (Meakin, 2004).
- Public transport integration leads to more administrative costs, check-through and harmonization losses (SPUTNIC 2009 a).
- Regional public transport integration that involves different local governments and ownership of mass transport requires the acceptance by each of these municipal

authorities and operators as well as the establishment of appropriate institutional arrangements for managing the system (World Bank, 2002b).

- Fully deregulated public transport market could pose a serious problem for greater coordination and integration initiatives (World Bank, 2000b).
- Fragmented decision making process inherent in the different tiers of government with different institutional responsibilities, financial constraints and acceptability by the public are impediments to integration policy initiative (Hull, 2005).
- The difficulty of decisions on fare setting, fare structure, choice of fare technology and fare media.

Despite these institutional, technical, operational, financial and governance challenges towards greater public transportation integration, it would be recommendable to pursue strategies that will lead to the desired levels of integration. The literature provides some general guidelines that will facilitate the integration process. These strategies, however, should not be perceived as universally applicable and cities that plan to adopt public transport integration should formulate strategies that fits their local situations.

- The Degree of the success of integration particularly at the operational and service levels depends to greater extent on sound planning and greater coordination among the different bodies responsible for transport, land use planning and operations of public transportation (Ibrahim, 2003).
- SPUTNIC (2000a) highlights the importance of greater coordination in public transport planning, presence of enabling legislation for integration, availability of appropriate organizational models that facilitate integration and increased consciousness among all actors for the success of integration.
- The study of NEA et al. (2003) on public integration recommends a number of strategies that will optimize integration. These measures include enabling regulatory and institutional framework governing the roles and functions of the operators, users and decision makers, granting a stronger coordination role for the transport authorities at the earlier stage of integration but gradually diminishing at later stages, identification of barriers of implementation of integration and taking relevant actions to overcome them, placing integration as the main criteria in awarding tenders and contracts, achieving

greater conformity of services in terms of market organization, application of advanced technologies and securing the necessary political commitments for integration.

- The presence of an autonomous metropolitan transport authority that is given power to set public transport service standards, formulate supportive policies and financing favoring integration at a regional level is precondition for a well-integrated public transport system (Nash as cited in Rivasplata, 2008b).
- Designing innovative financing mechanism for implementing public transport integration. Good examples include imposition of employment taxes on employers dedicated to public transport as in “Versement transport” in France which contributes to as high as 40% of total revenue of public transport (Zembri, 2010), parking charges, development tax, cross-utility financing of the public transport usually at local level in communities where the utilities are publicly owned as in Germany, and development levies imposed on owners and business which benefit or are expected to benefit from a public transportation improvements (PROCEED, 2009).
- In parallel with the implementation of integration, public transport networks should be redesigned in a hierarchical trunk- feeder (or line haul and feeder lines) structure that helps in avoiding unnecessary competition and provide linkage along the main corridors of movement, main residential areas, city center and sub centers. The integrated network should also consider integrating regional public transport services and terminals (PROCEED, 2009 & International association of public transport, 2009).
- In order to ensure an integrated fare system, it is important a methodology for pricing integrated transit trips, collecting fares for integrated transit trips, and allocating revenue collected from integrated transit trips be clearly worked out and agreed upon by all participating operators, public transport infrastructure owner and the local and regional governments (Barr, 1997).
- Ensure the involvement of public transport authorities in urban planning and development decision making process so that they can positively contribute in transport and land use integration (International Association of Public Transport, 2009).
- Public transport integration should provide the platform for phased implementation of integration the degree of which should be linked to the needs and capabilities of the institutions, operators and the public sector. Longer time frame and prolonged

negotiations are particularly important in the integration of the paratransit transport sector (Schalekamp, Mfinanga, Wilkinson, & Behrens, R. (n.d.).

4.8 Framework of public transport integration

As a protracted process, public transport integration process is expected to extend over a number of years. It is even more complicated for African cities as they lack public transport integration experiences. The overriding objective of public transport integration is to make public transport more attractive, convenient and affordable for the majority of urban dwellers of African cities. Public transport integration process should be accompanied or even preceded by measures to improve the performances of the public transport modes. Public transport priority and efficiency enhancing measure will be easier when there is a general public transport master plan. The framework of public transport integration, therefore, is designed to indicate the step-by-step procedures necessary for launching the process for the implementation of public transport integration. As a general principal, it is very essential to start integration of public transport with the lowest and least complicated ones, then gradually move to higher levels and ultimately reach fully integrated modes of public transport integration. The framework of public transport integration will be built upon the following elements.

1. Analysis of the city and urban public transport context,
2. Integration experiences,
3. Review of public transport integration enabling planning and policy frameworks,
4. Identification of barriers of integration and measures to overcome them,
5. Determination of the city's vision statement in general and urban transport vision in particular,
6. Definition of the goals of urban public transport integration,
7. Selection of the forms of public transport integration,
8. Development of an implementation action plan of public transport integration, and
9. Designing of monitoring and evaluation mechanisms.

I. Analysis of the city and urban public transport context

1. Urban public transport context
 - a. Check if there is a political commitment for public transport integration.

- b. Description of the urban context
 - Population
 - Urban development structure
 - Urban transport and public transport
 - Urban development trends
- c. Analysis of the available public transport modes and modal shares.
- d. Determine if there is a demonstrated need for integration.
 - Conduct travel surveys and travel diaries.
 - Conduct operator's survey.

II. Review of previous public transportation integration experiences.

III. Review public transport integration enabling policy and planning frameworks.

- a. Review relevant documents and planning studies on public transport integration.
- b. Determine if there are policy and planning frameworks favoring integration.
- c. Check if there are general urban transport and public transport master plans.
- c. Check if there is a mass rapid transit (LRT, Metro, BRT and Big Buses) available or anticipated in the near future.
- d. Determine if there is a need for public transport network restructuring.
- e. Check if there are public transport priority programs or public transport efficiency enhancing measures.
- f. Check if there are urban transport institutions promoting public transport integration.

IV. Desired future or vision statement of public transport integration

1. State the desired vision of public transport integration.
 - a. Review general planning and policy documents.
 - b. Review city development and urban public transport visions.
 - c. Consult local government and transport authority.

V. Barriers of public transport integration

1. Identify barriers of public transport integration.
 - a. Review the literature for identifying general barriers of integration and check the relevancy of these general barriers to the city under investigation.

- b. Refer to other previous studies, if already done, on public transport integration for the city under investigation.
- c. Conduct field assessment.

VI. Goals of public transport integration

1. On the basis of the long-term vision determine goals and objectives of public transport integration.
 - a. Review short and long term urban development frameworks.
 - b. Review urban and public transport development plans.
 - c. Review urban and public transport policy papers.
 - d. Conduct SWOT analysis.

VII. Selecting forms of public transport integration

1. Examine the different forms, components and requirements of each of the public transport integration.
 - a. Physical integration
 - b. Fare integration
 - c. Modal integration
 - d. Service integration
 - e. Operational integration
 - f. Information integration
 - g. Public transport and land use integration
2. Identify the criteria for selection of form or forms of public transport integration.
 - a. Review the requirements of each of the integration forms.
 - b. Review the city urban public transport context.
 - c. Identify the criteria and develop the weighing mechanisms for selection of public transport integration form. This includes
 - a. Previous public transport integration experiences,
 - b. City government awareness on integration,
 - c. Presence of public transport master plan that specify public transport integration,
 - d. The availability of mass transit system that requires integration as a precondition,
 - e. Ease of implementation of an integration form or combination of forms of integration,

- f. Capable urban institutions available to implement integration,
- g. Enabling legal and policy framework for integration,
- h. Committed body that has integration as its main task,
- i. Availability of sufficient funding, and
- j. Services of the present modes of public transportation with respect to each form of integration.

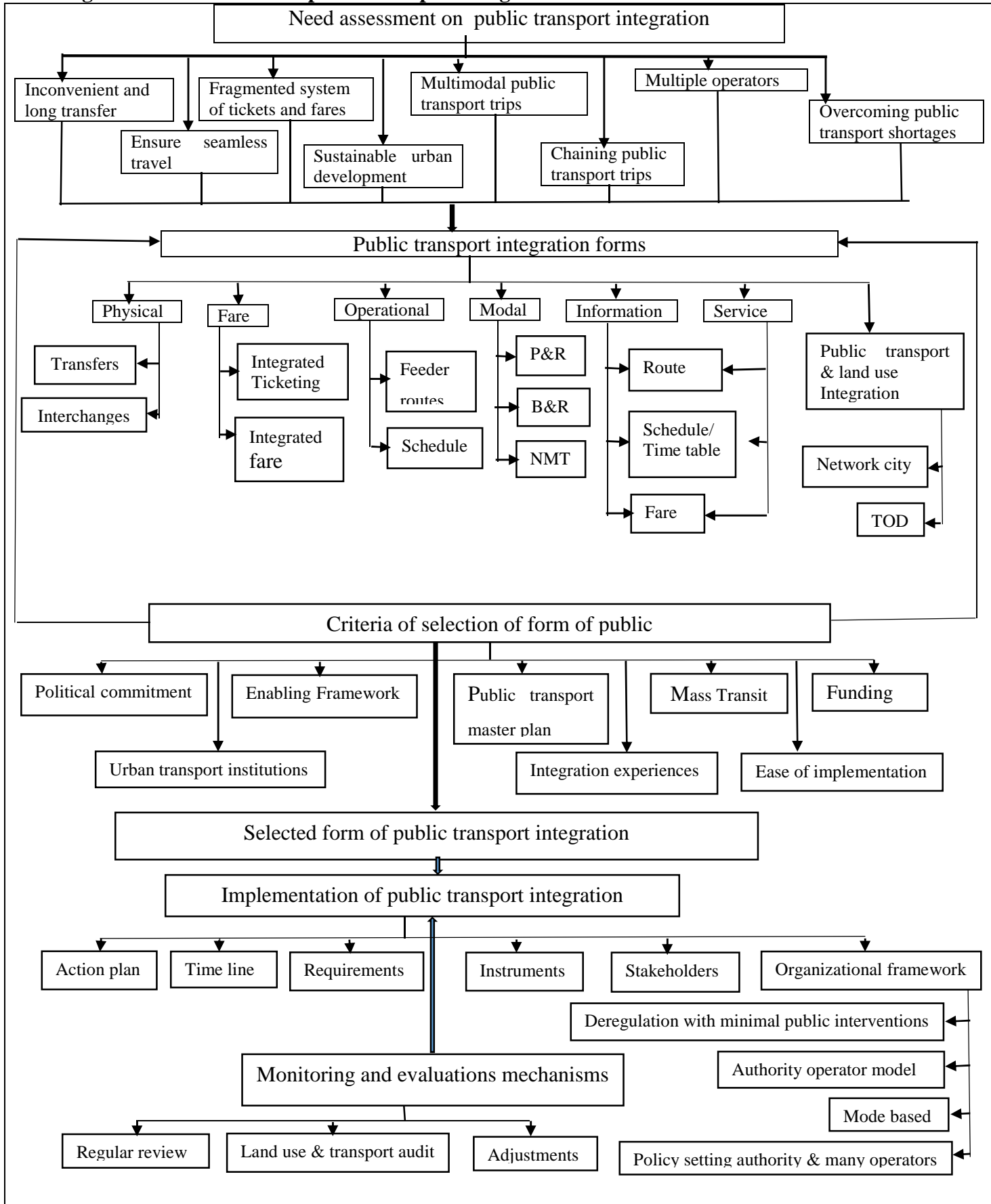
VIII. Development of an implementation action plan of public transport integration

1. Develop a plan of action for the phased implementation of the public transport integration forms or combination of forms.
2. Determine the time line for each of the phases of implementation of public transport integration.
3. Indicate the financial and other requirements for the implementation of integration
4. Identify instruments for the implementation of each of the forms of public transport integration
5. Identify the key stakeholders for the implementation of integration
 - a. Local governments
 - b. Regional governments
 - c. National government
 - d. Transport authorities
 - e. Public transport providers
6. Develop organizational and legal framework for the implementation and institutionalization of the process of public transport integration.

IX. Monitoring and evaluation mechanisms

1. Regularly review the integration process and check the achievements against targets.
2. Make plan and organizational adjustments to suit changed contexts.
3. Ensure that urban land use development is closely related to current and future public transport networks.
 - a. Conduct public transport compatibility assessment study (PTCAS), that is, ensure the compatibility of public transport master plan with land use development or vice versa.

Figure 4.6: Framework of public transport integration



4.9 Conclusion and discussion

Transport integration in general and public transport integration in particular have evolved and implemented in the cities of the North where declining public transport ridership, presence of many public operators and rising and high level of car ownership provided the contextual background. The criteria of sustainable urban development has also recently come to the forefront in the promotion of public transport integration. The forgoing discussion has shown that transport integration is defined differently depending on the disciplinary perspective. There is no universally acceptable definition of transport integration and the means to achieve it, although there is general unanimity that it is beneficial. There is also a general consensus on the necessity of adopting transport integration policies and instruments and on conceiving transport integration not as an objective by itself but as a means to achieve higher levels of public transport service. Public transportation integration has a strong system perspective. In light of this, it can be perceived as an organizational process and a comprehensive planning procedure which ensure higher quality and more attractive public transport services through bringing all the elements of a public transportation as one system. However, the literature does not provide an explicit answer on the questions of how that to be achieved is, what the preconditions are and what supplementary measures that will facilitate organizational process and comprehensive planning procedures are. Transport Integration has different levels and the degree of complexity of integration increases as one move from the lower operational to wider strategic levels. Public transport integration is found at lower levels in the ladder of integration. Although integration of public transportation is assumed to bring synergy and enhances seamless travel, the literature does not provide an easy answer to what should be an “ideal” or “optimum” level of public transport integration nor what instruments or combination of instruments are available to achieve it.

Despite the divergent notions, knowledge gap and the different degrees of difficulties of implementation, public transport integration is worth pursuing and provides a number of advantages. Public transport integration enhances the coordination of the planning, operation and management of the public transport system, aids in avoiding wasteful inter and intra modal competition and increases the attractiveness and ridership of public transport modes. Public transport integration provides a systematic framework for setting tariffs and tariff zones acceptable by all public transport providers and offers the platform for providing affordable

transport for the low income urban communities. The management of public transport integration process promotes public private partnership between local and regional governments, transport authorities and public transport providers. The institution that will be created through the partnership serves as a medium for the channeling of public finances for subsidy purposes and long term public transport infrastructure development. Public transport integration that extends beyond the city boundary into the metropolitan area makes commuting more organized, easier, more efficient and affordable. Public transportation networks serve as corridors of high density urban development when they become an integral part of city's spatial development process. The success of public transport integration largely depends on identification of barriers at planning stages and formulating strategies and policies to counter them. Mutual understanding and greater cooperation between institutions, transport authorities, local governments and public transport providers are essential ingredients for successful public transport integration programs. Moreover, committed institutions and enabling planning, political and policy frameworks are also key preconditions for promoting greater public transport integration. It should be noted however, that it is not easy to quantify the benefits of and costs of public transport integration projects. It is evident that quantifying the costs and benefits of public transport integration projects and programs either a priori or ex post has been rarely attempted in the literature. It will thus be very important for research to develop methodologies for making quantifiable evaluations of public transport integration projects and programs.

Public transport integration has different forms. Physical and fare integrations are the widely practiced form of integration, although other related forms of public transport integration are available. Physical integration which provides a physical linkage among different modes is designed to make public transport transfers more convenient and attractive. The major interchanges could also serve as focal areas of transit oriented high density urban development. The success of physical integration depends on public transport network restructuring process. This task is contingent upon the availability of general public transport master plan which should clearly shows the public transport networks of the present and the anticipated future. Such a master plan will provide the tool to help in deciding on route allocations among different operators and determining the different hierarchies of interchanges that are necessary for physical integration of the public transport network. Financing the construction and management of interchange facilities, securing the necessary land and developing institutional arrangements to administer and manage the interchanges are important issues in physical

integration. It is advisable for urban development plans to project future public transport networks and reserve spaces for interchanges early in the planning process or later when city development plans are updated and revised.

Fare integration enhances seamless public transport travel by overcoming the obstacles of multiple tariffs and tickets that are inherent in a non-integrated multimodal public transportation system. The implementation of fare integration is not again a smooth process. Decisions have to be made on the core issues of fare structure and fare pricing, fare collection and control and fare revenue allocation that are acceptable by all participating actors. Equally important are the decisions on fare collection media and ticket validation technologies. These are complicated matters for developing African cities where there are thousands of private operators and poorly coordinated public transport system. It will be unthinkable now for African cities to have a fully integrated fare, a fully automated fare collection and validation system. African cities have to develop a fare integration strategy that will extend over many years. Fare integration in Africa should aim to provide affordable public transport for the greater proportion of city dwellers. These cities have to gradually move in a phased manner from the simplest to the most complex full fare integration. It will be then advisable to start fare integration with large public transport operators. This could be the rail mode where there is a rail based mass public transport but this is rare in most African cities. The large buses of the public sector can be made to provide integrate fare services along the major and secondary corridors where they operate. Integration of the paratransit sector in the fare integration scheme, however, is a long term task which requires a protracted negotiations between the paratransit operators and the public authorities on the core elements of the fare integration. Cities should arrive at the decision regarding the future role of the paratransit sector that align both the interests of the public authorities for better services and the paratransit operators motive of maximizing profit. The decision should also be contingent upon the long term spatial development directions of cities. Fully committed urban transport institutions that foster greater cooperation and have a clear vision of the future will have a fundamental role to play in the integration process. There are various options of transport institutions and African cities should critically review the best practices and their local contexts in deciding the type of institutions that best accomplish the high expectations. There is a need to strengthen these institutions so that they are capable of developing an appropriate and conscious response to the tremendous transport problems such cities are encountering now and are likely to face in the future in response to the expected rapid urbanization process of the continent.

It is true that transport planning and land use development should proceed together. The methodology and tools of transport and land use modelling have been developed in cities of the Developed World and the applications of these models in African cities has not been without many criticisms. Transport and land use planning models that suit African cities has yet to be developed. On the other hand, linking main urban development with current and future major public transport corridors offers an opportunity for African cities to move on sustainable direction. There is no other viable choice other than promoting a compact city development pattern in which cities are walkable and highly accessible by public transport. African cities should critically investigate their current urban development strategy in order to determine whether it is sustainable or not. Financing and promoting car oriented urban development is highly unsustainable in Africa. African cities should lean more towards transit oriented development and the polycentric network city strategy, strategies that maximize the use of mass public transit. The case study cities of Paris, Hamburg, Singapore, Curitiba, Sao Paulo and Singapore were taken in order to draw some lessons on the process of public transport integration for African cities. It should be stressed at the outset that as there are differences between these and African cities, direct replication of best practices is neither possible nor advisable. The BRTs' of Lagos and Cape Town illustrate localized approach to public transport integration in Africa. The BRT of Lagos is a good example in which fare was reduced as the result of higher commercial speeds of the buses (due to bus priority measures) in the BRT corridor and thus reduced operating costs.

Motivated as it is by the need to improve public transportation and increase public transport patronage that resulted from a highly disjointed and fragmented public transport provisions, public transport integration process is a long process and requires a committed political body with greater authority and enabling legal framework. The integration process should proceed from the simpler forms and gradually advances to higher and more complex forms of public transport integration. The integration of land use planning and public transport is best achieved when the decisions on urban development programs are based on the criteria of availability of access to public transport. Such a general public transport audit framework will discourage future urban development programs that have no ensured access to current or planned public transport networks. The ideal organizational setting for such type of decision making is the presence of representatives of urban planning authorities in the body that coordinates, manage and plan the whole public transport system or vice versa. The presence of mass transport system that is publicly owned facilitates public transport integration. The low cost and yet high capacity

BRT system could provide the integration platform for African cities that envisage to modernize, increase the attractiveness and capacity of their public transport systems. Public transport traffic speed enhancing measures and public transport priorities on roads and intersections that increase the performances of public transport should complement public transport integration programs. Such public transport performance enhancing packages seem to have partly compensated for the setting of fare policies that promotes affordable transport for the urban poor and the underprivileged section of the population while at the same time ensuring cost recovery status of public transport operators. Although public transport will continue to get substantial amount of government financial support, public transport authorities and local governments should strive to find innovative funding mechanisms. There are different options and good practices of such off budget financing. Public transport operators should make a market analysis and promote marketing strategies that increases the type and volume of their ticket sales. Regional urban public transportation in metropolitan areas that constitute numerous local governments can be stifled by legal issues. Mutual agreements among these local governments are, therefore, necessary to decide on levels of public transport services and financing. There are good practices of public transport associations that have overcome such barriers to integration of regional public transportation in metropolitan areas.

Many of the contributions on public transport integration are not coming from the academia but from the world of public transport practitioners, namely; transport authorities, international public transport association, local governments and public transport providers. Moreover, much of the work on public transport integration is on the cities of the North. African cities have hardly any public transport integration experiences. African cities have urban and transport context that stands differently from the cities of the north. These cities have low levels of car ownership and usage, are highly dependent on public transport for motorized mobility, have higher modal share of walking, lower per capita income and are characterized by the coexistence of informal urban development. Very few of the African cities have rail based urban public transport and in most cases the publicly owned and operated public transport has been declining in importance. In view of this, the informal and paratransit transport sector has grown rapidly to fill the deficit created by inefficient public sector and in most cities it provides the main means of mechanized mobility. What makes these cities fundamentally different from the cities of the north is the sheer size and diversity of the privately operated public transport. There are thousands of operators and mostly owned by individuals. The greatest challenge for public transport integration in African cities, therefore, will be the incredible task of integrating the

paratransit. There are no successful examples of paratransit integration. Some attempts have been made to integrate the paratransit and the process will likely take long as these examples show. Until such time, nevertheless, the paratransit should be made to provide higher quality services along with the integrated formal one through route tendering packages and setting service quality standards. Public transport integration by itself will not bring the desired outcomes and cities should also strive to improve the efficiency of their public transport systems by employing more transport supply and demand management strategies.

The pursuit of transport integration in general and public transport integration in particular in African cities should be aligned to fit to their peculiar urban and transport contexts. The question is then what should then be transport integration in narrower and wider perspective in African context. There is no answer in the literature to this question. No doubt the path of public transport integration holds good for cities but it is a complex and lengthy process. In the long term, therefore, public transport integration attempts in African cities, while learning from the integration practices of the cities of the north, should be based on the development of framework of integration that takes local context into account. Above all public transport integration needs strong and capable transport institutions, political commitment and good leadership that has public transport integration as its main agenda.

Chapter 5 Household travel surveys: empirical results and implications

5.1 Introduction

Ethiopia conducts population censuses every ten years and the results of the latest and the 3rd census were officially announced in 2007. Addis Ababa has never had a systematic, city wide and periodical household travel surveys. The few examples that city had were project specific and limited spatially. The one good example was the travel survey of 2005 which was used for the purpose of transport demand modeling to serve as an input for the preparation of the 2005 urban transport master plan of Addis Ababa. However, the “travel surveys” that were conducted both for the purpose of revising the Addis Ababa transport master plan of 2001 and for the preparation of the current integrated master plan Addis Ababa and Oromia region were not as detailed and scientific as standard household travel surveys would be. These surveys were conducted on selected major road intersections and there were no household surveys at home. Hence these surveys could not provide valid inferences about urban travel characteristics and generate sound inputs for urban transport planning. Moreover, there has never been city wide and periodical survey to determine amount of household incomes and expenditures.

Although the sample size is not as high as standard and representative travel surveys, this sample household travel survey is different from the aforementioned surveys in that it was more detailed than earlier surveys and was conducted both at homes and at terminals. Hopefully, it will provide a framework for more organized and institutionalized implementation of future travel surveys in Addis Ababa. It is specifically designed to provide empirical evidences and supplement the theoretical analysis on urban transport situation in Addis Ababa. Specifically it will answer the following transport related questions dealing with households and individuals.

1. What are the demographic and socioeconomic characteristics that affect travel patterns?

2. How much is the income of households and what are the sources of their incomes?
3. How much do households spend on transport and other basic household expenditures?
4. How do households access the basic services and which problems do they counter for using and accessing these services?
5. How much time do households and individuals spend for trips to main destinations? Which mode or combination of modes do they use?
6. How much money and time do they spend on the trip segments or legs for accessing jobs and services? How do they assess those trip segments?
7. Which mode or combination of modes of public transportation are used? What are the factors of modal choices?
8. What are the (stated) preferences of the people for the public transport?

As evidenced in the literature, governmental and non-governmental reports and statistics, walking and public transport are the important modes of mobility in many cities in developing countries. It is also evident that the share of transport expenditure as of total household expenditure and transport expenditure as of total household income is high (World Bank, 2002b, Diaz Olvera, Plat, & Pochet, 2008, & AASZDPPO, 2013). Moreover, low income groups that live in the peripheries spent a considerable amount of time for commuting to and from the city centers for jobs and accessing services. High transport expenditures and long commuting hours put a restraint on the mobility of the urban poor at the peripheries and limit their opportunity for accessing jobs, social services and amenities (social exclusion). As discussed in the previous chapters, in Addis Ababa, walking is the dominant mode of transportation, public transport share of motorized mobility is very high and individual car ownership is very low. Moreover, urban poverty in Addis Ababa is widespread as revealed by high unemployment rate and low per capita income and recent reports indicate that poverty is not declining.

The survey was, therefore, originally intended to cover households, public and private public transport providers and governmental institutions with stake in urban transport infrastructure, public transport, urban planning and development. The private public transport were excluded from the survey for funding difficulties. Many of these public institutions, for the lack of technical competency and poor institutional memories, were unable to respond to the questions (See Appendix 39) that were sent to them. The exception was the Anbessa city bus enterprise (See Appendix 38) which fully responded to the questionnaire. The main institutions that did

not respond include the newly established Addis Ababa road and transport bureau that has little technical and planning capacity and more concerned with operational, routine and daily functions of license and vehicle administration, the Addis Ababa road authority mainly concerned with the road construction and engineering duties and less with traffic demand management and coordination with the public transport authorities, the Ethiopian railway corporation which mainly concerned with rail construction and little with the operational aspects of the proposed LRT system and its integration with other public transport modes and the Addis Ababa mayor's office mainly concerned with political duties and less with planning. The Addis Ababa master plan office failed to provide competent responses to the questionnaire on transport, public transport planning and public transport integration, although it envisages to promote an integrated multimodal public transport for the city in the newly prepared city master plan. The survey report, therefore, does not include the institutional issues of urban transport as originally planned.

5.2 The survey process

The survey process involved a number of phases that extended in the period between 2011 and 2015. It included the preparation of the survey questions, sample selection, survey implementation, encoding and data processing and the analysis stages. We also faced a number of problems when we were conducting the survey. The processes are briefly described below.

5.2.1 Survey preparation

The idea of conducting travel survey was conceived in the thesis proposal in 2011. The objective was to generate detailed and supplementary demographic, socioeconomic and travel data that are not available in the official statistics and governmental reports. The household travel survey questionnaire, after a thorough review of the literature on travel surveys, was fully developed in summer of 2012. Moreover, we exploited the LET research staffs' rich experiences of travel surveys designed for some West African cities in the developing the questionnaires for Addis Ababa. The questionnaires were closed ended type of questions and were intended for face to face interviews. Originally, the survey was planned to include a sample of 1,000 households and all adult persons aged 14 and above of each household. The survey was then planned to be conducted in 30 sample Weredas of Addis Ababa in the months of September and October of 2012. They included socioeconomic and demographic data on

households, detailed travel data and travel diary on each individual adult member of the household aged 14 and above.

The detailed program and cost structure of the household travel was presented to the sponsoring institution for funding approval. But for administrative and technical reasons, the sponsors declined to approve the financing. The survey could not be conducted according to the schedule and was postponed to later dates. It became clear to us that the survey cost that we originally proposed will not be available. This difficulty of getting sufficient funding for the survey forced us to reconsider the sample size and Weredas to be covered, although we in principle agreed to conduct the survey. In summer of 2013, therefore, we decided to revise the content of the survey, number of sample Weredas to be included and number of households and individuals to be interviewed. This decision gave us the framework for conducting the survey with limited funding. Consequently, we agreed to scale down the number of sample Weredas from 30 to 5, reduce the household numbers from 1000 to about 200, interview only one adult member instead of all adult members of each household for the travel survey and totally omit the survey part on travel diary (travel the day-before).

We began the survey at the beginning of July, 2014 with funds available from own sources and some contributions from individuals from LET. However, in late July of 2014 the graduate program of the Ethiopian Institute of Architecture, Building Construction and City Development (EiABC) of the Addis Ababa University provided additional funds for the survey. We were able to increase the number of Weredas to be surveyed and employed more interviewers. We increased the Sample Weredas to 12 and more than doubled the sample household numbers. The funds were used to cover the costs for the secretarial work of writing the questionnaire in the local Amharic language (See Appendix 26 and 27 for the English version of the questionnaire), buying stationeries, photocopying, fees for interviewers, transport allowances, fees for data encoding and some other administrative costs for managing and controlling the survey process.

5.2.2 Sample selection process

Once the sampling frame was worked, we proceeded to the next tasks of selecting the representative Weredas. The criterion of population density, distance from the city center, access to transport infrastructure and geographical locations were used as criteria for selecting the sample Weredas. Currently, Addis Ababa is estimated to have 3.1 Million inhabitants

(Demographia World Urban Areas, 2012). The last census report (CSA, 2008) for Addis Ababa gives 4.1 persons per household and assuming this to be valid now, then the city has 759,024 households. Constrained by the lack of sufficient funding, only 420 sample households (a sample size of about 0.06%) were included in the survey.

In accordance with the charter of the city, Addis Ababa has three tiers of government; namely the city (highest level), the sub city (intermediate level) and the Wereda (the lowest level). The Weredas are usually subdivided into zones for the purpose of facilitating decentralized Wereda administration. The city has 10 sub cities and 109 Weredas and a number of zones. The sampling took into account these political and administrative divisions. The selection of the sample Weredas was based mainly on the criteria of population density (Refer to Appendix 26), locational variable (city center, intermediate and periphery), access to transport infrastructure (road and public transport routes) and urban structure (old and dilapidated, planned and informal). Of the 109 Weredas, a sample of 8 Weredas was taken. On the basis of these criteria, 2, 3 and 3 Weredas were selected from the city core, intermediate and periphery respectively. A random sample of 40 households was taken from each Wereda. A stratified sampling method was used for selecting households where there were marked differences in residential quality of each Wereda. The zones within each Wereda were used for the stratified sampling purposes. A supplementary intercept survey at major shopping areas, terminals and other interchange stations of Merkato, Piazza, Megnagna and Lagare were also conducted.

Table 5.1: Population densities and locations of sample Weredas and main public transport terminals

Population Density	Location in Addis Ababa		
	Inner part	Intermediate part	Outer part
High	<ul style="list-style-type: none"> • Lideta Wereda 08 • Merkato Terminal • Lagare Terminal • Piazza Terminal 	-	-
Medium	<ul style="list-style-type: none"> • Nifas Silk Wereda 07 	<ul style="list-style-type: none"> • Kolfe Keranio Wereda 06 • Megnagna Terminal 	-
Low	-	<ul style="list-style-type: none"> • Bole Wereda 09 • Nifas Silk Wereda 01 	<ul style="list-style-type: none"> • Akaki Wereda 01 • Yeka Wereda 11 • Gulele Wereda 10

After the sample Weredas have been selected, we proceeded to employing the research assistants for the survey. The job announcement for the interview was posted at the EiABC. There were applicants both from students and fresh graduates that just finished their studies from the program of Urban and Regional Planning. We opted for fresh graduates and eight of the graduates were selected. They were given a one-day training on the survey technique, purpose of the survey, principles to be followed when conducting the survey. We had also a thorough discussion on each of the survey questions and survey responses.

The survey involved some preparatory and mandatory works. The following administrative tasks were undertaken before the survey was conducted;

1. Official letter of the EiABC stating the objective of the survey and requesting the permission to conduct the survey was sent to each of the participating Weredas. The letter also stated the name of the interviewer and the EiABC chair responsible for the survey.
2. The Wereda administrations approved the survey and each Wereda provided identification badges for the interviewers so that the interviewers will be easily identifiable by community police and households.
3. Each Wereda administration provided the database on number of zones of each Wereda, housing number (if any) and listing of households (residents) by zones. The zone are simply further subdivisions of the Wereda for facilitating administration and management and do not have any legal status.

5.2.3 Survey implementation

We then randomly selected 40 households from each Wereda using the household registry of the Wereda but ensuring fair distribution in accordance with the household number in each of the zones of the Wereda. We also took 20 samples from each of the main transport terminals at Piazza, Lagare and Megnagna and 40 samples from the main market and public transport terminal of Merkato. While we went to each of the residences of the sample households in each of the Weredas, the surveys in the transport terminals were conducted in the stations and the samples were randomly selected from boarding and alighting passengers. We used a face to face and question based closed ended interview at homes in the selected sample Weredas and at terminals. We tried to ensure a fair representation of all the Sub Cities of Addis Ababa. This

is presented in Table 5.2. The survey, encoding of the survey results and preliminary analysis of the survey was done from July to November of 2014.

Table 5.2: Sample Weredas, number of households interviewed and total population

No.	Name of Weredas by Sub City	Number of Households interviewed	Total number of population of the sampled households
1	Akaki Kaliti Sub City Wereda 01	40	171
2	Bole Sub City Wereda 09	40	199
3	Gulele Sub City Wereda 10	40	223
4	Kolfe Keranio Sub City Wereda 06	40	217
5	Lideta Sub City Wereda 08	40	161
6	Nifas Silk Lafto Sub City Wereda 01	40	132
7	Nifas Silk Lafto Sub City Wereda 07	40	184
8	Yeka Sub City Wereda 11	40	145
Public Transport Terminals			
1	Merkato (Market center) terminal at Addis Ketema Sub City	40	114
2	Lagare terminal at Lideta and Kirkos Sub Cities	20	62
3	Megnagna terminal at Yeka Sub City	20	117
4	Piazza terminal at Arada Sub City	20	60
Total	12 sample Weredas and terminals	420	1785

5.2.4 Data encoding and analysis

The survey and the encoding of the survey data lasted from the end of July, 2014 to beginning of November, 2014. The data was encoded in excel data sheet and the statistical application software tool SPSS was used to produce results. The results have been aggregated at the city level and no effort was made to make spatially disaggregated analysis at the Wereda level. This has been purposely avoided. Ababa has traditionally evolved as a city where poor and rich people live together. This has been enforced the city master plans that have promoted mixed residential development. Hence it is hard to find in Addis Ababa pure high income group's neighborhoods that are geographically segregated from pure poor income group's neighborhoods, although the situation may be rapidly changing now. The mixed income residential distributions and the small sample size did not provide us the ground to draw substantial conclusions and relationships from the comparisons of the survey data between

Weredas. In the income and expenditure analysis, we converted all income and expenditure amounts to monthly amount so that it would be easier to make comparisons.

5.2.5 Problems encountered and lessons

We encountered a number of technical problems during the survey period. Firstly, the lack of sufficient funding for the survey as originally intended had the impact on the number of households interviewed and Weredas selected. The number of Weredas were reduced and all adults in each household aged 14 and above as well as travel diary survey were purposely avoided for the lack of funding.

Secondly, one of the most important problem was the identification of the sample households in the field. The sample households were picked randomly from the Wereda household registry. Each household has a house number and this has to be traced in the field. Locating the sample households using the house number given by the Wereda administration was difficult for there was no systematic house numbering system. The problem of house number identification was complicated in Weredas having a significant proportion of informal housing. We had to use the older maps which, in most cases, were not very accurate. Recent digital maps are available but are confidential and could not be accessed by the public for security reasons. We used other supplementary sources to locate households. The community police services that have been organized at a block level within each Wereda were very helpful in tracing the sample households in the field.

Thirdly, most working households were unavailable during work days and interviewers had to go again on weekends to interview them.

Fourthly, as there was no any reward in participating the survey, we had a hard time convincing the survey participants on the importance of the survey and explaining why their responses are very important. Here, the skill of the interviewers was very valuable in arousing participants' motivation and getting correct responses. But still, getting proper responses that meet our standards was a painstaking task.

Fifthly, we had transport difficulty in Weredas located on the mountains and having poor transport access as in the case of Wereda 11 of Yeka sub city.

Sixthly, we have encountered very few item nonresponse to our questions. By and large in all the Weredas, it was apparent that insufficient responses and lack of interest to provide full responses to the questionnaires were the major problem that was encountered during the survey

process. Many households were reluctant to positively and actively participate in the survey for many thought that nothing substantive and constructive will emerge from the survey as in the previous surveys that were conducted but were never implemented. Nevertheless, the experiences of the interviewers was very valuable in convincing the households to fully respond to the questionnaires.

Finally, most of the governmental institutions failed to respond to the structured questionnaires sent to those institutions.

5.3 A description of the sample Weredas

The household survey, as already discussed earlier, included 420 sample households from eight sample Weredas and four major public transport hubs and the main city market of Merkato. These are shown in Figure 5.1.

The locations of the sample Weredas are displayed in Figure 5.1 and each Weredas' urban structure and the zones of each Wereda from where the samples were taken are shown in Appendix 27 to Appendix 34. The demographic characteristics, urban structure and typical land uses are briefly presented in Table 5.3.

Figure 5.1: Household travel survey coverage by Weredas and Terminals

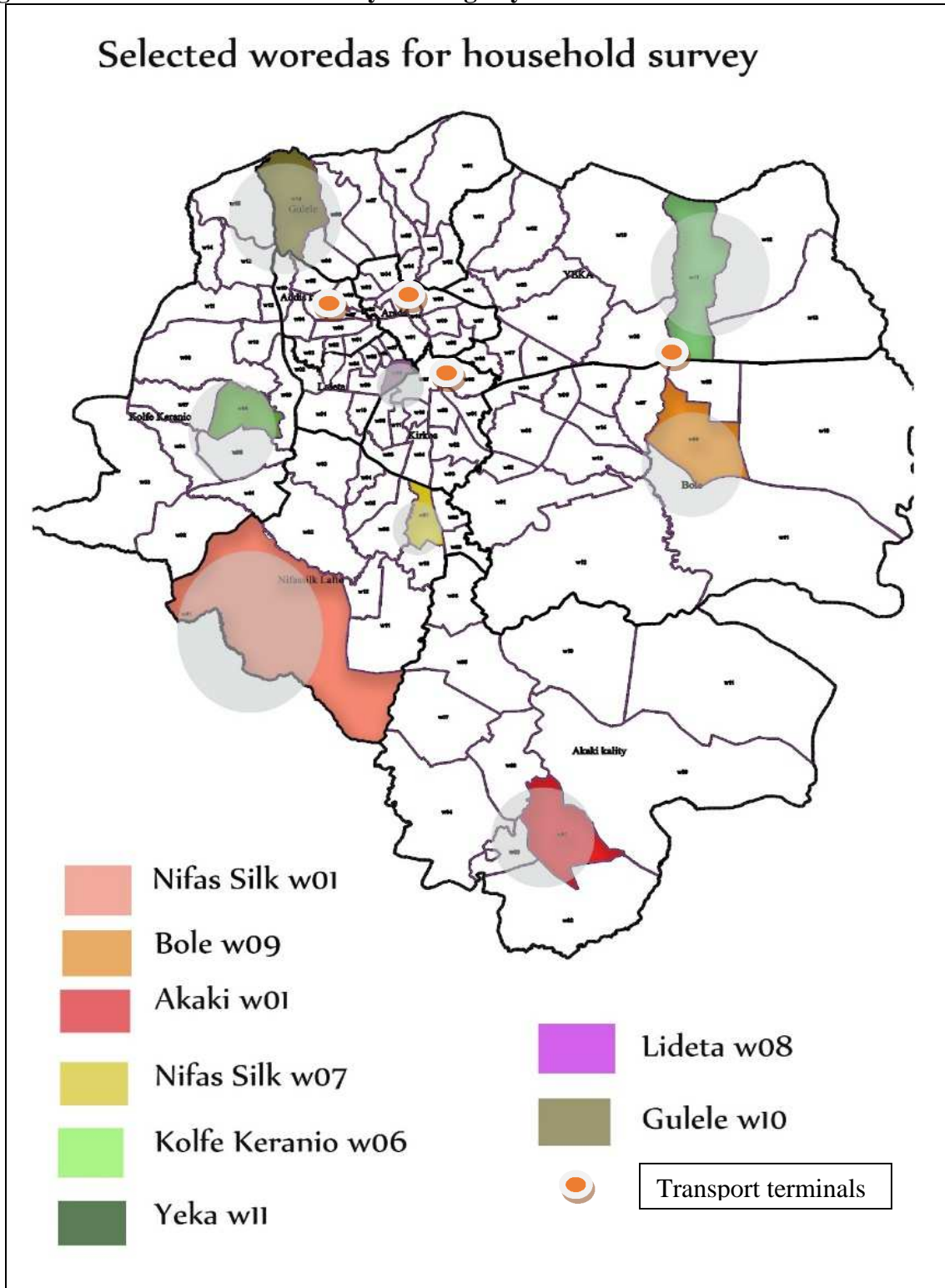


Table 5.3: Summary of the locational, demographic and land use characteristics of the sample Weredas

Name of Wereda	Sub City	Local Name	Number of zones	Population size	Number of Households	Land use and settlement structure
Wereda 01	Nifas Silk Lafto	Jemo	8	640,000	160,000 (of which 32,000 are female heads)	<ul style="list-style-type: none"> • Dominant residential land use. • Houses the first large scale integrated public housing (condominium housing) program. • The presence of large open spaces in some parts of the Wereda (See Appendix 27).
Wereda 07	Nifas Silk Lafto	None	Not available	40,000	8,000 (of which 2,000 are female heads)	<ul style="list-style-type: none"> • Mainly industrial zone with fewer number of residential units. • Agricultural land use and informal development in the outlying areas (See Appendix 28);
Wereda 06	Kolfe Keranio	Bethel	6	51,000	10,000 (of which 3,200 are female heads)	<ul style="list-style-type: none"> • Dominant residential land use. • The dominance of new planned settlement structure than in the other Weredas of the sub City. • Dominantly grid type of settlement pattern. (See Appendix 29).
Wereda 01	Akakai Kalti	Akaki Market	9	70,000	16,000 (of which 3,000 are female heads)	<ul style="list-style-type: none"> • Largely industrial zone with fewer number of residences. • Scattered settlement on some parts of the Wereda. • Agricultural land uses on fringe areas. (See Appendix 30).
Wereda 08	Lideta	Senga Tera	8	40,000	8,000 (of which 2,000 are female heads)	<ul style="list-style-type: none"> • Location of major governmental and other institutions of the city. • Large scale demolition of older settlements and slums underway. • Earmarked for major urban renewal program; • Gentrification process highly visible. • Large block dominant (See Appendix 31).
Wereda 11	Yeka	Kotebe	13	37,000	7,000 (of which 2,500 are female heads)	<ul style="list-style-type: none"> • The presence of scattered settlement on the upper slopes of the Wereda. • Largely informal development and poor access to transportation infrastructure. • Agriculture, forest and open space on the higher grounds of the Wereda. • Stepper slopes dominant. (See Appendix 32).
Wereda 11	Gulele	None	10	27,000	7,000 (of which 2,500 are female heads)	<ul style="list-style-type: none"> • Prevalence of large open space and forest areas. • Informal development and haphazard pattern of settlement on higher slopes and closer to green areas. (See Appendix 33).
Wereda 09	Bole	None	6	38,000	7,500 (of which 2,500 are female heads)	<ul style="list-style-type: none"> • Open space dominant. • Scattered settlement pattern. • Marked agricultural land uses. (See Appendix 34).

5.4 Survey results

The survey result and analysis have thus three parts; one dealing with households, second one with individuals and the third one dealing with the assessment of public transportation.

5.4.1 Household travel survey results

The aggregated travel survey result has two parts. The first part of the analysis deals with data at the household level and the second part of the analysis deals with individual demographic and travel data of one adult member of each household. A simple descriptive statistics is applied as method of analysis and no attempt was made to make use of advanced statistical inferences.

The data collected through the survey has been used to

- Analyze the socioeconomic and demographic variables including household size, age structure, income and expenditure patterns and residential choices,
- Explore the spatial factors of accessibility related to roads, jobs, residence and services,
- Investigate travel characteristics, car ownership, modal choice and mix and factors determining modal choices,
- Evaluate the public transport modes frequently used,
- Evaluate the trip segments that include access, waiting, transferring, travelling and egress, and
- Assess the revealed and stated preferences of the users of public transportation.

The results present a representative picture of the socioeconomic, demographic and travel characteristics of Addis Ababa. The survey result generally shows that most of the sampled households are poor. The results on income levels are indicative of the worsening economic situation in the city. More and more of the low income groups are becoming vulnerable to extreme poverty.

5.4.1.1 Household level results

Both the official population figures provide by the Wereda administration as presented in Table 5.3 and the survey results show that the average number of heads per household is 4.3 persons per household which is almost similar to the average figure of 4.1 heads per households for

Addis Ababa (CSA, 2008). It is observed, however, that the average number of persons per household ranges between 4 in the Wereda 01 of Nifas Silk Lafto sub city and above 5.3 persons for Wereda 11 of Guelele and Wereda 11 of Yeka sub city both of which have large informal developments.

Most of the sampled population are in the younger age groups and indeed about 83% of them are below the age of 35. The majority of the sampled population accounting for about 54% of the total population are in the age group of 19 to 35. Males are dominant both as household heads and in their share of the sample population in which they account for 62% and 70% respectively. Most of the population, i.e., 64% were born in Addis Ababa. The two regional states of Amhara with 15% and Southern people and nationalities with 9% are the major sources of migration to the city.

The survey result on residential locations and residential mobility reveals that people have been living in the same Wereda for longer periods and it is only few that have moved to their current residences from another locations. Therefore, the result shows that the majority of the (60%) households have been living in the same Wereda for over 5 years and it is only 14% of them that have been living in the Wereda for a shorter periods of less than a year. It is again evident from the result that people are less mobile in terms of their residential locations. About 66% of the households indicated that they have always lived in the same Wereda and it is only 14% and 20% that have moved from nearby Wereda from the same sub city and another Wereda from another sub city respectively. These results on length of residency and residential mobility have to be compared with ownership of houses. Most households own the houses they live in and the rest 37% have rented the houses either from private individuals or Wereda administration. The majority of the households (about 63%) own the houses they live in and therefore becomes invariably less mobile.

The reasons why households made their current residential choices were raised in the survey. The two most important factors given for the residential locations are proximity to work places and availability of easy access to public transport networks. About 52% of the households need 10 minutes or less to walk to the nearest public transport station, 45% between 10 and 60 minutes. Only 3% of them stated that they need one hour or more to walk to the nearest public transport station. Although, the majority of the households (60%) indicated that their residences is at closer proximity to vehicle usable asphalt road, most have to walk between 10 and 60 minutes (45%) or to walk over one hour (about 28%) to reach the closet vehicle usable asphalt

road. The remaining 28% of the households have to walk less than 10 minutes to access these roads. As expected car ownership is very low and it is only 6% of the households that indicated that they own a car.

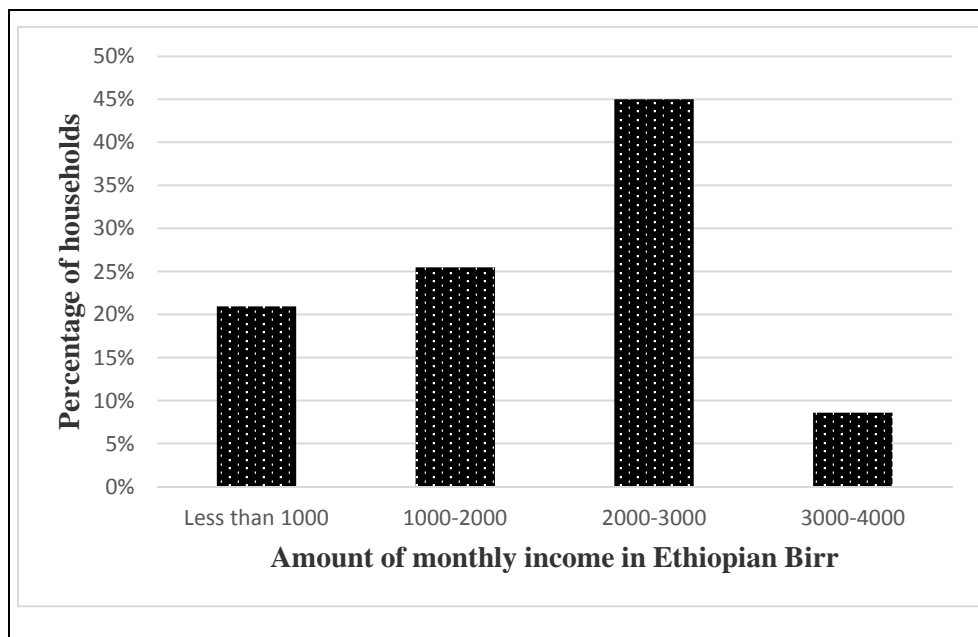
5.4.1.2 Household income and expenditures

The question on income and economic is directed at analyzing the dynamics of income situation over time. Households were asked to indicate their income situation now as compared to the one a year ago, although they were not asked to give explanations as to the why of their current economic situations. The analysis seek to know whether people are moving up (improving) or down (deteriorating) or remaining constant in their income levels through time. This approach is common in poverty assessment studies and the results are usually used in formulating poverty reduction strategies. The result shows that it is only 26% household whose income has slightly improved. On the other hand, 48% stated their situation has remained the same and 25% indicated their economic situation has worsen in the last one year. A World Bank report on poverty in Ethiopia between 2000 and 2011 published very recently (Ethiopian reporter, 2015a), shows that number of people living in poverty has decreased between the two periods. However, the study found out that the actual income of the low income groups has decreased from 2005 to 2011 and that more poor people have been relegated to extreme poverty groups. Neither has the situation apparently improved between 2011 and 2015. Inevitably, the worsening economic situation of the households in the sample area is a reflection of this general high level of inflation and constantly increasing cost of living relative to static or hardly increasing income levels in the country general and Addis Ababa in particular.

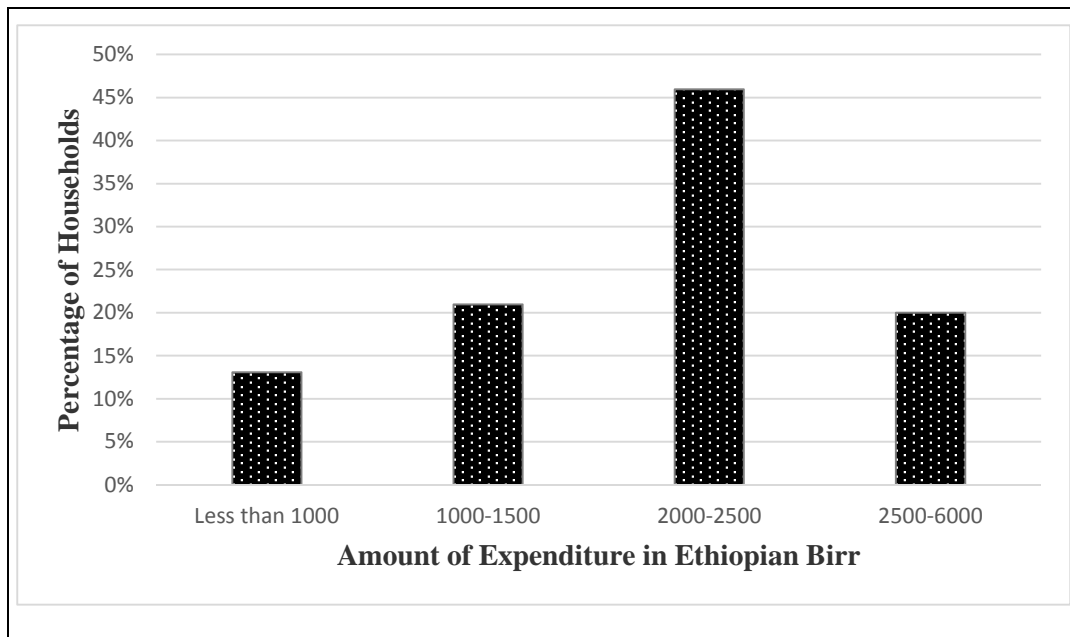
In terms of professional activity, about 48% are employed in the public and private sectors. Students and housewives contributed to 29% and 12% of the professional categories respectively. This does not, however, imply that students and housewives do not contribute to the household income generation. As shown in the survey results, about 70% of the sampled population contributed to the income generation for the households of which 22% were principal and 48% secondary contributors. It was only 30% of the population that did not contribute at all to the household income. As people do not keep a record of their daily income and expenditures by expenditure and income groups, data on household income and expenditures are estimate and could not be very reliable. Moreover, there is reluctance on the part of the people to give exact income and expenditure data for the fear imposition of additional taxes. This is revealed in the income and expenditure survey results.

The average monthly income for the households is about 1900 Ethiopian Birr. As shown in Figure 5.2, most of the households (about 45%) have an income of 2000 to 3000 Ethiopian Birr. However, 21% of them earn a monthly income of less than 1000 Ethiopian Birr while about 9% have a higher monthly income of between 3000 and 4000 Ethiopian Birr. This can be compared with minimum income or the poverty line below which people are assumed to be living in absolute poverty. This amounts to a monthly income of about 2,600 Ethiopian Birr (\$1.25 a day and per head). Using this benchmark, the result for a households in the study area explicitly shows that most are poor and only 9% of them could be considered as having income levels above the poverty line. The comparative analysis of the income and expenditures of the sample Weredas with that of the city’s average income and expenditure is practically impossible for the paucity of an official data on average monthly income and expenditures of the households of Addis Ababa.

Figure 5.2: Percentage distribution of households by monthly income groups



The average monthly expenditure per household is about 2200 Ethiopian birr per household. About 34% of the total households have expenditures of less than 1500 Ethiopian Birr and 20% above 2500 Ethiopian Birr. Most households (46%) spend between 2000 and 2500 Ethiopian Birr as shown in Figure 5.3.

Figure 5.3: Percentage distribution of households by monthly expenditure groups

The distribution of expenditure by expenditure groups is presented in Table 5.4. It is interesting to note down that expenditures on food, both durable (long-term) and non-durable, and transport together account for about 64% of the total household expenditures. Expenditure on transport accounts for about 23% of the total household expenditures and 29% of the total household income. It is not easy to draw conclusion on the relationship between income levels and expenditures. This is because it does not make sense to make stratification of incomes by income groups as basically the income levels are already very low.

The high expenditure of transport is related to the mode of transport used and number of trip legs. The survey indicate that the three public transport modes that are frequently used according to their order of importance are minibus taxis, Higer midibuses and Anbessa city buses. The fares are highest for minibuses and lowest for Anbessa minibuses. Similarly as most of the surveyed Weredas are mostly located in the intermediate and peripheral locations and most jobs and services are concentrated in the city center, it could be inferred that daily commuting of the sampled population to city center could involve more trip legs. As there is no integrated fare system in Addis Ababa, it is to be expected that transport costs would be higher than that in integrated system.

Table 5.4: Average monthly expenditures by expenditure items by households in Ethiopian Birr

Expenditure Item	Monthly Expenditure	Percentage
Food non-durable	593	24%
Food durable	349	14%
Transport	558	23%
Clothes and shoes	271	11%
Household furniture	349	14%
Education	116	5%
Medical care	186	8%
Utilities	37	2%
Total	2459	100%

The average amount of monthly expenditure by expenditure items, as presented in Table 5.4, is slightly higher than that by expenditure amount as shown in Figure 5.3. The difference could be attributed loss of information due to aggregation of the data and estimation errors by households. Nevertheless, the differences between the two estimations are not so much exaggerated. Generally, expenditure is higher than the income and that average monthly income is about 86% the average monthly expenditure (See Figure 5.3) and 76% of the average monthly expenditure by expenditure items (See Table 5.4). The inequalities between incomes and expenditures could be explained by either income that is unaccounted for or under or overestimation of the incomes and expenditures. Remittance from abroad and house rentals are additional sources of income that are not explicitly mentioned in the survey. The latter is usually undervalued for people do not disclose it as the source of income. This is because the federal tax law on income states that house rentals are taxable and that renters should pay taxes to the government. Even though there could be some errors in estimations, it is true that for most households expenditures are higher than incomes. This because in Ethiopia and particularly in large urban areas, the high rate of inflation is pushing the cost of living to higher levels and the cost of living is increasing much faster than incomes. By and large, the survey result on incomes and expenditures amounts corresponds with the city and the national trend.

5.4.1.3 Access to basic services

A number of basic services were listed in the questionnaire for the households to choose from provided that they have been using them. These service are provided publicly and privately. The major services that are considered important are public and private primary schools, public

and private secondary schools, public and private university preparatory schools, public and private health stations, public and private hospitals and markets for food items. The households were also asked to state the location of the services, the transport modes they used to access them, the trip duration for the selected mode to access these services and the reasons for not using the services, if they are not using them at all.

All the households indicated that they used the service categories of health stations, health centers and markets for food item. However, only 13%, 8%, 8% and 5% of the households make trips to public primary schools, public secondary schools, public university preparatory schools and public hospitals respectively. None of the households indicated that they used private services as they are usually too expensive for them. All those households, who indicated that they use public primary and secondary schools, make very regular trips to these services and so are also the trips to markets for food items. The trips to public university preparatory schools, health stations and centers and public hospitals are not frequently made.

The locational factor of distance between home and destination to get the required services greatly influences the modal choice and trip duration to get the services. The interpretation of the data as shown in Table 5.5, Figure 5.4 and Table 5.6 should be made collectively.

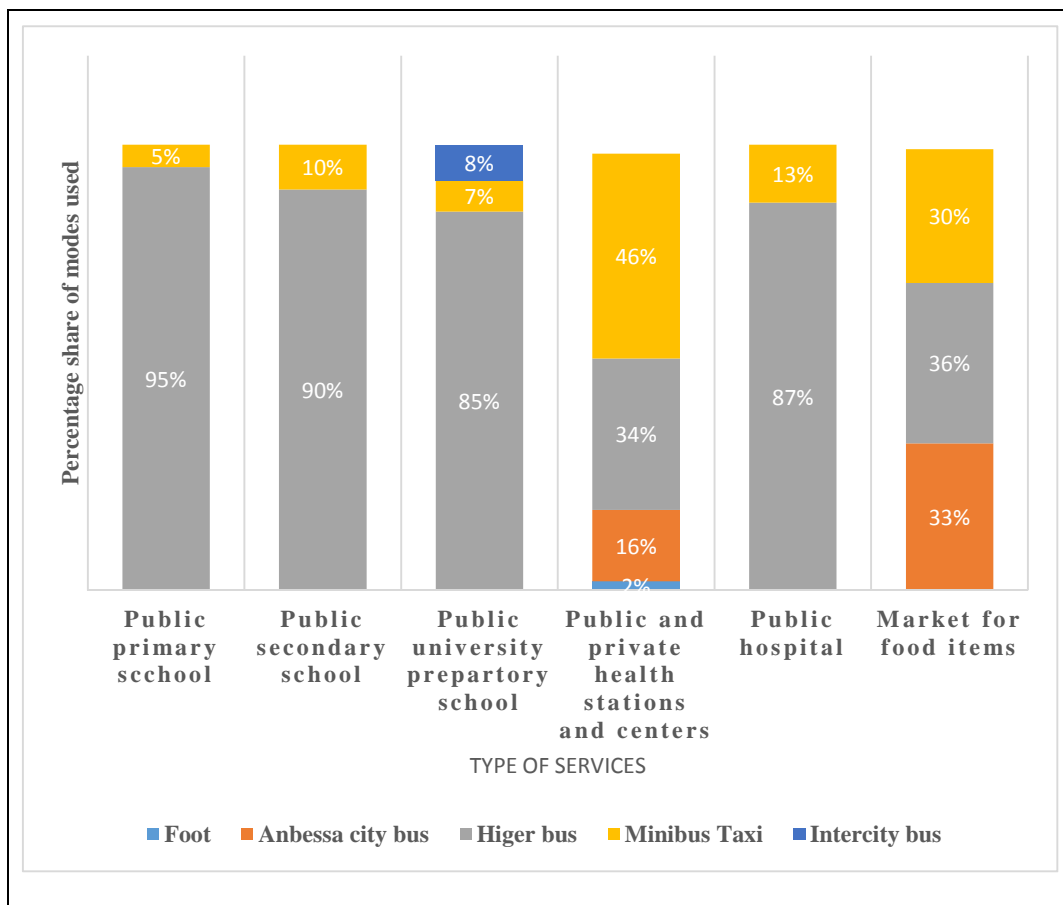
Table 5.5: Percentage distribution of location of services used by households

Service	Number of households using the services	Percentage of households using the services			
		In the same Wereda	In neighbouring Wereda	In neighbouring Sub city	Other
Public primary school	53	10%	55%	35%	–
Public secondary school	32	15%	49%	36%	–
Public university preparatory school	32	–	12%	86%	2%
Public and private health stations and centers	420	27%	35%	38%	–
Public hospital	21	–	8%	92%	–
Market for food items	420	11%	35%	54%	–

Most of the services used by the households are either in the neighbouring Weredas or in other Weredas in another sub city as presented in Table 5.5. One would not be surprised if higher ordered services are found at more central locations and at a greater spacing from each other as they require higher threshold populations. This is true for the specialized services like university

preparatory schools and public hospitals which are located at more centralized locations and at greater average distances from homes. Surprisingly, the most important and basic services like primary school and market for food items are not found in closer proximity to residences. In the survey, therefore, most households have to go the neighbouring Weredas or neighbouring Sub cities to get these basic and elementary services.

Figure 5.4: Transportation modes used by households to access services



Interestingly enough, the dominant mode of transport for accessing the services is not walking as one would expect and which stands in contrast to the modal distribution at the city level. Fewer trips are made on foot and by Anbessa city buses, and none by car. Most household trips use a modal combination of Higer buses and minibus taxis. Higer midibuses are the most important mode for trips to schools and public hospitals as shown in Figure 5.4. All household responded that they regularly go to health stations, health centers and markets for food. Three or more modes of transportation are used to access these services. As shown in Figure 5.4, the

maximum of four modes are used for trips to public health stations and health centers. Three modes are used for trips to market for food items and university preparatory schools. The least modal mix is observed for trips to public primary schools.

Most trips, as shown in Table 5.6, have a duration of less than one hour. This, however, does not imply that the trips are short in length for most of these trips uses motorized modes. An interpretation of the data in Table 5.6 must also consider the relative importance of the each of these trips as indicated by number of households using these services. A shorter trip duration of less than one hour is observed for most trips to primary schools, which by their functional character are expected to be found in greater number and at closer distance from homes. This holds also true for some of the food items that are frequently needed. Conversely, the longest trips are made for accessing university preparatory schools. Similarly, trips for food items could involve longer commuting to major food markets located in Piazza, Merkato and elsewhere in other secondary food markets found in other Weredas and Sub Cities. Health stations, health centers and markets for food items are services that are used by all households and these service could involve trips of longer than one hour in duration.

Table 5.6: Duration of trips to get the selected services for the transport mode used

Service	Number of households using the services	Trip duration to destination for the mode used		
		Less than 10 minutes	10 minutes to one hour	More than one hour
Public primary school	53	18%	80%	2%
Public secondary school	32	11%	84%	5%
Public university preparatory school	32	–	66%	34%
Public and private health stations and centers	420	–	87%	13%
Public hospital	21	–	100%	–
Market for food items	420	9%	63%	28%

The survey result also shows that almost none of the services provided by the private sector including primary schools, secondary schools, university preparatory schools, health stations, health centers and hospitals are used by households. These could be either due to the absence of privately provided services in the Weredas, which is not likely to be true, or most importantly these services are financially unaffordable by most households. Indeed all households in the

survey stated that they are not using the services provided by the private sector because they are too expensive for them.

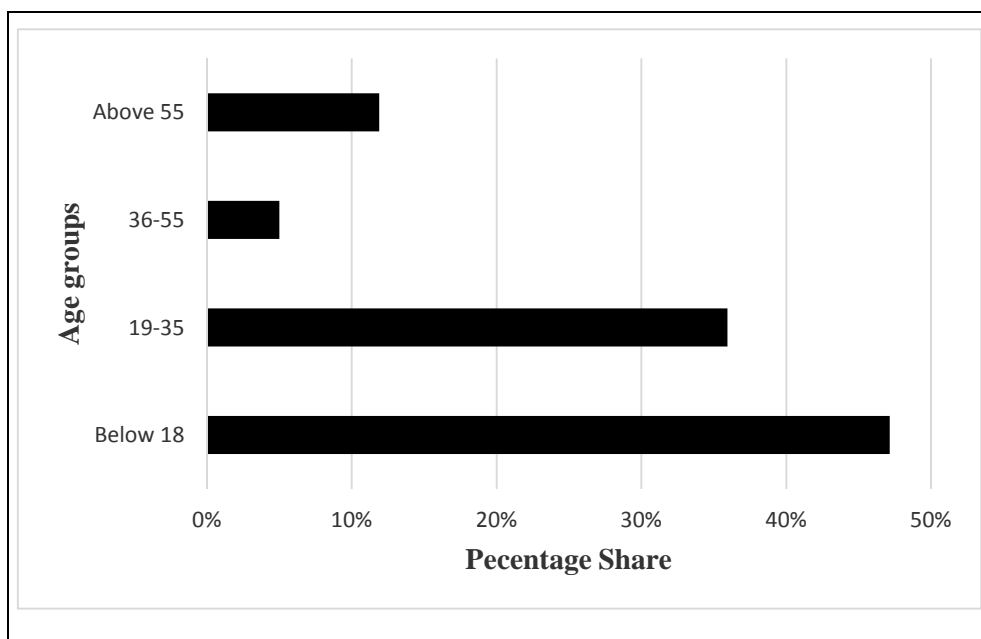
In light of the modes used and trip durations for accessing the services, it is plausible to draw the conclusion that some of the basic services are not found at reasonable distance from residential locations of the sample households. There is a need for making trips shorter and sustainable by providing some of the basic services more frequently in the Weredas, at closer locations and shorter walking distances from homes. It could also be inferred that there is a need for modal integration of public transport as most trips use a combination of a number of public transport modes and that fare integration should provide the means to provide affordable transport as the high transport expenditures actually incurred by the community is restraining non-transport expenditures.

5.4.2 Individual level results

The second part of the survey result is based on individual socioeconomic, demographic and travel characteristics, public transport mode choice and the stated preferences on the use of public transportation.

5.4.2.1 Socioeconomic and demographic results

Most of the individuals interviewed are males. Females only account for about 8%. Alike the sampled total population demographic characteristics, the result for individual level, as displayed in Figure 5.5, shows that the great majority are in the younger age groups. About 47% are below the age of 18 and 84% are aged 35 and below. Only 12% that are above the age of 55, again a picture similar to the feature of the population pyramid and age structure of Addis Ababa and the country. Most of the individuals (81%) interviewed are single. At individual level, again the impact of migration is less significant as about 78% stated that they were born and grown up in Addis Ababa.

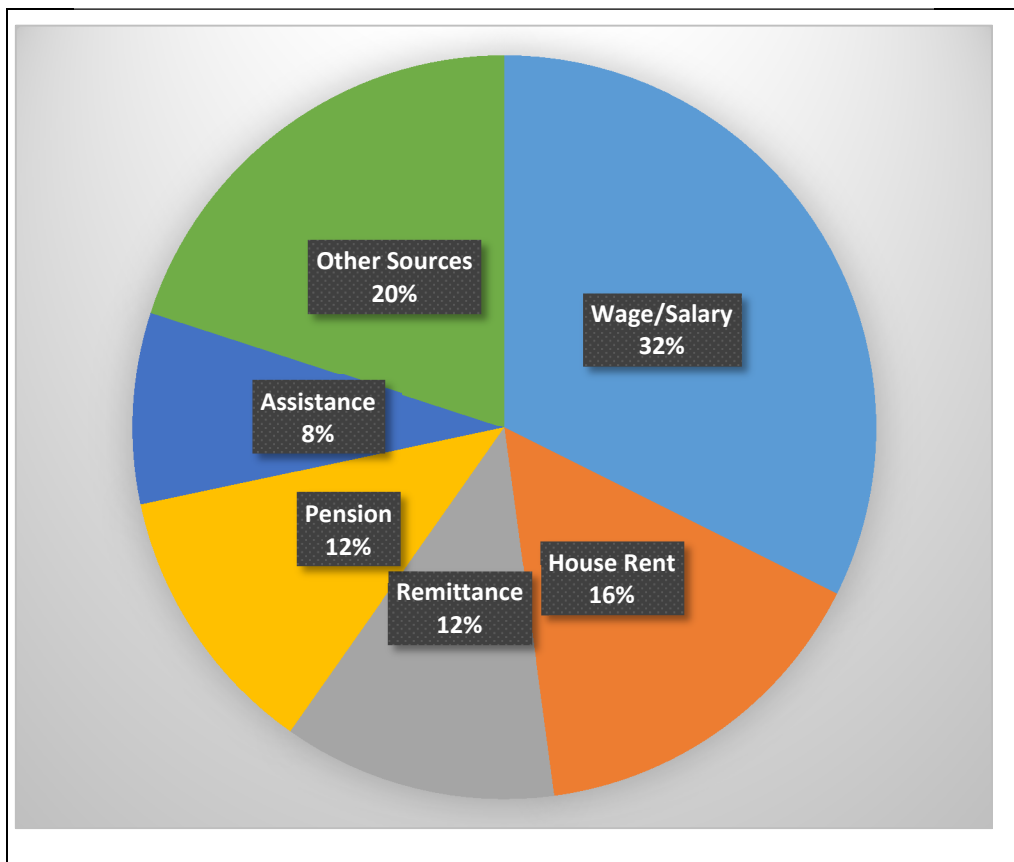
Figure 5.5: Percentage distribution of sampled individuals by age groups

Although 87% of the total sampled individual can read and write, only few of them have a higher level of education. Accordingly, only 13% have a university bachelor degree and above and the rest of them are graduates of vocational schools (19%), high schools (43%) and elementary schools (25%). However, one must be careful in interpreting these results as it should be seen in comparison with the proportion of individuals actually engaged in gainful employment and individuals attending schools. This is because a great proportion of the non-working samples could still be attending schools (See for example Figure 5.5).

The sample individuals were asked to assess their income situations over the last one year. The results of the enquiry show that about 25% of the individuals stated that their income has improved, 29% indicated their income has remained the same and the great majority (46%) stated that tier income has decreased. There are different sources of monthly incomes and the three important sources of income, as shown in Figure 5.6, are wage and salary, other sources and house rent. The income type designated as “other sources” of income is rather important. These could be incomes from very traditional social institutions in Ethiopia. Firstly, there are periodical money contributions from members of a voluntary saving associations known as “Equibs” in Ethiopia. The money collected (usually weekly and monthly) is then distributed to the members on lottery basis or other agreed rules. Although members get back what they contributed or will contribute in the future until every member is paid, the Equibs momentarily

provide supplementary source of income. Secondly, there are also incomes from voluntary burial associations (known as “Idir) from which members are paid agreed amount of money when member of the family dies. Remittance from abroad is becoming not only a vital source of supplementary income for many families but also a leading source of foreign currency for the government. Finally, soft loans from governmental microfinance institutions offer many households in Addis Ababa and elsewhere in the country an additional source of income.

Figure 5.6: Sources of income



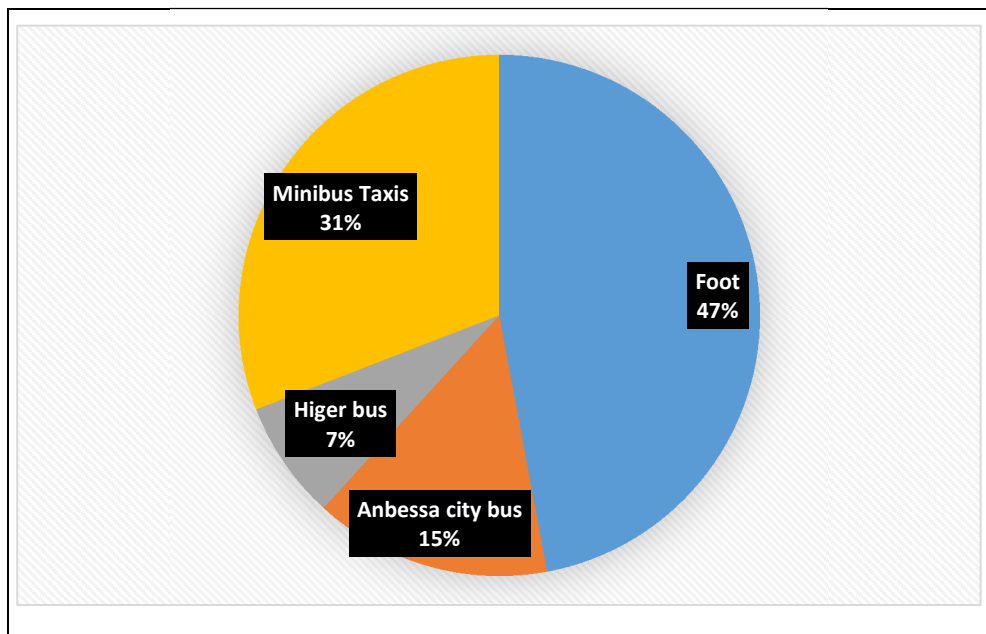
5.4.2.2 Results of Individual travel characteristics of work related trips

Only 33% of the sampled individuals stated that they have been gainfully employed in the last thirty days prior to the day when the survey was conducted. Of those, the largest proportion of them (54%) are working as contract employee in the private and public sectors, about 15% as

permanent employees in the public sector, 23% in the private sector and the rest are self-employed (8%).

The modal shares of work trips are shown in Figure 5.7. The great proportion of the samples use walking and minibus taxis for work trips. For both home-based work trips (home to work and work to home trips), the same combinations of transport modes are used. None of the trips were made by cars.

Figure 5.7: Modal choice for home-based work trips



Most of the outbound and inbound work trips are made on foot. Minibus taxi are the second most important modes used and they contribute for about 58% of the motorized modal share (or 31% of the total modal share). Again Anbessa city bus, despite significantly lower fares than minibus taxis, is not favored by users be it at the household levels for accessing basic services or at individual levels for home-work trips.

Most trips (about 51%) have a duration of between 10 minutes and one hour for both outbound work trips and inbound home trips. Fewer trip (about 7%) with duration of more than one hour have been observed in the survey and these are mostly for trips to destinations to neighbouring towns.

The sample individuals were asked to indicate three factors which they think are important for their choices of a transport mode or combination of modes. The result of the survey is shown in Table 5.7. The three most important reasons for modal choices of according to their order of importance are the availability of the public transport mode at closer proximity both to residences and work places, the absence of other modal choices for captive public transport riders and the provision of direct transport access to residences and place of work. Quality of public transport services as indicated by the degree of crowdedness and length of waiting times are also given consideration in the choices of motorized public transport modes.

Table 5.7: Factors of transport mode choice

Factors of modal choice	Number	Percentage
The mode is available at closer proximity to my residence and/or job	45	33%
The mode is less crowded	11	8%
There is little waiting time at station	11	8%
I walk little between transfer station	—	—
The personal are kind and cooperative	4	3%
The mode provides direct access to my residence and/or job	15	11%
The mode is affordable	7	5%
The mode is clean and safe	—	—
The mode is reliable and regular	4	3%
The mode is fast	4	3%
I have no other choice	35	26%
Total	136	100%

On the other hand, it should also be noted that about 47% of sample individuals, as is displayed in Figure5.7, use walking as means to access jobs and residences. For this group the question of affordability of other modes vis-à-vis their incomes is critical factor of modal choices.

5.4.3 User assessment and stated preferences of public transport

This section of the survey is specifically designed to serve as input for public transport integration which is the main theme of the thesis. It deals with the use and evaluation of the two public transport modes most frequently used by the sample individuals. It also investigates the

stated preferences for improving public transportation or what the users will like to have so that the public transportation provides more efficient, affordable, fast and reliable services.

The evaluation of the public transportation was based on 336 respondents who indicated they used public transport occasionally and frequently. Most of these respondents stated that they are using public transport daily (67%) and some occasionally (13%). Furthermore, they were asked to identify the two most important public transport modes they use for their most frequent trips. The Anbessa city bus and the minibus taxis were the two most important modes used. These respondents were further asked to evaluate these two modes. The evaluation criteria used were:

1. Locational criteria of place of residence and jobs in relation to public transport service
 - Proximity to place of work and residence: Access and egress factors/times
2. In vehicle qualities
 - Crowdedness
 - Clean
 - Safety
 - Personal qualities
3. Economics
 - Affordability
4. Service qualities
 - Speed: No traffic hold up, no delays
 - Direct access: Transfers
 - Waiting time at stations: Headways/service frequencies
 - Transfer walking
 - Reliability and regularity: Adherence to “schedules”

The samples were then asked to indicate their choices on a scaled ranges of preferences of the service quality indicators. The results of the users’ preferences are presented in Table 5.8 and Appendix 39. These results could be compared with overall observations on service quality of public transportation as displayed in Table 3.16. As can be inferred from the Appendix 39 and Table 5.8, there are service quality indicators which have been strongly positively evaluated and there are also service qualities that have been strongly negatively evaluated. There are also

service quality evaluation from which it is not possible to draw strong inferences either positively or negatively. The summary of the results is shown in Table 5.8.

As displayed in Table 5.8, the two widely used public transport modes are not positively evaluated in most of the service quality indicators, although the minibus taxis stand at a slightly more favorable positions than Anbessa city bus. Minibus taxis are faster and they are available at closer proximity to residential areas than that of Anbessa.

Table 5.8: User evaluation of service quality indicators of Anbessa city bus and minibus taxis

Service Quality Indicators	Anbessa City Bus			Minibus Taxis		
	Agree (+)	Disagree (-)	Somewhat in between	Agree (+)	Disagree (-)	Somewhat in between
It is close to my residence and/or job			✓	✓		
It is affordable	✓			✓		
It is fast			✓	✓		
It provides direct access to my residence and/or job	✓			✓		
It is less crowded		✓			✓	
It is clean and safe		✓			✓	
There is little waiting time at stations		✓			✓	
I walk little between transfer stations			✓			✓
It is reliable and regular		✓			✓	
The personal are kind and cooperative		✓			✓	

Public transport integration seeks to make travel seamless by chaining the travel from origin to destination as “one whole”. This “one whole” trip, however, has a number of trip segments; the travel (walk or drive) from home to nearest public transport station, waiting and transferring at the station, travelling with the public transport mode and finally walking to final destinations. These different trip components that include access, waiting and transfer, travelling and egress times are often described as weakest links in public transport journey. Accordingly in the survey, the user of public transportation, who earlier indicated that they use public transport frequently or occasionally, were also asked to assess these trip segments. They were requested to indicate how much time they spent for each of the trip segments and state their evaluation of

each of the trip segments on scaled preference indicators. The result of the survey are presented in Table 5.9 and 5.10.

Table 5.9: Result of the survey on percentage of duration of time spent on each of the trip segments

Trip Segments	Time Spent in Minutes			
	Less than 5	5 - 10	10 - 30	30 - 60
Walking (or driving) from home to nearest station or stop	-	45%	55%	-
Waiting at station or stop	-	35%	65%	-
Travelling using public transport mode	-	15%	60%	25%
Transfer between stations and stops	2%	36%	46%	16%
Walking from the last station or stop to final destination	-	20%	75%	5%

Most of the trip segments have a duration of 10 to 30 minutes and including waiting at stations. But there are also cases in which people have to walk at the transfer stations and walk from final stations to final destination for over 30 minutes.

Table 5.10: User preferences on the trip segments

Trip Segments	Preferences				
	Short & convenient	Short & inconvenient	Long & convenient	Long & inconvenient	Do not know
Walking (or driving) from home to nearest station or stop	45%	-	55%	-	-
Waiting at station or stop	30%	5%	50%	15%	-
Travelling using public transport mode		15%	50%	35%	
Transfer between stations and stops	2%	36%	42%	10%	10%
Walking (or driving) from the last station or stop to final destination	5%	25%	65%	5%	-

The evaluation of the trip segments are not generally favorable as displayed in Table 5.10. Most think that the trip segments have long duration and particularly a good majority thinks that transfer walking is inconvenient. In Addis Ababa terminals at major city center and sub centers, as discussed in chapter three, are not physically integrated. Inconvenient and long transfer walking is the result as the rule. Travelling is neither favored positively as many thinks it is too long usually because of endemic congestion in the city.

Finally, all participants of the survey were asked to indicate their five most preferred choices from given the proposed measures for improving public transportation in Addis Ababa. The result of the survey is presented in Table 5.11.

Table 5.11: Survey result of the participants' five best choices for improving public transportation

Measure for improving public transportation	Number of people in favor of the proposed measure	Percentage
Improve the reliability of public transport & reduce waiting times at stations.	252	12%
Increase the control on the operation of paratransit.	210	10%
Provide more buses and reduce overcrowding of buses during peak hours.	210	10%
Increase government subsidy for public transport.	200	9.5%
Provide affordable transport for the poor.	168	8%
Establish accountable transport institutions to plan and coordinate public transport.	137	6.5%
Improve safety, security and comfort on-board in the vehicles of the public transport.	126	6%
Increase the interconnectivity of taxi and bus stations and reduce transfer time.	116	5.5%
Provide real time information at public transport stations and on-board vehicles.	116	5.5%
Promote public transport oriented city development.	95	4.5%
Introduce an integrated fare system applicable to all modes.	84	4%
Improve public transport vehicle quality and safety.	84	4%
Introduce new modes and high capacity public transport systems.	84	4%
Provide more scheduled public transport services.	74	3.5%
Improve the physical condition of bus stops and terminals.	63	3%
Provide more priority in the traffic for public transport.	42	2%
Increase the coverage and improve performances of public transport network.	42	2%

The stated preferences of the survey participants shows the need for improving public transportation through a number of comprehensive measures. The preferences of the use should be seen in juxtaposition with the organization and characteristics of public transportation in Addis Ababa discussed in Chapter three. The most important preferences of the survey participants are reduction in waiting time at stations and improvement in the reliability of service provided by the city's public transport system. Second in importance in the preference of the users are the imposition of more control on the paratransit operations, provision of more buses, reduction of overcrowding of buses during peak hours and increment of government subsidy for public transport. Ensuring affordable public transport for the poor is the third ranking preference of the survey participants. Establishment of competent public transport planning and coordinating institutions, improvement in the safety, security and comfort in public transport vehicles, increment in the interconnectivity of stations, reduction in inconvenient transfers, and provision of real time information are the preferences of the users in the fourth rank. Finally, although at the lower levels in the lists of the users stated preferences, the survey result also shows the desire of the survey participants for the promotion of public transport oriented city development, introduction of fare integration, improvement in the quality of public transport vehicles, introduction of mass rapid transit, provision of scheduled public transport, and improvement in the physical conditions of terminals and stops. Generally, it is apparent from this result that there are no improvement measures that are strongly and equally important to all survey participants. The choices are distributed among a number of measures and it would be difficult to satisfy all the needs at the same time. Consequently, a number of other criteria like financial requirements, city's development policy, ease of implementation and time frame could be used to prioritize the preferences which will in turn aid the decision makers in arriving at a rational decisions.

5.5 Conclusion and discussion

Addis Ababa to date, as most cities in the Developing countries, lacks systematically and regularly conducted household travel surveys. The few examples of travel surveys the city had were limited in the context and were conditioned by specific project objectives. This survey was done to overcome the lack of detailed travel data in Addis Ababa and generate a fairly representative socioeconomic, demographic and travel database. This survey was broader, more

scientific and had taken into account good examples of travel survey questionnaires from French contributions and West African travel survey experiences of the research staff from LET. The choice of the type of the survey methodology determined design of the content of the travel survey. The survey employed face to face and question based closed ended type of interview. This required careful and thorough examinations of all the possible responses for each of the questions in the survey. A sample pretest of the questionnaires that included administrative, teaching staff and students of the EiABC was done to test whether the responses in the questionnaires were exhaustive. Some modifications to the original questionnaire were made following the pretest. The design of the household travel survey questionnaires that fit local context and must be done in local languages is not an easy task, as the experience from this survey demonstrates. The process needs a thorough preparation, a review of literatures on travel survey designs and examples of travel survey questionnaires that were designed for African cities.

The validity of the travel survey data for making inferences and conclusions is closely correlated with the sample size, degree of representativity of the samples across geographical areas and socioeconomic groups, sampling methods used and the conduct of the survey. Achieving a greater sample size as high as 1% of all the households was not practically feasible and only 0.1% of households were included in the survey. This was not because of the technical and administrative incapacity but rather due to funding shortages for administrating a larger sample size. Securing sufficient funding is critical in survey processes but getting public funding is difficult as there is lack of awareness and travel survey experiences by the city's transport authority.

Multistage sampling technique were used to select the Weredas from the city and households within the selected Weredas. All the Weredas were clustered into groups using the criteria of population, geographical distribution, transport access and distance from the city center. Personal judgment and experience were also used in the final selection of the Weredas which ensured the fair distribution of the samples for each sampling group. The selection of the sample households within the Weredas followed the same sampling technique. They were selected on the basis of the number of zones within each Wereda. The zones are geographical arrangements for facilitating administration in the Weredas. The process of selection of the sample households within each zone ensured fair representation.

Locating selected households in each of the zones was a difficult task as there is no digitally mapped house numbering system. The experience from this survey also shows the importance of the organization and conduct of the survey and the role of interviewers. The interviewers were fresh graduates of urban and regional planning from the EiABC. They had a lot of field based urban planning experiences and good knowledge of Addis Ababa. Moreover, these interviewers were available for full time as they have just finished their studies. Their motivation for the success of survey, their knowledge of the city and their desire to gain practical experiences from the survey were assets that ensured the success of the survey. A supplementary one day interviewer training was given to them and it focused on the purpose of the survey, the contents of the questionnaires, the survey procedures and rules of conduct in the survey process. Finally, data encoding and generating results from the survey is as equally important as the survey conduct. The seventy-six survey questions for each household, Wereda and terminal were encoded in excel data sheet and SPSS statistical tool was used to produce results. The assistant, who also participated in the survey, took the responsibility for encoding and producing preliminary results. The task required a lot of work and testing and the rich and diversified knowledge of the encoder on computer software programs facilitated the task. From this small exercise, it emerged that the commitment and experiences of the interviewers as well as the sound management and monitoring of surveys are important for the success of the survey. Most households responded all the questions and there were very few item nonresponses.

The survey was an attempt to fill the travel data gap and investigate the socioeconomic, demographic and travel characteristics of households in Addis Ababa. The survey result has been aggregated and no attempt was made to analyze the data for each Wereda. Moreover, as the sample size is small, it would not be very realistic to draw significant and valid conclusions that would be true to all households and Weredas of Addis Ababa. Nevertheless, some of the findings of the survey have striking similarities with some official reports. Firstly, income levels are very low in all Weredas and the majority of households indicated that their income levels have either remained static or declined in the last one year. Secondly, there are no marked differences in terms of income between income groups and most have income that is well below the poverty line. There are no significant income differences between Weredas either. This is largely attributed to the absence of residential segregation by income groups in Addis Ababa as both the poor and the rich have lived together. The survey result shows people spent more than they earn and that transport expenditure both as percentage of household expenditures and total income is rather high. Most of the basic services are not found in closer proximity to residences.

Most work and service trips involve the use of a combination of modes (inter and multimodality). Most survey participant use the combination of modes for accessing employment and services. The public owned Anbessa city bus is not the most important mode but it the minibus taxis that are widely used both for service and work trips. Walking as non-motorized mode of mobility has the over proportional modal share.

The following transport and integration related observations could be drawn from the survey;

- As most basic services are not found closer to residential location, urban planning intervention is necessary. It is recommendable to locate more basic services at closer locations and walking distances from homes so that people make few motorized and longer trips.
- As walking is an important mode of transport, it is imperative that the non-motorized forms of mobility be taken into account in public transport integration and road infrastructure development programs and projects.
- As the privately operated minibus taxis provide motorized mobility for majority of the population, they should be given more assistance, institutional support and positive recognition for services they render from the city and federal governments.
- The multimodality of trips is an indicative of the need for making transfer walking and transfer waiting more convenient and shorter through physical and network integration of public transportation. At the city, there is hardly any physical integration of public transportation.
- As the services that are frequently used by almost all households could be accessed by three or more combination of transport modes, this could be taken as an indication of the need for modal, operational and fare integration.
- As people income are low, fare integration and subsidy programs that keep transport expenditure low could be successful instrument in alleviation of poverty and enhancing social inclusion of the low income groups.
- The transport authority of Addis Ababa could not provide actual and precise data on modal shares, public transport passengers, trips origins and destinations, incomes and transport expenditures and the like. Therefore, it is advisable for the city transport authority to conduct detailed and regular household travel surveys.

- The response of the Anbessa city bus enterprise to structured questions (See Appendix 37) sent to it indicate the need for much effort to improve quality of its services, modernize fare collecting system, introduce season passes and examine the options of integration of its service and network restructuring when the LRT becomes operational.

Generally, the survey results and actual transport situation on the ground show the need for approaching the city's increasing transport and traffic problems from a new approach, an approach that capitalizes on the huge public finance that is being invested for improving the performance and attractiveness of the public transport. The fleet increment programs of Anbessa city bus and the new light rail transit could be used as an opportunity to reform the city's public transport system and establish the foundation for the provision of an integrated public transport service. These public transportation expansion programs could also be used as an opportunity to integrate urban development with public transport networks. Multimodal public transportation in Addis Ababa should be founded on a system of public transport integration that has denser and more structured transport networks, a public transport system that is seamless, more accessible, fast, affordable and reliable and provides higher level of transport services and has higher onboard qualities. Lastly, integration measures should be complemented or even preceded by traffic management programs that will enhance the productivity and efficiency of public transport modes. This is long overdue and Addis Ababa has been lagging far behind in their implementation. Such measures could lead to increased productivity, reduced operation costs and reduction of fares of public transportation as best demonstrated by the Lagos BRT.

Chapter 6 An Integrated multimodal public transportation in Addis Ababa

6.1 Introduction

The urban planning, development and urban transport contexts of Addis Ababa have been thoroughly discussed in the previous chapters. As a demonstration of the task, it will then suffice to make only some general observations and reflections on the issue. Addis Ababa is currently undergoing a massive transformation process, a transformation process that is engineered by the urban renewal programs, transport infrastructure development and booming private real estate and public housing constructions. The completion and approval of the integrated development plan of Addis Ababa and the surrounding Oromia special zone for the period 2014-2038 will open up many agricultural and green areas in the city hinterland to further urban sprawl. From a density of less than 10% a decade ago, the city road coverage has now surpassed 20%. Paradoxically, though congestion has now become more endemic and frequent than before. Public transport shortages have become more severe than ever before. This is more noticeable the during the morning and afternoon peak hours. The negative repercussions of longer travel times and travel delays are felt on every aspect of life and costs the economy. The city government has become indeed helpless in finding viable alternatives. The newly introduced free public transport service for all civil servants in the mornings and afternoons is one such intervention to mitigate the problem. The LRT is expected to significantly reduce the problem of public transport shortages along the main corridors. The framework of integration outlines the steps that are necessary to achieve the desired forms of integration in line with the general vision of public transport integration in Addis Ababa.

6.2 Process of implementation of public transport integration in Addis Ababa

The framework for the implementation of public transport integration in Addis Ababa will follow the procedures discussed in the theoretical discussion of public transport integration.

These are:

1. Analysis of the city and urban public transport context,
2. Integration experiences,
3. Review of public transport integration enabling planning and policy frameworks,
4. Identification of barriers of integration and measures to overcome them,
5. Determination of the city's vision statement in general and urban transport vision in particular,
6. Definition the goals and objectives of urban public transport integration,
7. Selection of the forms of public transport integration,
8. Development of an implementation action plan of public transport integration, and
9. Designing of monitoring and evaluation mechanisms.

6.2.1 City and urban public transport context

Addis Ababa's modal share of car is low. Walking and public transport are the main modes. The contribution of walking has been progressively declining and now accounts for 55% of the total modal share. Public transport provide a mechanized means of mobility for most city dwellers. One governmentally owned city bus enterprise and many thousands of private operators are involved in providing public transport service. The public transport fleet includes three-wheelers, small taxis, minibuses, midibuses, standard buses and articulated buses. Buses and minibus taxi now account for 16% and 24% of the total modal shares respectively. It is worth observing that minibus taxi has become more important and their contribution to the modal share has increased from 10% in 1984 to 24 now (Woldetensae et al., 2011, & AASZDPPO, 2013). Like many cities in the Developing Countries, Addis Ababa has thousands of public transport operators. In 2012, there were about 18,000 public transport vehicles operating in the city and it is likely that there are as many owners as the number of vehicles. The great majority of these public transport vehicles are minibuses (12,500) and saloon taxis saloon taxis (4.500) (Addis Ababa Road and Transport Bureau, 2012). Paris, for instance, had

about 80 private operators when it started public transport integration in the 1950s'. In light of this, it is not difficult to foresee the magnitude of the challenge for the integration of these operators into the formal system.

The fare system is again very fragmented and prepaid tickets and passes are not used. The fares are fixed on distance basis by the federal transport authority. The authority sets fares and regularly revises them in accordance with international oil prices. Different set of fare prices are used by three-wheelers (Bajajas), minibus taxis, Higer midibuses and Anbessa buses. The fares for door-to-door service of the saloon taxis are distance based but are negotiated before boarding. Fare payment on the public owned Anbessa city bus occurs before every boarding and paper tickets are issued on cash payment. Ticket validation is done manually on boarding the Anbessa vehicle. The Anbessa issues free passes for war veterans, its employees and their very close relatives. Fare payment for other public transport modes is cash based and happens after boarding. Generally there is no integrated fare and ticketing system, none of the public transport modes use pre-paid tickets and fare payments are made on cash. Fares for all public transport modes are trip based and there are as many cash payments as the number of trips.

The sample household travel survey that was conducted as the part of the thesis was an attempt to fill the travel data gap created by the absence of regularly conducted travel surveys and travel diaries in Addis Ababa. The survey result indicates that there is a demonstrated need for public transport integration and integration of land use and public transport. It is also evident from the result that transport expenditure both as a percentage of total household expenditure and total household income is considerably high. The following inputs for integration are evident from the survey result.

- Most work and service trips are accessed by using a combination of walking and public transport modes. This is an indication of the need for trip chaining and promotion of seamless travel. As walking is the dominant mode of travel, it is necessary to provide safe and attractive pedestrian facilities that link homes with services, jobs, public transport networks and terminals.
- There is a general perception that transfers are inconvenient and involve long walking. This is not surprising as main taxi terminals and bus stations at major centers and sub centers are not found at one centralized locations. There is a need for making transfer walking and transfer waiting more convenient and shorter through physical and network integration measures.

- Most households spent a great proportion of their income on transport. This calls for the institution of public transport efficiency enhancing measures, reforms in fare policies, and subsidy programs and introduction of through ticketing and integrated fares that will be directed at reducing transport expenditures. Such packages could contribute in alleviation of poverty and promoting the social inclusion of the low income groups.
- The result of the survey shows that most of the basic services are not found in closer proximity to residences. Locating basic services closer to residential areas will reduce the need to travel long and save the cost of travelling. Measures that promote greater integration of land use and transport planning can contribute to reducing travel demands and trip lengths and hence promote more sustainable urban development.
- The result of the opinion survey on public transport indicates that increasing the reliability of public transport, reducing waiting times at stations, providing more buses, reducing overcrowding of buses during peak hours, imposing more control on the operation of the paratransit and granting more subsidy are highly preferred by the survey participants.
- The response of the Anbessa city bus enterprise to structured questions and informal discussion with the Addis LRT project office show that there is little awareness on what really integration is and how it can be achieved, although it has now become common to hear the word “integration” in transport planning and related discussions among city’s urban planning circles and transport authorities. This is to be expected given the ambiguities that surrounds the notion of integration.
- There is an increasing understanding that transport problems could have an undesired political and economic repercussions. The favorable position of public transport both by the city and national governments could be exploited for promoting integration and reforming the public transport system. Indeed, the increasing awareness by the city government that the city’s transport problems should be solved and approached from multiple dimensions, the new LRT, the fleet increment and modernization efforts of the Anbessa city bus enterprise provide the avenues for introducing radical and comprehensive transport reforms.

6.2.2 Integration experiences

Public transport integration practice is not common in cities of the developing countries, particularly in African cities. In most of these cities, there are various modes of public transportation and there is striking dominance of the sector by the paratransit. Modal coordination of thousands of individual paratransit operators with a formal public transportation is not likely to be an easy task for city transport authorities. The forms of and status of integration in Addis Ababa are discussed below and the analysis shows the Addis Ababa's experiences on public transportation integration is rather rudimentary.

6.2.2.1 Physical integration experience

Instruments of physical integration are the provision of interchanges and transfers facilities. The public transportation terminal at Megnagna was an outcome of the local development planning process that was completed in 2002 (Woldetensae, Zeberga, & Beyene, 2002). The Megnagna terminal was one of the first planning intervention that was designed to bring together all the public transport modes at one place and link it with the nearby regional public transport terminal of Lambert. Having a total area of about 16,000 m², the Megnagna terminal provides off the road stops for loading and unloading of passenger for all modes of public transportation (Anbessa, minibus taxis, Higer midibuses and saloon taxis). The interchange is also designated as one of the important stations of the new LRT and is likely to be the focal point of TOD. Here transfer between modes and different destinations has been made convenient and transfer walking less demanding. However, the interchange exclusively lacks shopping facilities and basic services. Informal traders are highly active at the terminal.

6.2.2.2 Modal integration experiences

The provisions of Park and Ride, Bike and Ride and non-motorised transport facilities at interchanges and terminals are instrumental for modal integration and enhances modal interchange and transfers. In Addis Ababa, modal integration at interchanges with P&R and B&R facilities is nonexistent. The only interchange at Megnagna had no facilities for P&R and B&R. The new integrated regional development plan however has proposed five P&R facilities at Lebu, Asco, Akaki, Addisu Gebeya and Legetafo (see Figure 6.1). They are located close to regional bus and future national train terminals. These P&R facilities that are integrated with regional and national passenger terminals are expected to facilitate modal transfer between Addis Ababa and its hinterland (AASZDPPO, 2013). However, it is rather surprising that the

plan has not proposed integration terminals with P&R facilities at the end-of stations and other major stations of the two LRT networks. Moreover, there is no mention of B&R, although the new development plan has proposed bicycle lanes in all collector and arterial streets.

6.2.2.3 Service/ information integration experiences

Route and network integration, schedules (time tables), synchronization of arrivals and departures and fare payment integration promotes service/information. In Addis Ababa, the public transport services are highly fragmented and are heavily concentrated along the main public transport corridors. Availability and level of public transport services outside the main transport corridors are very low. There are strong competitions for passengers by Anbessa, Higer midibuses and minibus taxis. None of them provide information on fares prices, although all the fares for all modes are distance based. Time tables/schedules are totally unknown, although Anbessa has been attempting to introduce scheduled services and time tables at each stations. Origin and destination of the minibus taxis are shown on the placards placed on their front roof. The Anbessa buses have only numbers at the top of the front and rear windows to indicate the route. It is difficult to know the origins and destinations of the routes from these numbers.

6.2.2.4 Fare integration experiences

Integrated fares and integrated tickets are instruments of fare integration. The absence of integrated fares and integrated ticketing system are obviously the prominent weakness of the Addis Ababa public transport system. The use of single ticket for all trips from origin to destination and single fare for all trip legs irrespective of modes and operators used are totally unknown. Each mode of public transport has its own fare prices. Fares for each trip are paid in cash and on boarding the vehicles. Season passes are not widely used by Anbessa. The Anbessa offers tickets but these are only valid for that specific single trip. The tickets do not entitle passengers to make another trip with Anbessa. However, the introduction of time based tickets, season passes, integrated fares and tickets could offer Anbessa the instruments to boost its ridership.

6.2.2.5 Operational integration experiences

Trunk-feeder route structure and schedules promotes operational integration. Urban transport institutions that plan, manage and coordinate public transportation play a vital role in urban transportation planning. However, in that respect Addis Ababa unfortunately has again poor records. Until very recently, the city has no own transport authority as the federal government

took over this responsibility in late 1990s'. Moreover, since the reinstatement of the transport authority to city government, the authority has been subjected to constant reshuffling of its functions and organizational structure. This process coupled with high staff turnover have created obstacles to the development of capable urban transport institution. To date, there is no body within the transport authority that is fully responsible for planning and managing public transportation, although the presence of such body is a necessary requirement in urban transportation planning process. Operational integration in terms of planning of routes, development of trunk/feeder public transport structure, coordination and synchronization of public transport trips is not practiced in Addis Ababa. The Anbessa does its own planning and management independent of other public transport modes. The transport authority controls the entry into the market, assigns routes and sets standards of the minibus taxis, Higer midibuses and intercity buses. Its activities are more skewed towards to the day to day and routine transport operations rather than performing sound short and long term transport planning and coordination of activities with other institutions. It is timely now for the city's road and transport bureau (AARTB) to be proactive and use the new mass transit as an opportunity to introduce rationality in the operation of public transportation.

6.2.2.6 Public transport and land use integration experiences

Although there is now an increasing awareness on the importance of integrating land use development and public transportation networks, the actual practice in Addis Ababa has so far been really disappointing. Large scale residential developments have taken at peripheries which have poor or no connections to main public transport networks. This unsustainable path of urban development needs to be corrected and there are good examples of cities which have exploited integrated strategies to benefit their residents. The newly prepared integrated regional development plan of Addis Ababa and the neighbouring towns puts the lack of integration of transport and land use as root a cause for the generation of unnecessary trips, congestion, environmental damages and poor access of new residential areas to services and jobs. Polycentric urban development pattern (network city concept), high density and mixed development along mass transit lines (TOD approach) have been proposed to achieve integration and reduce urban sprawl (AASZDPPO, 2013, & Addis Ababa City Planning Project Office and Lyon Town Planning Agency, 2012).

6.2.2.7 Regional public transport integration experiences

There is a poor history of coordination between Addis Ababa and the Oromia regional governments on planning, managing and financing the regional public transportation. Regional public transportation planning, coordinated regional public transport services, regional and mobility planning between the two neighbouring governments have been always obstructed by politically sensitive issues. Planning efforts directed at engaging the two governments on regional planning matters have been always seen with suspicion and assumed by politicians to be a pretext for the expansion of Addis Ababa into Oromia region. However for ensuring the long term benefits of Addis Ababa and the surrounding towns, there is an adamant need to build confidence, trust and institutionalize regional and public transportation planning and coordination between Oromia and Addis Ababa. Grass root levels participatory engagement of the lowest local governments in the planning process will surely guarantee successes.

6.2.2.8 Regional and intercity public transport terminals integration experiences

Integrated terminals and coordinated regional and intercity public transport services facilitates regional and intercity public transport. The decision to relocate the main regional and intercity bus terminal from Merkato to five main exits of the city almost a decade ago still remains contentious. As these five decentralized intercity bus terminals are located far away from the city center, their accessibility from different parts of the city is rather very difficult and costly (see Figure 3.16). New transport services that increase the connectivity of the intercity bus terminals to the new LRT lines will likely improve their accessibility and reduce costs (time and money) for passengers.

6.2.3 Public transportation integration enabling planning and policy frameworks

The review of policy papers, planning documents and legal frameworks that have direct and indirect importance to transport and land use integration will help in articulating appropriate strategies and building a strong foundation for public transport integration programs in Addis Ababa.

6.2.3.1 Enabling planning and policy frameworks

The 15th CODATU conference held in Addis Ababa between October 22 and 25, 2012 was a landmark and brought many transport professionals from around the globe. The opportunity gave the city government to push forward the agenda of mass transit and transport integration to higher levels. Multimodal public transport integration and integration of mass transit lines with urban development was put as key development strategies by the city authority. Although questionable, the vice mayor of Addis Ababa in his inaugural speech at the CODATU conference stated that city is pursuing a development path “... that is vibrant, people friendly and genuinely integrated with different modes of transit” (Addis Ababa City Planning Project Office and Lyon Town Planning Agency, 2012, p. 4). Indeed the placard on promotion of multimodal public transport integration was posted over the city hall of Addis Ababa for weeks during and after the conference. This was a milestone in that public transport integration started getting recognition at the highest authority as a key development strategy for rapidly developing city.

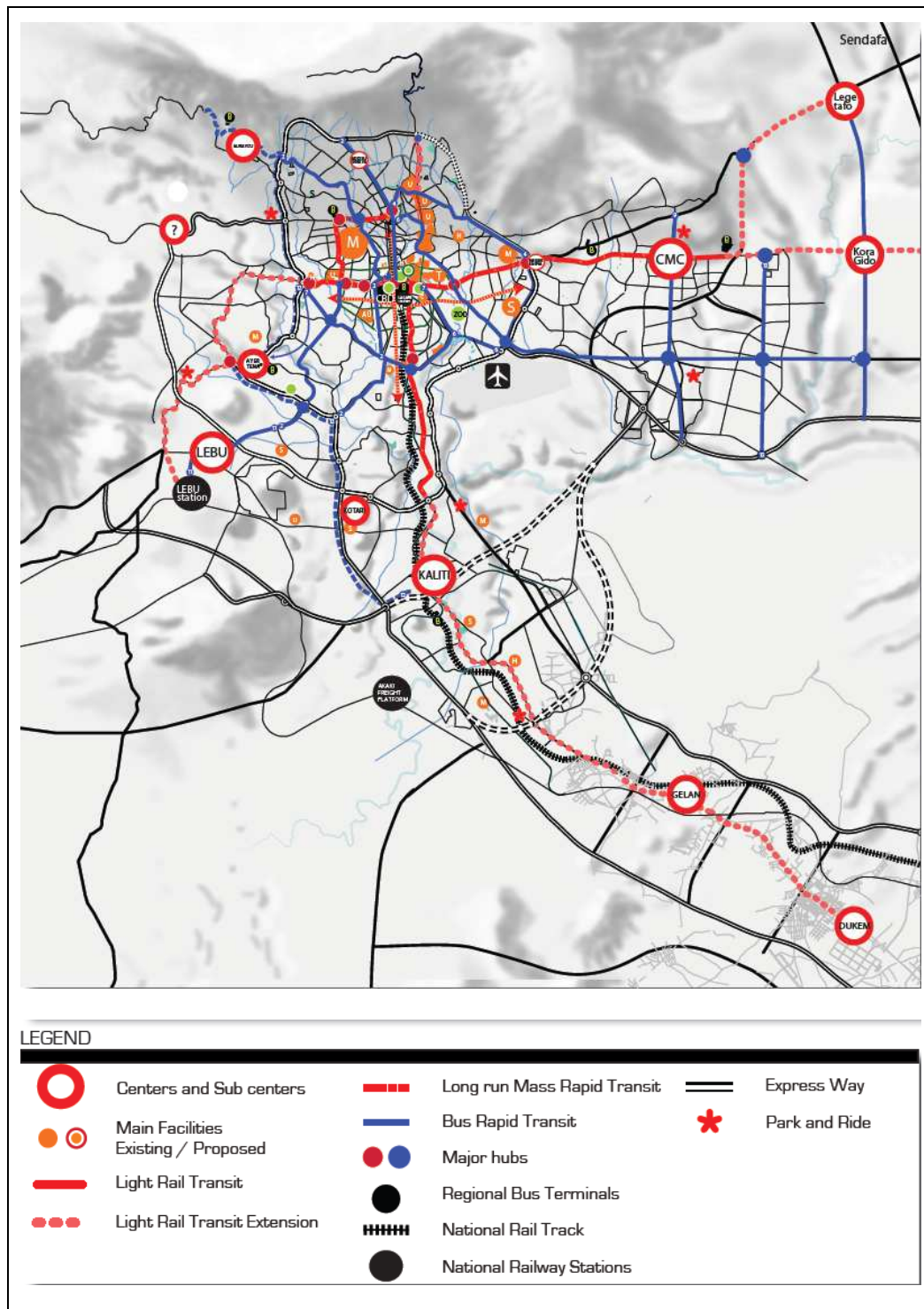
Another parallel development during this period was Addis Ababa was preparing to revise and update the 2001 city development which has already expired its implementation period. The city government awarded the technical task of evaluating the status of the implementation of the Addis Ababa master plan for the period between 2002/3 to 2010 to the Lyon planning agency, Mathewos consult and the EiABC of the Addis Ababa University. The recommendations from the evaluation process were to serve as inputs for the preparation of a new development plan of Addis Ababa. Although the city development plan of 2001 did not explicitly mention public transport integration, the importance of strategies for linking urban development with transport and promoting greater multimodal public transport coordination emerged as major transport sector recommendations to be considered as inputs in the future development plan of Addis Ababa (Addis Ababa City Planning Project Office and Lyon Town Planning Agency, 2012, & Woldetensae et al., 2011). The evaluation process paved the way for the establishment of a new project office for preparing a new master plan initially for Addis Ababa but was later extended to include the immediately neighbouring towns in the Oromia special zone of the Oromia regional government. The city government in cooperation with the Oromia regional government has since then been preparing a metropolitan plan for Addis Ababa and neighbouring towns in the Oromia special zone.

The integrated regional development of Addis Ababa and Oromia special zone, whose implementation period extends from 2014 to 2038, envisages the integration of transport and land use, enhanced use of NMT facilities and public transport, wide use of traffic management schemes, drastic reduction of traffic accident, increased use of environmentally friendly public transport vehicles and lower carbon emissions as its main transport sector goals. Moreover, the concept of multimodality of transport and the importance coordination is underlined in the plan document. The plan has a proposal for the development of a multimodal mass public transport system for the city and the region. The public transport networks are planned to link high density residential, industrial and service areas and increase the accessibility of main center, sub centers and public transport corridors. Metro, LRT and BRT are proposed as main mass transit modes (See Figure 6.1). Accordingly,

The ongoing LRT lines will be extended to Shiro Meda and to the three inlets/ outlets of the city of AA. 12 BRT lines have been proposed to provide the congested corridors (radial and ring routes) of the city to feed the east-west and south-north LRT systems and the BRT extended further to the surrounding Oromia cites, i.e. in the east to Legetafo, west to Sebeta, north west to Burayou and south to Gelan-Dukem. Reserved the right-of-ways for metro/ subways with possible connections to LRT and BRT stations north (Wingate, Addisu Gebeya, Shiro Meda) east (Megnagna, Kara, Ayat, Yeka Bole, Bole lemi, Bole airport towards Wolosefer), west (Fetnoderash, Ayertena towards Gotera) and south (Legehar, Akaki, Gelan until Dukem) of the city (AASZDPPO, 2013, p.33).

There will be stations every 1,000 meters along the main mass transit lines, 30 bus taxi terminals functionally grouped into four hierarchies and P&R facilities at main stations. Although the integrated development plan has proposal on the integration of LRT and BRT systems with Anbessa city bus, minibus taxis and other public transport modes, it fails to forward concrete measures needed to implement it. The plan mentions that Lagare is to be developed as main passenger terminal for intracity, regional and national passenger travel. Although the problem of lack of dedicated areas for intracity bus and taxi terminals are mentioned as challenges in the plan document, it does not have specific proposals on how this should be solved. Physical integration around main LRT and BRT interchanges is not fully addressed in the document. Moreover the plan has no proposal on fare integration, although the plan recognizes multimodality of public transport and proposed a system of new mass transit lines for whose success fare integration is usually a precondition.

Figure 6.1: Proposed public transport networks and multimodality



Source: AASZDPPO, 2013

The urban transport policy of Addis Ababa has explicit policy statements on public transport integration. The policy is very broad and has 11 policy categories on the issues of transport,

land use, traffic safety, traffic management, environment, accessibility of services, finance, institutions, legal framework, regional and national transport coordination. Although all the urban transport policy statements are closely interrelated and equally important, the policy statements on land use and transport planning integration, transport infrastructure, public transport and transport institutions are of particular importance for the objective under discussion (Woldetensae & Fanta, 2010). These are addressed in detail in articles 3.1, 3.2, 3.3 and 3.9 of the policy document.

1. Article 3.1 states that land use and transport planning should be approached in an integrated manner. This article highlights the problems that emanate from decisions on land use and transport development that are made independently from each other. As such pattern of urban development is unsustainable, the policy explicitly states that current and future urban development should be closely related to transport infrastructure and mass transit corridors. The article also emphasizes the need to reduce travel demand and trip lengths through mixed use land use and polycentric development in which residential areas are closely integrated with employment, schools, markets and social services.
2. Article 3.2 deals with transport infrastructure development. While increasing the road density to international standards is emphasized, the article states that transport infrastructure development program should be founded on the principle of giving maximum priority for NMT and public transport. The article also requires the provision of interchange facilities for intermodal connection when new mass transit lines are constructed.
3. Article 3.3 mentions shortage of public transportation, insufficient coverage of public transportation networks and their limitation to main corridors, absence of mass transit system and poor coordination between public transport providers as major problems of the urban public transport. It then has specification on provision of affordable transport, introduction of LRT and BRT based new mass transit lines, expansion of public transport services to unserved areas, provision of convenient intermodal transfer facilities at interchanges and main terminals, expansion of NMT networks and facilities, granting financial incentive for the use of bicycles and provision of B&R facilities at main terminals and interchanges. It also advocates for the establishment of a council composed of representatives of the government and public transport providers for promoting coordination and integration in public transportation. It also mention the

importance of gradually decreasing the number of minibus taxis by encouraging them to shift into using higher capacity vehicles.

4. Article 3.9 states there are various transport institutions whose activities are not coordinated. Emphasizing the gravity of transport problems in Addis Ababa, this policy calls for more concerted effort and institutional reforms. To that end the policy specifies the importance of establishing a capable transport authority which will be responsible for transport planning and research, public transport planning, transport infrastructure development and management, traffic management and development of traffic regulations and transport laws. The article also emphasizes the importance of working with the higher educational institutions in order to produce qualified traffic managers, transport planners, traffic and civil engineers. Such cooperation is believed to mitigate the serious shortage of qualified staff that the transport sector faces.

The urban transport policy of Addis Ababa is comprehensive package that addresses every aspect of the city's transport. Nevertheless, the policy seems to be little known outside of the narrow circles within the transport authority. This was surfaced in a public discussion on the new transport plan of Addis Ababa back in 2012. AASZDPPO was totally unaware of the urban transport policy document. Nevertheless, the urban transport policy together with integrated development plan provides the legal and planning framework for launching public transport integration and promoting greater integration between transport and urban development.

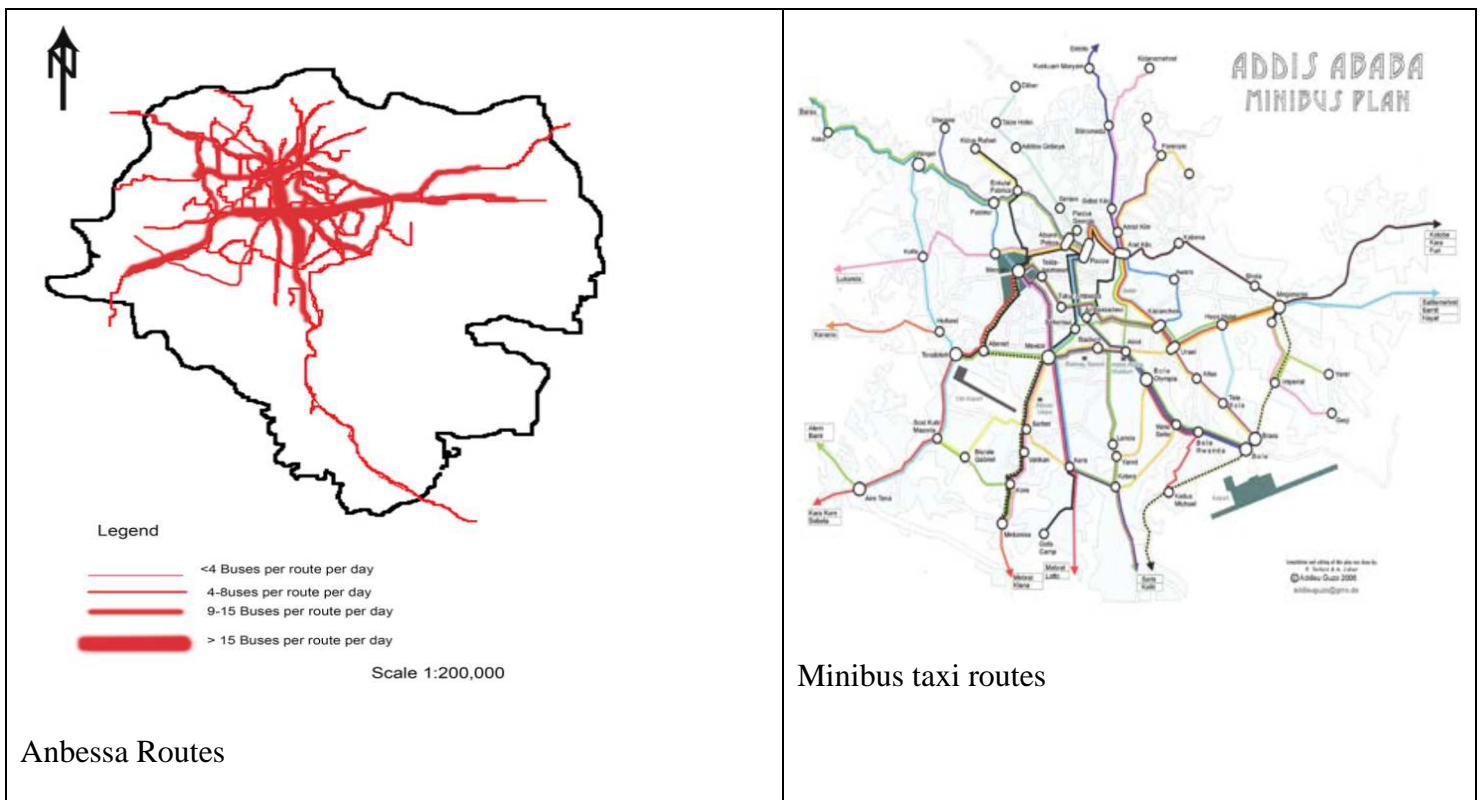
6.2.3.2 Public transport networks restructuring

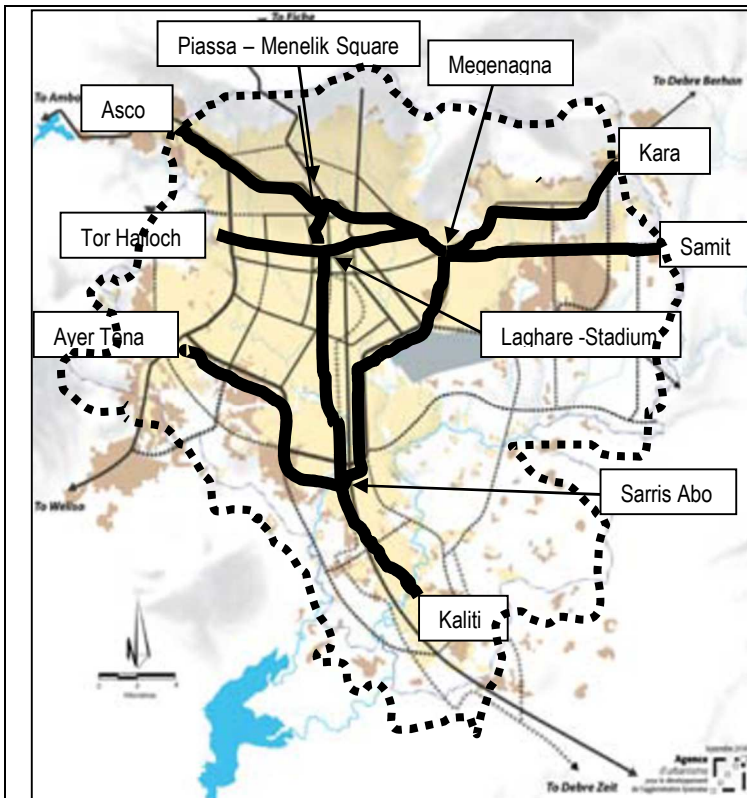
The previous master plans and the current under preparation have all proposed a mass transit system for Addis Ababa. In these plans the LRT and BRT system have been proposed to form the backbone of the mass transit system. Two LRT networks have been already constructed and will start operation in the coming months. A number of BRT lines have been proposed for Addis Ababa and the hinterland. Egisrail & Lyon town planning agency (2010) have previously proposed 7 BRT lines for Addis Ababa (see Figure 3.29). AASZDPPO (2013) has now 12 BRT lines some of which extend into the neighbouring towns of the Oromia special zone. One BRT (B2) line has been selected as a pilot and the detail design has been already completed. The project is moving towards the implantation phase (Asegedom, 2013). The Anbessa city bus, minibus taxis and other modes of public transportation will also provide public transport service and are to be integrated with the new LRT and BRT lines. The Anbessa city bus services are to be further strengthened (AASZDPPO, 2013). However, AASZDPPO has no specific proposals

on forms of integration, process of implementation of integration and institutional arrangement for integration. The plan also lacks proposal on how could the exiting Anbessa city, Higer midibus and minibus lines best align with and feed into the LRT and proposed BRT lines (see also Figures 3.10, 3.13, 3.14, 3.15, 3.27, 3.29 and 6.2).

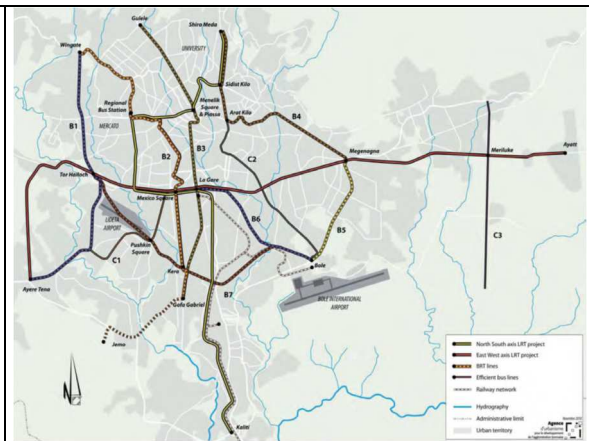
The provision of concentrated and competitive public transport services by all modes along the main east-west and north-south public transport corridors is no more justifiable as shown in Figure 6.2. The new LRT has created the condition, for reforming the public transport networks. The trunk-feeder or hub-and-spoke network structure of public transportation networks provides a sound basis to restructure the public transport network. Accordingly, the LRT and to a lesser degree the BRT will form the backbone of the city’s mass transit system and other modes will provide feeder services to the main trunk lines of the LRT and BRT systems (see also Addis Ababa City Planning Project Office and Lyon Town Planning Agency, 2012). In addition to providing feeder services, the Anbessa city bus, minibus taxis, Higer midibuses, the new Alliance city buses and other public transport modes will also provide transport services in areas which are not served by the LRT and BRT lines.

Figure 6.2: Existing public transport corridors and proposed mass rapid transit

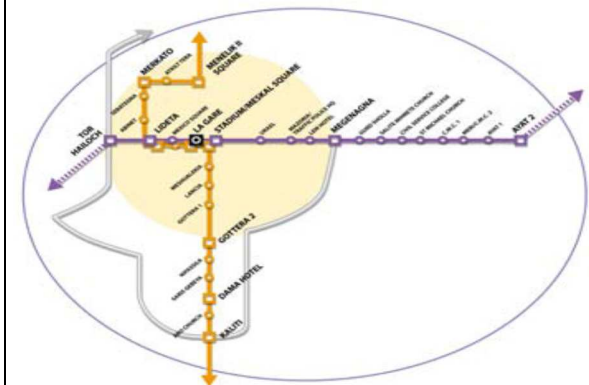




Higher midibus route



New mass rapid transit: Proposed BRT lines

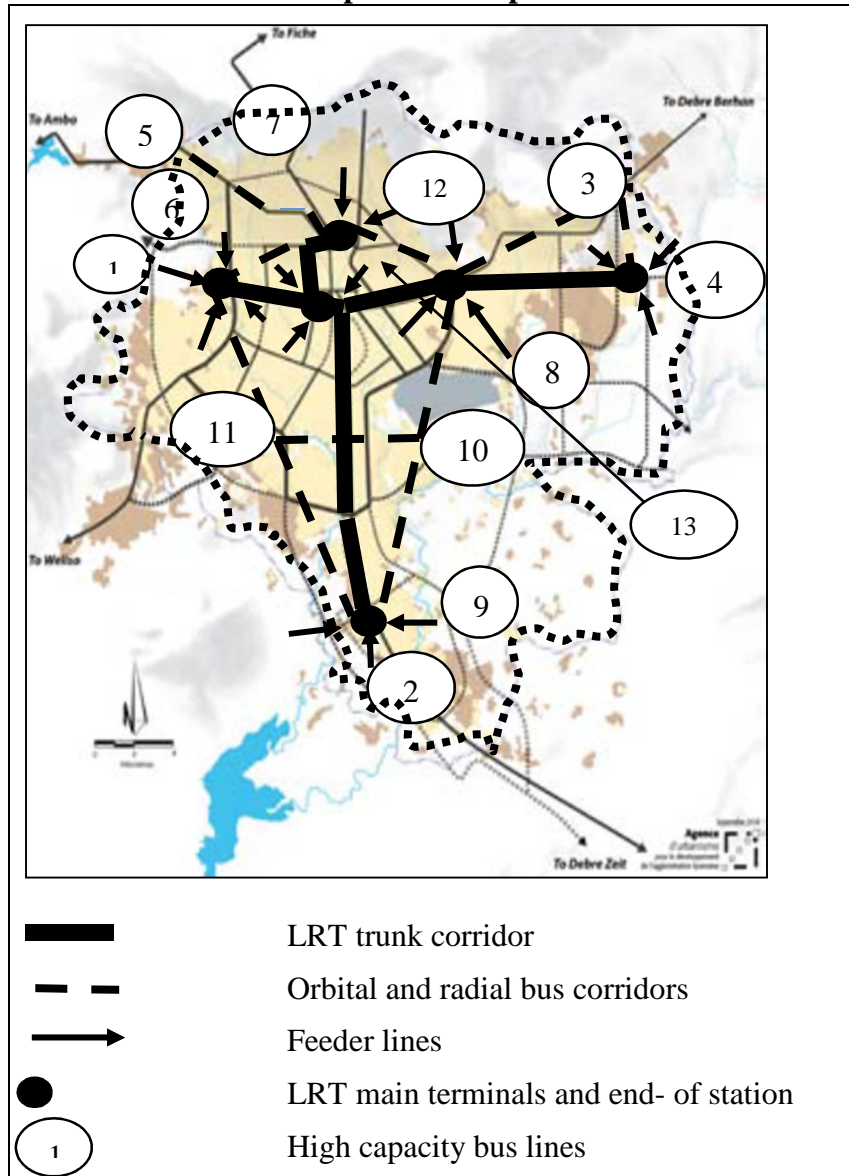


New mass rapid transit: LRT under completion

Source: All the maps have been adapted from Chapter three and please refer to Chapter three for the sources of these maps.

The basic structure of such as system is shown in Figure 6.3. The details of the routes and the route classification will be worked out by the proposed “Addis Ababa integrated and multimodal public transport service” when it becomes functional in 2016. The Anbessa city bus routes have to be restructured to align to the new LRT system. Consequently, all Anbessa bus services along the LRT corridors should be terminated. Anbessa should then reallocate its fleet and focus on providing feeder and orbital services along the routes which are unserved by the LRT and have high passenger demand. These corridors are shown in Figure 6.3.

Figure 6.3: Structure of trunk-feeder public transport networks



Source: Adapted from Chapter three

The new proposed high capacity bus route will consist of feeder and orbital lines. The proposed high capacity bus feeder lines are the Sebeta – Ayertena - Trohailoch corridor (See No 1 in Figure 6.3), the Kalti - Akakai Corridor (See No 2 in Figure 6.3), the Sendafa - Kotebe - Megnagna corridor (See No 3 in Figure 6.3), the Sendafa- Legetafo - Ayat corridor (See No 4 in Figure 6.3), the Guelele - Piazza corridor (See No 5 in Figure 6.3), the Guelele - Merkato Corridor(See No 6 in Figure 6.3), the Sululuta - Piazza corridor (See No 7 in Figure 6.3), the Gerji - Megenagna corridor (See No 8 in Figure 6.3) and the Bole Bulbula - Saris Abo - Kalti corridor (See No 9 in Figure 6.3)

The orbital lines will consist of the high passenger routes of Megenagna - Bole - Kalti corridor (See No 10 in Figure 6.3), Kalti-Sarris – Jemo – Ayertena - Torhialoch corridor (See No 11 in

Figure 6.3), Megnagna – Piazza - Merkato corridor (See No 12 in Figure 6.3), Megenagna - Kasacnchis- Filoweha - Merkato (See No 13 in Figure 6.3) and Torhialoch - Guelele corridor (See No 14 in Figure 6.3).

It would be unrealistic to prohibit the minibus taxis and to a lesser degree Higer buses from the main transport corridors as long as they provide higher quality level of transport service. Thus minibuses and Higer midibuses will continue to provide competitive services along the routes that are shown in Figure 6.2. It would be better to leave the decision to the market forces and much will depend on whether or not the minibus taxis and Higer buses will continue to offer superior services at reasonable prices as against the new LRT. The public transport network reform should be based on the sound public transport and land use plans and consultations with all stakeholders. Finally public transport and NMT, as sustainable mode of transportation, must be given all the priorities. As the experience from the Lagos BRT Lite system testifies, public transport priority programs increase productivity, reduce operation costs and fares. Therefore, it is very advisable for the city road authority and AASZDPPO to work out the technical details and outline the concrete measures necessary to fully implement the proposals on the provision of dedicated lanes for mass transit and NMT (ORAAMP, 2001, Woldetensae et.al, 2011, Addis Ababa City Planning Project Office and Lyon Town Planning Agency, 2012 & AASZDPPO 2013).

6.2.3.3 Institutional and political commitment for integration

The topics of urban transport and urban planning institutions have been thoroughly discussed in chapter two. The analysis has shown that Addis Ababa has been subjected to a continuous process of institutional and organizational changes since the early 2000's. The process has resulted in the creation of new organizations, abolition of some, merging of others and modification of still others. Duties and functions have been redefined, employees and managers have been transferred from one to another institutions and leadership has been changed. The lack of continuity in the management and institutional building process as well as loss of institutional memories, know-how and experiences as the result have had detrimental impacts on the city's capability to handle complex urban transport problems.

The Addis Ababa transport bureau has suffered more than any other institutions in the city from this continuous and irrational restructuring process. The striving and capable transport bureau that evolved after the urban management reform of early 2000's was dismantled. By mid-2000 the bureau was newly reorganized and its accountability was transferred from the city to the

Federal government. It took a number of years before the transport authority was reestablished as one of the city institutions. The bureau named as Addis Ababa road and transport bureau was reestablished in 2011. It constituted three organs; namely: the Addis Ababa Road Authority, the Anbessa city bus enterprise and the Addis Ababa transport bureau. A true merger could not take place between these institutions. Now the bureau has been again reorganized into five semiautonomous bodies; Addis Ababa Roads Authority, the Anbessa City Bus Enterprise, Addis Ababa Transport Authority, Traffic Management Agency and Drivers and Vehicles Affairs authority (Ethiopian reporter, 2015c). While ACRA and Anbessa are accountable both to the bureau and respective board of directors, the other are directly accountable to the bureau. Although there is the political will and strong commitment from the city government to overcome the challenges of transportation in Addis Ababa, this should be supported by more systematic efforts to build a strong and technically capable transport institution. The process so far has been rather discouraging and the response has been more spontaneous than based on sound analysis of the context and thorough investigation of the viable alternatives. Addis Ababa's transport problems, integration included, cannot be successfully addressed by such fragmented approach and continuous transport institutions restructuring process. As institutions are key elements of effective transport management, Addis Ababa needs to build technically competent transport institutions. This forms the foundation for the success of public transport integration in Addis Ababa and the Addis Ababa Road and Transport Bureau has much to contribute.

6.2.4 Barriers of public transport integration

There are a number of barriers to public transport integration in Addis Ababa. Identification of the barriers to public transport integration at an earlier stage of the integration process helps in formulating appropriate strategies to mitigate and solve them. The possible barriers and the measures that mitigate or solve the barriers are presented in Table 6.1.

Table 6.1: Barriers of public transport integration and solutions or mitigation measures

Barrier	Details of barrier	Solutions/Mitigations
Institutional	<ul style="list-style-type: none"> Lack of technically capable urban transport institutions that have the competency to conduct urban and regional mobility planning, develop public transport master plan, decide on fare structure and pricing between the different modes of public transport. 	<ul style="list-style-type: none"> Strengthen the planning capacity of AASZDPPO, Addis Ababa Road and Transport Bureau, ACRA, the Federal transport authority, Ethiopian Rail Corporation and the Anbessa City Bus Enterprise. Build the capacity of the staff of these institutions by giving advanced training on transport planning at Addis Ababa University and other higher educational institutions. Establish a legal body named "Addis Ababa integrated and multimodal public transport service" that will be responsible for public network

Chapter 6: An Integrated multimodal public transportation in Addis Ababa

	<ul style="list-style-type: none"> • Lack of expertise and institutions to plan and implement integration process. • Little awareness on integration and forms of integration. • Lack of experience on public private partnership on urban public transport management and financing. • Lack of institutions and experiences in the collection of primary and reliable data on travel characteristics, incomes, expenditures and transport demand 	<p>planning, integration, fare setting and financing of public transport infrastructure development. It will collect fare revenues and distribute revenues and subsidies to participating public transport operators. The public transport service will gradually extend into the surrounding towns of the Oromia special zone. (Addis Ababa metropolitan area).</p> <ul style="list-style-type: none"> • Establish a board of directors that supervise the functions of the “Addis Ababa integrated and multimodal public transport service”. It will include representative from the local, regional and national governments, AACRA, Addis Ababa Urban Planning Institute, Addis Ababa Road and Transport Bureau, the Federal transport authority, Ethiopian Rail Corporation, the Anbessa City Bus Enterprise and associations of minibus and Higer midibus operators. • Develop and approve a policy and legal framework for promoting public private partnership on public transport. • Strengthen the capacity of the Addis Ababa Road and Transport Bureau and the “Addis Ababa integrated and multimodal public transport service” for conducting periodic household and travel surveys properly documenting the results of the surveys for planning and research purposes.
Coordination between institutions	<ul style="list-style-type: none"> • Lack of coordination between institutions involved in the planning, operation and management of transport development. • Poor record of regional public transportation planning, management and integration between Addis Ababa and the Oromia regional governments. 	<ul style="list-style-type: none"> • Foster greater coordination of activities between AACRA, planning offices, Addis Ababa Road and Transport Bureau, the Ethiopian Rail Corporation, Anbessa and associations of minibus taxis and Higer midibuses. • Develop a legal framework for defining the roles, responsibilities and financing of public transport integration process by the public transport providers, Federal transport authority, and the Oromia regional and Addis Ababa city governments. The framework will provide a legal basis for a decision on the delineation, planning, phasing, and implementation of the public transport integration. • Promote mutual trust and develop a working framework acceptable by all parties for promoting regional and public transportation between the Addis Ababa and the Oromia regional governments. • Secure strong political commitment for integration from the Federal, Addis Ababa and Oromia regional governments.
Financing	<ul style="list-style-type: none"> • Securing the necessary finance for funding public transport infrastructure development and provision of affordable public transport. 	<ul style="list-style-type: none"> • The integration body should estimate the costs and provide the necessary fund for the construction of interchanges, terminals and associated facilities. It will decide on subsidy grants and fare revenue distribution to participating public transport operators. It should work to diversify revenue sources and formulate innovative financial strategies for boosting fare revenues and providing affordable transport. • Secure financing from the local, regional and federal governments.
Network redesign and urban development	<ul style="list-style-type: none"> • The new LRT in Addis Ababa calls for reorganization of the existing public transport networks for avoiding unnecessary competitions and ensuring the interests of the public and transport providers. • Promote mixed and high density urban development along mass transit corridors and major terminals. 	<ul style="list-style-type: none"> • The Addis Ababa integrated and multimodal public transport service should exploit the new mass rapid transit system for the promotion and introduction of public transport integration. • The integration office should overhaul the public transport routes, ensure their alignment with the new LRT and proposed BRT networks and clearly delineate the roles of Anbessa City Bus service enterprise and other private operators. • The office should identify and classify public transport routes for the purpose of route allocation and route franchising. • The office should actively participate in the urban planning process by ensuring that current and proposed public transport networks guide and frame city’s urban development process.
Integration of paratransit operators	<ul style="list-style-type: none"> • There are thousands of private paratransit operators and integrating them in the integration 	<ul style="list-style-type: none"> • Develop a long-term framework to fully integrate the paratransit sector as organized and modern public transport providers.

	<p>process is a difficult and protracted process.</p> <ul style="list-style-type: none"> • Deregulation and competition between different operators create obstacles in fare integration. 	<ul style="list-style-type: none"> • Negotiate and work closely with minibus taxi and Higer midibus associations to develop a strategy that is acceptable by all parties. • Assist and facilitate the paratransit operators to form cooperatives which then form the legal body and partner in route allocation and tendering processes as well as in setting service and vehicle standards. • Provide financial incentives to encourage paratransit operators to shift from using low capacity minibuses to higher capacity public transport vehicles.
Dedicated right-of-way for interchanges and terminals	<ul style="list-style-type: none"> • Securing space for interchanges and dedicated terminals. • Ensuring public transport priority on roads and intersections. 	<ul style="list-style-type: none"> • Work closely together with city planning office, Addis Ababa Road and Transport Bureau and AACRA to secure dedicated right-of-way for public transport and space for interchanges and off-street terminals. • Work proactively with AACRA and Addis Ababa Road and Transport Bureau to implement the public transit priority proposals of the city’s master plan. • Provide pedestrian friendly non-motorized facilities at interchanges and terminals

6.2.5 Vision statement of public transportation integration

The vision will be indicative of the desired future status of public transportation integration in Addis Ababa. The vision statement gives guidance on goals and objective to be achieved in the vision period. The city government, the integrated regional development plan of Addis Ababa, and the urban transport policy of Addis Ababa have vision statements that could be used to formulate vision for public transport integration. However, the Addis Ababa transport and road bureau transport has an authoritative and explicit vision statement on public transportation. This vision foresees an integrated, multimodal, sustainable and affordable public transportation in Addis Ababa by the year 2020. However given the experiences of other cities which were successful in integrating public transportation, achieving an integrated system in shorter time period is very unrealistic. It will be thus more realistic to extend the vision of fully integrated public transportation for Addis Ababa for 2030. The vision (Asegedom, 2013) is to have

“An integrated multi modal sustainable clean transport system which is able to give quality service to all residents in an affordable manner (up to 2020)”.

6.2.6 Goals of public transport integration

The Addis Ababa road and transport bureau vision 2020 envisages achieving a modal share of 80% of all trips in Addis Ababa by the sustainable and integrated modes of walking, cycling, bus and rail. It has also targets on increasing the accessibility of residences, employment and services to public transport nodes. The vision clearly lacks targets on integration itself, although

it talks about an integrated multimodal public transport. Vision 2020 (Asegedom, 2013) envisages to improve connectivity, accessibility and mobility within the city, promote the use of NMT as a viable mode of transport in the city, link CBD to the proposed BRT corridors, convert some of the existing motorized vehicular lanes to the electrical and regular bicycle lanes, create new pedestrian zones, bicycle facilities and greenery in the inner city, link BRT and LRT stations with non-motorized access, extend the LRT and BRT corridors to the suburban areas and provide feeder urban bus transport services on corridors unserved by the LRT and BRT networks.

Obviously, vision 2020 (modified as vision 2030) lacks important goals on achieving integration and affordable public transport. It would be reasonable to have more supplementary goals on integrations. This includes the provision of more affordable, public, seamless and attractiveness public transport in Addis Ababa and its metropolitan area. It is also important to provide feeder public bus transport services for all public mass housing areas and link them with LRT networks as well as increase the accessibility of informal and low income areas. It is also necessary to develop a new system of trunk-feeder and orbital public transport networks, tender public transport networks and reduce wasteful modal competition between public transport providers. Such goals facilitate the provision of scheduled and coordinated public transport services on the main mass transport corridors. The implementation of public transport priority measures increase the speed of public transport vehicles. It is also essential that the right-of-way for all terminals and interchanges be secured and interchanges with necessary facilities of P&R and B&R be constructed at LRT end-of-stations and main terminals. The promotion of public private partnership between the formal and informal public transport sectors and the application of Intelligent Transportation Systems (ITS) technologies will facilitate the integration and improve the performance and attractiveness of public transport respectively. The costs of achieving the goals should be clearly known and the mechanisms of financing should be secured early in the initial stages of the planning period.

However, achieving all these goals in the vision period is practically difficult. It is thus imperative to hierarchically structure them in accordance with their importance, urgency and relevancy to the achievement of the vision. Those goals that directly contribute to the realization of the vision are highly important and be given priority. This group includes all those mentioned goals which facilitate integration itself and integration of public transport and land use, improve efficiency, attractiveness and affordability of public transport. Those goals related to transport

infrastructure development could be considered as important but at the intermediate level. At lower level are those goals which will require longer periods to implement, need supplementary legal framework and have a high financial requirements. Such include PPP, extensions of mass transit corridors and application of ITS.

Table 6.2: SWOT analysis on public transport integration in Addis Ababa

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<p style="text-align: center;"><u>Strengths (S)</u></p> <ul style="list-style-type: none"> • General awareness on importance of multimodal public transport integration. • Government commitment to solve transport problems. • More government funding for transport infrastructure development and fleet acquisitions. • City mayor conscious and keen to solve transport problems for he formerly served as federal minister of transport. • Integration promoted in city's development plan and strategic framework. • TOD advocated in the development plan. • Urban renewal programs. • New LRT and BRT systems. • Urban transport policy. • New integrated regional development plan. • City long term vision of becoming a livable and sustainable city 	<p style="text-align: center;"><u>Weaknesses (W)</u></p> <ul style="list-style-type: none"> • Shortage of skilled man power. • Poor transport planning capacity. • Incapable institutions and weak coordination. • Lack of detailed public transport master plan. • The task of estimating the costs and financing of development proposals (or financial constrained planning) hardly applied by the city's planning body. • Lack of integration experiences. • Lack of detailed studies on integration in the city. • Shortage of funding for integration programs • Lack of experience on PPP. • Lack of legal framework on integration. • Lack of knowledge on what integration really is, which form of integration to follow and how to implement it. • Securing land for physical integration (interchanges and terminals). • Low applications of traffic management measures. • Poor NMT and public transport priorities. • Limited use of travel demand management strategies. • Car biased road infrastructure development. • Gentrification of inner city. • Public mass housing projects at city edges and far from major public transport corridors, employment centers and services. • Decentralization of intercity bus transport terminals. • .
External Environment	

<u>Opportunities (O)</u>	<u>Threats (T)</u>
<ul style="list-style-type: none"> • Government keen to modernize the city. • Addis Ababa as a seat of African union and many international organizations • Improving the image and increasing the attractiveness of the Addis Ababa as an international and conference city • The availability of foreign expertise (Lyon urban planning agency) • Addis Ababa as continental hub of aviation. • Increasing awareness on the role of public transport and NMT for promoting sustainable urban development. 	<ul style="list-style-type: none"> • Too many paratransit operators. • Poor coordination among public transport providers. • Continuous institutional restructuring process and the resulting loss of institutional memories and experiences. • Job placement based on political loyalty rather than merit and thus deterring those capable from holding positions. • Metropolitan level of public transportation integration in conflict with political interest of the Oromia and Addis Ababa city governments. • Decisions based on short sighted political gains rather than rational criteria and long-term benefits.

The short and long terms goals for achieving the vision of an integrated multimodal public transportation in Addis Ababa should be assessed against internal and external factors. The SWOT analysis of urban transport could assist transport decision makers and policy advisors to develop integration strategies that capitalize on strengths and opportunities and identify counter measures to remove weaknesses and overcome pending threats as shown in Table 6.3.

6.2.7 Selecting forms of public transport integration

It is not possible to start all forms of public transport integration at once. It then becomes imperative to phase the implementation of public transport integration. The process requires the identification of a number of criteria for screening the integration options. The criteria selected were applied on Addis Ababa shown in Table 6.4. Each of the criteria are weighted 0 (none or difficult to implement), 0.5 (partly or medium level of difficulty to implement) and 1 (yes or easy to implement). Although the weights looks subjective, they are based on the preceding analysis and own professional judgment. In practice, the evaluation process can follow Delphi method and be done by group of experts drawn from the administration, planning and implementation agencies. The criteria used are previous public transport integration experiences, city government awareness on integration, presence of public transport master plan that specify public transport integration, the availability of mass transit system that requires integration as a precondition, the ease of implementation of an integration form or combination of forms of integration, the presence of capable urban institutions available to implement integration, the existence of enabling legal (such as statutory development plan) and policy

framework for integration, the presence of a committed body that has integration as its main task, the availability of sufficient funding; and the practices of the present modes of public transportation (Anbessa, Higer midibuses, minibus taxis, saloon taxis and Bajajas) with respect to each form of integration.

Table 6.3: Criteria and weighing for selection of forms of public transport integration in Addis Ababa

Criteria for weighing forms of integration	Forms of integration						
	Physical	Fare	Modal	Service	Operational	Information	Public transport and land use integration
Previous integration experiences.	0.5	0	0	0	0	0.5	0
City government awareness on integration.	1	0	0.5	0	0	0	0.5
Presence of public transport master plan.	1	0	1	0	0.5	0.5	1
Availability of mass transit system.	1	1	1	1	1	1	0.5
Ease of implementation.	1	0	0.5	1	0.5	0.5	0
Capable urban transport institutions.	0	0	0	0	0	0	0
Enabling legal framework.	1	0	1	0	0	0	1
Enabling transport policy framework.	1	1	1	1	1	1	1
Committed body to promote integration.	0	0	0	0	0	0	0
Availability of funding.	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Practice of the present modes of public transportation.	0.5	0	0	0.5	0.5	0.5	0.5
Total weight	7.5	2.5	5.5	4.0	4.0	4.5	5.0
Period of implementation	Short to medium term	Medium to Long term	Short to medium term	Short to medium term	Short to medium term	Short to medium term	Medium to long term

Weighting factors: 0=not available or difficult to implement, 0.5= partly available or medium level of difficulty to implement and 1 = fully available or easy to implement

Period of implementation: Short-term between 2017 and 2018, medium-term between 2018 and 2021 and long-term between 2021 and 2030.

6.2.8 An implementation action plan of public transport integration

The process of public transportation integration in Addis Ababa will extend over the planning or vision period and will culminate with a fully integrated public transport by the year 2030. The whole process has two main phases; namely; the initial preparation phase and the implementation phase. The preparation phase of public transport will be completed by the end of 2016. This phase will involve a number of actions that will lay the basis for starting the integration process in 2017. The drafting and approval of a legal framework for integration process and the establishment of an integration body are preconditions that should be done at the initial stage of public transport integration in Addis Ababa. The main activities, the time frame of each of these activities and the stakeholders are discussed below. The specific implementation tasks for each forms of public transport integration are also outlined.

6.2.8.1 Institutional and legal

The main activities in this category include

1. Draft and approve the general legal framework on public transport integration by the federal government on the basis of the 2011 urban transport policy of Addis Ababa and other related urban development policies. This legal frame work will define the roles, responsibilities and financing of public transport integration process by the public transport providers, Federal transport authority, and the Oromia and Addis Ababa city governments. The framework will also provide a legal basis for a decision on the delineation, planning, phasing, and implementation of the public transport integration. The legal frame work will be finalized and approved by early 2016. The key stakeholders in this stage are the Federal government, Federal Ministry of Transport, the Federal Ministry of Urban Development and Construction, The Addis Ababa City Government, the Oromia Regional Government and the Addis Ababa Road and transport Bureau.
2. Establish a legal body named “Addis Ababa integrated and multimodal public transport service” on the basis of the approved legal framework of integration. The body will be responsible for public network planning, integration, fare setting and financing of public transport infrastructure development. It will collect fare revenues and distribute revenues and subsidies to participating public transport operators. The public transport service will gradually extend into the surrounding towns of the Oromia special zone (Addis Ababa metropolitan area).

3. Establish a board of directors that supervise the functions of the “Addis Ababa integrated and multimodal public transport service” which will include representative from the local, regional and national governments, AACRA, Addis Ababa Urban Planning Institute, Addis Ababa Road and Transport Bureau, the Federal transport authority, Ethiopian Rail Corporation, the Anbessa City Bus Service Enterprise and associations of minibus and Higer midibus operators.
4. Develop and approve a policy and legal framework for promoting public private partnership on public transport.

The first and fourth activities will be implemented by early 2016 and the second and third by mid-2016. The main actors for these activities are the Addis Ababa City Government, the Oromia Regional Government, the Ethiopian Rail Corporation, the Addis Ababa LRT Office, the Anbessa City Bus Service Enterprise; Minibus Taxi Associations, Alliance City Bus, Higer Midibus Associations, Addis Ababa Urban Planning Institute, AASZDPPO, and Addis Ababa Road and Transport Bureau Federal Transport Authority.

6.2.8.2 Network redesign and urban development

The main activities are to

1. Overhaul the public transport routes, ensure their alignment with the new LRT and BRT systems and clearly delineate the roles of Anbessa City Bus Service Enterprise and the private operators. This is to be implemented in 2016.
2. Exploit the opportunity created by the new mass rapid transit system for the promotion and introduction of public transport integration. This to be implemented in 2016.
3. Start public transport integration process according to the phases outlined in Table 6.2. This to be implemented in 2017.
4. Identify and classify public transport routes for the purpose of route tendering and route franchising. This to be implemented from 2016 to early 2017.
5. Actively participate in the urban planning process for ensuring that current and proposed future public transport networks guide and frame city’s urban development process which is to be implemented throughout the planning period.

The key stakeholders of this category are the Addis Ababa Road and Transport Bureau and the Addis Ababa integrated and multimodal public transport service.

6.2.8.3 Dedicated right-of-way for interchanges and terminals

The main activities for this action category include;

1. Work closely together with Addis Ababa Urban Planning Institute, Addis Ababa Road and Transport Bureau and AACRA to secure dedicated right-of-way for public transport and space for interchanges and off-street terminals.
2. Work proactively with AACRA and Addis Ababa Road and Transport Bureau to implement the public transit priority proposals of the city's master plan.
3. Provide pedestrian friendly NMT facilities at interchanges and terminals.

The first two of the activities are to be implemented in 2016 and the last one will be continuously done throughout the planning period. The key actor are the Addis Ababa integrated and multimodal public transport service, the Addis Ababa Urban Planning Institute, the Addis Ababa Road and Transport Bureau, AACRA and AASZDPPO

6.2.8.4 Financing

Under this category, the following two activities have been identified.

1. Estimate the costs and provide the necessary fund for the construction of interchanges, terminals and associated facilities by the integration office, decide on subsidy grants and fare revenue distribution to participating public transport operators, diversify revenue sources and formulate innovative financial strategies for boosting fare revenue and providing affordable transport.
2. Secure financial commitments from the local, regional and federal governments.

These activities should be completed by late 2016 and the main stakeholders are Addis Ababa integrated and multimodal public transport service, the Federal government, the Addis Ababa City government, Bureau of Finance and economic Development of the Addis Ababa City Government, the Oromia Regional government and Bureau of Finance and economic Development of the Oromia Regional Government.

6.2.8.5 Coordination between institutions

The main activities which are to be implemented throughout the planning period are

1. Foster greater coordination of activities between AACRA, planning offices, Addis Ababa Road and Transport Bureau, the Ethiopian Rail Corporation, Anbessa and associations of minibus taxis and Higer midibuses.
2. Promote mutual trust and develop a working framework acceptable by all parties for promoting regional and public transportation between the Addis Ababa and the Oromia regional governments.

3. Secure strong political commitment for integration from the from the Federal, Addis Ababa and Oromia regional governments.

The key stakeholders are the Federal Transport Authority, the Addis Ababa City government, the Oromia Regional government, the Ethiopian rail corporation, the Addis Ababa LRT office, the Anbessa City Bus Service Enterprise, Minibus Taxi Associations, Alliance city bus, Higer Bus Associations, Addis Ababa Urban Planning Institute, AASZDPPO, Addis Ababa Road and Transport Bureau and ACRA.

6.2.8.6 Integration of paratransit operators

The main activities are

1. Develop a long-term framework to fully integrate the paratransit sector as organized and modern public transport providers.
2. Negotiate and work closely with minibus taxi and Higer midibus associations to develop a strategy that is acceptable by all parties.
3. Assist and facilitate the paratransit operators to form cooperatives which then form the legal entity in route allocation and tendering processes as well as in setting service and vehicle standards.
4. Provide financial incentives to encourage paratransit operators to shift from minibuses to higher capacity vehicles.

While the first two activities should be done between 2016 and 2018, the last two will be done in the whole planning period. The main actors in this category are the Addis Ababa City government, the Oromia Regional government, the Addis Ababa integrated and multimodal public transport service, Minibus Taxi Associations, Alliance City Bus and Higer Midibus Associations.

6.2.8.7 Capacity and institutional building

Capacity and institutional building process is a continuous activity that will be done through the planning period and the activities include

1. Strengthen the planning capacity of AASZDPPO, Addis Ababa Urban Planning Institute, ACRA, Addis Ababa Road and Transport Bureau, the Federal transport authority, Ethiopian Rail Corporation and the Anbessa City Bus Service Enterprise.
2. Build the capacity of the staff of these institutions by giving advanced training on transport planning at Addis Ababa University and other higher educational institutions.

3. Strengthen the capacity of the Addis Ababa Road and Transport Bureau and the “Addis Ababa integrated and multimodal public transport service” for conducting periodic household travel surveys and properly documenting the results of the surveys for planning and research purposes.

The main stakeholders are AASZDPPO, the Addis Ababa Urban Planning Institute, ACRA, the Addis Ababa Road and Transport Bureau, the Addis Ababa University, EiABC, Civil Service College, other Higher Educational and External Training Institution. The EiABC of AAU should start offering postgraduate and advanced training on urban transportation planning in 2015/16.

6.2.8.8 Implementation of forms of public transport integration

The year 2016 is the year of preparation for launching integration in Addis Ababa. The legal framework of integration will be ratified in this year. The Addis Ababa integrated and multimodal public transport service will also be established in mid-2016 following the ratification of the legal framework by the federal government. It will be fully responsible for implementing the forms of integration in accordance with the time schedule and in collaboration with key stakeholders. It will monitor and evaluate progress and make the necessary adjustments.

The implementation period of public transport integration extends from 2015 to 2030. The implementation period has been divided into three phase; namely; short-term that extends between 2017 and 2018, medium-term between 2018 and 2021 and long-term between 2021 and 2030. However for practical purpose and ease of implementation, the period has been regrouped into two main phases. In the short-term to medium-term period of 2017to 2021, physical; modal, public transport and land use, information, service and operational integration are to be implemented. The more complex full fare integration will need longer time frame and is to be implemented in the medium–term to long-term period of 2021-2030. Nevertheless, this does not rule out the initiation of mode based fare integration in the short to medium periods. The specific actions for each forms of public transport integration in Addis Ababa are discussed below.

6.2.8.8.1 Physical integration

The provisions of interchange and transfer facilities at central stations, end-of- stations and other main stations and terminals are the instruments of physical integration. The interchanges will have all the standard facilities that will make travel, transferring, waiting and shopping

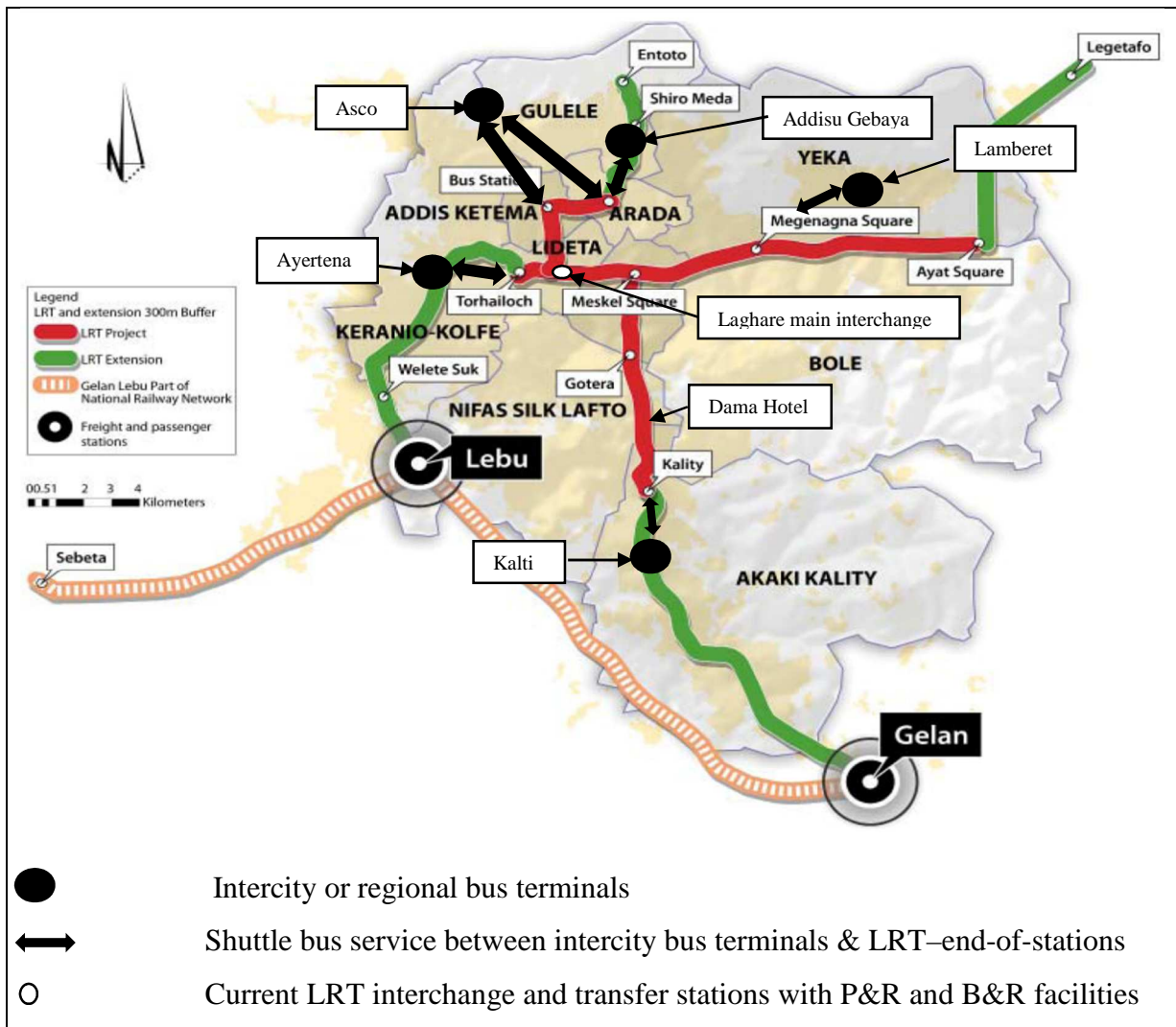
very convenient. They will have loading, unloading and parking facilities for all modes of public transportation including the LRT, buses and minibus taxis. The interchanges will also ensure modal integration through their P&R and B&R facilities. Moreover, the design principle of the interchange will be founded on giving highest priority to making transfer walking and accessing interchanges non-motorized transport friendly. AASZDPPO (2013) has indeed proposed to increase the share of NMT facilities (pedestrian and bicycles networks) to 50% of the road density.

Financing of interchange facilities and securing the necessary land around interchanges and main stations are main impediments to the implementation of physical integration. There are no easy solutions to these problems. There is a requirement for greater commitment from city governments, securing trust and positive engagement of land owners to be displaced by the interchanges and enhanced mutual partnership between the relevant public and the private sectors. The LRT of Addis Ababa has land provisions for interchanges facilities at end-of-LRT-stations. Implementation of physical integration in Addis Ababa can be done at four levels (See also Figure 6.4). These are indicated as follows.

1. Main interchange at Lagare central station.
2. End-of-LRT- station integration interchanges at Menelik Square (Arada), Torhialoch, Ayat, Merkato (Addis Ketema) and Kalti.
3. Intermediate integration stations at Megenagna, Lideta, Gotera and Dama Hotel

The main interchanges at end of the stations should have special shuttle connections with the five intercity bus transport terminals so that intercity passengers that are either leaving for regional cities and towns or arriving at Addis Ababa have smooth and convenient transfers (Refer to Figure 6.4). The special shuttle services will connect Lamberet intercity terminal with Megenagna LRT station, Addisu Gebaya intercity terminal with Menelik Square LRT station, Kalti intercity terminal with Kalti LRT station, Ayertena intercity terminal with Torhialoch station and Asco intercity terminal with Merkato and Menelik Square LRT stations.

Figure 6.4: Physical integration and integration with intercity bus terminals



Source: Adapted from ERC, 2011

6.2.8.8.2 Service, information and operational integration

All the LRT stations will display on screen and signage all the necessary information on trunk and connecting (feeder) routes, route destinations, schedules (time tables), real time information and fares for all public transport modes arriving at and departing from the stations

6.2.8.8.3 Fare Integration

Fare integration (integrated fares and integrated ticketing) in the context of Addis Ababa is very complex and needs a longer time framework. It should be implemented stage by stage starting from the least complex and going to the highest level of fare integration by the end of the planning or vision period. Here it has been proposed that fare integration can be implemented

in the medium-term to longer-term periods (beyond 2018). In the short-term period (until 2018), feasibility study and pilot projects should be conducted to determine the viability of the different options of fare integration, identify possible obstacles and define the ideal organizational framework. Pilot tests on the use of integrated tickets and periodic tickets could be made on some corridors of Anbessa and the LRT. Ticket validation options should also be tested. The result from the pilot project could be used to develop a fare integration strategies. The task will be undertaken by the Addis Ababa integrated and multimodal public transport service in cooperation with the Anbessa City Bus and the LRT administration.

It is in this period that decision will be made on fare structure, tickets and ticketing media, fare levels or fare pricing, fare revenue collection strategy, fare revenue collection and validation equipment and formula for sharing revenues among participating public transport providers. The current system of fare payment of the city's public transport system, which is outdated and forms a hindrance to integration, should gradually come out of the traditional cash based and move to the more modern prepaid system of fare payment. These tasks will be entrusted to "Addis Ababa integrated and multimodal public transport service".

Fare integration should progress from the lowest to the highest levels of fare integration (see SPUTNIC, 2009b) and some general recommendations can be made on fare integration. The new LRT provides the opportunity to apply modern system of fare payment and this remains to be seen when it starts its operation very soon. It will be very recommendable for the operators of the LRT to introduce prepaid tickets and period passes for all the LRT routes (the so called "mutual acceptance of tickets in the same route"). Equally, Anbessa will also start offering prepaid tickets that will enable passenger to use all Anbessa routes with one ticket. There are various experiences from around the world on types of tickets and the period of their validity (example the city of Lyon public transport). These could be tickets valid for one hour, two hours, peak hour, off-peak hour, evening or the whole day. There are also the period passes valid for a week, month, season, or a year. This will be the first step in fare integration process. Both Anbessa and the LRT should build mechanisms for evaluating and monitoring their progress in cooperation with the Addis Ababa integrated and multimodal public transport service. Gradually, the LRT should work with Anbessa city bus enterprise to expand fare integration to the all governmentally operated public transport networks (the so called ".mutual acceptance of tickets in the same network"). The experiences and the learning processes in the initial phases of fare integration will provide the avenue for advancing to higher stages of fare

integration. Accordingly in the third phase, the fare integration will advance to tariff unions in which the integration becomes functional in city's public transport networks operated by all large private providers, Anbessa and the LRT. In the final phase, fare integration could expand to include metropolitan region like in Verkhersverbund model. The Addis Ababa integrated and multimodal public transport service should work proactively with all public transport provider in order to ensure the success of fare integration. Providing affordable transport to majority urban poor in Addis Ababa should be the core principle in fare integration process.

6.2.8.8.4 Public transport and land use integration

Public transport oriented urban development is central to the realization of the Addis Ababa's vision of becoming a "livable" city. Sustainable urban development, among other things, calls for the greater use of public transport modes that are highly dependent on use of renewable energy resources. Addis Ababa should strongly link its urban development with mass transit corridors and other public transport networks. The city should promote mixed and high density urban development in the inner city areas, along the east-west and north-south LRT corridors, the proposed BRT lines, and feeder busways. Equally, the TOD principles should also be applied for making LRT and BRT stations as hubs of mixed and high density urban development. AASZDPPO (2013) has proposed such pattern of urban development along mass transit corridors and around LRT and BRT stations. Moreover, it is also very essential to link new mass housing areas at the peripheries with Anbessa feeder lines and other feasible public transport modes.

6.2.8.8.5 Paratransit integration

The informal or the paratransit sector provides incredible transport services, although they have been blamed for widespread congestion and traffic accidents in cities of the developing countries. As already discussed in the previous chapters, engaging thousands of paratransit operators in public transport integration process is a huge challenge for municipalities and transport authorities in developing countries. Despite some attempts here and there to integrate the private operators, there are no examples of cities that have been successful in achieving this goal. The process of the paratransit integration is going to extend over longer time periods. Moreover, it needs an interactive negotiation and building of mutual trust between local governments, transport authorities and paratransit operators on the matters of route franchising, vehicle size and replacement policies, service standards and financing.

In Addis Ababa, the paratransit operators have been organized under minibus taxi and Higer associations. There are eleven geographically based minibus taxi and three Higer midibus associations (refer to chapter three for the details). These legal associations will serve as a platform for their long term integration and their transformation into large scale and more formalized operators. The proposed Addis Ababa integrated and multimodal public transport service should play a key role in the negotiation process. As the associations of private operators are also represented in the board of directors that oversee the Addis Ababa integrated and multimodal public transport service, they have the legal opportunity to secure their interests in policy decision making processes of the board.

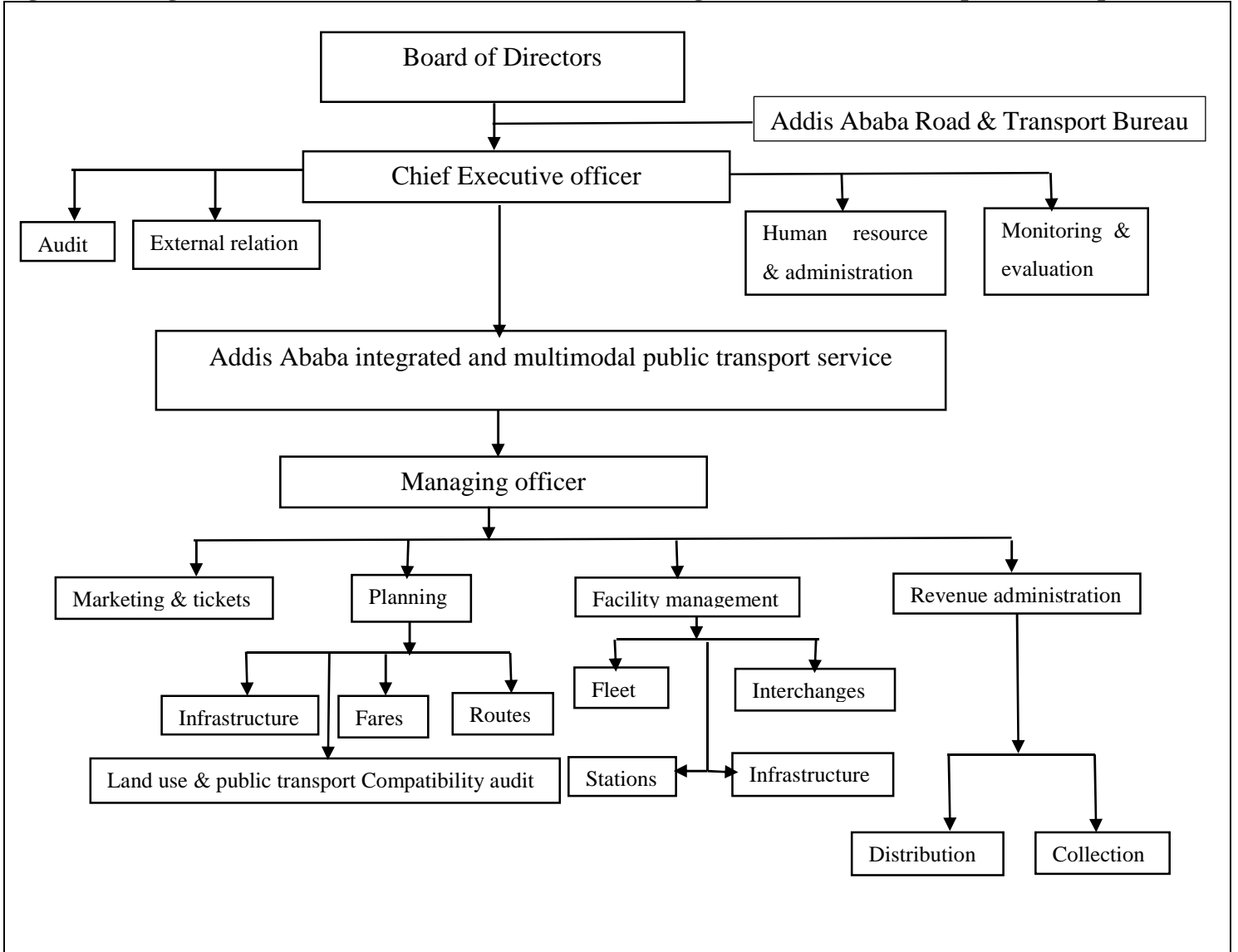
6.2.9 Monitoring and evaluation mechanisms

The Addis Ababa integrated and multimodal public transport service will be the body responsible for monitoring and evaluation of the process of integration. It will be very closely affiliated with the Addis Ababa Road and Transport Bureau. It will

- Regularly review the integration process and check the achievements against targets,
- Make plan and organizational adjustments to suit changed contexts, and
- Ensure that major urban land use development is closely related to current and future public transport networks. The office will conduct public transport compatibility assessment study (PTCAS) to ensure that major land use development in Addis Ababa are compatible with public transport master plan.

The office will have an organizational structure that will enable it to discharge its duties efficiently, clearly delineate the functional units and define its relation with the board and other stakeholders. This is shown in Figure 6.6.

Figure 6.5: Organizational structure of the Addis Ababa integrated and multimodal public transport service



6.3 Conclusion and discussion

The framework of public transport integration has provided step-by-step guidelines for implementing public transportation integration in Addis Ababa. The process of public transport integration in Addis Ababa will extend over a considerable number of years. As a principle, integration will start from the least complex forms of integration and gradually advance to the more complex forms of integration. The framework has also taken into account other indirect measures that will enhance the process of integration. Highly important among those measures are the task of public network restructuring, implementation of travel demand and traffic

management strategies which will accelerate the achievements of the vision and the desired goals of public transport integration.

The framework has been instrumental in identifying barriers of integration along with possible measures to solve those barriers, setting the long-term vision, defining the forms of integration in Addis Ababa's context and developing criteria for weighting and prioritizing the forms of integration for implementation. It also defined the task for each form of integration, identified actors and their specific roles in integration. It delineated the time frame for the phased implementation of integration, indicated the importance of the legal framework for integration which will set the rules of the process of integration and indicated the institutional arrangement necessary for the implementation of the tasks of integration. The proposed "Addis Ababa integrated and multimodal public transport service", working mutually and closely with all stakeholders in general and the Addis Ababa Road and Transport Bureau in particular, will play the lead role in the integration process. It should build its implementing and research capacities and in that respect the contributions of the country's higher educational institutions, particularly the Addis Ababa University, are very important. It should also seek to secure all the necessary commitments from all stakeholders. The Addis Ababa, Oromia and Federal governments should provide all the support that the office requires for providing an efficient, reliable, affordable, attractive and seamless public transport system in Addis Ababa and the metropolitan area. This is indeed the ultimate objective of public transport integration and sustainable urban development.

Chapter 7 Discussion and Conclusion

7.1 Introduction

We have postulated that integration of multimodal public transportation in Addis Ababa is beneficial and provides the mechanisms for overcoming many of the bottlenecks of urban public transport and putting Addis Ababa on the path of sustainable urban development. Integration is assumed to be instrumental in providing affordable, efficient, sustainable and integrated multimodal public transport and promoting coordination and public private partnerships.

Public transport integration has been largely practiced and developed in the cities of the north. It was originally meant as a means to contain rapid motorization and reverse the declining patronage in public transport. Integration seeks to provide seamless and attractive public transport travel. Although the notion “what integration is” is understood differently among disciplines, there is a general harmony on the necessity of implementing of transport integration policies as a means for achieving a higher levels of transportation services. This has been thoroughly discussed in Chapter 4.1.

The thesis has sought to answer the research questions:

- Which forms of integration can the Addis Ababa implement?
- How can Addis Ababa implement the selected forms of integration?

In order to answer these questions, we have found it important to develop sub-question that will help in answering the main research questions. The literature review on integration has provided answer to the following sub-questions.

- What is public transport integration?

- What are the forms of integration? What are the characteristics and features of each of these forms of integration?
- What are the major challenges/barriers in adopting an integrated approach?
- What are the institutional arrangements and how do the different operators – private and public- come under one umbrella managing body? What should be its legal framework? How do responsibilities be shared?
- How are costs and revenues to be shared among the different members (public and private) and how is government subsidy and fleet replacement fund allocated?
- What can one learn from public transport integration practices from cities that have successfully implemented integration?
- What can Addis Ababa learn from these practices and how Addis Ababa can develop its own integrated system of public transportation taking into account its own specific condition?

The contextual issue provides answers to the following questions.

- What is the urban context of Addis Ababa, including its growth and evolution? How has urban and transport planning and development been organized and conducted?
- How is transport supply and demand?
- How is public transport organized and provided in Addis Ababa?
- What are the actual travel experiences of Addis Ababa residents' in accessing jobs and services?

The objective of this concluding chapter is to summarize the thesis in view of the research questions. A synthesis of the methodologies used and the difficulties encountered are discussed in 7.2. Section 7.3 provides a summary on the growth and development, practice of urban and transport planning, institutions of urban and transport planning and transport supply and demand of Addis Ababa. Section 7.4 discusses the organization of public transport in Addis Ababa. Section 7.5 summarizes the theoretical findings on public transport integration in terms

of the main research questions and sub-questions. Section 7.6 discusses the main findings of the travel survey. Section 7.7 presents the summary on the framework of public transport integration on Addis Ababa. The final question is a reflection and forwards some suggestion for future research.

7.2 Methodology

We have used three tools for answering the main research question, sub questions and the questions on the urban context of Addis Ababa.

Firstly, the literature review on integration has revealed that public transport integration has been developed in European cities and African cities have virtually no integration experiences. There are few literature on the subject of public transport integration in Africa and the theme is little researched. This poses a difficulty for the implementation of public transport integration in Africa. It should be modified to suit to the local contexts while maintaining the ultimate goal of integration as an instrument for achieving better transport services. We have developed a frame work for application in Addis Ababa and shown the steps necessary for the implantation of public transport integration.

Secondly, we have used various reports, statistical bulletins, historical documents and formal and informal discussions to investigate the context of Addis Ababa. The major difficulties encountered were the lack and inconsistency of the information, the absence of time series data and poor institutional memories. My long years of engagement in the city government of Addis Ababa has facilitated the task. It is important that Addis Ababa build the necessary institution for collecting, documenting and dissemination of urban data for research and other purposes.

Thirdly, we have undertaken a household travel survey to get data on households and individuals which are totally unavailable in the city. The process has required an extended period of time and was constrained by shortage of funding. We have faced a number of problems and had difficulty in selecting sample households from the Weredas where house numbers identification system was not available. We observed also the lack of motivation to provide responses to the questionnaires. Here, it was apparent that the experiences of the interviewers were an asset that mitigated problems of no responses. The interviewers were graduates of urban and regional planning programs of the EiABC who had long years of field experiences. We also noticed the positive role of the local administration and community

organizations in facilitating household surveys and getting full cooperation from the survey participants.

7.3 Urban development, urban planning and transport

Addis Ababa, as a capital and primate city, dominates the urbanization process and the economy of the country. It has a decentralized system of governance and the city's charter provides the legal framework for full autonomy of the city to decide on all matters within its jurisdiction. For most parts of its history, the growth and development of the city has been framed by spontaneous factors rather than by instruments of modern urban planning. Most of the plans that have been prepared to guide the city's development were mostly done by foreign consulting firms, although the trend is now changing as more local staff are involved in the urban planning process. Lack of continuity in institutional building process has seriously impaired the capacity of urban and transport planning institutions to properly handle urban and transport.

The city growth and development has been on the ground and Addis Ababa has spread horizontally from its original nucleus around the imperial palace, though this historical development pattern is now again changing. The city currently is passing through a rapid phase of urban development unseen in previous periods. Addis Ababa's urban structure is dynamically changing due to major transport infrastructure development, mushrooming real estate and public housing programs underway in the city. The newly constructed light rail transit line and the grade separated and above ground rail physical structure has changed the image of the city along the major east-west and north south corridors. The rail public transport infrastructure that continuously runs for over 30 kilometers from Ayat through Lagare to Tor Hailoch in the east-west direction and Piazza through Merkato and Lagare to Kalti (See also Figure 3.27) is a new dominant urban landmark. The LRT infrastructure is already impacting on obstruction of traffic flow along these major traffic corridors. New road construction and road widening projects everywhere in the city, that are opening up formerly densely populated slum areas demolished for urban renewal programs as well as new green areas for new urban development, are also changing the urban landscape of Addis Ababa. Although the road density has progressively increased as the city's road authority statistics indicates, traffic congestion

has become more widespread, severe and frequent. Similarly, the car biased city's road infrastructure development insufficiently addresses the needs of non-motorized form of mobility and public transport. This manifested in the total absence of bus lanes and busways along the major public transport corridors, absence of traffic priority schemes at major intersections, presence of very few off street bus and taxi stops, poor pedestrian facilities and absence of properly equipped off street terminals and interchanges.

It is not only the transport infrastructure that is changing the urban landscape of Addis Ababa, but also the construction of high rise buildings in the city center, real estate development in the intermediate and outer sections of the city as well as the public mass housing projects at city edges. The old inner city areas are being demolished to give way to high rise buildings. The price of land in these urban renewal parts of the city has become so high that the majority of the former residents simply could not afford to buy it. As the result of this gentrification process, inner city areas are being converted into high income areas and former residents are being relocated and resettled in public mass housing areas or given compensation and plots usually at the outer parts of the city. At the same time, horizontal expansion of the city into hitherto agricultural areas is happening at a faster rate. The new dormitory settlements found at the city peripheries that have evolved as the result of the large scale public housing programs are poorly linked to major public transport corridors. The residents face insurmountable transport problems for commuting to and from the city center and sub centers which ultimately limits their access to employment, amenities and services and thus increases their social exclusion. The current urban redevelopment process and urban sprawl is unsustainable and has undesirable impacts for the inner city residents who have been displaced from the most accessible inner city areas and made to settle in the peripheries. Addis Ababa's pattern of urban growth and development, in which the linkages between transport and land use have been poorly considered, is undesirable. Such pattern of urban development should be halted. Linking urban development with public transport networks and changes in urban renewal programs will help reverse this unsustainable trend.

7.4 Public transport in Addis Ababa

Public transportation which provides motorized mobility for most of the city's residents is provided by thousands of paratransit operators and formal bus services. These services are not

sufficient enough to cover the public transport demand. Shortages, overcrowding and longer travel times during peak hours and poor quality of service and longer waiting times during off peak hours are the manifestations of the inequity between public transport supply and demand. The shortage of public transportation has become more severe and widespread as exhibited by the frequent long queues of people waiting for buses and minibuses and overcrowded buses particularly in the morning and afternoon peak hours. It is not unusual for one to wait for one hour or more in the queues to get minibus taxis and city buses in the peak hours and yet to be held up in the traffic jams once one gets into the minibuses and buses. Moreover, public transportation is uncoordinated and concentrated along major corridors and often display intense intermodal competitions for passengers and road. Traffic congestion and longer travel times make travel a daily evil to be confronted with for many residents of Addis Ababa. This calls for fundamental reform in the organization and provision of public transport in Addis Ababa. The new LRT has added more leverage on the importance of changes in the organization of the public transport sector. Poorly integrated terminals and stops involve longer transfer walking. The analysis shows the importance of providing public transport that is affordable, accessible, seamless, sustainable, integrated and cost effective. It is also apparent that integrating the different public transport modes is important as well. But public transport master plan and institutional arrangements to plan and manage public transport, foster more coordination among actors and link transport and land use development are critically missing. The contextual question on the organization of public transport in Addis Ababa is thoroughly addressed in Chapter three.

7.5 What is public transport integration

We have investigated from the literature the broad issues of transport integration and specifically we have focused on public transport integration. We have also explored public transport integration applications by taking case study cities from Europe, Asia, Latin America and Africa. This has been fully dealt in Chapter four. As final output, we have developed a framework of public transport integration which summarized the results of the literature review in view of the research questions. In Chapter six, the framework of public transport integration was applied in Addis Ababa which fully answered the research questions.

Section 4.2 discusses the wider notion of integration and provided answer to the sub question “*What is public transport integration?*” The review made it explicit that there is no harmony on what transport integration policy is and how it can be best achieved, although there is a consensus that adopting transport integration is useful and contributes to sustainable urban development. It was clear from the review that transport integration should not be merely regarded as an end but rather a means of attaining higher levels of transport services (May et al., 2006, & NEA et al, 2003). Transport integration strategies should be formulated to enhance synergy and yet overcome barriers of integration (May et al, 2006). The system perspectives of transportation enables one to define transport integration as *act* or *process* that brings together all the elements of the transport system and subsystems as an integral whole (Meyer & Miller, 2001, Anderton, 2010, & Szyliowicz, 2010). In this perspective, integration is an indication of “intermodality” and multimodality (Banister & Givoni, 2010). Different levels (Fox, 2000), types (May et al, 2006 & Stead, 2010), ladders (rungs) (Potter & Skinner, 2000, Preston, 2010) and domains (Hull, 2005) of integration are also distinguished. The difficulty of achieving the desire outcomes of integration increases from lower levels to higher levels in the ladders and scalar of integration. Public transport integration is perceived as an organizational process and comprehensive planning of services through which all the elements of the public transport system are rationally organized in order to bring about an efficient, seamless and sustainable public transport travel (Rivaspalta, 2008b & NEA et al, 2003). As the process of public transport integration involves different actors within the local government, across different levels of government and between neighbouring governments, clear delineation of roles and responsibilities and building of mutual trust are important for enhancing public transport integration. Public transport integration in African cities is likely to be difficult given the inadequacy of planning experiences, institutional deficiencies and highly fragmented operation of public transportation. Section 4.3 provides an answer to the research sub-question on the notion, forms, features and characteristics of integration.

Section 4.3.1 deals with physical integration. Physical integration is the most widely implemented and the least expensive forms of public transport integration. It is necessary because urban travel involves a number of trip legs and transfers are unavoidable as the result. Physical integration is also necessary to change mode of public transportation for purpose other than transfer (Rivasplata, 2008a, & Guo & Wilson, 2011). The purpose of physical integration is then to link the different public transport legs and modes so that the non-seamless trip legs

are reduced and transfer improved and made convenient. It ultimately results in the reduction of inconveniences and costs related to transfers. Interchanges with intermodal facilities (like P&R, B&R and NMT facilities) found at main locations in the public transport networks enhance the chaining of multimodal trips and facilitate inter and intramodal passenger transfers (NEA et al, 2003, Henry, 1990 as cited in Rivasplata, 2008b, Transport for London: Integration department, Priemus, Nijkamp & Banister, 2001). The design of interchange facilities should be directed at making transferring, waiting and the transfer environment ideal and lively (Guo & Wilson, 2011). Major interchanges have been promoted as hub of high density and mixed urban land use development (PROCEED, 2009). The success of physical integration in achieving seamless and attractive public transportation is dependent on public transport network reforms, availability of finance and establishing the institutional arrangement for managing interchanges and associated facilities.

Section 4.3.2 discusses fare integration whose purpose is to promote seamless urban public transport travel by removing the impediments of non-unified multiple tariffs and tickets of a non-integrated multimodal public transport system. Fare integration distinguishes between integrated fares and integrated ticketing (Holvad, 2010). Through ticketing enables the use of single ticket for the whole trip legs regardless of modes and operators (NEA et al., 2003, SPUTNIC, 2009b, & Fouracre, Allport & Thomson, 1990). The task of fare integration is centered on three core issues; namely; determining transfer fares, developing integrated fare collection and integrated ticketing and designing an integrated fare structure (Ong, 2008). A solution to this task is contingent upon the development of methodologies for pricing integrated transit trips, collecting fares of integrated transit trips and allocating revenues collected from integrated transit trips (Rink as cited in Barr, 2008, & Scottish government, 2008). Fare integration has different levels of implementation (SPUTNIC, 2009b).

Key to fare integration is the designing of pricing mechanisms to close the financial gap that emerges from through ticketing (integrated fares and ticketing) and distribute revenues (and by implication also costs) among participating public transport providers that have joined the fare integration scheme. Various methods for distributing fare revenues are mentioned: reimbursement method, accounting method and external user method (PROCEED, 2009). Other revenue allocation methods including that based on some measure of performance and quality of service are also used (SPUTNIC, 2009b, & Estache & Gomez-Lobo, 2005). The institutional modalities for managing fare and ticket integration are also discussed in section

4.3.2. Three forms of management structure are presented. These are a transit authority, a statutory cooperative arrangement between operators and a joint subsidiary company representing the main operators (Scottish government, 2008). Fare integration should be complemented by other forms of integration. As fare integration is a complex process, it should proceed on phases ultimately reaching full fare integration for the whole city and the metropolitan region. It needs decisions on fare collection and fare revenue distribution strategies as well as fare payment media and validation technology. The process of fare integration in many cities in the Developing Countries will be very complicated by the presence of thousands of private operators.

Section 4.3.3 discusses other forms of integration that include modal, information, service, institution and operational integration. The importance of institutional integration and the presence of institutions that plan, coordinate and manage urban transport and public transport is strongly emphasized and there are various models of urban transport institution (Costa, 1196, Groenewald, 2003, Meakin, 2002, & Parti et al., 2009). This provides an answer to the question on institutional set up and legal framework in integration. Service integration focuses on integration of routes, schedules and fare payment integration of a trunk-feeder system or other hierarchical structured public transport network (Miller, 2004, & Wright & Hook, 2007). Modal integration enhance intermodal connections by providing P&R, B&R and convenient pedestrian facilities at interchanges. Information integration provides information on routes, fare and time table/schedule. Operational integration has broad implications and is mainly focused on development of feeder routes and schedule coordination for the purpose of enhancing harmonization of multimodal trip chains (Shrivastava & O'Mahony, 2009, Priemus & Konings, & Parti and Katoch, 2009).

Section 4.4 addresses the integration of public transport with urban planning and development. The positive role of public transport in contributing towards sustainable urban development is widely recognized. Road infrastructure improvement programs that seek to improve the facilities for public transport and non-motorized will enhance sustain urban development (UN-HABITAT, 2010). Banister's conception of "*sustainable city*" (2008) is based on pattern of urban development that promotes mixed land use and is concentrated along public transport corridors and around highly accessible public transport interchanges. Such pattern of urban development should be supported by complimentary "*sustainable mobility*" measures which reduce the need to travel, reduce trip lengths, increase the modal shares of sustainable modes

and increase the efficiency of transport systems. Transit oriented development strategy also promotes the integration of public transport and land use by encouraging mixed and high density urban development around public transport station. The “*network city*” strategy of Curtis (2008) is based on his notion of “sustainable accessibility”. The promotion of urban development along most accessible locations and the importance of linking land use development with public transport are strongly advocated. Both the “network” and “sustainable” city approaches encourages polycentric pattern of urban development in which the public transport networks form the linkages between centers and subcentres. African cities that are characterized by their high dependency on public transport for motorized mobility should strongly link their urban development with public transport networks.

Section 4.5 investigates case studies in public transport integration. We have indicated that the process of public transport integration has started in Europe and later diffused to other Non-European cities, although African cities had little success stories on public transport integration. We have taken case study cities from Europe (Paris and Hamburg), Latin America (Curitiba and Sao Paulo), Asia (Singapore) and Africa (Cape Town and Lagos). We have tried to draw lessons regarding how integration was launched, who initiated it, which institutions and what processes were involved, which public transport modes were involved, which actor played the lead role, which public transport mode(s) formed the backbone of integration, how was fare pricing, fare collection and fare revenue distribution conducted, what was the institutional set up of the integration, what was the role of the government and how was the wider integration between public transportation and urban planning achieved. Generally, we observed that the success of public transport integration will largely depend on the strong involvement of the government and that the integration process should extend over a number of years. For many cities in Africa, Latin America and Asia, the greatest challenge in public transport integration is the informal public transport or the paratransit. It is not only the informality of the sector but also the huge number of operators, the fragmented and individualized system of operation that poses huge challenge to integration. There have been some small scale attempts (financial incentives for high capacity vehicle purchases and formation of informal transport associations) to integrate the sector but there is no example of large scale and successful formalization of the sector and its integration with the formal public transport. Section 4.6 gives some examples of paratransit integration from Africa and Latin America and the challenges the process faces.

As a complex and protracted process, the implementation of public transport integration will face a number of barriers. Foresight of these challenges early in the integration process and formulation of appropriate measures will facilitate the implementation of public transport integration. This was discussed in section 4.7 and we have tried to list some of the challenges of integration and strategies for facilitating integration. The lessons also provided us with some inputs for the development of the public transportation integration framework which we then applied to Addis Ababa.

7.6 Empirical Findings

The household travel survey (chapter 5) was designed and conducted to generate first hand and detailed data on households and their travel characteristics. We specifically tried to draw empirical evidences for the following questions.

- What are the demographic and socioeconomic characteristics that affect travel patterns?
- How much is the income of households and what are the sources of their incomes?
- How much do households spend on transport and other basic household expenditures?
- How do households access the basic services and which problems do they counter for using and accessing these services?
- How much time do households and individuals spend for trips to main destinations? Which mode or combination of modes do they use?
- How much money and time do they spend on the trip segments or legs for accessing jobs and services? How do they assess those trip segments?
- Which mode or combination of modes of public transportation are used? What are the factors of modal choices?
- What are the stated preferences of the people for the public transport?

The result from the survey has been aggregated at the city level. We found out that income levels are low and yet for most households the income levels have either remained static or even declined over time. We also found out that expenditures are higher than incomes and transport expenditure both as percentage of total expenditure and total income is significantly high. It emerged also that most of the basic services are not located closer to residences and accessing jobs and service involves the use of different modes of public transport including walking. The survey allowed us to make some general inferences. It revealed the importance of linking

closely transport and land use planning, giving more emphasis to non-motorized transport, and making transfer more convenient. We also observed from the survey result that the use of different modes of transport is an indication of the need for integration. We also observed the importance of building household and travel data base, modernizing and improving the quality of formal public transport service and giving more support for the informal public transport sector. It was apparent that fare integration measures should be directed at benefitting the low income communities and the socially disadvantaged groups by reducing the share of transport expenditures from total expenditures and income.

7.7 Framework of public transport integration in Addis Ababa

Chapter 6 is the final output of the thesis where we answered the main research questions. We developed a framework of public transport integration to answer these questions. The research sub-questions on integration and the contextual questions provided us the theoretical and practical foundations for the development of the framework of public transport integration. The framework explicitly showed the different steps and processes that are necessary for the implementation of public transport integration in Addis Ababa. We identified barriers of integration and possible measures to overcome those barriers. We developed a first draft for a criteria to prioritize the forms of integration to be implemented in the city and indicated the time frame of their implementation. We detailed all the necessary actions for the implementation of each forms of integration. Stakeholders for integration were identified and we proposed the institutional set up necessary for carrying the task of public transport integration in Addis Ababa, namely; the “*Addis Ababa integrated and multimodal public transport service*” We indicated the functions and organizational structure of this new institution.

The process of public transportation in Addis Ababa is likely to be long and requires the active engagement of all stakeholders. The Addis Ababa Transport and Road Bureau and the integration body should be actively engaged in implementation of integration and periodically evaluating and monitoring progresses in integration processes.

7.8 Recommendations for future research

The thesis has raised new questions which needs further research and recommendation for action.

Firstly, we found there is a great difficulty in determining the costs and benefits of integration. Measuring the benefits and costs of integration forms that have been already implemented or proposed for future implementation has been rarely done. Moreover, the difficulty of measuring that costs and benefits of integration programs a priori or ex post increases with the complexity of integration. This calls for more research on defining and quantifying costs and benefits of integration projects.

Secondly, we defined integration of public transportation as a comprehensive planning of services that results in a rationally organized public transport modes and services. From public transportation integration perspective, this will imply the decision processes and the integration forms that ultimately result in seamless and sustainable public transportation. But the literature does not explicitly state how that is to be achieved, what the preconditions are and what supplementary measures are necessary that facilitate the process. So we think that there is a need for more research to clarify these uncertainties.

Thirdly, it is true that the complexity of integration increases as the scale and level of integration moves up from lower operational levels to higher and wider strategic levels. The higher the level of integration, the greater is the difficulty of achieving the desired outcomes. In this regard the literature does not provide an easy answer to what should be an “ideal” or “optimum” level of public transport integration nor what instruments or combination of instruments are available to achieve it. Equally, there is no answer on what is the “minimum” level of public transport integration. We think that there is a need for more research to provide answers to these questions.

Fourthly, although there is no question on the importance of the integration of public transportation, we think that there is a need for more research on integration from African context. As integration practices have been developed and applied in the cities of the north, we think direct replication into African cities is erroneous. African cities suffer from poor planning experiences and highly deregulated and fragmented public transport provisions. Here the task

of integration of the paratransit or the informal public transport sector presents a great difficulty. There are few research on the subject of paratransit integration and this obviously call for more research on how to integrate thousands of private operators into more coordinated and rational system of public transport provision.

Finally, the paucity of time series and comprehensive data on transport supply and demand are the major obstacles for urban transport research undertakings in many cities in the Developing Countries. We have tried to overcome these problems and generate our own data on travel behavior, access to basic services, incomes, expenditures and general household information by conducting small scale pilot project in sample Weredas of Addis Ababa. But we think this is not enough. We highly recommend that Addis Ababa and other African cities should institutionalize, regularly conduct city wide and detailed household travel surveys, properly document the results and provide easy access to microdata as well to results for those who need them for further research.

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Appendix 1: Total population and urban population, percentage urban and growth rates of Ethiopian population 1950 to 2100

Year	Total	Urban	Percentage Urban	Annual Growth Rate	
				National	Urban
1950	18 434	848	4,6%		
1960	22 553	1 451	6,4%	2,23%	7,11%
1970	28 959	2 487	8,6%	2,84%	7,14%
1980	35 426	3 688	10,4%	2,23%	4,83%
1990	48 333	6 100	12,6%	3,64%	6,54%
2000	65 578	9 666	14,7%	3,57%	5,85%
2010	82 950	13 900	16,8%	2,65%	4,38%
2011	84 734	14 402	17,0%	2,15%	3,61%
2020	101 046	19 872	19,7%	1,93%	3,80%
2030	118 515	28 355	23,9%	1,73%	4,27%
2040	133 466	39 238	29,4%	1,26%	3,84%
2050	145 187	51 601	35,5%	0,88%	3,15%
2060	153 420			0,57%	
2070	157 446			0,26%	
2080	157 492			0,00%	
2090	154 636			-0,18%	
2100	150 140			-0,29%	

Source: UNPD, 2012

Appendix 2: Population and population growth rates of Addis Ababa between 1897 and 2012.

Year	Population	Annual Growth Rate
1897	30 000	
1916	70 000	7%
1935	100 000	2%
1946	180 000	7%
1964	650 000	14%
1978	1 170 000	6%
1984	1 400 000	3%
1994	2 120 000	5%
2000	2 630 000	4%
2007	2 738 248	1%
2010	2 920 000	1%
2012	3 112 000	3%

Source: Wondimu, 2000, CSA, 2008, & Demographia, 2012

Appendix 3: Population of Addis Ababa from 1950 to 2025

Year	Population in 000's	Percentage of Urban Population In Addis Ababa
1950	392	46,2
1955	451	40,8
1960	519	35,8
1965	597	30,9
1970	729	29,3
1975	926	29,7
1980	1 175	31,9
1985	1 476	31,4
1990	1 791	29,4
1995	2 144	27,2
2000	2 377	24,6
2005	2 634	22,6
2010	2 919	21,0
2011	2 979	20,7
2015	3 279	19,7
2020	3 881	19,5
2025	4 705	19,8

Source: UNPD, 2012

Appendixes

Appendix 4: Age and Sex Structure of Ethiopia in 2007

Age Group	Male	Female	Total	Percentage			Cumulative Percentage
				Male	Female	Total	
Under 1	881 065	860 418	1 741 483	1,2%	1,2%	2,4%	2,4%
1 to 4	4 596 226	4 447 394	9 043 620	6,2%	6,0%	12,2%	14,6%
4 to 9	6 117 281	5 887 456	12 004 737	8,3%	8,0%	16,2%	30,8%
10 to 14	5 437 318	5 020 863	10 458 181	7,4%	6,8%	14,2%	45,0%
15 to 19	4 474 378	4 313 362	8 787 740	6,1%	5,8%	11,9%	56,9%
20 to 24	3 110 675	3 314 489	6 425 164	4,2%	4,5%	8,7%	65,6%
25 to 29	2 631 202	3 049 367	5 680 569	3,6%	4,1%	7,7%	73,3%
30 to 34	2 091 932	2 137 536	4 229 468	2,8%	2,9%	5,7%	79,0%
35 to 39	1 825 390	1 949 109	3 774 499	2,5%	2,6%	5,1%	84,1%
40 to 44	1 465 605	1 410 506	2 876 111	2,0%	1,9%	3,9%	88,0%
45 to 49	1 149 510	1 097 820	2 247 330	1,6%	1,5%	3,0%	91,0%
50 to 54	928 329	964 015	1 892 344	1,3%	1,3%	2,6%	93,6%
55 to 59	633 409	537 279	1 170 688	0,9%	0,7%	1,6%	95,2%
60 to 64	646 290	589 902	1 236 192	0,9%	0,8%	1,7%	96,8%
65 to 69	446 338	359 857	806 195	0,6%	0,5%	1,1%	97,9%
70 to 74	359 371	317 044	676 415	0,5%	0,4%	0,9%	98,9%
75 and Above	490 721	355 638	846 359	0,7%	0,5%	1,1%	100,0%
Total	37 285 040	36 612 055	73 897 095	50,5%	49,5%	100,0%	

Source: CSA, 2008

Appendix 5: Age and sex structure of Addis Ababa in 2007

Age Group	Male	Female	Total	Percentage			Cumulative Percentage
				Male	Female	Total	
Under 1	18 506	17 937	36 443	0,7%	0,7%	1,3%	1,3%
1 to 4	81 155	78 334	159 489	3,0%	2,9%	5,8%	7,2%
4 to 9	101 651	107 881	209 532	3,7%	3,9%	7,7%	14,8%
10 to 14	109 266	141 503	250 769	4,0%	5,2%	9,2%	24,0%
15 to 19	153 352	233 011	386 363	5,6%	8,5%	14,1%	38,1%
20 to 24	184 341	220 793	405 134	6,7%	8,1%	14,8%	52,9%
25 to 29	179 963	191 941	371 904	6,6%	7,0%	13,6%	66,5%
30 to 34	126 147	106 815	232 962	4,6%	3,9%	8,5%	75,0%
35 to 39	98 140	90 996	189 136	3,6%	3,3%	6,9%	81,9%
40 to 44	65 746	54 151	119 897	2,4%	2,0%	4,4%	86,2%
45 to 49	50 974	51 077	102 051	1,9%	1,9%	3,7%	90,0%
50 to 54	38 892	41 664	80 556	1,4%	1,5%	2,9%	92,9%
55 to 59	28 187	26 947	55 134	1,0%	1,0%	2,0%	94,9%
60 to 64	23 863	23 555	47 418	0,9%	0,9%	1,7%	96,7%
65 to 69	17 807	16 877	34 684	0,7%	0,6%	1,3%	97,9%
70 to 74	12 639	13 760	26 399	0,5%	0,5%	1,0%	98,9%
75 and Above	13 889	16 488	30 377	0,5%	0,6%	1,1%	100,0%
Total	1 304 518	1 433 730	2 738 248	47,6%	52,4%	100,0%	

Source: CSA, 2008

Appendix 6: Population size, household number, housing Units, area and their percentage share of Addis Ababa in 2007

Subcity	Population Size	Household Number	Housing Units	Area in Km2	Percentage Shares			
					Area	Population	Household Number	Housing units
Addis Ketema	255 092	52 961	49 923	9,0	1,7%	9,3%	8,0%	7,8%
Akaki Kalti	181 202	47 373	46 092	126,1	23,4%	6,6%	7,1%	7,2%
Arada	212 009	50 349	48 134	11,6	2,1%	7,7%	7,6%	7,6%
Bole	308 714	80 174	77 445	120,9	22,4%	11,3%	12,1%	12,2%
Guelele	267 381	62 562	58 465	32,7	6,1%	9,8%	9,4%	9,2%
Kirkos	220 991	55 256	53 428	16,3	3,0%	8,1%	8,3%	8,4%
Kolfe								
Keranio	428 654	98 092	94 135	65,1	12,1%	15,7%	14,8%	14,8%
Lideta	201 613	46 813	44 946	12,4	2,3%	7,4%	7,1%	7,1%
Nifas Silk								
Lafto	316 108	78 192	75 779	63,6	11,8%	11,5%	11,8%	11,9%
Yeka	346 484	90 956	88 100	82,3	15,2%			
						12,7%	13,7%	13,8%
Total	2 738 248	662 728	636 447	540,0	100,0%	100,0%	100,0%	100,0%

Source: CSA, 2008

Appendix 7: GDP of Addis Ababa at constant factor Cost in Million US Dollar between 1996 & 2011

Sector	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Agriculture	6	6	6	6	6	6	6	6	6	6	3	4	4	4	3	7
Industry	219	212	230	246	234	233	248	259	323	305	359	399	412	369	351	307
Service	754	795	824	849	831	821	841	970	1 055	1 201	1 177	1 306	1 350	1 208	115	1 005
Total	979	1 014	1 060	1 100	1 071	1 059	1 095	1 236	1 385	1 511	1 540	1 709	1 766	1 580	469	1 319

Source: BOFED, 2008 & 2010b

Appendix 8: Estimated regional gross domestic product at constant factor cost from transport and communication in Million US Dollar from 1996 to 2005

Sector	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Transport & Communication	185,6	189,4	191,6	190,8	186,1	193,7	184,3	222,3	247,8	353,5
Growth rate		2,1	1,6	1,7	2,6	4,1	2,3	4,8	5,6	9,2
Percentage Share of Service Sector	24,6	23,8	23,3	22,5	22,4	23,6	21,9	22,9	23,5	29,4
Total GDP	979,2	1 013,9	1 059,9	1 100,4	1 070,5	1 058,9	1 095,0	1 235,6	1 384,9	1 511,0
Percentage of Total GDP	19,0%	18,7%	18,1%	17,3%	17,4%	18,3%	16,8%	18,0%	17,9%	23,4%

Source: BOFED, 2008

Appendix 9: Estimated regional gross domestic Product at constant factor cost from the service sector in Million Ethiopian Birr, growth rates and percentage share from 1996 to 2005

Description	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Trade, Hotel and Restaurants	1 100	1 143	1 207	1 302	1 308	1 493	1 438	1 729	1 970	1 924
Growth rate		7,90	5,93	3,32	4,75	5,76	6,75	7,21	7,54	7,37
% Share from Service	2,80	2,86	2,87	2,67	2,76	2,90	3,21	3,05	3,09	2,87
Transport & Communication	1 394	1 423	1 439	1 467	1 547	1 703	1 600	1 937	2 151	3 079
Growth rate		2,08	1,62	1,73	2,64	4,09	2,33	4,81	5,57	9,21
% Share from Service	24,61	23,81	23,26	22,47	22,40	23,60	21,92	22,92	23,48	29,45
Financial Intermediation	673	794	836	946	1 081	919	849	1 221	1 157	1 368
Growth rate		18,04	11,46	12,03	12,58	6,44	3,96	8,89	7,01	8,20
% Share from Service	11,88	13,30	13,51	14,49	15,65	12,74	11,64	14,45	12,63	13,08
Real estate, Renting & Business services	1 532	1 569	1 618	1 669	1 731	1 780	1 880	1 939	2 125	2 023
Growth rate		2,44	2,78	2,91	3,10	3,05	3,47	3,43	4,18	3,14
% Share from Service	27,05	26,27	26,15	25,56	25,07	24,67	25,75	22,95	23,20	19,35
Public Administration	409	433	445	465	487	511	678	712	747	776
Growth rate		6,07	4,34	4,39	4,48	4,59	8,80	8,25	7,84	7,39
% Share from Service	7,21	7,25	7,19	7,12	7,05	7,09	9,29	8,42	8,16	7,42
Education Services & Training services	158	171	178	175	191	209	234	258	283	300
Growth rate		7,90	5,93	3,32	4,75	5,76	6,75	7,21	7,54	7,37
% Share from Service	2,80	2,86	2,87	2,67	2,76	2,90	3,21	3,05	3,09	2,87
Health Services	103	112	114	117	129	138	150	161	172	196
Growth rate		8,00	5,20	4,26	5,81	5,92	6,43	6,56	6,61	7,41
% Share from Service	1,82	1,87	1,85	1,79	1,87	1,91	2,06	1,91	1,88	1,88
Other Community, Social and Personal Services	187	218	234	269	306	333	335	354	354	563
Growth rate		16,20	11,91	12,83	13,10	12,18	10,19	9,51	8,30	13,02
% Share from Service	3,31	3,64	3,79	4,12	4,44	4,61	4,59	4,19	3,87	5,39
Private Households with Employed Persons	108	112	116	121	125	130	135	140	201	227
Growth rate		3,72	3,72	3,72	3,72	3,72	3,72	3,72	8,04	8,57
% Share from Service	1,91	1,88	1,88	1,85	1,81	1,80	1,84	1,65	2,19	2,17
Service Sector Total	5 663	5 974	6 188	6 530	6 905	7 215	7 299	8 449	9 160	10 457

Source: BOFED, 2012

Appendix 10: Total and Revenue Sources of Addis Ababa City Government in Million US Dollar between 2004 & 2011

Revenue Type	2004	2005	2006	2007	2008	2009	2010	2011
Tax Revenue	73,0	113,8	118,6	129,4	178,7	214,4	273,7	282,2
Non Tax Revenue	33,9	33,0	83,5	55,5	64,7	47,8	75,6	58,6
Capital Revenue	9,4	1,1	23,6	13,6	44,3	89,4	0,0	0,1
Municipal Revenue	58,0	71,0	74,8	68,6	40,5	57,6	50,6	53,3
Transfers/Subsidy	2,4	2,9	7,2	3,1	4,7	2,6	3,1	2,4
Total Domestic Revenue	176,6	221,8	307,7	270,2	332,9	411,8	403,0	396,6
External Loan & Assistance	4,9	6,6	0,7	5,6	7,2	2,0	6,7	7,5
Grand Total	181,4	228,3	308,4	275,8	340,1	413,9	409,7	404,1

Source: BOFED, 2012

Appendix 11: Percentage Shares of Revenue of Addis Ababa between 2004 and 2011

Revenue Type	2004	2005	2006	2 007	2008	2009	2010	2011	Average 2009 - 2011
Tax Revenue	40,2%	49,8%	38,5%	46,9%	52,5%	51,8%	66,8%	69,8%	62,8%
Non Tax Revenue	18,7%	14,5%	27,1%	20,1%	19,0%	11,5%	18,5%	14,5%	14,8%
Capital Revenue	5,2%	0,5%	7,7%	4,9%	13,0%	21,6%	0,0%	0,0%	7,2%
Municipal Revenue	31,9%	31,1%	24,3%	24,9%	11,9%	13,9%	12,3%	13,2%	13,2%
Transfers/Subsidy	1,3%	1,3%	2,3%	1,1%	1,4%	0,6%	0,8%	0,6%	0,7%
Total Domestic Revenue	97,3%	97,1%	99,8%	98,0%	97,9%	99,5%	98,4%	98,1%	98,7%
External Loan & Assistance	2,7%	2,9%	0,2%	2,0%	2,1%	0,5%	1,6%	1,9%	1,3%
Grand Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Source: BOFED, 2012

Appendix 12: Addis Ababa City Government Expenditures in Million US Dollar between 2004 & 2011

Expenditure Category	2004	2005	2006	2007	2008	2009	2010	2011
Salary & Benefits	46,2	42,4	54,0	61,8	76,7	87,3	87,0	86,4
Purchase of Goods & Services	32,5	24,3	33,3	34,8	35,7	57,6	52,9	52,5
Fixed Assets & Construction	68,1	88,5	148,9	181,1	274,2	350,7	191,2	183,5
Public Housing	7,4	41,9	84,5	62,2	134,3	112,1	0,1	0,0
Road Infrastructure	45,9	27,9	36,4	73,6	98,3	108,9	95,7	96,6
Others	14,8	18,8	28,0	45,2	41,5	129,7	95,4	86,9
Other Payments	20,6	17,4	21,3	29,6	25,2	42,4	59,1	65,0
Subsidy to Anbessa City Bus	4,1	7,2	5,4	5,8	4,4	2,6	2,6	6,7
Public Debt Payment	0,1	0,0	0,0	0,4	1,3	6,8	19,9	34,4
Others	16,4	10,1	15,9	23,4	19,5	33,1	36,6	23,9
Total	167,4	172,6	257,5	307,2	411,8	538,0	390,2	387,4

Source: BOFED, 2012

Appendix 13: Major Land Use Components of the 2001 City Development Plan

Land Uses	Area in Hectare	Percentage
Mixed Use in Built Up Area	17 147	31,5%
Mixed Use in Expansion Areas	6 792	12,5%
Industry Existing and Proposed Center both the Main center and Sub Centers	4 130	7,6%
Social Services Existing and Proposed	1 233	2,3%
Road Network	637	1,2%
Transportation	3 055	5,6%
Forest and Open Spaces	975	1,8%
Agriculture	11 927	21,9%
Reserved Areas	7 499	13,8%
	1 120	2,1%
Total	54 515	100,0%

Source: ORAAMP, 2001

Appendix 14: Appendix 14: Length of Asphalt Road in Kilometer by Road Hierarchy 2003 to 2009

Road Hierarchy	2003	2004	2005	2006	2007	2008	2009
Principal Arterial Road	308	327	336	352	477	512	652
Sub Arterial Road	118	119	133	139	145	151	211
Collector Road	178	180	181	182	187	193	209
Local Road	152	152	167	177	181	193	208
Total Asphalt	756	778	817	850	990	1049	1280

Source: BOFED, 2010

Appendix 15: Percentage of Length of Asphalt Road by Road Hierarchy 2003 to 2009

Road Hierarchy	2005	2006	2007	2008	2009
Principal Arterial Road	41,1%	41,4%	48,2%	48,8%	50,9%
Sub Arterial Road	16,3%	16,4%	14,6%	14,4%	16,5%
Collector Road	22,2%	21,4%	18,9%	18,4%	16,3%
Local Road	20,4%	20,8%	18,3%	18,4%	16,3%

Source: BOFED, 2010

Appendix 16: Length of Pedestrian Walkway in Kilometer 2005 to 2008

Road Hierarchy	2005	2006	2007	2008	2009	2010
Principal Arterial Road	60,4	67,0	79,0	87,0	131,0	131,0
Sub Arterial Road	79,2	86,0	92,0	96,0	120,0	120,0
Collector Road	100,0	108,0	110,0	110,0	110,0	110,0
Local Road	24,0	24,0	26,0	26,0	26,0	26,0
Total Length	263,6	285,0	307,0	319,0	387,0	387,0
Percentage of Total	12,0%	12,7%	12,6%	12,6%	13,8%	11,6%

Source BOFED, 2010

Appendixes

Appendix 17: Number of Vehicles in Addis Ababa 1993 to 2011

Year	Taxis	Private Cars	Commercial Vehicles	Government	Public Associations	Aid Organization	African Union	Diplomatic	United Nations	Total
1993	10 991	44 667	12 238	6 220	1 378	3 065	181	754	853	80 347
1994	12 040	47 234	13 107	6 341	1 455	3 239	193	839	939	85 387
1995	13 089	50 130	14 062	6 746	1 505	3 434	197	929	993	91 085
1996	13 536	52 944	14 833	6 821	1 529	3 472	198	935	1 006	95 274
1997	13 665	54 336	15 299	6 916	1 555	3 612	203	984	1 035	97 605
2006	16 035	62 061	61 675	9 569	1 808	5 414	169	663	858	158 252
2007	16 974	67 190	70 906	10 547	1 997	6 094	203	829	1 028	175 768
2008	18 294	71 174	78 399	11 209	2 198	6 601	252	975	1 177	190 279
2009	18 656	71 896	79 811	11 298	2 216	6 709	258	1 039	1 242	193 125
2010	18 987	72 543	81 559	11 596	2 329	7 319	283	1 339	1 400	197 355
2011	19 178	72 901	83 057	12 047	2 483	8 930	343	1 571	1 613	202 123

Source: Addis Ababa City Transport Branch Office

Appendix 18: Percentage Annual Growth Rates of Motor Vehicles in Addis Ababa from 1993 to 2011

Year	Taxis	Private Cars	Commercial Vehicles	Government	Public Associations	Aid Organization	African Union	Diplomatic	United Nations	Total
1993										
1994	9,5%	5,7%	7,1%	1,9%	5,6%	5,7%	6,6%	11,3%	10,1%	6,3%
1995	8,7%	6,1%	7,3%	6,4%	3,4%	6,0%	2,1%	10,7%	5,8%	6,7%
1996	3,4%	5,6%	5,5%	1,1%	1,6%	1,1%	0,5%	0,6%	1,3%	4,6%
1997	1,0%	2,6%	3,1%	1,4%	1,7%	4,0%	2,5%	5,2%	2,9%	2,4%
2006	1,9%	1,6%	33,7%	4,3%	1,8%	5,5%	-1,9%	-3,6%	-1,9%	6,9%
2007	5,9%	8,3%	15,0%	10,2%	10,5%	12,6%	20,1%	25,0%	19,8%	11,1%
2008	7,8%	5,9%	10,6%	6,3%	10,1%	8,3%	24,1%	17,6%	14,5%	8,3%
2009	2,0%	1,0%	1,8%	0,8%	0,8%	1,6%	2,4%	6,6%	5,5%	1,5%
2010	1,8%	0,9%	2,2%	2,6%	5,1%	9,1%	9,7%	28,9%	12,7%	2,2%
2011	1,0%	0,5%	1,8%	3,9%	6,6%	22,0%	21,2%	17,3%	15,2%	2,4%
Annual Growth Rate 1993 to 2011	4,3%	3,8%	8,8%	3,9%	4,7%	7,6%	8,7%	12,0%	8,6%	5,2%

Source: Addis Ababa City Transport Branch Office

5,2%

Appendix 19: Percentage of Vehicles by type in Addis Ababa between 1993 and 2011

Year	Taxis	Private Cars	Commercial Vehicles	Government	Public Associations	Aid Organization	African Union	Diplomatic	United Nations
1993	13,7%	55,6%	15,2%	7,7%	1,7%	3,8%	0,2%	0,9%	1,1%
1994	14,1%	55,3%	15,4%	7,4%	1,7%	3,8%	0,2%	1,0%	1,1%
1995	14,4%	55,0%	15,4%	7,4%	1,7%	3,8%	0,2%	1,0%	1,1%
1996	14,2%	55,6%	15,6%	7,2%	1,6%	3,6%	0,2%	1,0%	1,1%
1997	14,0%	55,7%	15,7%	7,1%	1,6%	3,7%	0,2%	1,0%	1,1%
2006	10,1%	39,2%	39,0%	6,0%	1,1%	3,4%	0,1%	0,4%	0,5%
2007	9,7%	38,2%	40,3%	6,0%	1,1%	3,5%	0,1%	0,5%	0,6%
2008	9,6%	37,4%	41,2%	5,9%	1,2%	3,5%	0,1%	0,5%	0,6%
2009	9,7%	37,2%	41,3%	5,9%	1,1%	3,5%	0,1%	0,5%	0,6%
2010	9,6%	36,8%	41,3%	5,9%	1,2%	3,7%	0,1%	0,7%	0,7%
2011	9,5%	36,1%	41,1%	6,0%	1,2%	4,4%	0,2%	0,8%	0,8%
Average	11,7%	45,6%	29,2%	6,6%	1,4%	3,7%	0,2%	0,8%	0,8%

Source : Addis Ababa Transport Branch Office

Appendix 20: Estimated additional fleet required by modes of public transportation

Public transport Mode	Current Fleet t Share	Supplementary fleet required
Anbessa City Bus	0,03	83
Midi -bus	0,02	55
Minibus	0,68	1 872
Saloon Taxi	0,24	661
Intercity buses	0,03	83
Total	1,00	2 754

Source: Own calculation & Addis Ababa Transport Branch Office, 2012a

Appendix 21: Percentage of employee of Anbessa City Bus Enterprise from 2000 to 2012 by major employment groupings

Year	Employees of Anbessa by Categories		
	Administrative	Technical	Operational
2000	26,2%		73,8%
2001	28,3%		71,7%
2002	26,9%	14,3%	58,8%
2003	25,5%	14,6%	59,9%
2004	26,6%	14,5%	58,9%
2005	26,8%	14,6%	58,5%
2006	26,7%	13,8%	59,5%
2007	29,6%	12,1%	58,3%
2008	33,6%	11,9%	54,6%
2009	33,1%	11,7%	55,2%
2010	25,6%	8,9%	65,5%
2011	25,6%	8,9%	65,5%
2012	25,9%	9,7%	64,4%

Source: ACBSE, 2013b

Appendix 22: Anbessa City Bus routes, origin -destination, length of route, number of buses, tariff and daily passenger volume for the month of January 2013

Bus line Number	Route		Route length in Km	Number of buses/Line	Route Tariff In Eth.Birr	Total Daily Passenger	Passenger		Tariff /km
	Origin	Destination					/bus/day	/bus km/day	
1	Megenagna	Karaalo	7,7	4	1,40	6 885	1721	894	0,18
2	Mekanissa	Addis Ketema	11,1	4	2,00	3 576	894	322	0,18
3	Ayer Tena	Menelik Square	10,8	8	2,00	17 097	2137	1583	0,19
4	Kaliti	Addis Ketema	19,4	6	3,25	3 319	553	171	0,17
5	Mekanissa Kore	Menelik Square	12,7	3	2,40	3 092	1031	243	0,19
6	Kera	Addisu Gebaya Ring	10,7	8	2,00	16 955	2119	1585	0,19
7	Megenagna	Aleltu	49,0	3	10,00	1 965	655	40	0,20
8	Kechene School	Addis Ketema	9,4	3	1,40	1 614	538	172	0,15
9	Bole Biras	Piazza	10,5	3	2,00	1 587	529	151	0,19
10	Kotebe College	Piassa	12,7	6	2,40	4 023	671	317	0,19
11	Menelik Hotel	Efoyta Kolfe	10,0	4	2,00	2 078	520	208	0,20

12	Gurara Ferensaye	Addis Ketema	9,9	6	2,00	7 835	1306	791	0,20
13	Bella	Addis Ketema	9,9	3	2,00	3 028	1009	306	0,20
14	Saris Abo	Menelik Square	12,3	6	2,40	3 974	662	323	0,20
15	Megenagna	Addis Ketema	10,4	4	2,00	3 729	932	359	0,19
16	Kidane Mehret	Addis Ketema	7,9	8	1,40	6 917	865	876	0,18
17	Kusekume	Addis Ketema	9,1	6	2,00	5 765	961	634	0,22
18	Keranio	Addis Ketema	7,3	8	1,40	5 913	739	810	0,19
19	Asko	Piassa	12,2	4	2,00	6 017	1504	493	0,16
20	Dele Bire	Addis Ketema	8,6	3	1,40	1 303	434	152	0,16
21	Filli Doro	Addis Ketema	8,6	4	1,40	4 742	1186	551	0,16
22	Semite	Legahare	12,3	6	2,40	3 954	659	321	0,20
23	Lame Beret	Addis Ketema	12,4	3	2,40	1 159	386	93	0,19
24	Dire Sololiya	Addis Ketema	17,7	4	2,70	2 561	640	145	0,15
25	Akakai	Legahare	19,0	4	3,25	2 904	726	153	0,17
26	Sebeta	Addis Ketema	25,5	3	4,50	1 438	479	56	0,18
27	Kalti Total	Legahare	14,9	8	2,40	7 300	913	490	0,16
28	Sansuzi	Addis Ketema	11,1	4	2,00	3 389	847	305	0,18
29	Addisu Sefer Sarris	Addis Ketema	12,7	6	2,40	3 195	533	252	0,19
30	Sululuta	Addis Ketema	25,8	3	4,50	2 571	857	100	0,17
31	Shero Meda	Legahare	7,4	8	1,40	22 424	2803	3030	0,19
32	Kotebe Hanamariam	Legahare	10,6	6	2,00	8 299	1383	783	0,19
33	Kotebe Geberiel	Arat Kilo	11,4	5	2,00	7 499	1500	658	0,18
34	Gofa German Square	Addis Ketema	9,8	3	2,00	2 629	876	268	0,20
35	Lebu Musika Sefer	Addis Ketema	15,0	3	2,40	1 863	621	124	0,16
36	Kara Kore	Legahare	11,7	4	2,00	4 240	1060	362	0,17
37	Keranio	Menelik Square	12,0	4	2,00	6 150	1538	513	0,17
38	Sidist Kilo	Gofa German Square	11,0	4	2,00	4 659	1165	424	0,18
39	Bole Medehanealem	Addis Ketema	9,6	3	2,00	2 843	948	296	0,21
40	Kara Elo	Addis Ketema	17,9	3	2,70	2 493	831	139	0,15
41	Genete Eyesus	Addis Ketema	8,5	5	1,40	4 296	859	505	0,16
42	Megenagna	Via Bole Legahre	9,8	3	2,00	1 056	352	108	0,20
43	Menagesha	Addis Ketema	30,2	2	4,50	912	456	30	0,15
44	Legedadi	Addis Ketema	30,4	2	4,50	1 267	634	42	0,15

Appendixes

45	Dele Bire	Legahare	8,6	6	1,40	4 539	757	528	0,16
46	Gereji	Arat Kilo	11,2	6	2,00	5 913	986	528	0,18
47	Yenegewe Fire school Shegole	Addis Ketema	6,0	3	1,40	2 581	860	430	0,23
48	Bole Mikale	Menelik Square	10,9	6	2,00	4 332	722	397	0,18
49	Megenagna	Meri Ayat	8,8	6	1,40	8 601	1434	977	0,16
50	Megenagna	Ayer Tena	14,9	4	2,40	5 619	1405	377	0,16
51	Bethel	Addis Ketema	10,9	3	2,00	3 369	1123	309	0,18
52	Gereji	Addis Ketema	14,1	8	2,40	4 833	604	343	0,17
53	Bole Mikale	Shero Meda	11,5	4	2,00	4 435	1109	386	0,17
54	Lafeto	Legahare	9,5	4	2,00	2 250	563	237	0,21
55	Ferensaye Gurara	Legahare	9,5	4	2,00	4 494	1124	473	0,21
56	Saris Abo	Shero Meda	14,2	6	2,40	4 367	728	308	0,17
57	Kara Elo via Lamberet	Legahare	14,4	4	2,40	2 569	642	178	0,17
58	Aleme Bank	Legahare	12,0	3	2,00	2 107	702	176	0,17
59	Bethel Hotel	Menelik Square	11,5	6	2,00	9 630	1605	837	0,17
60	Debre Zeite	Legahare	47,2	8	7,50	5 059	632	107	0,16
61	Ayat Square	Legahare	15,8	6	2,40	3 696	616	234	0,15
62	Sebeta	Legahare	23,8	3	3,75	2 535	845	107	0,16
63	Mikililand Condominium	Addis Ketema	9,1	3	2,00	1 688	563	185	0,22
64	Sidist Kilo	Gorefe Aswegadge	9,5	4	2,00	3 036	759	320	0,21
65	Aleme Bank	Addis Ketema	11,0	3	2,00	2 650	883	241	0,18
66	Kara Kore	Addis Ketema	10,5	4	2,00	4 060	1015	387	0,19
67	Jemmo	Legahare	10,2	8	2,00	12 598	1575	1235	0,20
68	Tore Hailoch	Menelik Hospital	10,2	6	2,00	3 122	520	306	0,20
69	Lomi Meda	Addis Ketema	5,9	3	1,40	546	182	93	0,24
70	Aware Adebabye	Ayer Tena	12,0	4	2,00	3 971	993	331	0,17
71	Gereji Meberat Haile	Balcha Hospital	10,9	3	2,00	2 521	840	231	0,18
72	Sarris Abo	Hana Mariam	3,8	4	1,00	12 938	3235	3405	0,26
73	Wingate School	Legahare	10,2	6	2,00	5 849	975	573	0,20
74	CMC Mechaelle	Addis Ketema	13,3	6	2,40	3 348	558	252	0,18
75	Sidist Kilo	Kera	10,4	4	2,00	2 392	598	230	0,19
76	Megenagna	Kalti Total	18,2	3	2,70	1 378	459	76	0,15
77	Kera	Ayer Tena	5,0	2	1,00	1 206	603	241	0,20

78	Megenagna	Gofa Condominium	12,4	3	2,40	1 612	537	130	0,19
79	Arat Kilo	Semmit	12,7	4	2,40	1 590	398	125	0,19
80	Megenagna	Semen Gebaya	12,4	6	2,40	4 047	675	326	0,19
81	Sidist Kilo	Asko	10,7	3	2,40	1 167	389	109	0,22
82	Goro School	Balcha Hospital	14,6	6	2,40	3 693	616	253	0,16
83	Sidist Kilo	CMC Ayat	15,8	6	2,40	3 835	639	243	0,15
84	Kolfe Efoyta	Legahare	9,5	3	2,00	1 917	639	202	0,21
85	Holeta	Addis Ketema	45,0	2	7,50	1 715	858	38	0,17
86	Ayer Tena	Kalti Kori	12,3	4	2,40	2 335	584	190	0,20
87	Wingate School	Ayer Tena	10,5	6	2,00	8 854	1476	843	0,19
88	Chancho	Addis Ketema	40,0	3	7,50	1 620	540	41	0,19
89	Sendafa	Addis Ketema	44,0	3	7,50	1 732	577	39	0,17
90	Bethel Hospital	Legahare	10,0	6	2,00	7 108	1185	711	0,20
92	Teji	Addis Ketema	52,0	2	10,00	1 675	838	32	0,19
92	Hana Mariam	Balcha Hospital	9,6	4	2,00	5 900	1475	615	0,21
93	Megenagna	Bole Bulbula	15,2	4	2,40	3 199	800	210	0,16
94	Mikililand Condominium	Piassa	9,9	4	2,00	2 503	626	253	0,20
95	Addis Aleme	Addis Ketema	47,0	3	7,50	1 690	563	36	0,16
96	Megenagna	Gore Sefer	7,0	3	1,40	3 013	1004	430	0,20
97	Megenagna	Legetafo mission	15,8	6	2,40	5 185	864	328	0,15
98	Dukem	Sarris Abo	26,3	3	4,50	2 135	712	81	0,17
99	Aleme Gena	Ayer Tena	9,6	3	2,00	3 570	1190	372	0,21
100	Jemmo	Addis Ketema	14,5	3	2,40	3 412	1137	235	0,17
101	Megenagna	Aba Kirkos Adebabye	12,0	6	2,00	6 051	1009	504	0,17
102	Kara Elo via Wessen	Legahare	13,7	6	2,40	3 319	553	242	0,18
103	Jemmo	Menelik Square	12,2	6	2,40	6 695	1116	549	0,20
104	Werku Sefer	Kera	8,3	2	1,40	1 613	807	194	0,17
105	Anfo Meda	Legahare	12,0	4	2,00	3 913	978	326	0,17
106	Goro Adebabye	Megenagna	10,8	3	2,00	2 137	712	198	0,19
107	Sarris Abo	Akaki Korkoro	11,4	3	2,00	2 287	762	201	0,18
108	Addisu Sefer Asko	Menelik Square	9,3	3	2,00	1 692	564	182	0,22
109	Sarris Abo	Tulu Dimitu	12,0	3	2,00	2 366	789	197	0,17
110	Sidist Kilo	Akaki	24,9	3	4,50	887	296	36	0,18
111	Dire Sololiya	Piassa	16,6	3	2,70	2 066	689	124	0,16

Appendixes

Total	1611,9	485	2,59	459 280	947	285	0,18
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Source: ACBSE, 2013a

Appendix 23: Anbessa fare structure

Distance in Kilometer	Fare in Ethiopian Birr
Less than 5	1.00
5.1 – 9.0	1.40
9.1 – 12.0	2.00
12.1 – 15.0	2.40
15.1 – 18.0	2.70
18.1 – 21.0	3.25
21.1 – 24.0	3.75
24.1 – 30.0	4.50
30.1 – 47.0	7.50
Above 47	10.0

Source: ACBSE, 2013a

Appendix 24: Minibus fare structure

Distance in Kilometer	Fare in Ethiopian Birr
Less than 2.5	1.35
2.6 – 7.0	2.70
7.1 – 10.0	3.75
10.1 – 12.0	3.90
12.1– 15.0	5.00

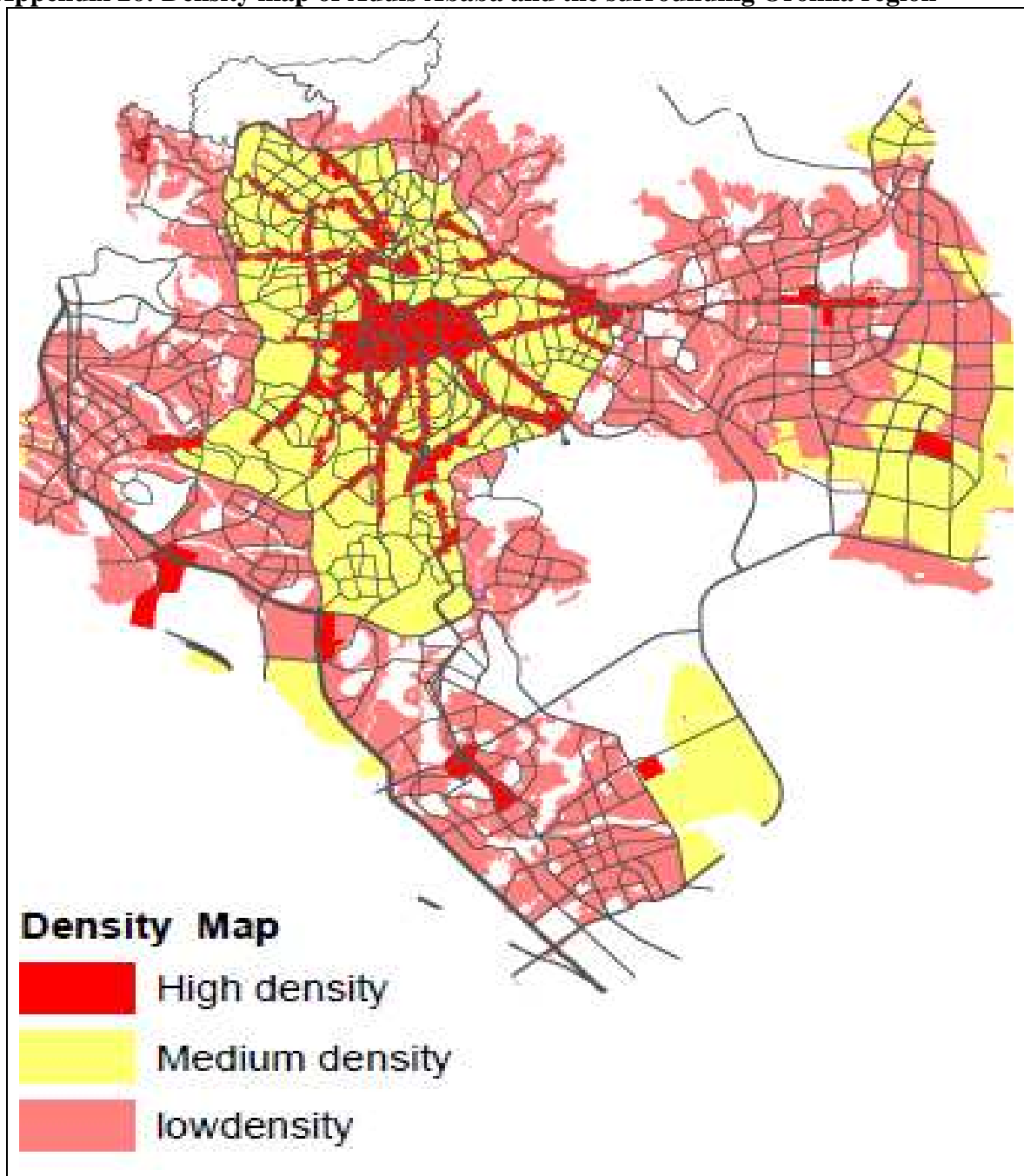
Source: AARTB, 2012b

Appendix 25: Higer midibus fare structure

Distance in Kilometer	Fare in Ethiopian Birr
Less than 8	1.95
8.1 – 12.0	3.10
12.1 – 15.0	3.80
15.1 – 18.0	4.30
18.1 – 21.0	4.90

Source: AARTB, 2012b

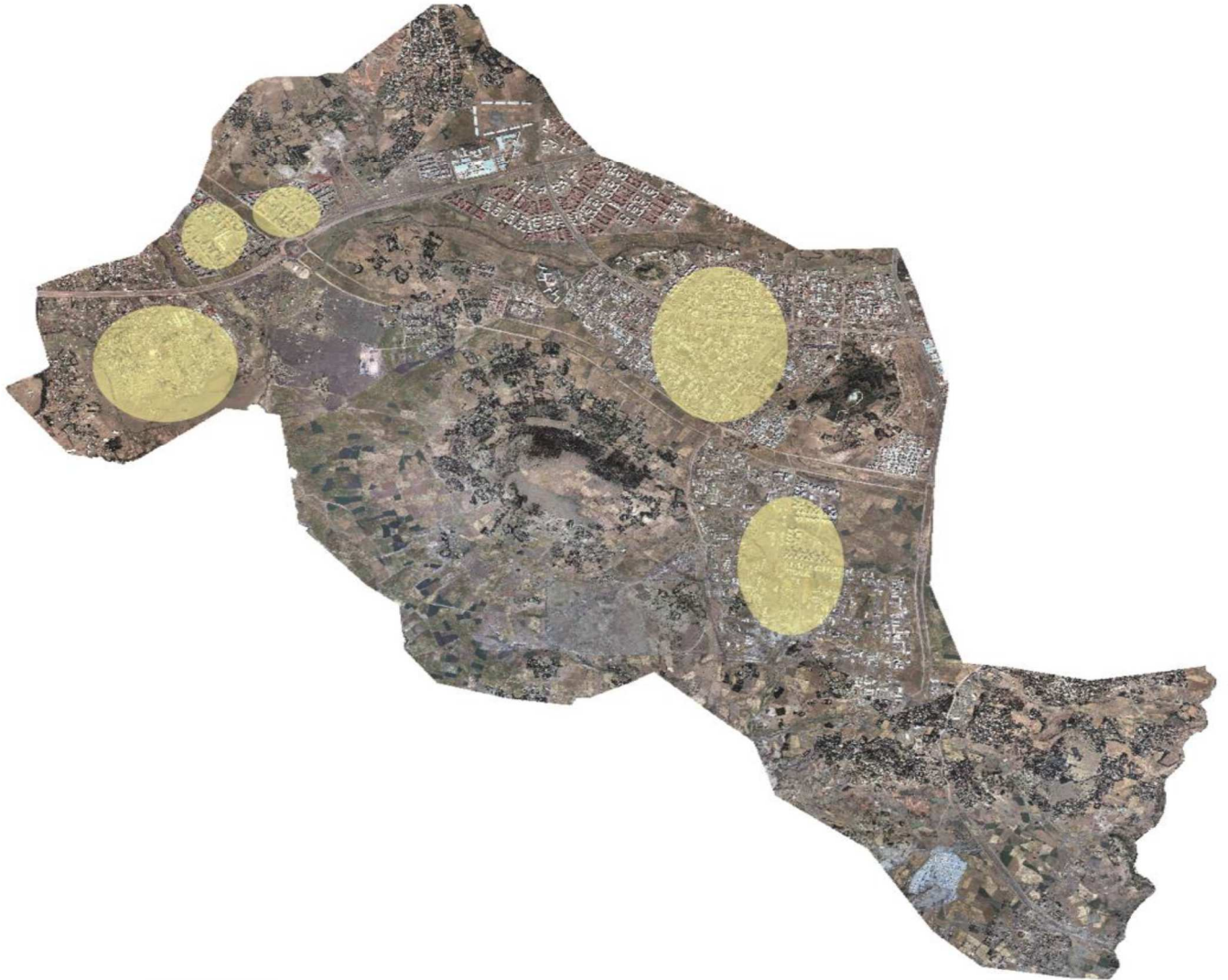
Appendix 26: Density map of Addis Ababa and the surrounding Oromia region



Source: AASZDPPO, 2013

Appendix 27: Wereda 01 of Nifas Silk Lafto Sub city

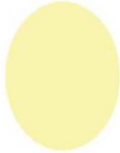
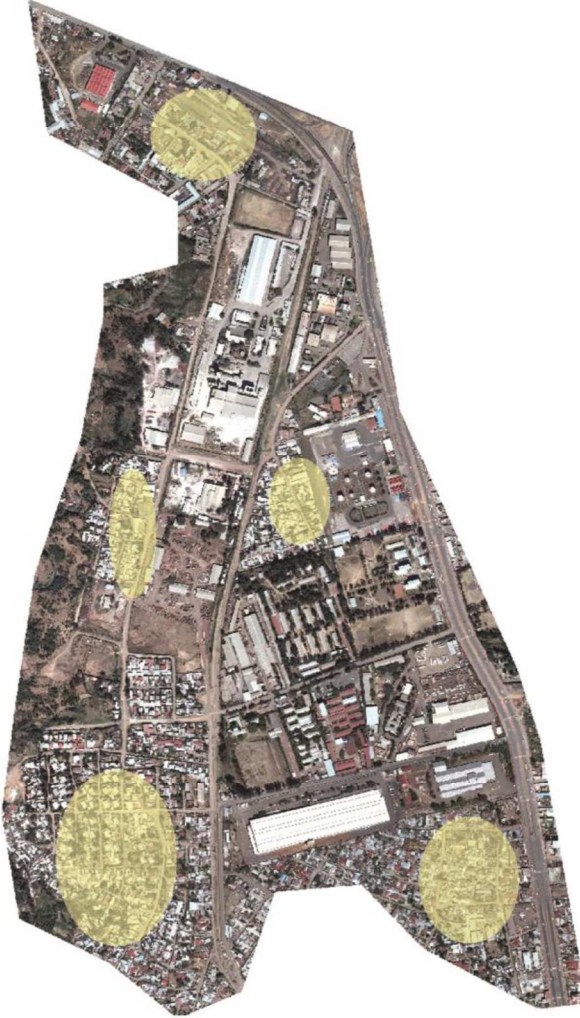
Nifas Silk Lafto / Woreda 01



**Location of the samples
taken**

Appendix 28: Wereda 07 of Nifas Silk Lafto Sub city

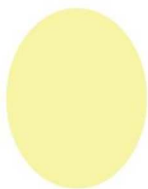
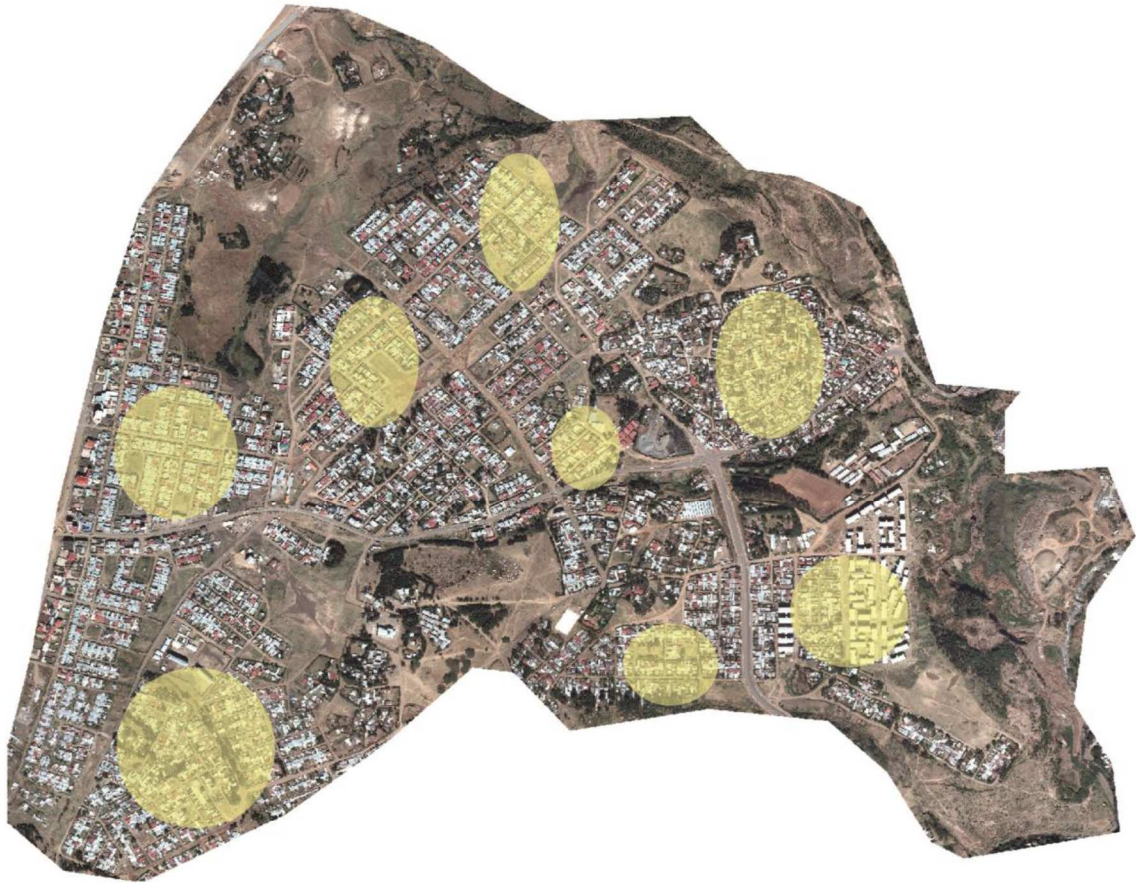
Nifas Silk Lafto/Woreda 07



Location of samples taken

Appendix 29: Wereda 06 of Kolfe Keranio Sub city

Kolfe Keranio / woreda 06



**Location of the
samples taken**

Appendix 30: Wereda 01 of Akaki Kaliti Sub city

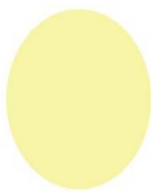
Akaki sub city/ Woreda 01



Location of samples

Appendix 31: Wereda 08 of Lideta Sub city

Lideta / woreda 08



Location of the samples taken

Appendix 32: Wereda 11 of Yeka Sub city

Yeka / Woreda 11



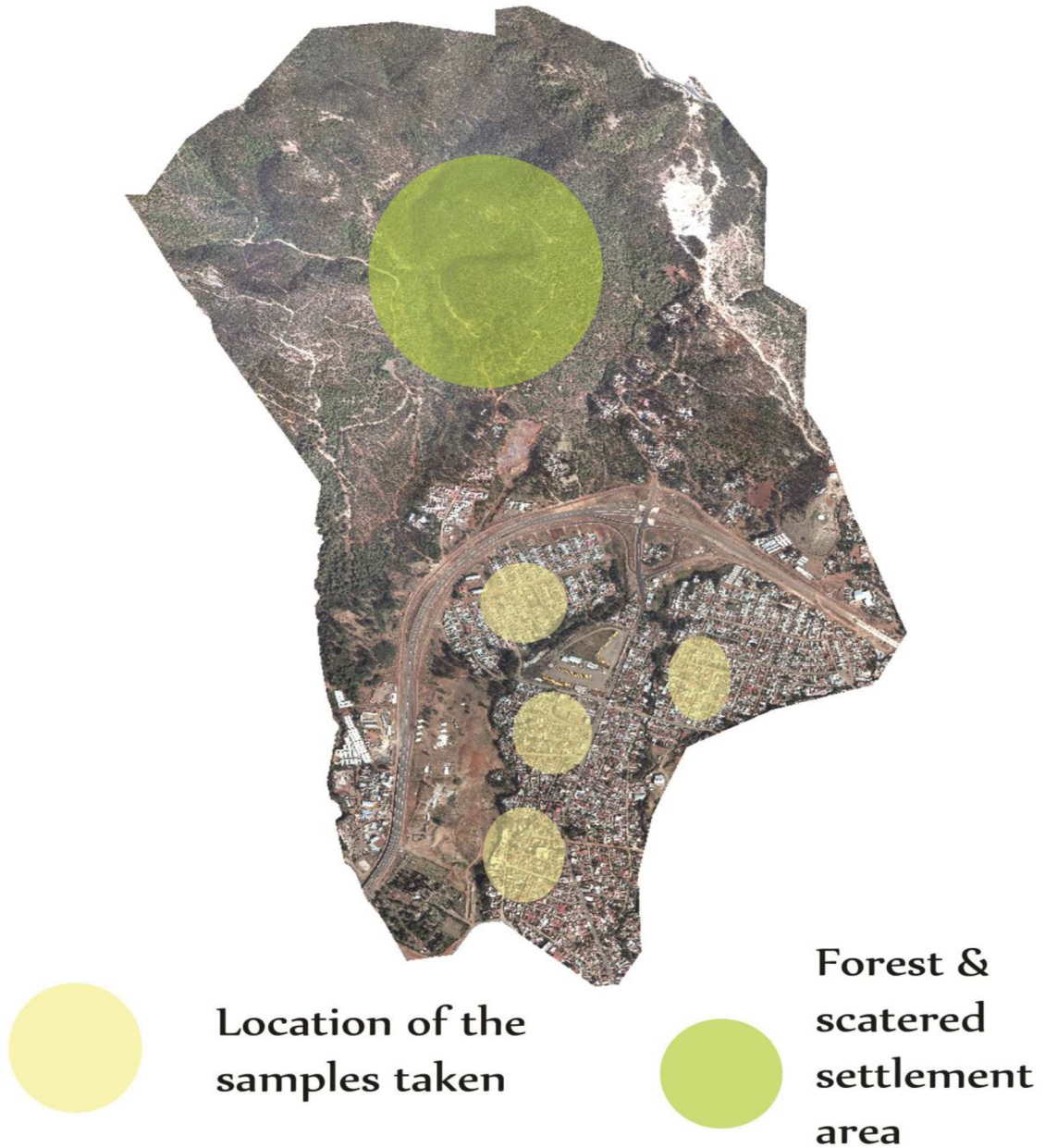
Location of samples taken



Forestry and green area

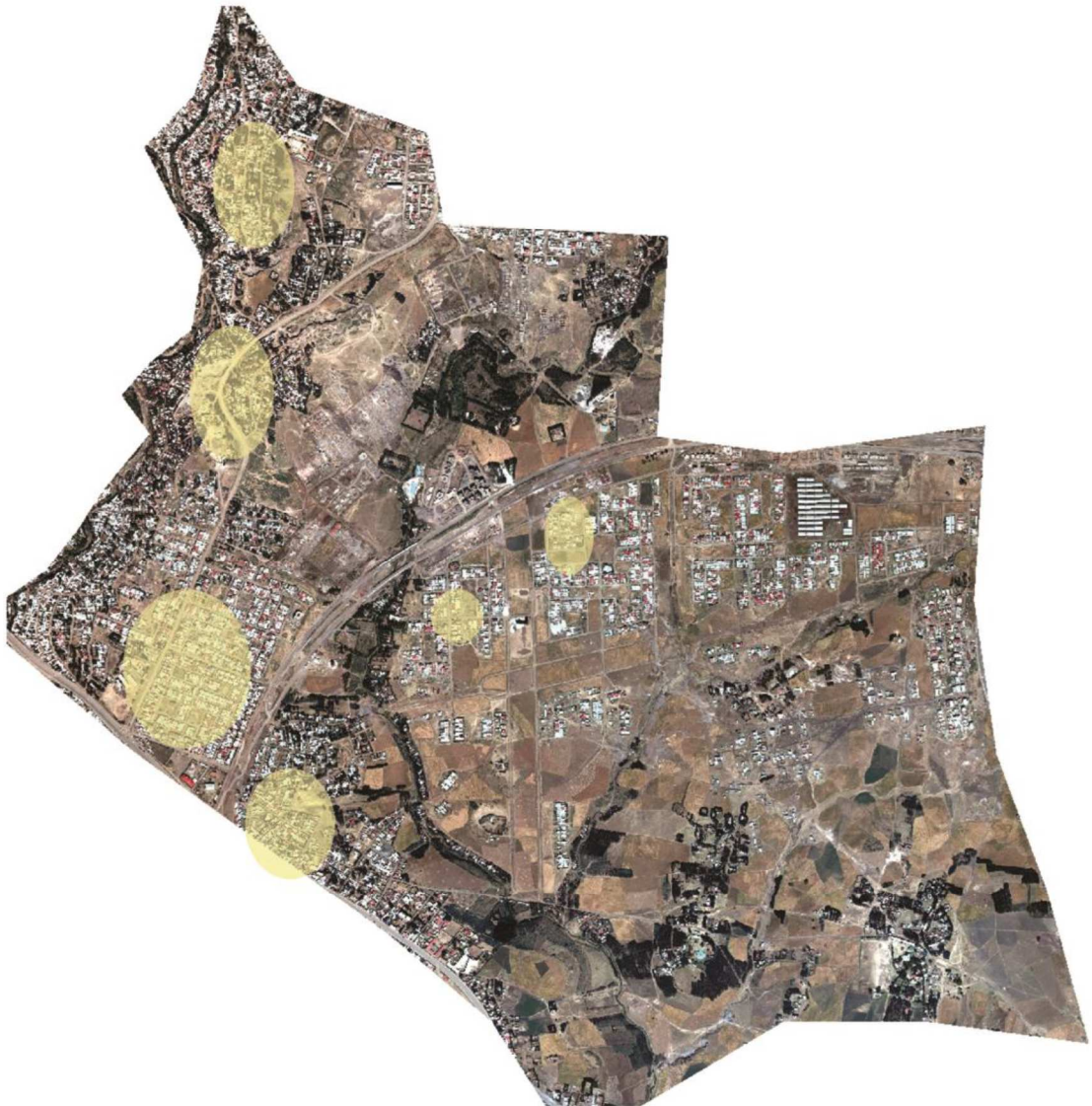
Appendix 33: Wereda 11 of Gulele Sub city

Gulele / woreda 11



Appendix 34: Wereda 09 of Bole Sub city

Bole /woreda 09



 Location of the samples taken

Appendix 35: Travel survey of Addis Ababa July/August 2014: General household information

1. Sub City: _____ 2. Wereda: _____ 3. Specific Zone: _____ 4. Household No: _____ 5. Date of Survey: _____ 6. Day of survey: _____ 7. Interviewer Name: _____

8. Name	9. Gender 1. Male 2. Female	10. Position 1. Head 2. Spouse 3. Child 4. Other Relative 5. Domestic Worker 6. Other _____	11. Age	12. Place of Birth 1. Addis Ababa 2. Diredawa 3. Oromia 4. Amhara 5. Tigray 6. Somalia 7. Dibub 8. Afar 9. Gambella 10. Benshangul 11. Abroad	13. Marital Status 1. Single 2. Married 3. Divorced 4. Widow 5. Other _____ -	14. Professional Activity 1. Civil Servant 2. Private Sector Employee 3. Contract/Seasonal Worker 4. Other 5. Unemployed 6. Student 7. Retired 8. Housewife 9. Other	15. Contribution to Household Income 1. Yes, Principal 2. Yes, Secondary 3. No Contribution	16. Periodical Contribution to household income 1. Daily 2. Weekly 3. Monthly 4. Quarterly 5. Bi Annually 6. Annually 7. Other specify _____	17. Amount in Birr
8.1.									
8.2									
8.3									
8.4									
8.5									
8.6									
8.7									
8.8									
8.9									
8.10									

18. Total No Persons in the Household: _____ 19. Total Number of Adults in the Household: _____ 20. Number of Children in the Household: _____

Appendixes

Travel Survey of Addis Ababa July/August 2014: General Household Expenditure Information

21. Household Expenditure Items (Tick appropriate)	22. Period of expenditure for the selected expenditure category 1. Daily 2. Weekly 3. Monthly 4. Quarterly 5. Bi Annually 6. Annually 7. Other please specify _____	23. Amount of Expenditure in Birr for the selected Item and Period
21.1 Food non-durable	<input type="checkbox"/>	-----,
21.2 Food durable	<input type="checkbox"/>	-----,
21.3 Rent	<input type="checkbox"/>	-----,
21.4 Transport cost for each mode or combination of modes used		-----,
• 21.4.1 Bajaj	<input type="checkbox"/>	-----,
• 21.4.2 Bicycle	<input type="checkbox"/>	-----,
• 21.4.3 Motor Cycle	<input type="checkbox"/>	-----,
• 21.4.4 Anbessa City Bus	<input type="checkbox"/>	-----,
• 21.4.5 Higer Bus	<input type="checkbox"/>	-----,
• 21.4.6 Intercity Bus	<input type="checkbox"/>	-----,

• 21.4.7 Minibus Taxi	<input type="text"/>`
• 21.4.8. Saloon Taxi	`
• 21.4.9. Private car including operation, insurance and maintenance costs	<input type="text"/>`
21.5 Clothes and shoes	<input type="text"/>`
21.6 Household Furniture	<input type="text"/>`
21.7 Education	<input type="text"/>`
21.8 Medical care	<input type="text"/>`
21.9 Utilities (water and electricity)	<input type="text"/>`
21.10 Other please specify _____	<input type="text"/>`

Appendixes

24. General Household Information: Access to basic services

24.1. Type of basic services	24.2. Does anyone in the household regularly use the services listed, for reasons other than professional ones? 1. Yes, often 2. Yes, sometimes 3. No, never → Go to question 24.6 4. Service not necessary	24.3. Where is the service located? 1. In the same Wereda where I live 2. In neighboring Wereda where I live. 3. In neighboring Sub City 4. Other specify ----- -----	24.4. Which mode or combination of modes do you use to access the service? 1. On foot 2. Bajaj 3. Bicycle 4. Motorcycle 5. Anbessa City Bus 6. Higer Bus 7. Intercity Bus 8. Minibus Taxi 9. Saloon Taxi 10. Private Car 11. Other specify _____	24.5. How long does it take to reach the service from your home using the mode or combination of modes you just indicated? (in minutes)	24.6. What are the three major problems you encounter for not using the service you indicated in 24.2? 1. Service is too far 2. Transport problem 3. Service is too expensive 4. Too much waiting time for getting the service 5. Poor quality of service 6. Overcrowding of classes 7. Poor diversity of food items in the market 8. Other problem specify _____ 9. No problem
24.1.1. Public Primary School (Grade 1 to 8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.2. Private Primary School (Grade 1 to 8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.3. Public Secondary School (Grade 9 & 10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.4. Private Secondary School (Grade 9 & 10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.5. Public University Preparatory School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.6. Private University Preparatory School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.7. Public Health Station or Center	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.8. Private Health Station or Center	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.9. Public Hospital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.10. Private Hospital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.1.11. Markets for food items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Appendix 36: Travel Survey of Addis Ababa July/August 2014: General Household Information II

RESIDENCE OF HOUSEHOLD HEAD	VEHICLE OWNERSHIP
<p>25. How long have you lived here? <input type="text"/> 1. Number of Months, if less than a year <input type="text"/> 2. Number of Years</p> <p>26. Where were you living before? <input type="text"/> 1. Always here <input type="text"/> 2. Another Wereda of the same Subcity <input type="text"/> 3. Another Wereda in another Sub city <input type="text"/> 4. Out of Addis Ababa or Regions <input type="text"/> 5. Abroad</p> <p>27. Are you owner of the house? <input type="text"/> 1. Yes <input type="text"/> 2. No → Go to question 29</p> <p>28. If your answer is yes, do you have title deed? <input type="text"/> 1. Yes <input type="text"/> 2. No</p> <p>29. What are the two most important reasons for your current residential choice? <input type="text"/> 1. Own the house <input type="text"/> 2. Low Rent <input type="text"/> 3. Close to work place <input type="text"/> 4. Close to school <input type="text"/> 5. Close to family members <input type="text"/> 6. Away from Family members <input type="text"/> 7. Better access to public transport <input type="text"/> 8. Better access to other public services <input type="text"/> 9. Safe and clean neighbourhood <input type="text"/> 10. Like the area <input type="text"/> 11. Others please specify _____</p>	<p>31. Do you or anyone in the household own a vehicle for own use? <input type="text"/> 1. Yes <input type="text"/> 2. No → Go to question 33</p> <p>32. If yes, which one's and how many? <input type="text"/> 1. Car <input type="text"/> 2. Minibus <input type="text"/> 3. Midi Bus <input type="text"/> 4. Large Bus <input type="text"/> 5. Motorcycle <input type="text"/> 6. Bicycle <input type="text"/> 7. Truck <input type="text"/> 8. Others, Please Specify _____</p>
HOUSEHOLD ECONOMIC SITUATION	ACCESS TO ROAD NETWORKS & TRANSPORT SERVICES of the RESIDENCE
<p>30. How do you describe the economic situation of your household in comparison with that of one year ago? <input type="text"/> 1. Much better now <input type="text"/> 2. Somehow better now <input type="text"/> 3. No change <input type="text"/> 4. Somewhat worse now <input type="text"/> 5. Much worse now <input type="text"/> 6. Do not know</p>	<p>33. Is your home accessible by motor vehicles or has direct access to asphalt road? <input type="text"/> 1. Yes → Go to Question 36 <input type="text"/> 2. No ↓</p> <p>34. How long does it take to walk to nearest vehicle usable asphalt road? <input type="text"/> In Minutes</p> <p>35. What kind of road links your home to nearest vehicle usable road? <input type="text"/> 1. Coarse and rough for vehicles <input type="text"/> 2. Too dusty and muddy to be usable by my Vehicles <input type="text"/> 3. Too Sloopy for Vehicles <input type="text"/> 4. Too narrow for Vehicles <input type="text"/> 5. Others please specify _____</p> <p>36. How long does it take to walk to nearest public transport station for mode frequented by most of the household? <input type="text"/> In Minutes</p>

Appendix 37: Travel survey of Addis Ababa July/August 2014: Individual travel characteristics

SOCIODEMOGRAPHIC CHARACTERISTICS

37. Gender: 1. Male 2. Female

38. Age

39. Position in the Household

1. Head 2. Spouse 3. Child
 4. Other Relative 5. Domestic Worker 6. Other specify_____

40. Marital Status

1. Single 2. Married 3. Divorced
 4. Widow 5. Other please specify_____

41. Indicate Place of Birth

1. Addis Ababa 2. Diredawa 3. Afar
 4. Amahara 5. Benshangu 6. Dibub
 7. Gambella 8. Oromia 9. Somalia
 10. Tigray 11. Abroad

LEVEL of EDUCATION

42. Can you read and write?

1. Yes 2. No → **Go to Question 44**



43.. Level of Education Attained

1. Elementary school graduate 2. High school graduate
 3. Vocational school graduate 4. University graduate with BA degree
 5. University graduate with master degree 6. University graduate with PhD
 7. Other specify_____

44. Do you go to school now?

1. Yes 2. No → **Go to Question 53**



45. Name of School_____

46. Location of School: Wereda Name _____ Sub City Name_____

47. Which one or combination of transport modes do you usually use for going to school?

1. On foot 2. Bajaj 3. Bicycle 4. Motor Cycle
 5. Anbessa City Bus 6. Higer Bus 7. Intercity Bus
 8. Minibus Taxi 9. Saloon Taxi 10. Private Car
 11. Other specify_____

48. How long do you need to reach your school with the mode or combination of modes you used?

Minutes

49. How much daily do you spent to reach your school for the mode or combination of modes you used?

Birr

50. Which one or combination of transport modes do you usually use for returning home?

1. On foot 2. Bajaj 3. Bicycle 4. Motor Cycle
 5. Anbessa City Bus 6. Higer Bus 7. Intercity Bus
 8. Minibus Taxi 9. Saloon Taxi 10. Private Car
 11. Other specify_____

51. How long do you need to return home with the mode or combination of modes you used?

Minutes

52. How much daily do you spent to go back to your home for the mode or combination of modes you used?

Birr

PROFESSIONAL ACTIVITY

53. Have you been gainfully employed in the last 30 days?

1. Yes 2. No → **Go to question 55**



54. Is the job

1. A civil servant 2. A permanent job in the private sector

3. A contract job 4. A self-employed job

5. Other specify _____ → **Go to question 56**

55. Are you

1. Unemployed 2. Pensioner 3. Student

4. Housewife 5. Other specify _____

56. What is your function in the job?

1. Employer/Manager 2. Self Employed 3. Senior Manager

4. Middle Manager 5. Civil Servant 6. Skilled Worker

7. Unskilled Worker 8. Driver 9. Daily laborer

10. Vendor 11. Domestic Worker

12. Other specify _____

57. Where is the place of your work?

1. Home → **Go to question 65.1**

2. Outside home



57.2.1 Name of Sub city _____ 57.2.2 Name of Wereda _____

57.2.3 Specific Name _____ 57.2.4 Name of Town if outside Addis Ababa _____

58. Which one or combination of transport modes do you usually use to go your place of work?

1. On foot 2. Bajaj 3. Bicycle 4. Motor Cycle

5. Anbessa City Bus 6. Higer Bus 7. Intercity Bus

8. Minibus Taxi 9. Saloon Taxi 10. Private Car

11. Other specify _____

59. How long do you need to go to your place of work with the mode or combination of modes you used? Hours/Minutes.

60. How much daily do you spent to reach your place of work for the mode or combination of modes you used? Birr

61. Which one or combination of transport modes do you use to return to your home?

1. On foot 2. Bajaj 3. Bicycle 4. Motor Cycle

5. Anbessa City Bus 6. Higer Bus 7. Intercity Bus

8. Minibus Taxi 9. Saloon Taxi 10. Private Car

11. Other specify _____

62. How long do you need to return to your home with the mode or combination of modes you used? Hours/Minutes.

63. How much daily do you spent to return to your home for the mode or combination of modes you used? Birr

64. Indicate three responses why you chose this or combination of transport modes you used?

1. It is close to my residence and/or job

2. It is less crowded

3. There is little waiting time at station

4. I walk little between transfer station

5. The personnel are kind and

6. It provides direct access to my residence and/or job

7. It is affordable

8. It is clean and safe

9. It is reliable and regular

10. It is fast

11. No Other Choice

12. Others specify _____

Appendixes

ECONOMIC SITUATION			
65. 1 Type of Income	65.2 Applicable 1. Yes 2. No	65.3 Period 1. Daily 2. Weekly 3. Monthly 4. Quarterly 5. Bi Annually 6. Annually 7. Other specify _____ —	65.4 Amount In Birr ____ _
65.1.1. Wage or Salary	<input type="checkbox"/>	<input type="checkbox"/>	____ _
65.1.2. Rent	<input type="checkbox"/>	<input type="checkbox"/>	____ _
65.1.3. Remittance	<input type="checkbox"/>	<input type="checkbox"/>	____ _
65.1.4. Pension	<input type="checkbox"/>	<input type="checkbox"/>	____ _
65.1.5. Assistance	<input type="checkbox"/>	<input type="checkbox"/>	____ _
65.1.6. Other	<input type="checkbox"/>	<input type="checkbox"/>	____ _
65.1.7. Total	<input type="checkbox"/>	<input type="checkbox"/>	____ _

66. How would you describe your income situation in the past one year?

1. Increase

2. Decreased

3. Remained the same

67. Do you own vehicle for own use?

1. Yes

2. No → **Go to question 69**

68. If yes, which one and how many?

1. Bicycle 2. Bajaj 3. Motorcycle

4. Private Car 5. Minibus 6. Midi Bus

7. Large Bus 8. Truck 9. Others specify _____

OPINION ON PUBLIC TRANSPORT

69. Do you use public transport?

1. Yes daily 2. Never → **Go to question 76**

3. Yes occasionally

70. What are the two most mode of public transport that you use for your most frequent trip?

1. Horse Drawn Cart 2. Bajaj

3. Saloon Taxi 4. Minibus Taxi

5. Anbessa City Bus 6. Higer Bus

7. Intercity Bus 8. Other Please Specify _____

71. What is your opinion regarding these modes

1. Strongly Agree 2. Agree 3. Do not Know 4. Disagree 5. Strongly disagree	71.1 Mode 1	71.2 Mode 2
71.1 It is close to my residence and/or job		
71.2 It is affordable		
71.3 It is fast		
71.4 It provides direct access to my residence and/or job		
71.5 It is less crowded		
71.6 It is clean and safe		
71.7 There is little waiting time at station		
71.8 I walk little between transfer station		
71.9 It is reliable and regular		
71.10 The personnel are kind and cooperative		

72. In the last one week or 7 days how often do you use and spent on public transport?			75. What is your opinion on your trip segments?		
72.1 Mode	72.2 Number of trips made in the last 7 days	72.3 Amount Spent in Birr	75.1 Trip Segments		75.2
72.1.1. Horse Drawn Cart					1. Short & Convenient 2. Short & Inconvenient 3. Long & Convenient 4. Long & Inconvenient 5. Do not know
72.1.2. Bajaj					
72.1.3. Anbessa					
72.1.4. Higer Bus					
72.1.5. Intercity Bus					
72.1.6. Minibus Taxi					
72.1.7. Saloon Taxi					
72.1.8 Other specify_____					
73. What is the most frequent trip purpose you did in the last seven days?			75.1.1. Walking from home to nearest station or taxi stop		
<input type="checkbox"/> 1. Home to Work <input type="checkbox"/> 2. Home to School <input type="checkbox"/> 3. Home to Market			75.1.2. Waiting at Station or taxi stop		
<input type="checkbox"/> 4. Home to Social Services <input type="checkbox"/> 5. Home to Health Service or Hospital			75.1.3. Travelling		
<input type="checkbox"/> 6. Non Home Based <input type="checkbox"/> 7. Others Please Specify_____			75.1.3.1 Public transport Mode 1		
			75.1.3.2 Public Transport Mode 2		
			75.1.4. Transfer between station or taxi stop		
			75.1.5. Walking from the last station or taxi stop to your final place of destination		
74. What time do you spent for the following trip segments for the most common trip you make and for two most frequented mode of public transport you use indicated in question 70?			76. Please indicate five best choices that best fit your opinion for improving public transportation.		
74.1 Trip Segments		74.2 Time Spent	<input type="checkbox"/> 1. Increase government subsidy for public transport		
74.1.1. Walking from home to nearest station or taxi stop			<input type="checkbox"/> 2. Increase control of the operation of the paratransit		
74.1.2. Waiting at Station or taxi stop			<input type="checkbox"/> 3. Provide affordable transport to the poor		
74.1.3. Travelling			<input type="checkbox"/> 4. Promote public transport oriented city development		
74.1.3.1 Public transport Mode 1			<input type="checkbox"/> 5. Establish accountable transport institutions to plan and coordinate public transport		
74.1.3.2 Public Transport Mode 2			<input type="checkbox"/> 6. Introduce an integrated fare system acceptable by all modes		
74.1.4. Transfer between station or taxi stop			<input type="checkbox"/> 7. Increase the interconnectivity of taxi and bus stations and reduce transfer times		
74.1.5. Walking from the last station or taxi stop to your final place of destination			<input type="checkbox"/> 8. Provide more priority in the traffic for public transport		
			<input type="checkbox"/> 9. Provide more scheduled public transport services		
			<input type="checkbox"/> 10. Provide more buses and reduce overcrowding of buses during peak hours		
			<input type="checkbox"/> 11. Increase the coverage and improve performance of public transport networks		

Appendixes

	<table><tr><td><input type="checkbox"/></td><td>12. Improve safety, security and comfort on board vehicles of the public transport</td></tr><tr><td><input type="checkbox"/></td><td>13. Improve the physical condition of bus stops and terminals</td></tr><tr><td><input type="checkbox"/></td><td>14. Provide real time information at public transport stations and on-board vehicles</td></tr><tr><td><input type="checkbox"/></td><td>15. Improve public transport vehicle quality and safety</td></tr><tr><td><input type="checkbox"/></td><td>16. Introduce new modes and high capacity public transport systems</td></tr><tr><td><input type="checkbox"/></td><td>17. Improve the reliability of public transport and reduce waiting times at stations</td></tr><tr><td><input type="checkbox"/></td><td>18. Provide more direct or shuttle service</td></tr></table>	<input type="checkbox"/>	12. Improve safety, security and comfort on board vehicles of the public transport	<input type="checkbox"/>	13. Improve the physical condition of bus stops and terminals	<input type="checkbox"/>	14. Provide real time information at public transport stations and on-board vehicles	<input type="checkbox"/>	15. Improve public transport vehicle quality and safety	<input type="checkbox"/>	16. Introduce new modes and high capacity public transport systems	<input type="checkbox"/>	17. Improve the reliability of public transport and reduce waiting times at stations	<input type="checkbox"/>	18. Provide more direct or shuttle service
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<input type="checkbox"/>	17. Improve the reliability of public transport and reduce waiting times at stations														
<input type="checkbox"/>	18. Provide more direct or shuttle service														

Appendix 38: Questions on the formal and public Anbessa City Bus Enterprise

1. How many employees do you have?
2. What are the profiles of employee?
 - Origin
 - i. Migrant
 - ii. Resident
 - Qualification
 - Gender
 - Age
3. What are the work arrangement and remuneration?
 - Working hours
 - Salary
 - i. Fixed income per day as per agreement
 - ii. Contract
 - iii. Trip based
 - iv. Other Specify_____
4. What type of service do you provide? What is your service coverage? What is the frequency of your service? How many trips do you make a day?
5. What are the route numbers? Route description/names? Route length? Number of buses per route? Daily Volume of passenger per route? Fare per route? For 2002, 2003 and 2004 Ethiopian calendar.
6. Total number of fleet and operational buses for the year 2002, 2003 and 2004 Ethiopian calendar?
7. What is your total volume of total cost (administrative and operational costs) and total revenue (fare box, contract, subsidy etc.) in the last three years of 2002, 2003 and 2004? Ethiopian calendar
8. Has your fare been revised in the last three years (2002, 2003 and 2004 Ethiopian calendar)? Reasons for the revision?
9. Has there been a subsidy revision in the last three years (2002, 2003 and 2004 Ethiopian calendar)
10. As a formal public transport provider what major tasks do you perform within the framework of public transportation planning including: Route planning? Vehicle scheduling? Vehicle maintenance? Crew scheduling?

6. What is the fare you charge? Do you have zonal arrangement?
7. Do you have differentiated fares (students), free pass?
 - a. Differentiated fares
 - i. Students
 - ii. Retired persons
 - iii. Others specify_____
8. What is your ticket system? Do you have a prepaid ticket system?
 - a. Fare types
 - i. Cash Payment
 - ii. Ticket system
 1. Tickets
 - Multi journey and multi operator tickets
 - Differentiated fares for different time of the day
 - School tickets and employers
 - Free passes
 - Employee
 - Relative of employee
 - Retired persons
 - Special privileged persons
 2. Others specify_____
 - b. How is fare collected?
 - i. Before embarking
 - ii. On board
 - iii. Pre-paid ticket
9. Do you compete with other modes to collect more passengers? Compete for the infrastructure? Is that a problem and how does it impact upon you? What do you think are the remedies? How do you develop a complementary service with your competitors?
10. Do you get financial support from the government? What type of Support? Tax exemption? Subsidy? Vehicle replacement? Other type of support?
11. Do you have access to capital and financing: fleet replacement/maintenance?
 - i. Government budget support
 - ii. Fare revenue
 - iii. Formal bank loan

iv. Others specify_____

12. Are you satisfied with the current volume of passengers by your company? Do you think you can increase the ridership? What are the problems encountered and what do you think are the solutions to improve the situation? What do you think are some measures that will improve the attractiveness of your company (safety, comfort, reliability)?

13. How can you improve the quality of service of public transport in terms of waiting time, travel time, in vehicle comfort and occupancy and cleanness and security?

14. How can you improve your performance in terms of the following performance indicators?

- i. On board comfort including availability of seats and security
- ii. On board safety
- iii. Ticketing and fare system
- iv. Delay and congestion
- v. Noise and air pollution
- vi. Waiting time at station
- vii. Walking time to and from the bus stop
- viii. Reliability and frequency
- ix. Punctuality/precision
- x. Time table/travel information
 1. On stations
 - Schedules
 - Real time information: Arrivals
 2. On board
 - a. Video and audio information
- xi. Terminals and stops
 1. Bus and taxi stop shelters
 2. Cleanness
 3. Availability of seats
 4. Display of Real time information on arrivals

15. Why do you think about the introduction of multimodal integrated public transport in Addis Ababa including the taxis, buses and LRT system in terms of

- a. Fare integration
 - i. Payment modality
 - ii. Ticket system
 - 1. Single trip
 - 2. Multiple tickets
 - 3. Passes
- b. Operation integration
 - i. Feeder services
 - 1. Punctuality
 - 2. Reliability
 - 3. Frequency
 - ii. Synchronization of arrivals and departures
 - iii. Operational adjustments related to
 - 1. Service frequencies,
 - 2. Network expansion,
 - 3. Transfer points,
 - 4. Network coverage
 - 5. Supportive time tables
 - iv. Schedules
 - v. Information
 - 1. On stations
 - 2. On board
- c. Institutional integration
 - i. Creation and /or strengthening appropriate urban transport institution
- d. Physical integration
 - i. Proximity of stops of different modes
 - ii. Coordination of local and regional transport
 - iii. Interconnectivity

16. How do you contribute to this integrated system?

Name of Respondent: _____

Status and Title: _____

Date: _____

Appendix 39: Some discussion questions with the governmental institutions – Addis Ababa Master Plan Revision Office/Addis Ababa Road and transport bureau/ Addis Ababa City Government/Ethiopian Rail Corporation

I. Current Status and Problems

1. How do you describe the road network and public transportation system in the Addis Ababa?
2. Do you know the total daily transport demand of the city? Average trip rate for the city? Average trip lengths for major trip purposes over the years? Temporal and spatial (origin and destination) distribution of the trips? The modal distribution?
3. What are the total number of public transport fleet available (Anbessa, Higer buses, Minibuses, Supportive, Saloon Taxis, Bajaj and horse drawn Carts) and passenger transported daily within Addis Ababa? To immediately neighbouring towns?
4. Motorization level in the last 10 years?
5. What do you think of the public transportation in the city? What are its major problems? Do you think there is shortage of public transportation in the city (formal and informal)? How serious is the problem? What impacts? What is the way out?
6. How do you evaluate the current system of Anbessa Bus and taxi routes? What are its positive and negative sides? Should it be abolished or improved and sustained? How can Taxies be functionally integrated with formal public transport? Do you think that the current competition between providers as healthy?

II. Planning Related Issues

1. How transport in general and public transport planning is in particular conducted at the city level? Tasks? Responsible Institutions? Implementation?
2. How is regional transportation administered? Who provides the service? Which fare? Which institution is responsible for the planning and fleet assignment?
3. Do you think that city development takes into account the availability of public transport infrastructure or transport development takes into account current and future anticipated or proposed development?
4. What are the main challenges to improving public transport? And what urgent improvements are needed in the public transport sector- short term and long term? Demand verses supply side approach?
5. What do you propose to improve the system and increase coverage and efficiency? Is there any plan to promote complimentary services along a hierarchical network structure?

6. What are your basic assumptions, your future expectations and vision regarding the development of Addis Ababa? What kind of transport system – both the road network and transport system - do you envisage for that city? For what size of projected population, trip rate, origin destination patterns and land use developments?
6. How can the city make public transportation a sustainable mode of mobility?
7. How do you plan to provide affordable transport to the urban poor, students, disabled and elderly?
8. How can the city capitalize from planned urban structure that reduces the need for long trips?
9. How can the city benefit from transit oriented development, given the planned new LRT and BRT systems? (Land use transport issue: Compatibility of long-term city development with public transport network)
10. How can the public transport be provided in underserved areas? Can you support such unprofitable routes for the operators? Is there any financial mechanism to support such provisions, for example, cross subsidy from profitable routes?
11. Do you think that the decentralization of regional transport terminals as proposed in the 2001 master plan resulted in bringing about the expected benefits? Unforeseen outcomes? What do you propose to improve the observed shortcomings, if any?

III. Urban Transport Institutions and Public Private Partnership

1. What are the urban transport institutions- public and private - that are active in urban transport in the city? Which functions do they perform? How do they coordinate their activities?
2. What are the weaknesses of governmental and nongovernmental institutions in terms of forming a sound and viable organization that will effectively address current and future transport needs? How can this be reformed taking some best practices elsewhere as an example?
3. Is there any public private partnership in public transportation? What type and how? Which regulations govern PPP?

IV. Multimodal Public Transport Integration

1. Do you have any idea on integrated provision of multimodal public transportation?

2. Do you know about some modalities of integration (fare, physical, operational and institutional)? Do you think the city can implement and benefit from such system and
3. How can the city integrate the formal Anbessa with the new BRT and LRT systems?
4. How can the informal public transport sector be integrated in this system? How can such system be operational? Any proposal at hand?
5. What are the factors that will likely hinder such integration? And what should be done to counteract these negative factors?

V. Financing

1. How do you think of the current fare system used by the public transport system? Should fare reflect actual cost incurred by the operators? Is there a need for subsidy revision? How can subsidy be restructured to fit in this system?
2. Do you have any idea as the total finance needed over the planning period to implement your transport proposals? How do you plan finance it?
3. How can the government generate new revenues to finance the public transport sector? Impose transport tax on employers as in some countries like France? How can this finance be used to support the public transport sector including the informal ones, particularly in the area of fleet replacement and providing affordable transport to the urban poor?
4. Do you think the current subsidy granted to Anbessa as effective and sufficient? What about granting subsidy to informal ones for providing services to the urban poor and schoolchildren and students?
5. What is the total volume of money earmarked for the transport and road sectors by the city in the last three budget years? What were the sources of finance?
6. How can the city finance new transport systems in the framework in the face of financial constraints?

Name of Respondent: _____

Status and Title: _____

Date: _____

Appendix 40: Evaluation of the Anbessa city bus and minibus taxis

Opinion	Preferences									
	Anbessa city bus					Minibus taxis				
	Strongly agree	Agree	Do not know	Disagree	Strongly Disagree	Strongly Agree	Agree	Do not know	Disagree	Strongly Disagree
It is close to my residence and/or job	9%	44%	13%	27%	7%	11%	51%	15%	10%	13%
It is affordable	36%	48%	16%	—	—	32%	49%	12%	—	7%
It is fast	—	56%	18%	36%	—	28%	63%	9%	—	—
It provides direct access to my residence and/or job	15%	85%	—	—	—	18%	82%	—	—	—
It is less crowded	2%	—	66%	32%	—	—	15%	—	80%	5%
It is clean and safe	—	—	10%	70%	20%	—	3%	12%	80%	5%
There is little waiting time at stations	—	5%	16%	79%	—	—	5%	16%	79%	—
I walk little between transfer stations	3%	38%	20%	18%	21%	—	47%	36%	17%	—
It is reliable and regular	—	13%	22%	56%	9%	13%	27%	36%	24%	—
The personal are kind and cooperative	—	13%	22%	56%	9%	—	15%	25%	36%	24%