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Sustainability for Startups: A Complex Phenomenon Analyzed Through A Symbolic Interactionist Perspective

Alice Carle

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Sustainability for startups

A Complex Phenomenon Analyzed Through
a Symbolic Interactionist Perspective

Thèse de doctorat de l'Institut Polytechnique de Paris
préparée à l'École Polytechnique

École doctorale n°626
Institut Polytechnique de Paris (ED IP Paris)

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Thèse présentée et soutenue à Paris, le 19 décembre 2023, par

Alice Carle

Composition du Jury :

Bérangère SZOSTAK Professeur, ISM-IAE de Versailles Saint-Quentin-en-Yvelines	Présidente
Valentina CARBONE Professeur, ESCP Business School	Rapporteure
Véronique SCHAEFFER Professeur, Université de Strasbourg	Rapporteure
Jan KRATZER Professeur, Technische Universität Berlin	Examineur
Philippe MUSTAR Professeur, MINES Paris – PSL University	Examineur
Thierry RAYNA Professeur, École Polytechnique (i3-CRG)	Directeur de thèse
Jean-Michel DALLE Directeur Agoranov	Invité

Titre : L'impact social et environnemental des startups. Une perspective symbolique interactionniste d'un phénomène complexe

Mots clés : Entrepreneuriat ; Développement durable Startups ; Impact social et environnemental

Résumé : Traditionnellement reconnues pour leur contribution à l'innovation et à l'économie, les startups sont désormais considérées comme des organisations prometteuses pour résoudre les problèmes sociaux et environnementaux. Cette attente s'ajoute à la tâche - déjà difficile - de lancer une startup, et pose des questions sur la méthode appropriée pour mesurer leur contribution. L'objectif de cette recherche est d'explorer comment les startups abordent la durabilité dans un contexte de grande incertitude.

Tandis que les pratiques des grandes entreprises ont largement été étudiées, peu d'informations sont disponibles pour les plus petites, et en particulier pour les startups. Fournir de telles connaissances est crucial non seulement pour les startups, mais aussi pour leurs parties prenantes et les décideurs qui manquent actuellement d'informations sur ce qu'il est possible d'attendre des startups en termes d'impact social et environnemental.

Compte-tenu de la nouveauté et de la complexité du phénomène, une démarche exploratoire a été privilégiée. Une recherche action de 36 mois dans un incubateur de jeunes startups innovantes a permis de collecter différents types de données, notamment des observations directes, des entretiens et des documents d'archive.

Plutôt que de viser la généralisation, cette approche qualitative et compréhensive cherche

à révéler les pratiques, les défis et les arbitrages des acteurs pour mieux comprendre les mécanismes en jeu et comment les actions sont menées. La recherche s'est inspirée de problèmes rencontrés sur le terrain, suivant un processus abductif où les surprises ont conduit à l'identification de sous-questions de recherche.

Les résultats sont articulés autour de trois articles de recherche, mettant en évidence différents aspects du phénomène. La durabilité pour les startups est vue comme faisant partie du processus entrepreneurial (1), intégrée dans un écosystème entrepreneurial (2) et comme une nouvelle exigence demandée par les acteurs publics (3).

Le terrain a révélé que les acteurs agissaient en faveur de la durabilité en fonction du sens qu'ils donnaient à ce concept encore abstrait, et que ce sens évoluait continuellement selon un processus interactif et interprétatif. Une telle perspective interactionniste symbolique enrichit la littérature en proposant une approche originale pour décrire une gestion de l'incertitude d'un problème complexe.

En combinant les résultats des trois articles de recherche, la thèse a mis l'accent sur un écosystème entrepreneurial en transition et a suggéré une nouvelle définition pour les startups durables. Des recommandations pratiques pour les startups et les décideurs ont également été fournies.

Title: Sustainability for Startups. A Complex Phenomenon Analyzed Through A Symbolic Interactionist Perspective

Keywords: Entrepreneurship; Sustainability; Startups; Social and Environmental Impact

Abstract: Traditionally known for their contribution to innovation and the economy, startups are now considered promising organizations to respond to social and environmental challenges. However, turning to startups is not straightforward. Not only does such an expectation add up to the already challenging task of launching a startup, but the contribution of startups to sustainability is difficult to determine due to the uncertainty that characterizes them. Therefore, the aim of this research is to explore how startups tackle sustainability given their significant uncertainty.

While the literature has extensively explored the practices of large companies, little information is available for smaller ones. According to the literature, they not only face less pressure from stakeholders but also seem to perceive fewer benefits in engaging in sustainable development. The field of sustainable entrepreneurship has begun to fill this gap, but the specific case of startups remains largely overlooked. Providing such knowledge is crucial not only for startups but also for their stakeholders and decision-makers who currently lack information on what to expect from startups in terms of social and environmental impact. So far, research has demonstrated the complexity of the subject and suggested frameworks for assessing their contribution to sustainability. However, startups' perspective is lacking, especially on how they tackle the matter in the absence of shared norms and practices in the entrepreneurial ecosystem.

Given the novelty and complexity of the phenomenon, an exploratory approach was favored. A 36-month action research in an incubator of young innovative startups allowed the collection of various types of data, including direct observations, interviews, and archival documents.

Instead of aiming for generalization, this qualitative and comprehensive approach seeks to reveal the practices, challenges, and trade-offs of the actors to better understand the mechanisms at play and how actions are taken. The research drew inspiration from issues met on the field, following an abductive process where surprises led to the identification of sub-research questions.

The results are articulated around three research articles, highlighting different aspects of the phenomenon. Sustainability for startups is seen as part of the entrepreneurial process (1), as embedded into an entrepreneurial ecosystem (2), and as a new requirement demanded by public actors (3). The immersive framework revealed that actors acted in favor of sustainability based on the meaning they attributed to this still abstract concept, and that this meaning continually evolved through an interactive and interpretative process. Such a symbolic interactionist perspective enriches the literature by proposing an original approach to describing the management of uncertainty in a complex problem.

By combining the results of the three research articles, the thesis focused on an entrepreneurial ecosystem in transition and suggested a new definition for sustainable startups. In line with the collective and contextual approach, the research mobilized the concept of improvisation to emphasize that sustainability for startups is not a static object, leading startups to consider their changing environment. The process approach contributed to both the literature on sustainable entrepreneurship and the emerging field of research on evaluating the impact of sustainability for startups. Practical recommendations for startups and decision-makers were also provided.

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Acronyms

ADEME: *Agence de la transition écologique* (French Ecological Transition Agency)

B Corp: Benefit Corporation

BSS: Born-Sustainable Startups

CE: *Comité d'experts* (Experts Committee)

CEO: Chief Executive Officer

CIFRE: *Conventions Industrielles de Formation par la Recherche* (Industrial agreements for training through research)

CSR: Corporate Social Responsibility

DBL: Double Bottom Line

EE: Entrepreneurial Ecosystem

ESG: Environmental, Social and Governance

EIC: European Innovation Council

IPCC: Intergovernmental Panel on Climate Change

KPI: Key Performance Indicators

N.A.: Not Applicable

NETVA: New Technology Venture Accelerator

PACTE: *Plan d'Action pour la Croissance et la Transformation des Entreprises* (Action Plan for Business Growth and Transformation)

PSS: Progressive Sustainable

R&D: Research and Development

RRI: Responsible Research and Innovation (RRI)

SEE: Sustainable Entrepreneurial Ecosystem

SEP: Sustainable Entrepreneurial Process

SIA: Sustainability Impact Assessment

SME: Small and Medium Enterprise

TBL: Triple Bottom Line

VC: Venture Capital

Contexte et objectifs du manuscrit

Les différents rapports du Groupe d'Experts Intergouvernemental sur l'évolution du Climat (GEIC) le démontrent sans ambiguïté : les perturbations climatiques augmentent, avec des effets concrets sur les populations. Ceux-ci concernent l'accès à l'eau, à l'alimentation, aux soins, et affectent également les activités économiques. Ainsi, la transition écologique doit être comprise comme une transition socio-écologique (Laurent, 2019), intégrant des enjeux sociaux, tels que la montée des inégalités (Oxfam, 2023). Cette transition est celle de la durabilité, et est de plus en plus prise en compte par les acteurs publics. La tâche n'est pas aisée, car si un relatif consensus sur le problème émerge, plusieurs trajectoires peuvent être privilégiées (ADEME, 2021). Le débat est souvent présenté de façon assez dichotomique, voire caricaturale, opposant les techno-solutionnistes aux partisans de la décroissance.

Dans une société adepte d'une culture de l'innovation (Aggeri, 2023), celle-ci est prônée par différents types d'acteurs comme une partie intégrante de la solution face aux problèmes contemporains. Puisque l'innovation est définie comme l'introduction d'une nouveauté dans un champ d'application, elle peut s'inscrire dans diverses trajectoires pour la transition. En revanche, les startups, définies comme des jeunes entreprises innovantes visant une forte croissance, semblent d'emblée soutenir un certain modèle d'hyper-croissance. Ce type d'entreprise a été plébiscité par les gouvernements et les chercheurs depuis les années 1980 (Schot et Steinmueller, 2018), qui considèrent leur potentiel pour développer l'économie et les emplois (Mason and Brown, 2013; Acs and Szerb, 2007). Plus récemment, l'idée que les startups peuvent contribuer à des objectifs sociaux et environnementaux s'est instaurée (Kanda et al., 2020; Gast et al., 2017; Kuckertz and Wagner, 2010), notamment à travers la littérature sur l'entrepreneuriat durable (Terán-Yépez et al., 2020; Cohen et al., 2006; Elkington, 1997).

Alors que de plus en plus d'acteurs pronent l'intérêt des startups pour résoudre des enjeux sociaux et environnementaux, des critiques ont également émergé ces dernières années. Alors que la crise financière de 2008 n'avait pas terni l'image des startups - le modèle de la Silicon Valley était promu par les gouvernements (Jones et Sudlow, 2022; Lacorne, 2019) et les entrepreneurs présentés comme des génies créatifs (Galluzzo, 2023) - un peu plus d'une décennie plus tard, le modèle des startups est remis en cause. Les détracteurs de la "Startup Nation" dénoncent un modèle d'ubérisation qui aggrave les inégalités (Ticona et Mateescu, 2018; Fleming, 2017) au privilège d'une certaine élite (Schmeleck, 2018), ou encore un style de management hypocrite (Truong et Chavanne, 2017) favorisant le développement de "bullshit jobs" (Graeber, 2018). La cas de l'initiative "Tech for Good", étudié par

Aurélien Acquier (2020), est révélateur du contexte actuel pour les startups. L'expression sous-entend que les startups et les technologies qu'elles proposent ont le potentiel d'agir pour le bien commun, et de résoudre des problématiques sociales et environnementales. Toutefois, elle est acceptée par le même mouvement que certaines soient "for Bad", c'est-à-dire avec une influence négative sur la société. Cette initiative dans l'écosystème entrepreneurial français démontre une attention nouvelle portée aux startups, qui s'accompagne d'exigences de responsabilité dont les startups semblaient jusque-là exemptées.

L'objectif de la thèse n'est pas de déterminer si les startups sont les organisations adéquates pour résoudre des problématiques sociales et environnementales. Le manuscrit prend plutôt le parti d'explorer les pratiques de ces organisations en matière de durabilité, dans un contexte de grande incertitude. En effet, l'incertitude de notre objet - la durabilité pour les startups - est double. En premier lieu, puisque que ces exigences commencent seulement à émerger, il n'existe pas de cadre commun pour analyser l'impact social et environnemental des startups. Il n'y a pas de définition, de pratique, ni d'outil légitimisé par les parties-prenantes. La durabilité est présentée ici comme un concept mouvant, sujet aux interprétations, créant ainsi une certaine incertitude pour les acteurs. En second lieu, l'incertitude vient du type de structure étudiée. Les startups étant des jeunes structures, orientées vers le futur, évoluant rapidement et de façon souvent informelle, leur impact est difficile à évaluer ex ante (Trautwein, 2021). La littérature s'est récemment saisie de la question de la mesure d'impact social et environnemental pour les startups. Certains chercheurs ont insisté sur la difficulté du sujet (Leendertse et al., 2020), d'autres ont proposé des outils adaptés à cette incertitude (Hornes, 2019), mais la littérature n'a jusqu'à présent que peu étudié les pratiques instaurées par ces organisations (Fichter et al., 2023). Nous ne savons pas comment les startups intègrent la durabilité dans leur organisation, en l'absence de normes et de pratiques partagées dans l'écosystème entrepreneurial. Fournir de telles connaissances est crucial non seulement pour les startups, mais également pour éclairer les débats, parfois passionnés, autour de l'innovation.

Compte-tenu de la nouveauté et de la complexité du phénomène, une démarche exploratoire a été privilégiée. Une recherche-action de 36 mois dans un incubateur de jeunes startups innovantes a permis de collecter différents types de données, notamment des observations directes, des entretiens et des documents d'archives. Plutôt que de viser la généralisation, cette approche qualitative et compréhensive cherche à révéler les pratiques, les défis et les arbitrages des acteurs pour mieux comprendre les mécanismes en jeu et comment les actions sont menées. La recherche s'est inspirée de problèmes rencontrés sur le terrain, suivant un processus abductif où des surprises ont conduit à l'identification de sous-questions de recherche.

Les résultats sont articulés autour de trois articles de recherche, mettant en évidence différents aspects du phénomène. La durabilité pour les startups est vue comme faisant partie du processus entrepreneurial (1), comme intégrée dans un écosystème entrepreneurial (2) et comme une nouvelle exigence demandée par les acteurs publics (3). L'étude empirique, à travers ces trois articles de recherche, suggère que les acteurs agissent en faveur de la durabilité en fonction du sens qu'ils donnaient à ce concept encore abstrait, et que ce sens évolue continuellement selon un processus interactif et interprétatif. Une telle perspective symbolique interactionniste propose une approche originale pour décrire une gestion de l'incertitude d'un problème complexe.

En combinant les résultats des articles de recherche, la thèse met l'accent sur une période de transition dans l'écosystème entrepreneurial étudié. L'approche longitudinale permet de révéler un "point de bascule" (Dumez, 2016), à partir duquel la définition d'une startup durable doit être réévaluée. La discussion en suggère une nouvelle à partir des résultats obtenus, en insistant particulièrement sur le rôle clé joué par la mesure de l'impact de durabilité.

Revue de littérature

L'entrepreneuriat durable

La littérature de l'entrepreneuriat, dans laquelle s'inscrit cette recherche, a catégorisé différents types d'entrepreneuriat selon l'objectif de l'activité conduite. Premièrement, les "entrepreneurs commerciaux" (Santos, 2012), ou "entrepreneurs traditionnels" (Smith et al., 2014), qui suivent un bilan uniquement économique. Deuxièmement, les "entrepreneurs environnementaux" (Schaefer et al., 2015; Schaltegger, 2002) qui visent des objectifs environnementaux et économiques. Troisièmement, les "entrepreneurs sociaux" (Saebi et al., 2018; Zahra et al., 2009; Brinckerhoff, 2000), qui poursuivent des objectifs sociaux et économiques. Enfin, le concept d'"entrepreneur durable" a été introduit il y a deux décennies pour désigner un entrepreneuriat qui suit un bilan triple (Cohen et al., 2006; Elkington, 1997), d'objectifs sociaux, environnementaux et économiques (Terán-Yépez et al., 2020; Schaltegger et Wagner, 2011; Dean et McMullen, 2010).

Ce champ a progressivement construit sa légitimité, notamment en se distinguant des autres concepts mentionnés (Belz and Binder, 2015). Sa production académique a atteint un équilibre de contributions quantitatives, qualitatives et conceptuelles (Anand et al., 2021), et reste très dynamique, puisqu'on observe une croissance significative et constante des publications (Konys, 2019). Cette littérature est multidisciplinaire par nature, et ce d'autant plus que les chercheurs qui l'investissent viennent de disciplines variées, telles que les sciences politiques, environnementales,

sociologiques, ou encore économiques. Devant cette prolifération de contributions, plusieurs auteurs en ont proposés une lecture structurée, afin de mieux comprendre ce qui avait été étudié jusqu'à présent, et ce qui méritait d'être davantage approfondi (Anand et al., 2021; Terán-Yépez et al., 2020; Schaltegger et al., 2018; Muñoz and Cohen, 2018; Sarango-Lalangui et al., 2018; Shepherd and Patzelt, 2011).

La littérature sur l'entrepreneuriat durable peut être organisée en fonction du niveau d'analyse investi par les chercheurs. Premièrement, le niveau individuel met l'accent sur les connaissances, compétences, motivations, intentions, valeurs et attitudes des entrepreneurs durables (Koe et al., 2014; Shepherd et al., 2013; Schaltegger and Wagner, 2011; De Clerc and Voronov, 2011; Parrish, 2010; Kirkwood and Walton, 2010; Patzelt and Shepherd, 2010; Shepherd et al., 2009; De Clerc and Voronov, 2009; Choi and Gray, 2008; Schlange, 2006; Choi and Gray, 2004; Linnanen, 2002; Walley and Taylor, 2002). Deuxièmement, le niveau organisationnel s'intéresse à la façon dont l'entrepreneuriat durable est construit, en insistant sur les mécanismes de reconnaissance d'opportunités et de processus entrepreneurial (Muñoz and Cohen, 2017; Dean and McMullen, 2007; Cohen and Winn, 2007; Schich et al., 2002; Larson, 2000; Hostager et al., 1998). L'entrepreneuriat durable est enfin compris par rapport au contexte dans lequel il s'inscrit. Ce dernier niveau d'analyse étudie particulièrement les relations avec les parties-prenantes, l'écosystème entrepreneurial, ou encore l'entrepreneuriat institutionnel conduit (Muñoz and Dimov, 2015, Cohen and Muñoz, 2015; York and Venkataraman, 2010; Pacheco et al., 2010; Hockerts and Wüstenhagen, 2010; Harris & Wheeler, 2005; Cohen, 2006).

Si cette grille d'analyse permet de comprendre rapidement les principales approches, les frontières entre les niveaux d'analyses sont actuellement plus poreuses qu'il n'y paraît. La plupart des études naviguent entre les niveaux d'analyse (Patzelt and Shepherd, 2010), ce qui est plutôt classique dans la littérature sur l'entrepreneuriat (Luke et al., 2007; Davidsson and Wiklund, 2001; Low and MacMillan, 1988). Ce parti-pris, qui est également suivi dans la thèse, est cohérent avec la nature même du phénomène entrepreneurial, qui désigne depuis Schumpeter (1934) une activité initiée par des individus, qui prend forme dans un contexte organisationnel, et qui a une influence sur les industries, et plus largement sur la société.

La durabilité pour les startups

La littérature entrepreneuriale s'est longtemps peu intéressée à la question de la contribution de l'entrepreneuriat à des objectifs extra-financiers. Tandis que ce champ s'est largement développé ces dernières années, avec plusieurs contributions théoriques (Schaltegger et al., 2018; Sarango-Lalangui et al., 2018; Urbaniec, 2018), les pratiques des startups restent sous-étudiées. En tissant avec la

littérature sur la durabilité, plusieurs approches ont été explorées pour mieux comprendre comment le management de la durabilité peut s'appliquer au cas des startups.

Le concept de responsabilité sociale et environnementale (RSE) est un vaste champ qui a émergé pour étudier les pratiques économiques, légales, éthiques et philanthropiques (Carroll, 1991), mises en oeuvre par les entreprises pour créer de la valeur pour leurs parties-prenantes (Freeman, 1984), et plus largement pour la société (Porter et Kramer, 2011). A l'exception de quelques contributions (Tiba et al., 2018), le cas des startups reste largement ignoré dans cette littérature, puisque la majorité des articles concernent les pratiques des grandes entreprises (Retolaza et al., 2009). Plusieurs auteurs affirment que la RSE est un champ très différent de celui de l'entrepreneuriat responsable (Hansen et Schaltegger, 2013), dans la mesure où ce dernier intègre les principes de la durabilité dans la création de valeur, plutôt que prendre en compte des activités plutôt superficielles.

C'est pourquoi certains auteurs privilégient plutôt l'étude des modèles d'affaires (Baldassarre et al. 2017; Evans et al., 2017; Schaltegger et al., 2016; Bocken et al., 2014; Boons et Lüdeke-Freund, 2013). Certains chercheurs ont proposé des cadres d'analyse spécifiques pour étudier les modèles d'affaires durables des startups (Baldassarre et al., 2020; Geissdoerfer et al., 2016), tandis que d'autres ont souligné les différences selon les industries (Franceschelli et al., 2018; Todeschini et al., 2017). Toutefois, la littérature ne nous fournit pas d'information sur la façon dont ces modèles d'affaires durables sont développés chez les startups (Ghezzi and Cavallo, 2020; Neumeyer et Santos, 2018), ni sur les mécanismes qui conduisent certaines à adopter de tels modèles d'affaires, ou encore sur les défis que cela peut engendrer (Todeschini et al., 2017). Enfin, dans l'approche par modèle d'affaires, la contribution à des enjeux sociaux et environnementaux est davantage supposée que mesurée.

Une littérature plus récente s'est intéressée à la question de la mesure de ces impacts. Les champs de la mesure de la durabilité et de la mesure de l'impact se sont progressivement associés (Waas et al., 2014; Ness et al., 2007), pour faire émerger le concept de mesure d'impact de la durabilité, qui désigne "tout processus qui vise à atteindre des objectifs de durabilité, en rendant les problématiques de durabilité tangibles et compréhensibles, à partir d'une approche qui oriente les décisions pour identifier, structurer et évaluer l'impact en termes de durabilité des actions passées et/ou planifiées" (Trautwein, 2021: 3). Comme pour les approches précédemment citées, cette littérature a traditionnellement étudié le cas des grandes entreprises (Omri, 2018; Schaltegger et al., 2017), au détriment de celui des startups (Fichter et al., 2023; Di Viao et al., 2022; Anand et al., 2021, Hornes, 2019).

La revue de littérature de ces trois principaux courants pour étudier l'impact social et environnemental des entreprises met en avant le gap que représente le cas des startups. Elle révèle la difficulté à prévoir l'impact en termes de durabilité ex ante pour les startups, compte-tenu de l'incertitude qui les caractérise. De surcroît, l'absence d'une compréhension commune, partagée dans l'écosystème des startups, sur ce qu'est, ou ce que devrait être la durabilité dans le cas des startups, rend ce concept sujet à différentes interprétations. Cette conclusion motive une approche processuelle et exploratoire, pour mettre en lumière les pratiques développées en l'absence de consensus.

Approche méthodologique

Une recherche-action résolument empirique

La recherche menée est qualitative et compréhensive (Dumez, 2016), avec l'objectif de révéler les mécanismes, relations et processus en enjeux entre les acteurs, pour comprendre leurs actions. Cette approche est recommandée pour étudier les phénomènes récents, sous-étudiés et complexes (Dumez, 2016), ce qui est le cas de notre objet, comme démontré dans la revue de littérature. Elle sous-entend une position épistémologique proche du constructivisme (Avenir, 2011; Bouchikhi, 1993), où la réalité est considérée comme subjective et plurielle, construite et artificielle. Dans cette perspective, le rôle du chercheur est de comprendre un phénomène social, en insistant sur sa spécificité, sans viser la généralisation. Il révèle "ce qui peut être" (Aliseda, 2006) et produit des résultats présentés de façon hypothétique.

La thèse a été menée en contrat CIFRE au sein de l'incubateur public Agoranov, situé à Paris. Sa spécificité est d'accompagner des startups dans leurs premières années de développement, et d'accompagner des projets "deeptech", c'est-à-dire proposant des innovations radicales (Dionisio et al., 2023; Kask and Linton, 2023; Rotolo et al., 2015). L'incertitude est encore plus prononcée pour ce type spécifique de startup, ce qui donne à ce cas un "potentiel révélateur" (Giori et al., 2012) pour comprendre un phénomène plus général. Le travail effectué peut être qualifié de recherche-action, c'est-à-dire conduit avec l'objectif de préparer un groupe - l'incubateur - au changement (Gonzalez-Laporte, 2014). La recherche-intervention est un travail collectif de transformation (David, 2000), où la transformation de l'organisation est elle-même étudiée, tandis que la recherche-action vise l'autonomie des acteurs à partir de l'analyse des pratiques existantes, plutôt qu'en partant d'un objectif préétabli.

L'approche méthodologique suivie s'inspire des principes de symbolique interactionnisme de Herbert Blumer (1969), de l'opportunisme méthodologique de Jacques Girin (1989, 2011, 2016), et de la perspective d'Hervé Dumez de la recherche compréhensive (2016). Ces approches préconisent d'entrer sur le terrain sans cadre d'analyse pré-défini, pour permettre un processus de découverte fertile grâce à une certaine proximité avec les acteurs. L'immersion a eu lieu en passant quatre jours par semaine sur le terrain. Le travail effectué peut être découpé en deux temps, comme proposé par Herbert Blumer (1969). Une première phase d'exploration, d'octobre 2020 à décembre 2021 a permis de comprendre comment le problème pouvait être posé. Dans cette phase, la proximité avec les entrepreneurs et leurs parties-prenantes a permis de collecter de nombreuses premières données, confrontées ensuite à la littérature suivant un processus abductif. La seconde phase d'inspection, de janvier 2022 à mars 2023, a permis d'identifier des cadres théoriques pertinents, en collectant encore des données nécessaires et en creusant davantage la littérature.

Les approches méthodologiques mentionnées insistent sur l'importance des observations et de l'expérience vécue par le chercheur. Herbert Blumer (1969) propose le terme d'"action jointe", pour caractériser les interactions entre plusieurs individus, qui ont une vision préétablie de l'interaction sociale dans laquelle ils s'engagent et agissent en conséquence. La compréhension de l'interaction sociale en question évolue au fil des interactions. Jacques Girin (2011) opte plutôt pour le concept de "situation de gestion", expérimentée lors que les participants sont réunis et doivent accomplir, dans un temps déterminé, une action collective qui aboutit sur un résultat. L'intérêt du processus abductif décrit par Hervé Dumez (2016) est d'explicitement comment identifier et analyser ces situations particulièrement fertiles pour la recherche qualitative. Il encourage le chercheur à être sensible à des "faits surprenants", qui émergent en confrontation avec son bagage théorique (Aliseda, 2006). Suivant ces recommandations, les trois articles de recherche présentés dans cette thèse sont introduits par une narration, qui relate une surprise rencontrée sur le terrain, suivie d'une explication sur le processus abductif qui a conduit à l'identification d'une question de recherche.

Collecte et analyse des données

Ces surprises sont apparues dans la première phase d'exploration, où la majeure partie des données ont été collectées. Les données empiriques collectées sont multiples (Dumez, 2016). Les observations directes ont été nombreuses compte-tenu des missions opérationnelles effectuées sur le terrain, et ont permis de saisir les "agents en action" (Blumer, 1969). Les interactions observées ont été systématiquement notées dans un journal de recherche (Bourgoin et Harvey, 2018; Ohly et al., 2010; Tschan et al., 2005), renforçant ainsi leur "validité écologique" (Lischetzke and Könen, 2021). Les interviews semi-directives ont été conduites en suivant les recommandations de Dumez (2022), avec une première catégorie "exploratoire" (42 entretiens) permettant l'émergence de surprises, et

une seconde “orientée” (31 entretiens), pour tester des hypothèses. Enfin, les documents collectés ont permis de préparer les entretiens, et de confronter les discours avec les documents produits.

La collecte et l’analyse de données pour chaque question de recherche est présentée plus en détail au sein de chaque article. Compte-tenu de l’ampleur du volume de données collectées, elles ont d’abord été analysées selon les principes de l’attention flottante (Ayache et Dumez, 2011), afin d’éviter les risques de circularité. L’analyse multi-thématique effectuée est détaillée dans le manuscrit de thèse. Suivant un processus de complexification progressif (Ayache et Dumez, 2022), le phénomène est exploré selon plusieurs “vu comme” (Dumez, 2011). La durabilité pour les startups est vue comme une partie intégrante du processus entrepreneurial (Article 1), comme dépendante de l’écosystème entrepreneurial dans lequel la startup évolue (Article 2), et comme une nouvelle exigence demandée par les acteurs publics (Article 3).

Plusieurs difficultés ont été rencontrées lors de la recherche. La première concerne le langage, qui est particulièrement critique pour les études qualitatives. Le terme de “sustainability”, plus souvent utilisé, est rarement traduit par “durabilité”, mais plutôt par “impact” par les acteurs. Chaque terme contient ses propres ambivalences, qui peuvent générer des confusions. La seconde difficulté concerne l’étude d’un phénomène nouveau et en constante évolution. En particulier, la définition d’une startup durable retenue au début de la recherche, ne semble plus appropriée au terme de celle-ci, compte-tenu des évolutions observées dans les pratiques des startups et de leurs parties-prenantes.

L’une des limites classiques des recherches qualitatives de ce type est d’accepter, et même de valoriser, la subjectivité du chercheur. Pour réduire ce biais, le manuscrit rend compte au maximum la démarche suivie, la posture du chercheur, ainsi que les précautions éthiques mises en place. Pour garantir la rigueur et la qualité du travail effectué, la recherche mobilise l’article de Schwalbe (2009) qui propose plusieurs pistes pour éviter les écueils les plus récurrents des travaux qui s’inspirent de Blumer (1969). De surcroît, la triangulation de données variées a permis de s’assurer de leur validité et d’éviter de tirer des conclusions hâtives (Dumez, 2016). Enfin, le travail produit s’appuie sur une approche “initié / non-initié” (Gioia et al., 2010), dans la mesure où la recherche s’est nourrie de nombreuses discussions avec le directeur de thèse pour identifier ce qui méritait d’être étudié de façon plus approfondie.

Résultats

La durabilité pour les startups, vue comme intégrée dans le processus entrepreneurial

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Le premier article part du postulat que nous disposons de peu de connaissances sur la façon dont les startups tentent d'évaluer leur impact social et environnement (Fichter et al., 2023; Di Vaio et al., 2022; Trautwein, 2021; Hornes, 2019). L'absence de ces informations pose problème dans la mesure où les entrepreneurs ne peuvent pas se projeter dans les pratiques qui pourraient être mises en place. Nous avons donc exploré comment les startups durables, censées être les plus matures en la matière (Vionea et al., 2019), intègrent la mesure d'impact dans leur processus entrepreneurial. Pour ce faire, nous avons étudié 8 startups durables. La collecte de données inclut en particulier 16 entretiens semi-directifs avec les fondateurs, pour comprendre leur interprétation et intentions en termes de mesure d'impact, ainsi que 3 entretiens avec les chargés d'affaires qui les ont accompagnés pour permettre la triangulation des données. Celle-ci est favorisée également par la collecte et l'analyse d'observations directes et de documents confidentiels et publics. L'analyse des données s'appuie en particulier sur les recommandations de Gioia et al. (2013).

Les résultats montrent que l'intégration du triple bilan dans le processus entrepreneurial joue un rôle primordial sur les pratiques de mesure d'impact. Deux groupes émergent de l'analyse. D'un côté, les startups nées durables visent un objectif triple dès le stade de génération d'idée. Elles prennent tôt des décisions structurantes en lien avec des trois objectifs, et choisissent leurs parties-prenantes en fonction. Plus tard, elles construisent une mesure d'impact robuste, en mobilisant des ressources externes et internes. Elles développent des routines de mesure d'impact et planifient leur mesure d'impact dans un processus itératif et continue. L'autre groupe de startups transitionne au cours de leur processus entrepreneurial. Ces dernières commencent par chercher un impact double, économique et social ou économique et environnemental, et ajoutent plus tard le troisième objectif, avec des conséquences sur leur processus entrepreneurial. Au début de leur processus, elles se concentrent sur deux objectifs, choisissent des indicateurs en fonction, et ne considèrent pas la mesure d'impact comme une priorité. Lorsqu'elles intègrent le bilan triple, elles découvrent les prérequis de la mesure d'impact, et tentent, comme elles le peuvent, de rattraper leur retard en la matière. Elles rencontrent des difficultés spécifiques, compte-tenu de leur manque de connaissances, de ressources, et du fait que leurs parties-prenantes ne sont pas impliquées dans la recherche d'un bilan triple.

La contribution de cet article est d'investiguer le gap que représente la mesure d'impact pour les startups, et l'absence de connaissances dont nous disposons sur leurs pratiques (Fichter et al., 2023;

Di Vaio et al., 2022; Trautwein, 2021; Hornes, 2019; Álvarez Jaramillo et al., 2019). Il présente ce que les startups durables font en la matière, et insiste en particulier sur le fait que si toutes les startups peuvent être qualifiées de durables au terme de leur processus entrepreneurial, plusieurs trajectoires peuvent être envisagées. Il contribue ainsi à un débat dans la littérature sur le processus de l'entrepreneuriat durable. Comme Matzembacher et al. (2019), et à l'opposé de ce que Belz et Binder (2017) suggèrent, la recherche montre que certaines startups commencent dès le début par la recherche d'un bilan triple. Enfin, l'article rompt l'idée selon laquelle les startups ont un scope limité en termes d'impact (Hockerts et Wüstenhagen, 2010). L'étude révèle que des startups font souvent plus en termes de mesure d'impact que ce qui est visible de l'extérieur, ou même communiqué à leurs parties-prenantes. Craignant le green- et le social-washing, les entrepreneurs gardent leur mesure d'impact le plus souvent en interne, sans nécessairement le communiquer aux parties-prenantes dans un premier temps, contrairement à ce qui est le plus souvent défendu dans la littérature (Costa et Pesci, 2016).

La durabilité pour les startups, vue comme dépendante de l'écosystème entrepreneurial

Article en cours de révision pour la revue *Creativity and Innovation Management*.

Le second article part d'un présupposé dans la littérature, selon lequel les entrepreneurs durables doivent agir comme des entrepreneurs insitutionnels (Pinkse and Groot, 2015; Schaltegger and Wagner, 2011), compte-tenu de l'environnement hostile dans lequel ils évoluent (Kirkwooda and Waltona, 2014; Pacheco et al., 2010; Beveridge and Guy, 2005; Aldrich and Fiol, 1994). Dans un contexte où la durabilité joue un rôle de plus en plus important pour les entreprises, une réévaluation de ce postulat semble nécessaire. En effet, les startups évoluent dans des écosystèmes entrepreneuriaux dynamiques. Toutefois, peu d'études mettent en lumière leurs transformations au cours du temps (Cho et al., 2021; Theodoraki et al. 2022). Nous avons donc exploré cet écueil en s'interrogeant sur la façon dont les évolutions d'un écosystème entrepreneurial influencent le besoin d'entrepreneuriat institutionnel, en prenant le cas de l'entrepreneuriat durable. Pour étudier l'influence du contexte, nous avons comparé deux startups lancées dans les années 2010, avec deux autres lancées dans les années 2020. Nous avons collecté des données variées, incluant des entretiens, des notes d'observations directes, ainsi que des documents. L'analyse hybride des données a permis de faire émerger différents résultats.

Afin de proposer une interprétation à la question de recherche, nous avons d'abord analysé la perception des entrepreneurs de l'écosystème entrepreneurial dans lequel ils ont lancé leur startup, en utilisant le cadre d'analyse proposé par Bischoff et Volkmann (2018). Les résultats mettent en évidence une transition dans l'écosystème entrepreneurial, qui est perçue comme plus favorable dans

les années 2020 que dans les années 2010. En particulier, l'étude suggère que les employés et les acteurs publics ont plutôt été parmi les premiers à s'intéresser aux enjeux sociaux et environnementaux. Toutefois, l'écosystème entrepreneurial ne peut toujours pas être considéré comme durable selon les propositions introduites par Bischoff et Volkmann (2018), dans la mesure où certains acteurs, les investisseurs privés et les clients, restent ambigus.

Nous avons également pu observer l'évolution dans les pratiques d'entrepreneuriat institutionnel. Les différentes actions menées ont été analysées en reprenant le cadre d'analyse suggéré par Hillman et Hitt (1999). Un codage inductif a permis de mettre en lumière comment ces actions ont été conduites. L'entrepreneuriat institutionnel apparaît dans les années 2020 comme collectif et organisé au sein de réseaux, tandis qu'il était auparavant très isolé. Les entrepreneurs lancés dans les années 2010 rejoignaient souvent des réseaux très éloignés de l'écosystème entrepreneurial pour mener des actions sociales et environnementales. Enfin, les résultats suggèrent différentes motivations pour ces pratiques d'entrepreneuriat institutionnel. Il y a une décennie, l'entrepreneuriat institutionnel était considéré comme critique pour la survie de la startup, tandis que les entrepreneurs durables qui s'engagent dans ces pratiques aujourd'hui perçoivent leurs actions comme décorrélées du succès de la startup.

L'article s'inscrit dans une perspective dynamique de l'écosystème entrepreneurial, et considère, comme d'autres académiques (Cloitre et al., 2022), que les théories institutionnelles sont particulièrement fertiles pour rendre compte de ces évolutions. A travers cette approche, il contribue à la littérature sur les écosystèmes entrepreneuriaux durables (Cohen, 2006; Theodoraki et al., 2018; De Bernardi and Tirabeni, 2018; Terán-Yépez et al., 2020), en mettant en lumière leur émergence à partir d'un écosystème entrepreneurial "classique" (Spigel and Harrison, 2018).

La durabilité pour les startups, vue comme un critère pour les acteurs publics

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<https://www.cairn.info/revue-journal-of-innovation-economics-2023-0-page-1152.htm>

Le troisième article interroge le rôle des acteurs publics. Des politiques d'innovation considèrent le potentiel des startups pour résoudre des problèmes sociaux et environnementaux, et développent par exemple des programmes dédiés aux startups durables (Bergmann and Utikal, 2021; Adler, 2011). Toutefois, peu d'études se sont attachées à révéler le potentiel des politiques publiques pour influencer toutes les startups vers plus de pratiques responsables (Gay et al., 2019), et pas seulement

celles qui ont un objectif durable. Cet écueil n'est pas surprenant dans la mesure où peu d'initiatives en ce sens se sont lancées, étant donné que les impacts sociaux, environnementaux et économiques des startups sont complexes à évaluer.

En France, une prestigieuse subvention pour les jeunes startups innovantes a, pour la première fois en 2022, ajouté des critères sociaux et environnementaux dans son dossier de candidature. Nous avons pris le cas de ce concours i-Lab pour explorer les difficultés que cela peut représenter, à la fois pour les opérateurs du concours, mais également pour les startups. Le terrain de l'incubateur a permis de collecter des données variées : 9 entretiens avec les startups candidates; 16 heures d'observation participante de sessions de préparation pour les candidats et d'information par les opérateurs du concours; 26 dossiers de candidature et 11 évaluations; ainsi que des documents divers, tels que les règlements du concours depuis 2005 ou encore les notes de l'incubateur des sessions passées.

Pour mettre en lumière les problématiques liées à l'intégration de critères sociaux et environnementaux dans un concours pour les startups, nous avons utilisé le cadre d'analyse proposé par Stigloe et al. (2013), suivant l'approche de Gay et al. (2019). Combiné au codage inductif également conduit, l'étude montre qu'une faible anticipation crée de la confusion et de la frustration pour les candidats, exprimée par une crainte de faire du green- et/ou du social-washing. Ce résultat suggère que la légitimité d'un concours ne garantit pas l'acceptabilité de tels changements (Banister, 2008). Le cas révèle une faible transparence des opérateurs et d'inclusion des participants, mais une bonne réactivité, puisque des changements ont été intégrés tous les ans, en fonction des retours d'expérience de l'année précédente.

L'analyse révèle ce que les entrepreneurs identifient comme des impacts sociaux et environnementaux de leur startup, et met en lumière les différents outils et pratiques qu'ils prennent en compte. La plupart n'utilise pas les cadres d'analyse traditionnellement mentionnés dans la littérature (Bengo et al., 2016). Les résultats montrent ainsi que les entrepreneurs ont peu de connaissances sur les pratiques de mesure d'impact (Johnson, 2015). L'étude suggère que de tels concours ont une influence sur la compréhension que se font les entrepreneurs de l'impact social et environnemental de leur startup. Les acteurs publics ont ainsi un rôle à jouer pour diffuser de la connaissance en la matière (Steurer et al., 2012), puisqu'aucun entrepreneur interrogé n'avait eu à répondre à de tels critères auparavant. Les résultats révèlent que les entrepreneurs sont généralement plus réactifs que proactifs en termes de durabilité (Burch et al., 2016), puisque la majorité des interrogés ont réfléchi à la question à cette occasion seulement.

Les apports et les limites de la recherche

Les apports de la thèse

L'étude empirique, à travers ces trois articles, suggère que les acteurs agissent en faveur de la durabilité en fonction du sens qu'ils donnaient à ce concept encore abstrait, et que ce sens évolue continuellement selon un processus interactif et interprétatif. Une telle perspective symbolique interactionniste propose une approche originale pour décrire une gestion de l'incertitude d'un problème complexe. En combinant les résultats des articles de recherche, la thèse met l'accent sur trois considérations.

Premièrement, à travers une enquête longitudinale, nous avons pu mettre en lumière un écosystème dynamique qui cherche à intégrer des enjeux de durabilité. Plusieurs acteurs tentent de changer une situation initiale où les considérations économiques dominent, pour faire émerger de nouvelles conventions. Dans le cas de l'écosystème entrepreneurial étudié, les changements ont été plutôt incrémentaux et diffus : nous ne sommes pas dans une situation où des acteurs se sont fédérés pour proposer un cadre conceptuel qui fasse consensus. L'écosystème en question apparaît encore en transition, et des groupes commencent seulement à définir collectivement leur vision de l'entrepreneuriat durable. La recherche conduite s'est intéressée à cette phase de transition, pour comprendre comment les entrepreneurs agissent en l'absence de représentations collectives et de pratiques établies.

Deuxièmement, cette transition de l'écosystème entrepreneurial invite à une nouvelle définition de l'entrepreneuriat durable. Alors que la littérature met l'accent sur le triple bilan, ce critère n'est plus suffisant pour caractériser les startups durables. En effet, si tous les entrepreneurs doivent s'exprimer sur leurs impacts sociaux et environnementaux dès leurs premières années pour avoir accès à des fonds publics, alors ce critère n'est plus discriminant. Nous proposons donc une nouvelle définition des startups durables, inspirée des pratiques des startups plus engagées que nous avons étudiées. La définition s'appuie sur la mesure d'impact social, environnemental et économique, et propose qu'une startup peut être considérée comme durable si elle intègre cette mesure dans ses processus de décision, si cette mesure est évaluée par une partie tiers et indépendante, et si elle est communiquée. Cette approche entend engager toutes les startups, plutôt que de présupposer que certaines ont un impact positif de facto de par leurs objectifs initiaux. Elle invite les startups à mettre en place des pratiques concrètes tôt dans leur développement, plutôt qu'évaluer ex-post leur impact. Il est suggéré que la mesure d'impact pour les startups doit prendre en compte à la fois l'impact actuel des startups et leur impact potentiel - en mettant en évidence les hypothèses sous-jacentes à ces impacts potentiels;

et que cette mesure doit s'inscrire dans l'action, en cherchant à maximiser l'impact positif, sans oublier de réfléchir à des façons de réduire l'impact négatif.

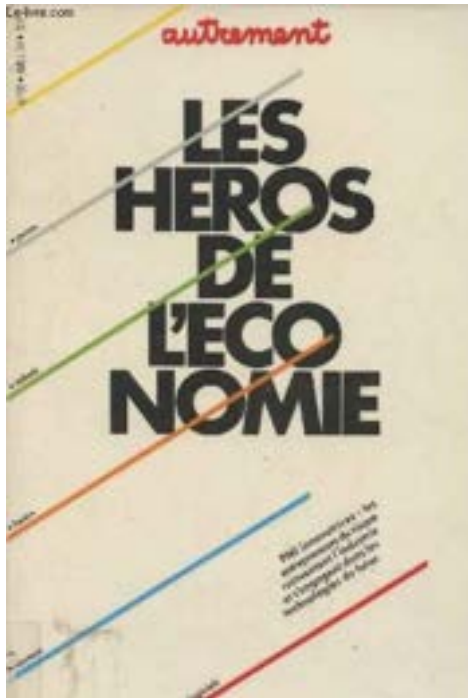
Troisièmement, cette approche met l'accent sur la dimension processuelle de la mesure d'impact pour les startups. Il est probable qu'à l'avenir, des standards s'imposent dans l'écosystème entrepreneurial pour mesurer l'impact des startups. En l'absence d'un tel cadre légitime et rationnel, nous mobilisons le concept d'improvisation (Weick, 1998; Miner et al., 1997) pour décrire la durabilité pour les startups. Cette perspective invite les entrepreneurs à s'adapter à un environnement changeant, en produisant des réponses rapides qui intègrent simultanément la planification et la mise en œuvre. Les entrepreneurs interprètent les signaux internes et externes liés à la durabilité, et cette interprétation motive des pratiques qui sont mises en place et impliquent une planification du futur. Il s'agit donc pour les entrepreneurs d'apprendre à improviser, et d'improviser l'apprentissage. La mesure d'impact pour les startups est ainsi vu comme un processus d'apprentissage. Il semblerait que ce processus commence par l'acquisition de connaissances, pour définir ses valeurs, qui aident ensuite à identifier un outil de mesure qui fasse sens dans son contexte. Ce processus est vu comme circulaire et itératif, le premier outil de mesure permettant de produire de nouvelles connaissances qui permettront d'améliorer la mesure d'impact.

L'approche processuelle contribue à la fois à la littérature sur l'entrepreneuriat durable et au domaine émergent de la recherche sur l'évaluation de l'impact de la durabilité pour les startups. Des recommandations pratiques pour les startups et les décideurs sont également fournies.

Les limites de la recherche conduite

Les limites de la recherche ont été introduites dans la section méthodologie de ce résumé, et celles de chaque article peuvent être retrouvées dans ceux-ci. La thèse contient deux limites principales. Les premières sont liées au format de thèse par articles, ceux-ci ayant évolué grandement au fil des retours des examinateurs pour atteindre le format succinct demandé. Ainsi, certaines questions soulevées dans les surprises rencontrées sur le terrain n'ont pas été développées. De futures recherches pourraient s'intéresser par exemple aux différences selon les secteurs d'activité, à l'impact de la durabilité sur des enjeux économiques, ou encore aux nouveaux emplois liés à la durabilité qui ont émergé chez les jeunes pousses. La recherche s'inscrit également dans une temporalité particulière, au sein d'un écosystème entrepreneurial en transition vers la durabilité. Si les parties-prenantes valorisent toutes par le futur la durabilité, cela pourrait avoir des conséquences sur le profil type de l'entrepreneur durable, le choix de la durabilité devant ainsi un choix rationnel. Enfin, la spécificité du design de recherche implique plusieurs limites. De futures recherches pourront alors confronter les résultats obtenus avec des startups non-incubées, ou encore dans un

autre contexte géographique. L'incubateur effectuant une première sélection, les startups étudiées sont parmi les plus prometteuses, et les résultats pourraient varier si on observe les startups dans leur ensemble. De même, les startups jeunes et deeptechs ont des spécificités qui sont difficilement généralisable pour des startups plus matures et/ou moins innovantes. Par exemple, les difficultés à mesurer l'impact décroît lorsqu'une startup a déjà un produit ou un service établi, un modèle d'affaires stable et des revenus. Agrandir l'échantillon des études conduites permettrait de valider les hypothèses présentées dans la recherche.



On the left: “Heroes of economy: Innovative small and medium industries: risk entrepreneurs reinvent the industry and engage in future technologies ”. Cover of *Autrement*, April 1984.



On the right: “The 2023 bug: Mass layoffs, banks’ bankruptcies... The end of the Silicon Valley myth?”. Cover of *Society*, March 2023.

PART I

Chapter 1. Introduction

The current period is characterized by an acceleration of social and environmental crises, leading to great uncertainty with respect to the future. The scale and complexity of the challenges calls for a mobilization of actors of all types. Some advocate that innovation is critical to challenge the unsustainable status quo and consider startups as promising organizations for addressing sustainability issues. Nonetheless, criticism emerged in recent years toward the startup model. In this context of polarized debate, startups are either portrayed as heroic ventures mobilized for a better future, or as the emblem of a capitalist system that created the current issues in the first place. Entrepreneurs, who already faced the difficult task of launching a new innovative venture, also now need to justify their contribution to sustainability goals. Therefore, a question arose with respect to the management of these new prerogatives, not well defined at that point. Entrepreneurs' perspective is often ignored and a lot is assumed about startups' concerns, thus calling for research.

Motivational Background

An Unsustainable Status Quo

The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report indicated that the 2011-2020 decade was the warmest since about 125,000 years ago. It demonstrated that the concentration of CO₂ in the atmosphere in 2019 reached an average of 410 ppm, a level which had not been seen for 2 million years. These climate perturbations have a direct effect on populations, notably in terms of access to water, food and health, but also on economic activities. The ecological transition therefore needs to be understood as a social-ecological transition. The two major crises of this century—the inequality crisis (Oxfam, 2023) and the ecological crisis—are two faces of the same coin (Laurent, 2019). Such disruptions, as well as critiques of the capitalist dominant model from which they result, are not new. Since the 1960s, voices have emerged to alert about the negative impacts of the consumption models created by continuous economic growth. *The Limits to Growth*, written by Donella Meadows and Dennis Meadows in 1972, is considered a founding text. It emphasizes the risks associated with a growth-based economic development. Economic growth is supported by demographic growth and increasing exploitation of natural resources. However, these factors, when combined, are said to lead to major perturbations, such as critical climate change and a shortage of raw materials. The text asserts that the quest for unlimited exponential growth without considering the limits of production will have extremely harmful consequences.

Despite the aforementioned warnings, the quest for eternal growth persisted, and disturbances increased and intensified. Public actors must now take charge of the issue, an uneasy task given that the relative consensus on the problem does not lead to a single trajectory to address it. The French Ecological Transition Agency (ADEME) published in 2021 four possible paths to reach carbon neutrality by 2050, according to identical data but different hypotheses. All imply novelties in different fields of application, and each of them reflects different societal choices.

The first one is named “Frugal generation”. It considers that carbon capture and storage technologies have not proven their effectiveness at a large scale, thus major behavioral transformations are needed. The transition implies a certain sobriety, enforced using constraints, to reduce energy-intensive activities, and a increasing the forest area to absorb more CO₂. In that perspective, industrial production relies on low technologies (Schumacher, 1973). Such technologies are located in between traditional and modern technologies, take into account both workers’ well-being, and consider nature as a capital to preserve. As problems are considered at a local scale, they rely on individuals and communities. Low technology is sometimes described as an alternative innovative approach to a problem, rather an object itself (ADEME, 2022). The concept is often associated with frugal innovation, but the former aims for a decrease in new product commercialization (Tanguy et al., 2023). Last, and contrary to high-tech, low-tech does not depend on rare metals, which is an issue to address in the context of limited resources (Bihouix, 2014; De Decker, 2017). However, the low-tech approach does not exclude high-tech solutions, but rather aims at using them as a last resort, and in the context of a broader sobriety strategy (Bihouix, 2014).

At the opposite end of the spectrum, the fourth suggested scenario is named “Repairing bet”. It considers that citizens will pursue a quest for “always more”, consuming energy-intensive goods and services, and overall, that citizens’ lifestyles will barely change. Such a comfort would be guaranteed thanks to different technological wells, which are notably able to capture CO₂ in the air. We would repair the consequences of the increased climate perturbations, instead of addressing their rootcauses. The French Ecological Transition Agency calls this scenario a “bet” to the extent that it relies on radical technologies that have not yet proven their efficiency.

Aside from these two extreme scenarios, there are two others more balanced. The second one, “Territorial cooperation”, relies on a pragmatic shared governance to achieve a gradual but steady evolution of the economic system toward a sustainable path combining sobriety and efficiency. Finally, the third one, “Green technologies”, focuses more on technologies than behavioral change, but stresses that individual behaviors will be more measured and responsible.

All scenarios suggest both a modification of human behaviors (for example, a reduction of 10% of meat consumption in the “Repairing bet”) and an use of innovations to adapt to climate change. Therefore, the - often caricatured - dichotomy between, on the one hand, a return to primary ways of life, and on the other hand, a blind technosolutionism must be overcome, while a consensus emerges with respect to the current socio-economic model’s unsustainability.

According to Franck Aggeri (2023), the rise of uncertainty and skepticism toward a prosperous future favored the emergence of the flexible concept of innovation, defined as the introduction of a novelty in a field of application. Its large appropriation from various typologies of actors - states, organizations or individuals - and the different forms it can take, such as technological or managerial, contributed to its success. The author considers that innovation became a culture, as every actor in the society is now incentivized to innovate, transforming the role of innovation from a means to an end in itself. Innovations are perceived as critical in the context of the current crises, due to their ability to challenge the status quo, and entrepreneurs and startups have been acknowledged as critical actors for innovation since Schumpeter (1934).

Startups: A Controversial Symbol

Startups, defined as growth-oriented innovative new ventures, have been praised by most governments and academics since the 1980s (Schot and Steinmueller, 2018) for their potential to foster economy and to stimulate high-growth (Mason and Brown, 2013; Acs and Szerb, 2007). Recently, in France, a “Tech for Good” initiative was launched by Emmanuel Macron, and led to a non-binding call promoting responsible practices, signed on the 30th of November in 2020 by key actors of the digital entrepreneurial ecosystems. According to Aurelien Acquier (2020), such an initiative indicated a breaking point in the way startups are perceived. While the expression “Tech for Good” implied that technologies have the potential to solve ecological and social issues, at the same time, it also presupposed that others are “for Bad”, thus challenging the legitimacy of technological companies.

Such criticism toward technological companies was rather rare a few years prior. As the 2008 financial crisis struck, Silicon Valley firms were mostly portrayed as victims of the financial sector, and their entrepreneurs as altruistic creative geniuses (Galluzzo, 2023). The financial crisis did not deter enthusiasm for startups. On the contrary, many governments sought to replicate the model, or at least to develop entrepreneurial ecosystems in their countries. It was the case in France (Lacorne, 2019), where an agenda to build a “Startup Nation” was promoted. Jones and Sudlow (2022) observed the influence of Silicon Valley model in the French context. They argue the symbolic

power of Silicon Valley, which embodies “a cocktail of abstract ideas in discourses” (Jones and Sudlow, 2022:1123). Silicon Valley is identified as the hallmark symbol of the startup culture, and is mostly used by politicians and business leaders to defend startups as the solution to many socio-economic challenges.

The “Tech for Good” movement seemed to reflect a more profound scrutiny of the Startup Nation model. Startups appeared more accountable for their actions than they were before. During his 2017 VivaTech speech, Emmanuel Macron stated: “this freedom, which is yours, I want to give it back to you and to recognize it, but it also imposes an immense responsibility”. Such a call for more responsibility may be an indicator of the deterioration of the “Startup Nation”’s public image.

Startups detractors pointed out that the human capital theory it supports favors an “uberization”, based on self-employment and on-demand business models, that deepens inequalities in several sectors (Ticona and Mateescu, 2018). Such a “radical responsabilization of the workforce” (Fleming, 2017) was presented as a source of “growing economic insecurity, low productivity, diminished autonomy and worrying levels of personal debt” (Fleming, 2017: 1). Other criticism denounced the promotion of a certain elite, from the best engineering and business schools (Schmelck, 2018), which dug the gap between “those who succeed and those who are nothing”. This last sentence used by Emmanuel Macron at the opening ceremony of Station F in 2017, was quickly taken up by his detractors, who considered that the model widened inequalities. Last, the management style it promotes, described as being based on employee care, was presented as hypocritical, motivated by performance more than workers’ actual well-being (Truong and Chavanne, 2017). Despite the initial proposition by Keynes (1930) that technologies could lead to a decrease in working hours to approximately 15 hours per week, such a reduction has not happened. Rather, it increased the number of office workers, and led to the emergence of what was named by some as “bullshit jobs” (Greaber, 2018). This concept was introduced to describe how workers may end up working on useless and meaningless tasks, while also suffering from the superficiality of their contribution to society. In addition to this phenomenon, which echoes with the more recent “great resignation” and “quiet quitting” movements (Formica and Sfodera, 2022), startups’ image was tarnished by denunciations on social networks. Mainstream media widely relayed a “*Balance Ta Startup*” account on social networks, which denounced startups’ managerial practices.

Crises: A Catalyst to Redefine Startups’ Values

At a period where a certain “startup bashing” emerged, and criticisms developed, the pandemic broke out. The challenges it created requested rapid responses. The need for flexible and responsive

structures matched startups' organizational characteristics. They adapted their model to the lockdown (Myles et al., 2023), but went even further by offering solutions to respond to the emergency. In other national contexts, academics emphasized that entrepreneurs were the “unsung heroes” of the pandemic, as their contributions to society and to the economy were often undervalued (Maritz et al., 2020). However in France, their efforts and support were largely acknowledged. The use of Doctolib as the official vaccination platform is significant in that regard. The major use of digital platforms from private actors was said to be an opportunity to catch up the “French delay” in terms of digitalization, and was widely supported by innovation policies (Dumez et al., 2022). The French government also actively backed the entrepreneurial ecosystem in that period, and put in place exceptional measures to support businesses, such as state-guaranteed loans (*“Prêt Garanti par l’Etat”*).

Despite these opportunities and massive support, some startups faced difficulties, and the pandemic led to the beginning of a financial crisis, notably with a significant reduction in available funds. Geopolitical perturbations then added up, and the landscape became very tense for startups. According to the capital-risk barometer produced every year by EY (Bouchez, 2023), startups' fundraising difficulties could be observed with a little delay, during the first semester of 2023. However, it was possible earlier to observe a shift in the discourses surrounding startups. In particular, the concepts of “resilience” and “sustainability” have been increasingly used to designate the new characteristics of promising startups (Le Pendeven, 2020; Laurent, 2019). While these concepts are not new (Fiksel, 2006), they were said to be of paramount importance for organization in the pandemic context and afterward (Berger-Douce, 2021).

The term “resilience”, defined as “the capacity for companies to survive, adapt and grow in the face of turbulent change” (Fiksel, 2006: 16), was widely promoted in the startup context both by academics (Mota et al., 2022) and practitioners (Bpifrance, 2022). While it supposed that startups should be flexible and adapt their model to survive, it also reflected the end of an abundance period for startups. In the French entrepreneurial ecosystem, many stated that “The party is over” (Fabrion, 2022; Versavau, 2022), i.e. investors will be more careful with their investments than they used to be in previous years, and valorisations will be less generous (Le Pendeven, 2020). This evolution called into question diverse emblems of the startup culture, notably the cult of “unicorns” (startups with a private valuation of a billion or more US dollars), which used to be portrayed as the ultimate goal for startups. The number of unicorns was used as an indicator for national innovation policy: in 2019, the French government fixed the objective to reach 25 unicorns by 2025, and, as that goal was reached sooner, it aimed in 2022 at 100 unicorns for 2030.

Academics had begun questioning valorization as a key indicator even before this turbulent period. According to Kenney and Zysman (2019), the enormous amount of capital available for startups created a situation in which new entrants could challenge incumbents, and more broadly industrial sectors. Indeed, such startups nurtured by venture capitalism can afford massive losses for a long period, as their survival relies less on profitability than on their ability to satisfy their investors. Authors consider that “these firms are destroying economic value. This new dynamic has social consequences, and in particular, a drive toward disruption without social benefit. Indeed, in some cases, they may be destroying social value while also devaluing labor and work in the enterprise” (Kenney and Zysman, 2019: 39).

The criticism of startups’ valorisation as a key indicator also emerged from some actors of the entrepreneurial ecosystem. A collective of entrepreneurs, Mouvement Impact France, the Boston Consulting Group, and ESSEC Business School (BCG, 2022) issued a ranking of “impact unicorns”, selected according to another indicator: the costs avoided for society. In their view, valorisation does not acknowledge the benefits for society, and therefore should not be the ultimate goal. They argued that key indicators need to better reflect the role companies should play in society, and emphasized in particular their responsibility in terms of social and environmental objectives. This position echoes a myriad of initiatives launched within the entrepreneurial ecosystem since the Tech for Good movement. More and more, startups’ stakeholders started to pay attention to sustainability: investors paid attention to Environmental Social and Governance (ESG) criteria (Duque-Grisales and Aguilera-Caracuel, 2019; Antarciuc et al., 2018; Bocken, 2015), public funds targeted sustainability (Bergmann, Utikal, 2021; European Commission, 2020; Johnson, 2015; Adler, 2011), and integrating sustainability became an asset to recruit in a context of talent war (Magbool et al., 2016; Lis, 2012; Beechler and Woodward, 2009; Choi and Gray, 2008).

In a landscape marked by escalating environmental and social crises, diverse viewpoints are surfacing in public discourse to tackle pressing sustainability concerns. Startups are coming under increased scrutiny, as they are the emblematic figures of a model of hyper-growth that is now being called into question. They are the subject of passionate - if not caricatured - debate. Their supporters defend the legitimacy of the model, highlighting its potential, but also integrate criticisms by imagining ways to take into account more social and environmental aspects of startups’ development. Some of the most concerned entrepreneurs found themselves in a challenging situation, as one once told me: “There is a certain schizophrenia in defending degrowth while launching a high-growth startup”. The objective of this manuscript is not to determine whether startups are the appropriate actors to answer social and environmental challenges. Rather, it aims at

going beyond passionate debates and caricatures to explore from within how startups and entrepreneurs actually act and react to what might be a period of transition.

Thesis Objectives

The attention paid to startups' behavior in terms of social and environmental goals is rather new. Academics and regulations traditionally investigated large firms' actions (Kanya, 2016; Pinkse and Groot, 2015; Brammer et al., 2012; Simnett et al., 2009; Perrini et al., 2007), considering that their individual impact is more significant than smaller companies. However, many advocated that both incumbents and startups are needed to reach a more sustainable development (Niemann et al., 2020; Leendertse et al., 2021; Kuckertz and Wagner, 2010). Great hopes - and funds - were therefore placed in startups to address social and environmental issues (European Commission, 2020; Kanda et al., 2020; Gast et al., 2017; Kuckertz and Wagner, 2010). The literature on sustainable entrepreneurship emerged to better understand the phenomenon at stake. It emphasized that while some entrepreneurs are targeting environmental issues (Piwowar-Sulej, 2021; Schaltegger, 2002; Bennett, 1991) or social issues (Saebi et al., 2018; Rey-Martí et al., 2016b), others aim for the triple bottom line of social, environmental and economic objectives (Terán-Yépez et al., 2020; Cohen et al., 2006; Elkington, 1997).

As previously mentioned, startups' stakeholders seem to increasingly target sustainability. However, a paradox remains between the important attention startups receive to address sustainability issues and the inability to determine whether they can actually contribute to these goals (Leendertse et al., 2020). Indeed, stakeholders lack tools to evaluate under which conditions a startup can be considered sustainable, a question that the literature is only starting to address (Fichter et al., 2023). The research only began to investigate what could be the appropriate sustainability impact assessment for startups (Fichter et al., 2023; Hornes, 2019), a challenge considering the uncertainty they deal with (Trautwein, 2021). So far, academics investigated the appropriate sustainability impact assessment for new ventures, but a dearth of knowledge remains on how startups deal with these new requirements, in the absence of common and shared meaning and practices. Hence the following research question:

How startups tackle sustainability in a context of great uncertainty?

The thesis explores how, in the absence of a consensual and clear framework to define what is or what should be sustainability for startups, actors of the entrepreneurial ecosystem interact to make sense of the concept of sustainability applied to startups, in a context of conflicting tensions and

great uncertainty with respect to the actual outcome. Building on the literature on entrepreneurship, this research focuses on entrepreneurs' perspectives, considering them as key informants to understand startups challenges (Bridge, 2021). I explored this phenomenon at a Parisian public incubator specialized in early-stage innovative startups, Agoranov. This setting has a "revelatory potential" (Gioia et al., 2013: 15) considering that uncertainty increases with younger and more innovative companies (Pomerol, 2018; Freeman, 1983; Stinchcombe, 1965). From a 36-month field immersion, I was able to collect multiple types of data, including in particular direct observations, interviews and archival documentations. Rather than aiming for generalization, this qualitative and comprehensive approach (Yin, 2018; Dumez, 2016) focuses on actors, their discourse, interaction and practices, to reveal the mechanisms at stake and to understand how actions are conducted. Through the thesis, three research papers were produced, investigating different aspects of the phenomenon (Dumez, 2016). Each of them is introduced through a "situation" (Dumez, 2016; Girin, 1989; Blumer, 1969) met on the field, analyzed with a background theory, to retrace the abductive process followed.

First, recent contributions emphasized why sustainability impact assessment is a challenge for startups (Trautwein, 2021), but a dearth of knowledge remains on startups' actual practices in that context. I therefore chose to explore the practices of the ones supposed to be "best-in-class" in that matter (Voinea et al., 2019), i.e. sustainable startups, in order to explore how they integrate sustainability impact assessment in their entrepreneurial process. Through a multiple case study of eight sustainable startups, I observed that the integration of the triple bottom line in the entrepreneurial process has a major effect on startups' sustainability impact assessment practices. In particular, two distinct groups emerged, "born-sustainable startups" and "transitioned sustainable startups", each with a specific entrepreneurial process.

Second, the literature advocates the need for sustainable entrepreneurs to conduct institutional entrepreneurship (Pinkse and Groot, 2015; Schaltegger and Wagner, 2011), considering they have to overcome an adverse environment (Kirkwooda and Waltona, 2014; Pacheco et al., 2010; Beveridge and Guy, 2005; Aldrich and Fiol, 1994). While the institutional setting is said to be critical to understand entrepreneurs' action (Bourdreaux and Nikolaev, 2018), little is known about how entrepreneurial ecosystems evolve through time (Cho et al., 2021; Theodoraki et al. 2022), a surprising gap considering their dynamic nature (Spigel and Harrison, 2018). To explore this issue, I compare two startups launched in the 2010s and two others launched in the 2020s to understand how the evolution of the entrepreneurial ecosystem affects institutional entrepreneurship, using the case of sustainable startups.

Third, public policies have identified startups as promising actors to address sustainability issues. Some research investigated public programs dedicated to sustainable startups (Bergmann and Utikal, 2021; Adler, 2011), fewer studies analyzed how public policies can influence sustainability representations and practices for all startups (Gay et al., 2019) - a not surprising gap considering how rare such public policies are. Through the case of a well-established public grant for early-stage technological startups, which added sustainability criteria in its application in 2022, I analyze the challenges it represents, both for operators and entrepreneurs.

Through these empirical inquiries, I emphasize the evolving interpretative process through which startups adapt their practices according to the meaning they give to sustainability, suggesting that this meaning is influenced by startups' social interactions with their environment. To stress this phenomenon, the thesis uses symbolic interactionism (Blumer, 1969) as an orienting theory. This approach aims to understand how the social world - and here more particularly the entrepreneurial ecosystem - is constructed through the interaction of its components' perceptions. The research setting favors such investigation on perceptions and practices, as it provides access to informants and confidential data, thus revealing mechanisms that can hardly be understood from outside.

From the results obtained, the discussion highlights in particular three considerations. First, the research explored an entrepreneurial ecosystem in transition, a process starting with an initial situation that diverse actors attempt to change, to create new conventions. In the case of the entrepreneurial ecosystem studied, the meaning affected to sustainability is still being constructed, as no common language or practices are shared among actors. Second, the research can be considered longitudinal to the extent that a turning point (Dumez, 2016) appeared when innovation grants - an almost mandatory step for these startups - added environmental and social criteria. From that point, almost every startup presented a triple bottom line they aimed for, in order to have access to these funds, needed for their development. This shift calls for a revision of the traditional definition of sustainable entrepreneurship, and a proposition is made from the results obtained. Third, the concept of sustainability impact assessment for startups has played a major role in the research. Different frameworks and tools emerged in the entrepreneurial ecosystem, trying to rationally evaluate startups' contribution to sustainability. Considering that, at that point, none predominates, the thesis suggests that sustainability for startups requires improvisation (Weick, 1998), i.e. when it comes to sustainability, entrepreneurs' planning simultaneously integrate creation and execution. Therefore, a process approach to sustainability for startups is advocated, emphasizing the learning process at stake.

The thesis contributes to the emerging literature on sustainable entrepreneurship by providing an original insider approach, converting entrepreneurs' challenges met on the field into academic

research. It enriches the current knowledge on this field by investigating in-depth related concepts that were hardly connected before. In the broader field of entrepreneurship, it supports the context-based approach for entrepreneurship and contributes to demystifying entrepreneurship by emphasizing the collective action it represents (Mustar, 2021). The research illustrates this perspective through the specific and critical question of sustainability, and suggests how sustainability might become a new standard for startups, and not an additional endeavor for just a few highly motivated entrepreneurs (York et al., 2017; Kirkwooda and Waltona, 2014). With respect to the literature on innovation management, it is the case of a collective sensemaking process in a context of great uncertainty. The research finally supports the calls for more organizational research using symbolic interactionism (Dumez and Toussaint, 2022; Fine, 2016), and illustrates how it can be used to produce research.

From a managerial perspective, the thesis exploits empirical questions met on the field, for which the literature failed to inform us, and therefore contributes to portraying “the entrepreneurial phenomenon in a suitable and realistic manner” (Sørensen et al., 2007: 91). It provides empirical-based knowledge to nuance current debates on startups, considering that their perspective will be useful to understand the phenomenon and mechanisms at stake. Actors involved in the entrepreneurial ecosystem can learn for the thesis on startups’ challenges and responses to the new sustainability requirements. From the results obtained, a possible framework for sustainability impact assessment for startups is introduced. Decision makers, in France or abroad, can find recommendations on how to diffuse a demanding but realistic vision of sustainability in an entrepreneurial ecosystem.

An overview of the thesis structure is presented in Figure 1. Following this introductory **Chapter 1**, **Chapter 2** provides a literature review. It introduces and reviews the concept of sustainable entrepreneurship, and emphasizes the collective and contextual perspective adopted. From the dominant approaches existing in the literature to talk about sustainability in the context of startups, it appears that the phenomenon is characterized by its complexity and uncertainty. Considering the emergence of this research field, a lot of research gaps remain. This chapter concludes with the three that will be investigated in this thesis. Then, **Chapter 3** presents the methodological approach and the research design. **Chapter 4** introduces the abductive process which led to the identification of sub-research questions. The thesis follows a progressive complexification (Ayache and Dumez, 2022) to reveal different aspects of the phenomenon, from issues met on the field. With the three research articles, sustainability for startups is understood through different “seen as” (Dumez, 2021). It is presented as a part of the entrepreneurial process (**Chapter 5**), as embedded in an entrepreneurial ecosystem (**Chapter 6**), and as a prerequisite required by public actors (**Chapter 7**).

Results are gathered and discussed in **Chapter 8**. It also emphasizes contributions, limitations and avenues for research.

Table 1. Thesis structure

PART I			
Chapter 1. Introduction			
<ul style="list-style-type: none"> ● Motivational Background ● Manuscript Objectives <p style="text-align: center;"><i>RQ: How startups tackle sustainability in a context of great uncertainty?</i></p>			
Chapter 2. Literature Review			
<ul style="list-style-type: none"> ● Sustainable Entrepreneurship Principles: A Contextualized and Collective Approach ● Sustainability for Startups: Different Approaches 			
Chapter 3. Methodological Approach and Research Design			
<ul style="list-style-type: none"> ● Empirical Setting ● Motivation for Research and Assumptions ● Methodological Approach ● Research Methods ● Conclusion 			
PART II			
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The Abduction Process	“They already save lives!”	“We are a mission-driven company”	“What happens if I write N.A.?”
Article Title	Where to Start? Exploring How Sustainable Startups Integrate Sustainability Impact Assessment Within Their Entrepreneurial Process	Exploring the Evolution of Entrepreneurial Ecosystems Through Institutional Entrepreneurship: The Case of Sustainable Entrepreneurship	Implementation Challenges of Innovation Policies Fostering Sustainability: Evidence from a French Public Grant for Technological Startups
Research Question	How do sustainable startups integrate sustainability impact assessment in their entrepreneurial process?	How does the evolution of the entrepreneurial ecosystem affect institutional entrepreneurship?	What are the challenges of an innovation policy targeting responsible innovation for technological startups?
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<ul style="list-style-type: none"> ● Summary of Findings ● Discussion of Results <ul style="list-style-type: none"> ○ An Entrepreneurial Ecosystem in Transition ○ A Call for a More Stringent Definition of Sustainable Startups ○ Managing Uncertainty and Complexity Through Improvisation ● Contributions to Research and for Practitioners ● Limitations and Further Research 			

Chapter 2. Literature Review

This chapter emphasizes the theoretical motivation for the exploration of the concept of sustainability applied to startups. The thesis is located in the academic field of sustainable entrepreneurship, which emerged about two decades ago from the entrepreneurship literature. The originality of this study is to pay attention to startups, a specific kind of entrepreneurship. Such innovative organizations appear particularly promising for sustainability, but their actions are constrained by a specific context, and they also bear intrinsic characteristics that complexify sustainability management. This tension is only starting to be investigated in the literature, which mostly overlooked the case of startups.

The first section presents and reviews the field of sustainable entrepreneurship, to understand its origin and the different approaches adopted by researchers. As this research considers entrepreneurship a collective action embedded in a specific environment, it investigates organizational practices in their context. The second section highlights three related literature often used to investigate the specificities of startups' sustainability management practices: the corporate social responsibility, the sustainable business model innovation, and the sustainability impact assessment literature. The combination of these perspectives provides foundations for a process approach and a focus on symbols. The third section emphasizes the literature gaps which will be addressed through the three research papers.

Overall, this chapter defends that the concept of sustainability applied to startups is a matter that requires a focus on interactions, given the collective and contextual approach adopted. These interactions influence organizational practices, which follows an evolutive experimentation process to deal with the complexity of sustainability management, in a context of great uncertainty.

Section 1. Sustainable Entrepreneurship Principles: A Contextualized and Collective Approach

The objective of this section is to introduce the concept of sustainable entrepreneurship, the academic field in which this thesis is built. It will first explain how it emerged from the broader field of entrepreneurship, and how it is different from earlier concepts of environmental and social entrepreneurship. Then, a brief literature review will be provided, in order to identify the different

approaches adopted by academics who investigated this phenomenon. It will finally justify the collective and contextual approach adopted in this thesis.

1. Sustainable Entrepreneurship: A Brief Literature Review of an Emerging Field

Sustainable Entrepreneurship: Emergence of the Concept

The Schumpeter's (1934) vision of entrepreneurship as a "process of creative destruction" is central within entrepreneurship research. Entrepreneurs bring innovative solutions (Drucker, 1985), which destroy or replace previous ways of doing things. They both challenge established industries and are enablers of economic performance. From that perspective, entrepreneurship appears valuable for sustainability, as it can provide alternative models to a current unsustainable status quo. However, the call for entrepreneurs to address these issues is not straightforward (Hall et al., 2003), as some researchers suggest that new ventures damage the environment and violate regulation more often than incumbents (Fuller and Tian, 2006; Wang and Bansal, 2012). Such a new perception of entrepreneurship reflects several evolutions from the traditional approach in this field. While entrepreneurship success was determined by its economic performance, scholars paid attention to how these companies contributed to economic growth and job creation (Audretsch and Thurik, 2001), stressing that high growth potential entrepreneurship contributed the most to these economic indicators (Wong et al., 2005). Entrepreneurship's ability to address social and environmental issues was historically largely ignored, but during the past decades, academics started to extend their understanding of entrepreneurship's value creation to cover also non-economic gains (Schaltegger et al., 2018; Sarango-Lalangui et al., 2018; Urbaniec, 2018). The idea of entrepreneurs as solely profit-driven agents was progressively deconstructed (Zollo et al., 2013; Acs, 2007), and entrepreneurship considered as "an important channel for sustainable products and services" (Ferreira et al., 2022: 8).

The literature identified different types of entrepreneurship according to their objectives, expressed in terms of bottom lines (Elkington, 1997), as presented in Table 2. First, "traditional entrepreneurship" (Santos, 2012), or "commercial entrepreneurship" (Smith et al., 2014), reflects the historical approach in this field, and characterizes a type of entrepreneurship that follows a single bottom line, i.e. pursues economic objectives only. Second, the literature investigated its potential contribution to environmental stakes, thus creating the concept of "environmental entrepreneurship" (Bennett, 1991), "ecopreneurship" (Schaltegger, 2002), or "green entrepreneurship" (Schaefer et al., 2015), which aims for a double bottom line of environmental and economic objectives. Third, the field of "social entrepreneurship" emerged (Brinckerhoff, 2000), to analyze a type of entrepreneurship pursuing a double bottom line of social and economic goals (Zahra et al., 2009;

Saebi et al., 2018). Finally, the term “sustainable entrepreneurship” was introduced (Schaltegger and Wagner, 2011; Dean and McMullen, 2010), to designate a type of entrepreneurship that follows a triple bottom line of social, environmental and economic objectives. While a myriad of definitions are offered in the literature, the latter is commonly accepted among the community of researchers (Konys, 2019; Shepherd and Patzelt, 2011; Schaltegger and Wagner, 2011; Dean and McMullen, 2007; Cohen, 2006), and will be therefore adopted in this thesis.

Table 2. Sustainable entrepreneurship and related concepts

	Single bottom line	Double Bottom Line		Triple Bottom Line
Objectives	Economic goals	Environmental goals	Social goals	Economic, environmental and social goals
Concepts	Traditional or commercial entrepreneurship	Environmental entrepreneurship	Social Entrepreneurship	Sustainable entrepreneurship
Influent Articles	Santos, 2012; Smith et al., 2014	Blue, 1990; Bennett, 1991	Brinckerhoff, 2000	Cohen, 2006; Schaltegger and Wagner, 2011

Pioneer contributors of the sustainable entrepreneurship field insisted on the environmental lens (Dean and McMullen, 2007; Cohen and Winn, 2007), rather than on the social one (Anand et al., 2021), a pattern that can be observed in other research fields (Carbone et al., 2012). When the concept of social entrepreneurship was developed and gained importance, its proximity with the more recent term of sustainable entrepreneurship (Kury, 2012) led authors to emphasize their main differences (Belz and Binder, 2015). First, the multiplicity of objectives: the sustainable entrepreneur aims for a triple bottom line, whereas social entrepreneurship adopts a double bottom line. The second distinction lies in the definition of sustainable development from the Brundtland report, i.e. “a development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987), which implies equity between present and future generations. Sustainable entrepreneurship includes both these principles, while social entrepreneurship focuses primarily on equity between present generations, by addressing for example marginalized or disadvantaged communities’ needs (Schaefer et al., 2015). Finally, the third distinction concerns the type of organizations studied. Social entrepreneurship takes into account non-profit organizations (Nikolaou et al., 2018), whereas that of sustainable entrepreneurship includes only for-profit organizations (Dean and McMullen, 2007).

Sustainable Entrepreneurship: Reviews of the Different Approaches in the Literature

The field of sustainable entrepreneurship obtained its legitimacy as a field of research (Gast et al., 2017; Shepherd and Patzelt, 2011), and reached a healthy balance of quantitative, qualitative and conceptual contributions (Anand et al., 2021). However, it is still emerging: a significant and almost constant rise of academic papers on this topic can be observed (Konys, 2019) since the first seminal papers paved the way about two decades ago (see Tilley & Young, 2006; Cohen and Winn, 2007; Dean and McMullen, 2007). This field is said to be multidisciplinary in nature, as it was investigated by academics from vast ranges of disciplines, such as politics, environmental sciences, sociology, and economics. While it contributed to its richness, it did not favor a common comprehension of the concept. This argument motivated researchers to produce literature reviews, in order to better understand and to bring clarity to this promising field (Anand et al., 2021; Terán-Yépez et al., 2020; Sarango-Lalangui et al., 2018; Muñoz and Cohen, 2018). Overall, these scholars agree to consider sustainable entrepreneurship as a phenomenon largely under understood, and call for further exploration.

Some (Sarango-Lalangui et al., 2018; Terán-Yépez et al., 2020) distinguish the research produced within the field of sustainable entrepreneurship according to theoretical background adopted, either from the sustainable management or from the entrepreneurship research. From the first perspective (Urbaniec, 2018; Lans et al., 2014; Schaltegger and Wagner, 2011; Hall et al., 2010; Parrish and Foxon, 2010; Crals and Vereeck, 2005; Hart and Mistein, 1999; Oviatt and McDougall, 1997), innovations are useful for society as they have the ability to introduce more sustainable solutions, and entrepreneurial activities must be subordinated to the triple bottom line. The focus is less on the exploitation of opportunities than on sustainable entrepreneurship's social, environmental and economic impacts on territories. Sustainable entrepreneurship is therefore identified as a key driver for a transition to more sustainable practices and solutions. On the other hand, the entrepreneurship perspective (Blez and Binder, 2017; Anggadwita and Mustafid, 2014; Moroz and Hindle, 2012; Shepherd and Patzelt, 2011; Hockerts and Wüstenhagen, 2010; Pacheco et al., 2010; Dean and McMullan, 2007; Cohen and Winn, 2007) stresses the importance of the entrepreneurial process, analyzing the relationship between individuals and opportunities. It considers that entrepreneurs are aware of their impact, and attempt to create sustainable business models because they perceive sustainability as a long-term opportunity.

Another approach distinguishes the research produced according to the focus adopted (Anand et al., 2021; Schaltegger et al., 2018; Muñoz and Cohen, 2018; Shepherd and Patzelt, 2011). While these

literature reviews offer different typologies, key themes emerge. First, a stream of research focuses on the individual level. Sustainable entrepreneurs are studied under the lens of their knowledge, skills, motivation, intention, business orientation, values and attitudes (Koe et al., 2014; Shepherd et al., 2013; Schaltegger and Wagner, 2011; De Clerc and Voronov, 2011; Parrish, 2010; Kirkwood and Walton, 2010; Patzelt and Shepherd, 2010; Shepherd et al., 2009; De Clerc and Voronov, 2009; Choi and Gray, 2008; Schlange, 2006; Choi and Gray, 2004; Linnanen, 2002; Walley and Taylor, 2002). Second, another focus emphasizes how sustainable entrepreneurship is constructed. It analyzes in particular opportunity recognition mechanisms, the entrepreneurial process and its outcome (Muñoz and Cohen, 2017; Dean and McMullen, 2007; Cohen and Winn, 2007; Schich et al., 2002; Larson, 2000; Hostager et al., 1998). Third, sustainable entrepreneurship is studied according to its context, and sustainable entrepreneurs are perceived as change agents. That perspective investigates their relationship with their stakeholders, their ecosystem, and builds on institutional theories, using the concept of institutional entrepreneurship, to stress how entrepreneurs can change the institutional context in which they are embedded in (Muñoz and Dimov, 2015, Cohen and Muñoz, 2015; York and Venkataraman, 2010; Pacheco et al., 2010; Hockerts and Wüstenhagen, 2010; Harris & Wheeler, 2005; Cohen, 2006).

While the literature on sustainable entrepreneurship can be determined in terms of the level of analysis, i.e. individual, organizational or institutional, the frontiers are actually rather porous. Indeed, most studies combine one or all approaches, by investigating for example how individual characteristics, including the knowledge of their environment, influence the recognition of sustainable opportunities and the entrepreneurial process (Patzelt and Shepherd, 2011). Such a combination of multiple sub-concepts and level of analysis is consistent with the entrepreneurship literature advocating for multiple levels of analysis (Luke et al., 2007; Davidsson and Wiklund, 2001; Low and MacMillan, 1988). This approach is in line with the phenomenon of entrepreneurship itself, determined since Schumpeter (1934) as an activity initiated by individuals, which takes place in an organizational context, and has an influence on industries and more broadly on society.

2. Implications for the Thesis: A Collective and a Contextual Approach

From this brief literature review, two main considerations for this thesis are retained: the need for a collective and contextual approach.

This research is influenced by an understanding of entrepreneurship as a collective action. Such an approach breaks with the “myth of the lonely-only entrepreneur” (Schoonhoven and Romanelli, 2002), influenced by public figures of famous entrepreneurs portrayed as “heroes” (Mustar, 2021). It

led past research to focus on personal traits of such “genius” entrepreneurs (Kets de Vries, 1997; Hockerts, 2006). According to some academics (Schaltegger et al., 2018; Schoonhoven and Romanelli, 2002), the research on entrepreneurs’ individual characteristics failed to grasp the context and social embeddings of entrepreneurial processes. While studies on the individual entrepreneur are useful for the field - from a psychological perspective and because the individual level can explain a broader social context (Sarasvathy et al., 2009) - this thesis will not analyze in-depth entrepreneurs’ personal traits. Rather, the objective is to reveal practices, processes and social embeddedness, which are at the core of the collective perspective of entrepreneurship research. This choice is also influenced by the methodology adopted (see [Methodological Approach and Research Design](#)), which favors the investigation of key issues raised from the field, while still placing entrepreneurs at the core of the research. Indeed, entrepreneurs do not need to be the level of analysis to be central (Davidsson and Wiklund, 2007), as they can be key informants to grasp startups’ practices and challenges.

While entrepreneurship scholars defended a collective perspective, the field broadened its perspective from individual entrepreneurship to a more contextualized approach. It favored the exploration of entrepreneurial ecosystems (Cohen, 2006), considering that the entrepreneurial activity “does not occur in a vacuum” (Schaltegger et al., 2018: 136). They are embedded in a geographical context, which motivated the exploration in a specific localisation (see [Methodological Approach and Research Design](#)). Entrepreneurship can influence the institutional setting in which it operates. Such an approach, inspired by institutional theories, is investigated in the second research article. On the one hand, entrepreneurs are influenced by their social, political, and regulatory contexts. In that respect, innovation policies have the ability to guide private actors toward more sustainable practices, a perspective that is explored in the third research article. On the other hand, entrepreneurship can influence the institutional setting in which it operates. Such an approach, inspired by institutional theories, is investigated in the second article.

Section 2. Sustainability for Startups

The objective of this section is to provide a better understanding of how sustainability management can be understood in the specific case of startups. Indeed, the broad definition of sustainable entrepreneurship - a type of entrepreneurial activity that aims for the triple bottom line - has the advantage of being shared among academics, but remains rather vague. A gap remains with respect to startups’ practices, as little is known about what is actually done by such organizations in terms of sustainability. Three approaches are more commonly used in the literature to address this gap. The corporate social responsibility literature emphasizes the internal actions, while the business models

field focuses rather on the core activity developed by the startup. A third and more recent approach, from the impact assessment literature, insists on the need to evaluate the outcome generated by the organization. However, these approaches fail to reflect the experimentation process through which startups explore sustainability management. Indeed, in the absence of suited standards and shared norms, their understanding of sustainability is influenced by evolving interactions with their stakeholders.

1. Sustainability for Startups: Different Approaches

The Corporate Social Responsibility (CSR) Literature

The concept of sustainable entrepreneurship is often related to corporate social responsibility (CSR), which implies actions to achieve social and environmental outcomes beyond the core interest of the firm (Hansen and Schaltegger, 2013; Choi and Gray, 2008). A responsible company should follow four major pillars of economic, legal, ethical and philanthropic principles (Carroll, 1991), to create value for its stakeholders (Freeman, 1984) and for society (Porter and Kramer, 2011). By integrating other considerations, aside from profit maximization, such businesses are “doing well by doing good” (Kraus et al., 2022; Waddock and Smith, 2002). Indeed, adopting a CSR strategy favors companies’ competitiveness and legitimacy (Bansal and Roth, 2000; Sharma, 2000). This field provided in the past years a great amount of definitions of CSR policies, to explain precisely what it means for a company to behave responsibly (Kraus et al., 2018). However, such a vertical approach, analyzing how CSR policies can enhance a firm’s performance, fails to appreciate the organizational and institutional context in which the collective action is conducted (Acquier et al., 2017).

Another gap in the CSR literature concerns the type of organizations analyzed. Indeed, CSR has been developed originally mainly for large companies (Snider et al., 2003), as regulators paid attention mostly to these organizations’ practices. For instance, the European Union passed in 2014 CSR guidelines for large listed firms, requiring them to publish their social and environmental performance, in addition to their financial reporting. Some academics investigated CSR for SMEs, and discovered that what applies to large firms is not replicable for smaller ones, as they have different resources, constraints, practices and challenges (Baumann-Pauly et al., 2013; Russo and Perrini, 2010; Jenkins, 2006; Murillo and Lozano, 2006). In addition, knowledge on smaller firms do not encompass the specificities of new innovative ventures, a gap identified in the literature: “there has been no research focused on newly created or startup enterprises” (Retolaza et al., 2009: 325). Few exceptions can be mentioned, such as Tiba et al.’s (2018) paper. Their research does not study startups, but reviews approaches adopted in the CSR and responsible entrepreneurship’s literature. It

considers that the entrepreneurship field has so far a narrowed perspective of responsibility compared to the richness of this literature. Last, Hansen and Schaltegger (2013) advocate that CSR activities are very different from sustainable entrepreneurship. While the former involve “reparations” of firms’ activities, and are therefore rather superficial, sustainable entrepreneurship adopts sustainable principles as an integral part of value creation.

Overall, the CSR literature is useful to understand internal practices initiated with the goal to become a responsible organization, but is often limited to superficial activities, independent from the core activity conducted. Last, it is dependent on regulations and norms, for which startups are more generally exempted.

The Business Models Literature

Another stream in the literature rather insists on the core business developed, suggesting that it can be designed to target sustainability goals. From this perspective, a sustainable startup is defined as a new innovative venture developing an opportunity within a sustainable business model (Baldassare et al. 2017; Evans et al., 2017; Schaltegger et al., 2016; Bocken et al., 2014; Boons and Lüdeke-Freund, 2013). In the context of startups, the concept of business model innovation (Rayna and Striukova, 2016; Chesbrough, 2007), i.e. how new ventures found mechanisms to capture value through innovation, is key. Combining the two approaches, some scholars investigate sustainable business model innovation (Bocken and Geradts, 2020; Geissdoerfer et al., 2018; Yang et al., 2017; Baldassarre et al., 2017; Geissdoerfer et al., 2016), as the conception and implementation of new business models with a proactive stakeholder management and a long-term perspective. In practice, different strategies are implemented, first identified by Bocken et al. (2014), and then updated by Ritala et al. (2018): “(1) maximizing material and energy efficiency; (2) closing resource loops; (3) substitute with renewables and natural processes; (4) deliver functionality rather than ownership; (5) adopt a stewardship role; (6) encourage sufficiency; (7) repurpose for society or the environment; (8) inclusive value creation; and (9) develop sustainable scale up solutions” (Geissdoerfer et al., 2018: 406).

Several barriers for business models innovation are identified in the literature, and challenges are different for incumbents and startups (Toldeschini et al., 2017; Cortimiglia et al., 2016). While in established organizations, a key obstacle is the conflict with the existing business model and logic, or internal inertia (Christensen and Raynor, 2003; Christensen, 1997), for new innovative ventures, the issue more often concerns the difficulty to found the appropriate business model for a new technology (Chesbrough, 2010). Business model innovation is considered as one of the top reasons

why 9 of 10 startups fail (Patel, 2015). Frameworks dedicated to startups have been developed, to explore sustainable business models innovation and to improve them (Baldassarre et al., 2020; Geissdoerfer et al., 2016), and to highlight industries specificities (Franceschelli et al., 2018; Todeschini et al., 2017). This literature rarely addresses the context in which such business models are developed (Ghezzi and Cavallo, 2020; Neumeier and Santos, 2018), and the mechanisms that led a startup to test such a business model, and the challenges it led to (Toldeschini et al., 2017).

The business model literature is useful to understand how a startup can develop an activity which creates value in terms of sustainability goals. However, such a focus on the core business fails to provide information with respect to the organization's internal practices. More importantly, business models are tools used for the design of the value creation mechanisms: the contribution to sustainability goals is rather assumed than assessed.

The Sustainability Impact Assessment Literature

A more recent perspective starts to investigate startups' actual sustainable outcomes, considering such knowledge critical to legitimate hopes and funds placed in such ventures. To do so, it uses the literature of sustainability assessment and impact assessment, two concepts that have been increasingly associated with each other (Waas et al., 2014; Ness et al., 2007). Sustainability assessment refers to "any process that aims to direct decision-making towards sustainability" (Bond et al., 2012). It encompasses impact assessment (Hacking and Guthrie, 2008; Ness et al., 2007), which aims at "identifying the future consequences of a current or proposed action" (IAIA International Association for Impact Assessment, 2020). To emphasize the two dimensions, the concept of sustainability impact assessment emerged to designate "any process aiming to achieve sustainability goals and to make sustainability issues tangible and understandable based on a decision-guiding approach that helps to identify, structure and evaluate the sustainability impact of past current and/or planned actions" (Trautwein, 2021: 3). While an organization's sustainability impact can be defined in different ways (Souza et al., 2015; Maas and Liket, 2011), the Theory of Change (Funnell and Rogers, 2011; McLaughlin and Jordan, 1999) and its Input-Output-Outcome-Impact approach is often used. It emphasizes that an activity (input) creates countable results (output), which have effects on stakeholders (outcome), thus leading to macro- and medium-level effects and long-term change (impact). This perspective supports a contextual and multi-level perspective, analyzing ventures' activities, business model's performance, stakeholders' value, and the macro-context's impact (Fichter et al., 2023).

Here again, the traditional sustainability impact assessment literature overlooked the case of startups (Fichter et al., 2023; Di Viao et al., 2022; Anand et al., 2021, Hornes, 2019), when compared to large firms (Omri, 2018; Schaltegger et al., 2017). Sustainable development for organizations is a complex matter that makes measurement particularly challenging (Costanza et al., 2016; Nilsson et al., 2016), but the task is particularly challenging for startups (Trautwein, 2021). The task is complex for resources-limited organizations, which do not even possess enough data to complete such assessment (Dichter et al., 2016). Moreover, innovative startups are characterized by uncertainty about future developments (Alvarez and Barney, 2005). Assessing a firms' sustainability impact without sufficient track records or a clear vision about the future appears as an "almost unsolvable challenge" (Hornes, 2019: 20). The lack of knowledge on what should be done by startups to assess their sustainability performance explains, among other factors, why there are so few of them implementing such practices. As a result, the credibility of sustainable startups is questioned: "the inability to adequately discriminate between good and bad performers, and between positive and negative wider sustainability impacts, opens the door for symbolism and organized hypocrisy" (Anand et al., 2021: 15). Here, authors refer to organizational "façades" (Nystrom and Starbuck, 1984), i.e. "accounting and rhetorical symbols desired by critical stakeholders" (Abrahamson and Baumard, 2008: 447). Therefore, it opposes genuine activities to ones with a recognition objective, such as implementing standards and certifications (Aguinis and Glavas, 2012).

The sustainability impact assessment perspective has the advantage of taking into account both internal practices and the substantive outcome of the activity conducted. Sustainability management can be considered according to the level of priority given by the organization (Almeida and Terra, 2019): (1) low priority, when the environmental and social requirements are seen as tasks; (2) medium priority, if sustainability issues are treated as complementary to normal business, of sustainability; (3) high priority, if sustainability is considered as integrated within the core business. However, with the sustainability impact assessment, a higher level of prioritization emerges. Figure 1 presents the three levels of sustainability management for startups that emerged from the literature review conducted.



Figure 1. Different levels of prioritization of sustainability management for startups

2. Implications for the thesis

From the related concepts mentioned above, two considerations will be retained in this research: the need for a process approach, and the importance of symbols.

The corporate social responsibility, the sustainable business models innovation, and the sustainability impact assessment literatures are useful lenses to grasp the mechanisms through which startups can implement responsible practices, create sustainable value, and measure their contribution to sustainability goals. These fields are only starting to explore the case of startups. They emphasize in particular challenges that arose from the uncertainty they deal with (Andries et al., 2013; Anderson and Tushman, 1990), which makes their outcome hardly predictable (Alvarez and Barney, 2007). High potential, technology-based new ventures face “unusual time pressures and uncertainty” (Roure and Keeley, 1990: 201), making their practices diverge from other types of organizations. To better understand them, the effectuation theory appears relevant, as it takes into account startups’ changing and uncertain environments (Sarasvathy, 2001). It stands that entrepreneurs proceed with available resources to map possible business opportunities, and will test some of them, to finally adopt one according to circumstances and feedback. Such an approach retraces an experimentation process. Little is currently known about what this process actually looks like and how it evolves through time (Andries et al. 2013). The literature is even more silent with respect to the experimentation process through which startups take sustainability into account, whereas effectuation might provide a relevant approach to understand this complex phenomenon. Therefore, considering the great

uncertainty startups deal with, this research focuses less on value creation mechanisms, on reparatory practices, or on their actual sustainability performance, than on the exploration of the process through which sustainability is managed.

In addition to this structural uncertainty, another emerges with sustainability. The lack of knowledge about the outcome of future events is one core characteristic of startups, but for other topics, such as financial outcomes, common practices and standards are shared among startups and their stakeholders. In the case of sustainability, no common framework emerged (Hornes, 2019). Whereas the literature denounced firms taking symbolic actions to satisfy their stakeholders, in the case of startups, such practices with recognition objectives are not well established at that point. Startups thus have little insights on what is expected from them, as stakeholders have different understandings of sustainability requirements for startups. It creates a situation of collective sensemaking, a concept inherited from the organizational symbolism literature (Weick, 1969), which designates “the process whereby groups interactively create social reality, which becomes the organizational reality” (Boyce, 1995: 109). In the entrepreneurial ecosystem context, actors share common meanings, but as sustainability appeared, it created a blind spot. This situation leads to a collective experimentation process through which symbols related to sustainability are created in a specific context, and interpreted through interactions.

Section 3. Research Gaps

1. Conclusions From the Literature Review

The literature review presented the concept of sustainable entrepreneurship, which emerged from the entrepreneurship field to designate a type of entrepreneurship aiming for the triple bottom line. The phenomenon is still considered under understood, and in particular, little is known about the specific case of startups. This gap is surprising as startups are said to have the potential to challenge an unsustainable status quo. Nonetheless, they already deal with a lot of constraints and a great level of uncertainty, which questions their potential to contribute to sustainability goals. The goal of this thesis is therefore to explore how startups tackle sustainability, by paying attention to their actual practices.

Several theoretical considerations are taken into account for this research. First, entrepreneurship is considered as a collective action taking place in a specific context. The phenomenon is understood as activity initiated by individuals, which takes place in an organizational context, and has an influence on industries and more broadly on society. Second, sustainability is acknowledged as a complex

issue for startups, for which no standards or shared norms are established to that point. Therefore, the thesis highlights the process, influenced by interactions, through which startups tackle sustainability. A specific literature review is provided in each research article, but the following sub-section presents an overview of the three research gaps addressed.

2. Sub-Research Questions

A startup can be considered sustainable if it aims for the triple bottom line of environmental, social and economic objectives. However, little is known about their actual practices, a gap addressed through the first paper. Sustainability impact assessment for new ventures only recently retained the attention of researchers (Fichter et al., 2023), which so far explained why the topic at stake is complex (Di Vaio, 2022; Trautwein, 2021), or attempted to provide a suitable framework for startups to measure their contribution to sustainability goals (Hornes, 2019). However, a dearth of knowledge remains with respect to the different shapes sustainability impact assessment can take for startups, at different levels of maturity, from idea generation, prototype, validation, production, to commercialization (Terán-Yépez, 2020; Blez and Binder, 2017; Pacheco et al., 2010; Dean and McMullen, 2007). The first paper therefore investigates the following research question: how do sustainable startups integrate sustainability impact assessment into their entrepreneurial process?

The first paper demonstrates that some startups actually do more than what is expected from them, or even more than what their stakeholders are aware of. This raises the question of their ability to influence their entrepreneurial ecosystem, and the embeddedness of their actions. Past research emphasized that sustainable entrepreneurs have to conduct institutional entrepreneurship, i.e. “efforts to change institutions such as market regulations despite pressures towards stasis” (Schaltegger and Wagner, 2011: 223), as they evolve in an unfavorable environment (Pinkse and Groot, 2015; Schaltegger and Wagner, 2011; Pacheco et al., 2010; Beveridge and Guy, 2005; Aldrich and Fiol, 1994). However, the entrepreneurial ecosystem (Bischoff, 2021; Bischoff and Volkmann, 2018; Spiegel, 2015; Cohen, 2006; Dubini, 1989) is not a static but a dynamic object evolving through time. Therefore, the second paper investigates the following research question: How does the evolution of the entrepreneurial ecosystem affect institutional entrepreneurship?

While the second research papers explore entrepreneurship's ability to influence institutions, the third one analyzes how, conversely, public institutions can influence startups' practices in terms of sustainability. Traditionally, public actors mostly paid attention to large firms' practices (Kolk, 2008; Kanya, 2016; Streurer et al., 2012), considering the complexity of the topic for startups (Di Vaio, 2022; Trautwein, 2021). While different tools can be used to encourage, support and guide

innovation (Edler et al., 2016) toward sustainability, little is known about how public policies can influence all startups (Gay et al. 2019), and not just the ones already directly targeting sustainability issues (Bergmann and Utikal, 2021; Adler, 2011). The third paper addresses that gap through the following research question: What are the implementation challenges of an innovation policy targeting responsible innovation for technological startups?

Chapter 3. Methodological Approach and Research Design

From the literature review, sustainability for startups appeared as a complex phenomenon. The research is still in its infancy, a gap that needs to be addressed to guide entrepreneurs, their stakeholders, and policymakers. An exploratory research approach is suited to reveal the mechanisms at stake. This research takes place at Agoranov, a Parisian incubator presented in the first section. The research motivations are then introduced, and reflect the epistemological assumptions adopted. The third section justifies the comprehensive research approach adopted, seeking proximity with informants. Finally, the fourth section presents the data collection and analysis conducted through the research, and justifies its rigor and quality.

Section 1. Empirical Setting

This section presents more in-depth the empirical setting of the research, which takes place at the Parisian incubator Agoranov. After emphasizing its origin and key figures, its structure and specificities are introduced, using a business model framework (Rayna and Striukova, 2016).

Genesis of Agoranov

The 12th of July 1999 law on innovation and research (n°99-587) was initiated by the Ministry of Research and Technology, Claude Allègre. Through different tools, it favored technological transfer from the research centers to the economy. In particular, the French Research Code modification allowed the public researchers to build their own company, to obtain stocks, and to sit on the administrative board. To support the creation of startups, the public research created supporting infrastructure, hence the apparition of twenty “Allègre incubators” in different regions of France. 200 billion of public funds were allocated, half at the benefice of incubators, and the other half for seed capital funds for innovative projects, which were, at the time, hard to find for early-stage entrepreneurs.

The Ministry of Research launched a call for interest targeting higher education institutions and research organizations proposals. In 2018, the French Ministry of Higher Education, Research and

Innovation counted 21 incubators connected to public research, mostly generalists (three exceptions: two in Health and one in Information Technology and Communication), which hosted +4.500 innovative projects, creating +3.100 companies. Their particularity is to be connected to public research, but it does not appear as an exclusion criterion for projects: 41% of them come from public research, and 39% are connected to a public laboratory (French Ministry of Higher Education, Research and Innovation, 2018).

The proposal submitted by the École Normale Supérieure, ParisTech, l'Université Paris Dauphine and Sorbonne University, joined by Inria, was accepted. Their incubator project, Agoranov - a combination of Agora and innovation, was created in 2000. This non-profit organization is now supported by the Ministry of Higher Education, Research and Innovation, the Île-de-France Region, the city of Paris and the European Social Fund. In 2022, Agoranov counted +520 incubated projects, resulting in +485 companies launched, which created +14.500 direct jobs and raised +4.7 billion euros from private funds. Its website displays one Nasdaq and six Euronext, and its walls support, near the coffee machines, six cardboard unicorn trophies (Criteo, Doctolib, Dataiku, Alan, Shift Technology). In 2020, Agoranov was ranked by Dealroom as the number one French player in the field of seed financing and number six in Europe (Dealroom, 2020).

Presentation of the Incubator Using the 360°Business Model Framework (Rayna and Striukova, 2016)

The 360° Business Model framework (Rayna and Striukova, 2016) is useful to grasp the specificities of an organization as it provides a comprehensive framework with an integrated and value-based view of all of the critical components of its business model (see Figure 2). It will be used to present Agoranov, thus highlighting all its specificities.

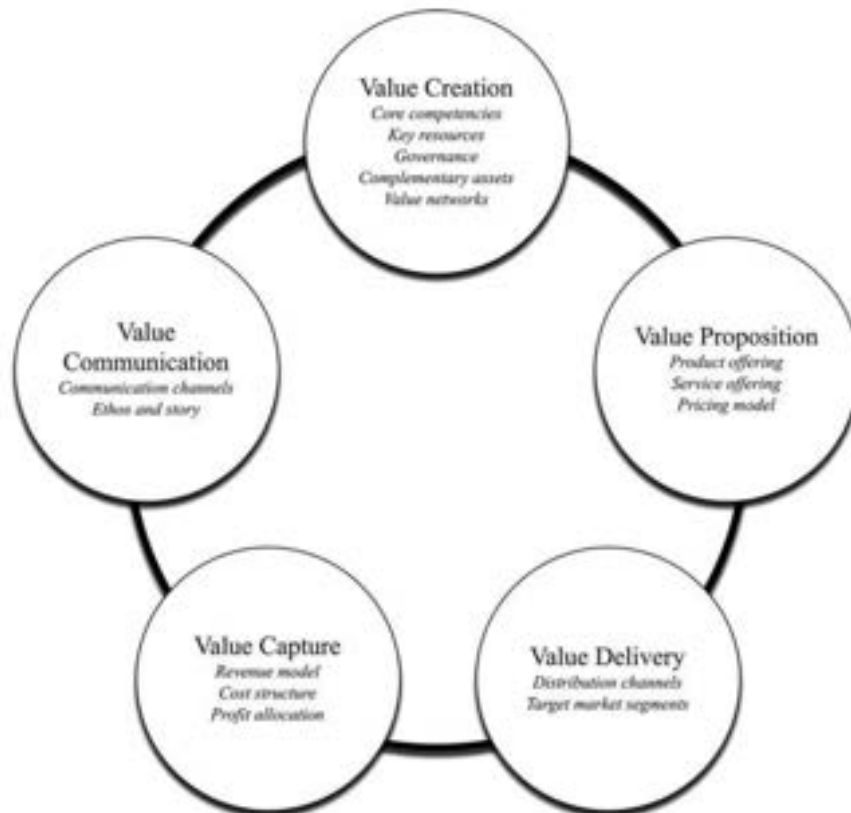


Figure 2. 360° Business Model Framework, from Rayna and Striukova (2016).

The first component is “value creation”, and describes the mechanism by which goods and services are associated to a certain value, and relies on different components. It concerns the core competencies, the key resources, the governance, the complementary assets, and the value networks. The core competencies come for its staff (see staffing structure in Figure 3) and relies on the incubator experience on technological transfer, startup development and a solid understanding of the entrepreneurial ecosystem. In addition, key resources include the facilities available for entrepreneurs. Core competencies and key resources are managed by the Director and the Deputy Director, who defend their strategic choices to the administration board, composed of representatives of the founding institutions. Among its complementary assets, the incubator relies in particular on its reputation, defended mostly by alumni startups. It has forged partnerships with different institutions, European (EIT Climate-KIC, EIT Digital...) and thematic (Vision Institute, 140Factory, ESPCI Paris...). In particular, two initiatives strengthen its complementary assets. First, Entrepreneurs in Residence complete the incubator staff, with both Senior Entrepreneurs in Residence - entrepreneurs with their own successful startups who coach some startups on demand for specific topics and present the incubator at different events; and Junior Entrepreneurs in Residence - graduated with a strong entrepreneurial mindset who are at the incubator for a short period (6 to 12 months) and do operational missions for some startups. Second, the Startups at Schools program (Startups à

l'Ecole)¹, initiated in 2015 by Agoranov, brings together school audiences and startups through educational projects, considering startups as an inspiring pedagogical tool to diffuse sciences and entrepreneurship. The incubator value network consists of a few suppliers upstream and the entrepreneurs incubated downstream.



Figure 3. Agoranov staffing structure

The second component of the 360° Business Model Innovation is the “value proposition”, and emphasizes how the value created is offered to the market. It concerns the product offering and service offering. Agoranov’s value proposition is often decomposed into three pillars. (1) A personalized and customized support from the referred Startup Manager. There are three Startup Managers, each expert on a specific industry: Health, Industry and Greentech, and Digital. Their role can be functionalist, oriented to a problem to fix; reflective and critical, helping the entrepreneur to make decisions; and empathic, guiding individuals to become entrepreneurs (Verzat and Gaujard, 2009). (2) 2.300 square meters of facilities located in the center of Paris. (3) Access to an Acceleration Program offering different forms of networking events and training to improve their knowledge, to share feedback and difficulties, and to connect entrepreneurs together and with their ecosystem.

The third component is “value delivery”, and stands for the mechanism through which the customers receive the value created. It describes the distribution channels and the target market segments. About 350 applications are received per year on its website. While no formal research has been conducted to analyze the distribution channels, it is safe to say that most of the accepted projects

¹ <https://lesstartupsalecole.com/>

have a prestigious background and heard about Agoranov from the entrepreneurial ecosystem, for example from Alumni or investors. A pair composed of a Startup Manager and a Young Entrepreneur in Residence reviews applications (overview of the application process in Figure 4). Candidates who do not meet the incubator standards receive a phone call to explain the incubator's choice to reject the project, and to guide entrepreneurs to more suited structures. The incubator does not have a formal set of criteria for selection. Startup Managers make their choice based on basic criteria to evaluate a project - such as quality of the team, potential market, quality of the technology, etc.; and on the incubator's specificities, e.g. is it the right timing for an incubation? Will these entrepreneurs benefit from and to the community? If Startup Managers support a project, they will pursue the process and prepare the entrepreneurs for the experts committee. Once accepted for incubation, entrepreneurs traditionally perceive the value proposition directly onsite. During the pandemic, value was delivered online, and since the end of the first lockdown, the value is delivered mostly in person, but can also occasionally be done online.

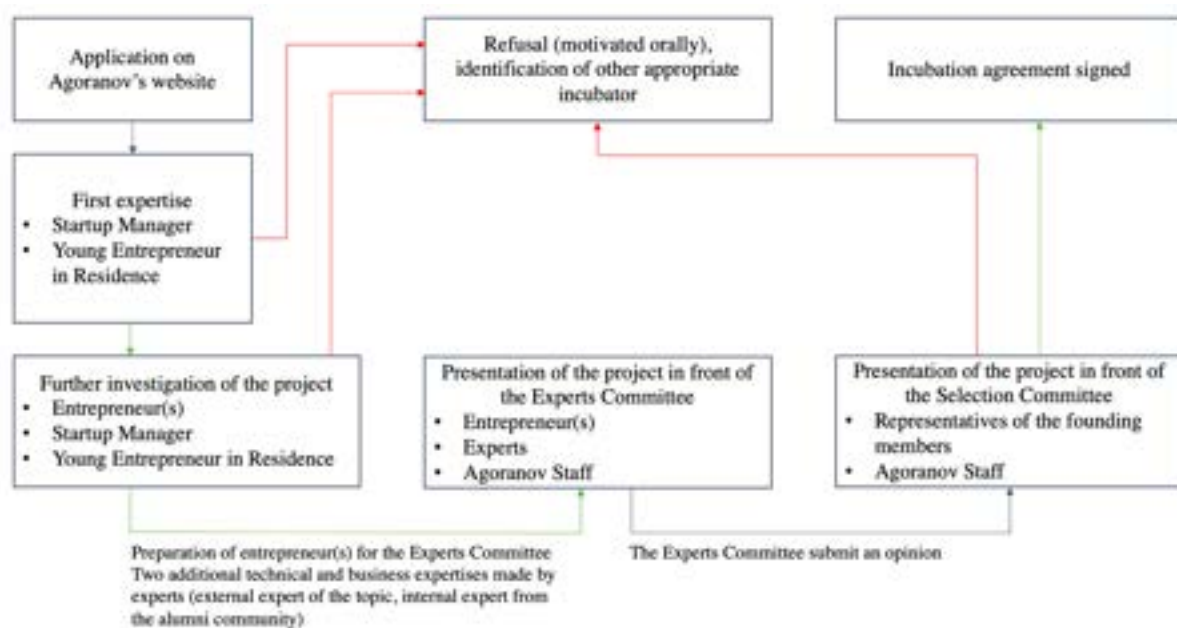


Figure 4. Agoranov's application process

The fourth component is “value capture”, and describes the organization's ability to benefit from the value created. It concerns the revenue model, the cost structure, and profit allocation. The incubator does not take equity from the startups it supports. When accepted for incubation, projects get access to a public grant and the incubator takes a part of this grant at the end of the incubation period. If the project fails, it does not have to pay the incubation fee. The incubator also benefits from local, national and European public support. Its cost structures are mostly affected by the staff wages and substantial operational cost.

The last component is the “value communication” emphasizes how the incubator communicates with entrepreneurs and partners about their offer and value. It concerns the communication channels and the ethos and story constructed. At the beginning of the field immersion, Agoranov’s values could not be found on external or internal documents, thus reflecting its oral culture. The incubator defends principles of privacy, confidentiality and trust. For example, no “replays” of webinars from the Acceleration Program, nor extensive notes, are shared with entrepreneurs who could not attend a session, in order to guarantee freedom of speech (“What is said at Agoranov stays at Agoranov”, is an expression often used). Consistently, the incubator is not open to the public and not easily accessible for interested parties, aside from education. Indeed, it does not organize events for corporations, nor hosts “Demo Days” for private investors. It rather arranges one-to-one meetings when entrepreneurs are considered ready to meet potential clients or investors. Likewise, speakers from the Acceleration Program have to be recommended by the community. The incubator tries to make choices according to entrepreneurs needs and to act as a trusted third party, which is considered favored by the fact that it does not take equity. It communicates according to entrepreneurs’ will. For example, it asks for consent before adding a startup on its website, anticipating that some projects prefer to remain out of radars. Aside from a few exceptions, Agoranov rarely communicates about itself and rather focuses on its startups. Its communication is not oriented toward a great audience but rather specialized actors, using its website and social media.

When compared with other incubators, Agoranov’s specificity lies in particular in its early implementation, its focus on technological innovation, and on the fact that it does not take shares from the project it works with.

Section 2. Motivation for Research and Assumptions

This section introduces the initial motivation for research, which aimed to make sense of the practical world. Therefore, the epistemological framework adopted is related to constructivism.

Motivation for Research

The objective of this subsection is to introduce the motivation for this research, as it contributes to explaining the epistemological frame adopted, presented in the next sub-section. This thesis follows an “opportunistic methodology”, a methodological approach offered by Jacques Girin (2011). It presupposes an easy access to informants and a personal interest. Girin retraces the management research path, which begins with a negotiation to access the field. He argues that researchers should describe the negotiation which allowed them to investigate the phenomenon. This research is not the

continuity of a Master thesis, nor did it emerge from a specific demand from the organization in which it takes place. Rather, it is the result of tripartite discussions with Professor Thierry Rayna, the Director of this thesis, Professor Jean-Michel Dalle, Agoranov's Director, and myself. They started in September 2019, when I just joined the incubator staff and defended my Master thesis defense, for which Professor Jean-Michel Dalle was my Director, and Professor Thierry Rayna my examiner.

“Il n'y a pas de lendemains qui chantent. Il n'y a que des aujourd'hui qui bruissent”²

Alain Damasio, Les Furtifs (2019)

In that period, we identified many weak signals suggesting the emergence of sustainability as a key topic for startups. Could it be a paradigm shift, or was it just another “bullshit” phenomenon (Frankfurt, 2005; Kirchher, 2022) in the entrepreneurial ecosystem, as many others did before? Frankfurt (2005) used this provocative word to analyze speeches intended to persuade without regard for truth. A few decades ago, Philippe Mustar observed that the trend in the entrepreneurial ecosystem was on technological solutions. He suggested that, in this context, entrepreneurial ventures should brand themselves insisting on the technology aspect to be more successful - a phenomena he labeled “*habillo-technologie*”³. With respect to sustainability, and considering the experience of the incubator with trends in the entrepreneurial ecosystem, the same questions emerged. Would it require a profound change in the way entrepreneurship is done, or would it just invite startups to emphasize more an aspect of something they were already doing?

The concept of weak signals was primarily offered by Ansoff (1975) to characterize the first symptoms announcing new possibilities and strategic discontinuities. They are “valuable tools when anticipating the future changes” (Hiltunen, 2008). The firm's response reflects its state of knowledge, and can make the firm's relationship with its environment evolve, and/or influence its internal structure (Holopainen and Toivenen, 2012). Ansoff (1975) emphasizes there are three progressively stronger strategies: (1) improving the firm's knowledge, (2) enhancing the firm's flexibility, and (3) addressing the threat or opportunity. The incubator followed that path, and the goal with this research was to initiate the first step. The weak signals initially observed took different forms, and were mostly isolated incidents or a series of connected occurrences. While appearing insignificant or limited in the moment, they can hold significant or even pivotal significance in shaping future developments. The incubator's knowledge on sustainability was weak, and soon it appeared relevant for the organization to improve its awareness and understanding of this topic.

² “There are no tomorrows that sing. There are only todays that rustle”

³ A pun, *habiller* means dress up in French.

Agoranov was not the only actor in the entrepreneurial ecosystem to seek a better understanding on sustainability for startups. The temporality and the motivation varied among similar organizations, but the choice of a scientific research is quite original, as most others preferred to consult external companies to adapt their offer. The choice of a scientific research was mostly influenced by three main factors: (1) my personal desire to conduct a PhD; (2) the fact that the Director of the incubator is a Professor, thus experienced in academic research and aware of its possible outcome; (3) the opportunity to conduct it with an identified thesis Director, enthusiastic about the topic.

We worked to define the subject, and the application for the thesis CIFRE was accepted by the ANRT in October 2020. Surprisingly, the pandemic crisis appeared as an opportunity to test the interest for research and the collaboration, as such an unprecedented event motivated the three of us to conduct research. We notably prepared a survey during the lockdown, answered by 110 startups founders, to learn more about how they adapt to the crisis. While the pandemic crisis raised difficult and critical management challenges, the study (see [Appendix A](#)) also revealed that sustainability should, according to entrepreneurs, gain more importance in the entrepreneurial ecosystem in the future (according to 87% of respondents). Such an assumption surprised us, as the incubator focuses more on technology and innovation than sustainability.

This research thus starts with observations of weak signals, and a surprise from a study conducted during the pandemic. The initial subject submitted to the ANRT was “how do startups integrate environmental, social and economic goals?”. The implicit goal was to step back to understand what was going on, to make sense of the practical world, seize actors’ perceptions, and grasp the mechanisms at stake behind the introduction of the concept of sustainability, which remained fuzzy in the entrepreneurial ecosystem.

Research Philosophy

The initial motivation presented above contributes to explaining philosophical assumptions adopted in this research. In social sciences, positivism and constructivism are the two epistemological frames usually opposed (see Table 3). Epistemology studies how we know, it aims at providing a critical review of established premises, and reflects a certain view of knowledge and reality (Stake, 1995). It is influenced by an ontological postulate, which concerns the nature of reality and stands for what can be known. Positivism is a philosophical view developed by Auguste Comte (Gavard-Perret et al., 2012). It supports the idea of an objective, tangible and unique reality, defined by scientific proposals that can be either tautological or empirically verified. Rooted in empiricism, positivism asserts that reality exists independently of human perception and can be objectively studied through observable

phenomena and quantifiable data. This position emphasizes the pursuit of objective truths and universal laws, often favoring deductive reasoning and hypothesis testing (Saunders et al., 2009).

Here, a constructivist position is adopted, which is rather common in management and in entrepreneurship research (Avenier, 2011; Bouchikhi, 1993). This approach is consistent with the initial motivation to better understand the phenomenon at stake. From this perspective, reality is considered subjective and plural, constructed and “artificial”: there are no generic social laws determining the world that the researcher should reveal (Bhasker, 1975). Knowledge is produced through proximity with informants, and reflects the construction of different realities. Jean Piaget (1983) and Anthony Giddens (1984) both greatly contributed to its conceptualization, to go beyond the traditional action/structure duality in social sciences. In particular, Giddens (1984) defended the idea that “action and structures are complementary dimensions of the structure of social systems” (Bouchikhi, 1993: 557). He emphasizes the circular duality produced through processes of interaction, which are the result of a search for balance between individuals and their environment. Structures emerged from agents’ intentional and unintentional strategies. They are located in a specific context that the researcher should investigate, while acknowledging its specificities. Therefore, social sciences’ contributions lie in their ability to understand social phenomena, rather than to produce general theories.

Table 3. Positivism and constructivism through philosophical questions
 Inspired by Figueiredo and Cunha (2007: 12)

	Positivism	Constructivism
Ontology <i>What can be known?</i>	Realist hypothesis Reality is objective, tangible and unique, driven by immutable law	Phenomenological hypothesis Reality is subjective and plural, constructed through interactions
Epistemology <i>What is knowledge?</i>	Deterministic hypothesis Knowledge is what is obtained through deductive reasoning and hypothesis testing	Teleological hypothesis Knowledge is what is produced through interactions with people and contexts

Symbolic interactionism is a theoretical perspective in line with constructivism. It stands that perceptions, actions and interactions of actors have “immense potential to augment scholarly [the] understanding of organizations” (Prasad, 1993: 1401). Herbert Blumer first conceptualized it in *Symbolic Interactionism: Perspective and Method* (1969) and emphasized three main propositions

(see Figure 5). From that perspective, people construct the character or meaning of objects in their environment. An object - anything that individuals indicate to themselves - cannot be dissociated from individuals, as it only exists through their interpretation. Individuals' actions are constructed through a step-by-step process of self-indication. Humans consider different elements to take into account for the prospective action, such as what they want, how the action can be conducted, etc. They take decisions on the basis of the judgment they made of the object. The interpretation lies in the action made on the basis of symbols. Self-indication is a moving communicative process. The meaning ascribed to an object is likely to change over time as actors' interactions change. Overall, symbolic interactionism emphasizes the creation of social meaning through continuous interactions. This approach guides this research.

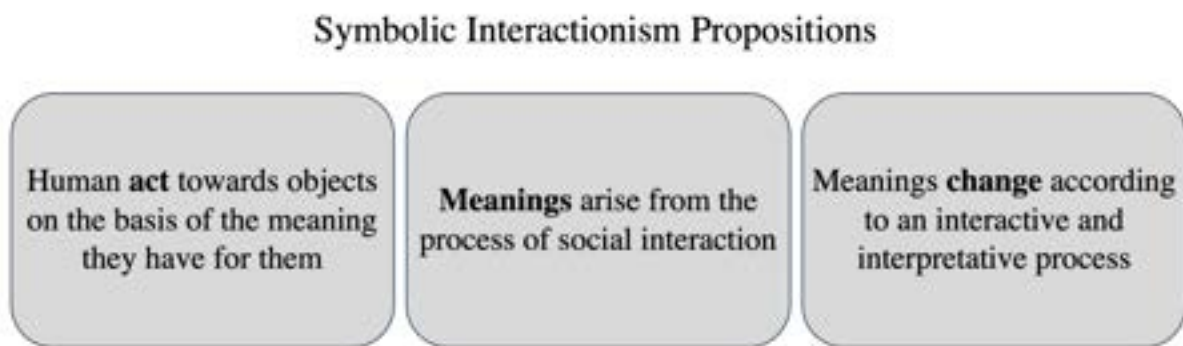


Figure 5. Symbolic interactionism propositions.
Inspired by Blumer (1969)

Consistently with Jacques Girin's opportunist methodology (1989), the choice of symbolic interactionism as an orienting theory was not pre-established, but rather emerged from our investigation. Girin highlights the Latin origin of opportunism which comes from *portus*, i.e. the port. He asserts that opportunism designates a way to reach port, not always following the initial path, not always for the duration estimated, and even, maybe not to reach the port that was first aimed for. Researchers, like sailors, should seize opportunities, accept unexpected trajectories and adapt to them. Jacques Girin asserts that after entering the field, researchers need to stay a certain time there, and explore the environment they joined.

Section 3. Methodological Approach

This section emphasizes the methodological approach adopted. It provides justification for the unit of analysis retained, i.e. sustainability for startups. I then explain the methodological principles of the comprehensive research initiated. This research follows a two-step process advocated by Blumer (1969). The evolution of my operational missions favored this research path. Finally, the work conducted can be considered as an action-research process.

The Unit of Analysis

Considering the amount of observations made on the field, interesting phenomena calling for investigation were not lacking. To avoid scattering, the goal was to stick to one unit of analysis. This step is critical for qualitative research, or comprehensive research, which analyzes action in context (Dumez, 2011). Here, the initial inquiry was how do startups integrate environmental, social and economic goals in their development. In management research, the unit of analysis can be one or several organizations. This investigation takes place at a single incubator, and uses several startups as cases in research articles. The incubator, or the cases retained, could have been units of analysis. However, the one retained is rather located in a “remarkable event” (Yin, 2012: 7). After interviewing several entrepreneurs, it appeared that the concept of sustainability emerged as a problematic for their organization, but remained fuzzy for them. The interest of the research problematic appeared to be less on the specificities of organizations investigated, but rather on the blind spot that is sustainability for startups. Such a unit of analysis favors the exploration of a transition as it is happening, i.e. “in the making” (Farla et al., 2012). The richness of the situation indeed lies in the fact that the unit of analysis is ambiguous (Dumez, 2011).

The unit of analysis chosen, i.e. sustainability for startups, is anchored in the sustainable entrepreneurship theoretical field, investigated through a comprehensive research methodology, in a specific empirical design. Dumez (2011) argues that once the unit of analysis is established, different contexts can be explored. Researchers can either choose to reduce or to extend the variety of contexts. Here, the number of contexts is reduced because the focus is on startups’ perspective, and because startups observed share important similarities.

First, the focus on startups’ perspective provides a certain view of the issue at stake. The methodological postulate is that while many actors are concerned by the phenomenon, e.g. investors, incubators, talents, etc., investigating startups’ perspective should reflect inherent challenges for organizations. Patton (2002) asserts that the choice of the unit of analysis reflects what researchers want to be able to say at the end of their study. Here, the goal was to provide better knowledge on

startups' position on the issue, i.e. how startups can tackle sustainability, considering their constraints, and through a specific context.

Second, startups observed are members of the same incubator, and based in the same region. They are deeptech startups, exploring opportunities from emerging technologies (Rotolo et al., 2015), such as artificial intelligence, big data, robotics, nanotechnology etc. (Dionisio et al., 2023). They are “a specific types of entrepreneurial ventures that are based on disruptive technologies that are capital-intensive, research-intensive and require lengthy development process” (Kask and Linton, 2023: 1). Sustainability for other types of startups might be different because they are less affected by these constraints. Startups observed evolve in different industries. However, the postulate is that early stage new ventures with radical innovations share similarities as they follow a similar evolution path.

Overall, this choice of unit of analysis with this empirical setting influences the knowledge produced, which therefore concerns sustainability for startups, from (deeptech) startups' point of view. Investigating such startups, for which uncertainty is critical, offers a certain view of the issue. It fails to reach generalization, to the extent that the results would have been different if the study had focused on a different population. However, analyzing a population for which initial pressures and uncertainty are even more critical as a “revelatory potential” (Gioia et al., 2012) to understand the broader phenomenon.

Methodological Principles for Comprehensive Research

A comprehensive research (Dumez, 2016), more often called qualitative research, matches with the research philosophy, the initial orienting question (Dumez and Toussaint, 2022) and the phenomenon at stake. Such research focuses on mechanisms, relations and processes that occur among actors, to understand their actions. Through the analysis of discourses, intentions and interactions, it has the power to provide comprehension of a complex and underexplored phenomenon (Yin, 2018), which is the case of the object of research, as argued in the [Literature Review](#). The methodological approach adopted is influenced by Hervé Dumez's perception of comprehensive research (2016), Jacques Girin's opportunism methodology (2011), and Herbert Blumers' symbolic interactionism methodology (1969). These approaches advocate for a discovery process, developing a specific kind of knowledge through proximity with informants.

Comprehensive researchers should not try to use the field to confirm or invalidate a theory. The knowledge produced rather reflects “what can be” (Aliseda, 2006). It is constructed through the

interaction of empirical materials and theory, and needs to be presented as hypothetical. The abductive methodology, inherited from Pierce, invites qualitative researchers to consider surprises, to imagine their explanation (Dumez, 2013). Doing so, it should avoid the risk of circularity (Dumez, 2013), i.e. to focus only on the facts that validate one's theory.

At first, theory should not be restrictive. Researchers should “get in there and get [their] hands dirty” (Gioia et al., 2012: 19). Such “engaging research” (ibid) favors the generation of new hypotheses (Yin, 2018), and the exploration of questions rooted in the practical world. Blumer (1969) considers that scientific protocols that did not emerge from the empirical world should be rejected. In line with this approach, no strict protocol was determined at the beginning of this research, to favor the discovery process. It emphasizes interactions, which should be observed focusing on “what they experience and do, individually and collectively, as they engage in their respective forms of living” (Blumer 1969/1998: 35). Qualitative research follows a “proximity methodology” (Paillé, 2007: 409), which valorizes spontaneity and instinct to apprehend, question and understand the world.

Blumer (1969/1989) argues that the methodological approach consists in two phases. First, during “exploration”, researchers should not impose prepared conceptual frameworks to analyze its topic, and rather accept a flexible methodology. Then, the “inspection” phase consists in the identification of the appropriate frames to issues met on the field.

From Exploration to Inspection

This research followed the two-step process suggested by Blumer (1969). My operational missions within the incubator evolved accordingly. An overview is provided in Figure 6.



Figure 6. Overview of the research process and operational missions

Exploration Phase (October 2020 - December 2021)

During the exploration phase, I maintained my initial missions and received support with the recruitment of an apprentice. I was in the “Startups Team”, composed of the three Startups Managers and the Entrepreneurs in Residence. My job description, as Head of Communities, deeply favored interactions with informants (Blumer, 1969, 1989).

First, I was in charge of the “Acceleration Program”, one of the three pillars of the incubator offer, which is composed of different kinds of events for entrepreneurs, with an average of two events per week. The “Workshop” sessions are held by an external expert to address a specific topic for which entrepreneurs need knowledge and/or network. The incubator also invites representatives of grants dedicated to startups to guide entrepreneurs on the procedures and to answer their questions. Topics can be defined according to entrepreneurs’ demand, in which case we will find the right person to address this topic - for example, a layer recommended by an Alumni will present key aspects of the management package. For topics that might require personalized support, because answers to their questions vary greatly according to startups, “Office Hours” were organized, and the expert dedicated half a day to meet individually with four startups. Sometimes, rather than having an expert opinion, the entrepreneurs’ problem needs to be debated. In such cases - for example, how to improve collaboration between business and tech teams - we organized “Sharetime” sessions, for which we invited two alumni who experienced the issue and adopted different solutions. Last,

“Network” events were organized to strengthen the community of entrepreneurs. It included in particular monthly sessions, to welcome new members and to gather entrepreneurs from a specific industry, and two large main annual events.

Second, I was in charge of the communication of the incubator and its relations with the entrepreneurial ecosystem. In terms of communication, it mostly included daily media monitoring and support for startups with their communication, notably through the incubator’s social media and relations with journalists. I structured the use of each social media, and in particular developed the Agoranov Slack to foster relationships between incubated entrepreneurs and alumni. Relations with the entrepreneurial ecosystem were developed through support for partners, such as 104Factory or French Tech Tremplin; main external events, such as VivaTech or Big by Bpifrance; and events hosted by the incubator, mostly for students and academic audiences. Venture Capitalists (VCs) relations are also redirected to the appropriate Startup Manager, while relations with public institutions are mostly handled by the Deputy Director. One of the objectives of my position was also to fluidize the internal processes and mostly to decompartmentalize the knowledge and network of each Startup Manager. For example, a list of recommended providers for startups was established and internally shared, and some “Perks”, i.e. negotiated discounts, were installed. Each year, a report had to be prepared for the incubator investors to present all the actions conducted.

According to Blumer (1969/1989), the goal of the exploration phase is to have a better understanding of how the problem should be approached, to identify the appropriate data needed to investigate it, and to contribute to the academic knowledge with empirical-based issues (Dumez and Toussaint, 2022). Overall, my very central position led me to interact and work hand in hand with each member of the incubator staff; most members of the community of entrepreneurs - both incubated and alumni; and different actors implicated in startups’ development.

Inspection phase (January 2022 - March 2023)

The second “inspection” phase consists in the search for theoretical frames that fit the issues met on the field. The approach seeks “close shifting scrutiny [and is] flexible, imaginative, creative and free to take new directions” (Blumer, 1989: 43-44). During that period, I identified theoretical frameworks and developed research papers. My operational missions shifted to dedicate more time to research.

My job title evolved to become “R&D - Sustainability”, and I moved from the “Startups Team” to the “R&D Team”. As ideas emerged from the field, much time was needed to be dedicated to analysis and writing. I progressively reduced my operational missions. Consistently with Ansoff’s

(1975, 1980) three-step process for organizations to adapt to weak signals, the first step of improving the firm's knowledge was obtained with the exploration phase, while the two following steps - enhancing the firm's flexibility and addressing the threat or opportunity - were implemented with this transition.

First, while I obtained knowledge on sustainability practices for startups, I mostly reported to the organization's direction during the exploration phase. During the inspection period, the objective was to spread the knowledge within the incubator staff. Inspired by recommendations from an academic peer (Valentine Georget), I diffused the knowledge obtained using two main tools. First, I organized "Impact Lunch" every two months with all the incubator staff, presenting topics related to the issue of sustainability for startups. Some of them were very practical, and others closer to academic presentations. Second, I sent "Impact News" to them every two months to have a watch of trends with respect to sustainability, within the entrepreneurial ecosystem and beyond.

Second, the objective was that the community of entrepreneurs benefited from the knowledge obtained by the organization. First, I implemented "Impact Focus sessions every quarter for entrepreneurs, using similar approaches than for the Acceleration Program. For some topics that required more support, I developed regular workshops with entrepreneurs motivated to improve their competencies on a specific issue. Second, I guided entrepreneurs and Startups Managers to answer new social and environmental requirements that arose in public grants. In particular, I created a framework for Startups Managers, so that they could provide a first answer to these criteria, that I will then validate. Last, if entrepreneurs notified their interest in sustainability to their Startup Managers, I had one-to-one meetings with them to explain what the topic consists of, and we identified what could be their strategy in that respect.

Through these new missions, which did not exist before the research, the organization enhanced its flexibility and internal knowledge, and adapted its offer for entrepreneurs by adding expertise on sustainability. Strategic recommendations for the incubator were also submitted to the direction, some were soon implemented and others planned, thus reaching the transformative goal of such research (Lallé, 2003). While I pursued the operation missions mentioned above, the inspection phase is dated until March 2023, as at that time, most theoretical frames were found.

From March 2023 to June 2023, I also conducted an academic visiting at Technische Universität Berlin, under the supervision of Professor Jan Kratzer. During this period, I came back one week a month to ensure the operational missions that were easier to organize in-person. This visiting had two main objectives.

First, the Innovation Management, Entrepreneurship and Sustainability chair is highly specialized in entrepreneurship and sustainability. Key contributions that inspired this research came from this chair, in particular the ones related to sustainability impact assessment for new ventures. While sharing the same object of research, our approaches varied greatly, as the chair has an economic tradition, with a positivist epistemological lens. Therefore, the visiting was an opportunity to both obtain up-to-date literature recommendations from peers highly specialized in my research topic, and to get inspiration from the confrontation of different perspectives of a shared interest.

Second, the research takes place in a specific entrepreneurial ecosystem, thus leading to knowledge that can hardly reach generalization. The opportunity to discover a different entrepreneurial ecosystem provided me with insights on what was specific to the Parisian entrepreneurial ecosystem, and what challenges can be shared in another context. In particular, the third research article focuses on a French public grant, and it was interesting to enhance it with an international perspective. Thanks to the visiting, I could compare it with another public grant in Germany. Finding such knowledge often takes time, in particular when one does not speak the local language, and the visiting facilitated access to the information needed.

Overall, the exploration phase favored proximity with informants, while the inspection phase dedicated more time to find appropriate theoretical frameworks for the research, and to enhance the organization's knowledge.

Conducting Action-Research

Action-Research Principles

Considering the research philosophy and the goal to concretely construct reality, two kinds of research can be considered: action-research and intervention-research (David, 2000). On the one hand, action-research contributes to transforming the system throughout its own reflection, in a participative approach. The idea is to “prepare a group to change: participatory process, autonomy given to actors lead to a form of liberation of individuals and the collective, therefore a change in the relationships which is its in turn likely to bring about concrete transformations in the decision-making process” (David, 2008; cited by Gonzalez-Laporte, 2014: 20). On the other hand, intervention-research helps, on the field, to conceive and implement models and suited management tools, from a transformative project, more or less completely defined (David, 2000). Intervention-research is produced through a collective construction, where conception and implementation are simultaneously managed.

The thesis rather followed action-research principles. Indeed, the research path can be distinguished in two distinct phases, exploration and interpretation, while intervention-research simultaneously integrates conception and implementation. Moreover, the transformative process was initiated, but not integrated in the research. While actors' discourses and action were analyzed to produce practical tools - such as the framework to answer sustainability criteria for public grant applications; they were not co-constructed with actors. The action-research process aims for an organizational transformation, but stops at the threshold of the process of formalization (Gonzalez-Laporte, 2014). The goal was for the organization to become autonomous, as the incubator's staff and Direction have, at the end of this research, tools and practical recommendations. However, the research does not concern their appropriation of such knowledge, nor the transformation of the incubator through conception-implementation process.

While intervention-research starts with an idealized situation to reach, action-research rather begins with what already exists (David, 2000). Such a focus requires proximity with informants, to contribute to the academic knowledge with empirical-based issues (Dumez and Toussaint, 2022). Since the beginning, I aimed for proximity with informants. I had both formal and informal recurrent interactions with entrepreneurs and their stakeholders. Such a proximity with actors affects the research in two ways (Girin, 2011). On the one hand, informants will assign assumptions to researchers, and adapt their actions and discourses in consequences. It will jeopardize the study even more if researchers try to stick to their initial plan. On the other hand, informants should be considered as "ordinary scholars" to the extent that they produce theories. Researchers should pay attention to them, and analyze such representations, observe how they affect or not their actions.

Informants indeed had expectations with respect to my research. First, they were curious about management research, and in particular about its methodology. This is not surprising considering that social sciences is not the most represented scientific community in the incubator. During the exploration phase, I did not select a theoretical framework, and remained open with respect to the methods that could be relevant. They were very surprised by this methodological approach, without any pre-designed protocol. However, most of them engaged themselves in the research, and consistently with Girin's (2011) recommendations, I paid attention to their concerns and theories. They spontaneously came to me to discuss the topic, some volunteered to participate, recommended paths for research according to their issues, or suggested books or articles that influenced their vision on sustainability. Entrepreneurs asked me their questions with respect to sustainability, and notified me if one of their stakeholders asked them questions in this regard.

Researcher's Postures

My posture as a researcher evolved through the research. While it is rather common in management research (Dumez, 2017), it was influenced both by endogenous and exogenous factors. First, as I joined the R&D Team to focus on sustainability issues, entrepreneurs - and especially the ones who just joined the incubator and did not know about my former position - mostly came to me to talk about sustainability. During the exploration phase, the variety of topics that I discussed with them was broader. As I was expressly in charge of sustainability issues, they came with more concrete questions, looking for practical solutions. Second, the entrepreneurial ecosystem also changed with respect to sustainability throughout my research. Sustainability shifted from an interest from a few entrepreneurs to a common requirement they received from their stakeholders. Therefore, my interactions with entrepreneurs evolved from a personal interest they wanted to talk about, that they might implement in their organizations, to a strategic concern, for which they might have a personal point of view. Consistently with this evolution, during the exploration phase, I mostly listened to their concerns and asked them about their perceptions of such new requirements, while during the interpretation period, I kept asking questions but dedicated more time to actually guide them. The warm welcome I received from informants and the trust relationship we built strongly benefited my research. Indeed, they were very honest, and did not hesitate to criticize the craze for sustainability and the foundations of these new requirements for startups.

Overall, I navigated through different postures as a researcher, influenced by different factors, including interpersonal relationships. My operational missions favored interactions with informants. I was interchangeably a researcher-confident, a researcher-actor and a researcher observer (Georget, 2020), but thanks to my position at the incubator, I never felt in the position of “intruder researcher” (Laroche, 2017). My main difficulty throughout the thesis thus concerns the need to shift to the inspection phase, i.e. to deal with the overwhelming amount of empirical materials collected (and the need to stop collecting more once saturation was achieved), and to select appropriate theoretical frameworks (at the expense of others).

This section clarified the unit of analysis and the methodological approach adopted, which was mainly influenced by a certain vision of comprehensive research (Dumez, 2016), the opportunist methodology (Girin, 2011) and the symbolic interactionism methodology (Blumer, 1969). These approaches advocate for proximity with informants to tackle issues met on the field. Such an immersion was possible thanks to my operational missions, which evolved through the thesis. This research followed an action-research process (David, 2000; Gonzalez-Laporte, 2014), i.e. a

participatory process with a transformative goal, which starts with an exploration of the existing practices. The following section retraces the methods used to collect and analyze empirical data.

Section 4. Research Methods

This research adopted a strong empirical approach. From exploration to the inspection, different kinds of data were collected and analyzed, before finding appropriate theoretical frameworks. In this section, the global data collection and analysis conducted is presented. Then, the data collection and analysis used in each research article are introduced, while more in-depth information with respect to methods are furnished in dedicated research articles. Finally, the difficulties faced are highlighted, and the quality of the research defended.

Data Collection

Data collection “may involve direct observation, interviewing of people, listening to their conversations, securing life-history accounts, using letters and diaries, consulting public records, arranging for group discussions, and making counts of an item if this appears worthwhile” (Blumer, 1969, 1989: 41). Likewise, this research combines multiple sources of data (Dumez, 2016). The different kinds of data collected are presented below, while the Table 4. provides an overview.

Table 4 - Overview of the data collected

Data Collection	Sources	Details
Notes From Direct Observation	Interactions with the incubator staff	Weekly meetings, direct interactions...
	Individual and collective interactions with entrepreneurs	Direct interactions, experts' committees, meetings, Acceleration Program
	Interaction with entrepreneurs' stakeholders	Events, private investors, preparation of the Acceleration Program
Interviews	42 Explorative interviews	Various typology of entrepreneurs (different levels of maturity, sectors, cities...) and stakeholders (employees, investors, incubators, networks...)
	31 Theory-oriented interviews	Entrepreneurs and Startups Managers
Documentation From The Incubator	Confidential documentation	Documentation among startups and the incubator, and various startups confidential documentations shared with their peers and stakeholders
	Archival documentation	Rules of public grants
External and Public Documentations	Communications	LinkedIn post, press releases, and others public documents produced

Notes from direct observations

First and foremost, an important amount of direct observations was made, as I was on site 4 days a week, which is consistent with an ethnographic approach (Atkinson and Hammersley, 1994). Without being able to describe every observation made for a period of 36 months, they can be categorized in types of interactions.

First, interactions observed among the incubator staff, and in particular during the weekly meetings with the incubators' "Startups Team", which could be described as participant observation as I was directly involved. They allowed me to understand how the incubator works and to understand - and sometimes decrypt - the challenges entrepreneurs face. It also provided me with their vision on sustainability, which was, during the exploration phase, not so much influenced by my research. It also includes information collected during informal interactions with the incubator staff which mentioned sustainability.

Second, interactions with entrepreneurs. As previously mentioned, entrepreneurs spontaneously came to me to discuss their challenges and impressions. Some of these interactions were rather

informal, taking place as we crossed each other in the building, or were initiated on the incubator's Slack. Through these informal interactions, sustainability was sometimes not mentioned and I obtained information about their personal or organizational issues and concerns. More often, entrepreneurs asked questions about my research and shared their view on the issue at stake. Some of them were very animated by the question, and had a strong position they defended. Most times, I did not express any view and rather asked questions to better seize their beliefs and argumentation. Other entrepreneurs were rather discreet about their position. They often later admitted that they did not feel legitimate to discuss the topic, as they considered that they could "do more", whether it was in their personal life or within their organization. Often, they mentioned an episode of green or social washing they observed and which shocked them. From these informational interactions, some longer meetings or interviews were planned.

Collective interactions were also observed among entrepreneurs or with their stakeholders. I participated in startups experts' committees, meetings between entrepreneurs and their Startups Manager and I observed how they interact with their employees. In particular, the participant observations made during the Acceleration Program sessions were very useful. Considering how wide the concept of sustainability can be, the topic could emerge in every session even though it was not dedicated to sustainability. I paid attention to entrepreneurs' questions and debates, and how they might vary according to who is in the room, whether the animators of the session were for example alumni entrepreneurs or representatives of public grants.

Third, interactions with entrepreneurs' stakeholders. It concerns every event attended offsite, gathering the entrepreneurial ecosystem. Through these events, I observe how sustainability was defined, by whom, and overall, how it became more and more standard to have panels dedicated to sustainability to such events. Within the research site, it concerns mostly direct interactions with employees and first meetings I had with private investors interested in the startups from the incubator. I asked them about the kinds of startups they were looking for, and noted if they mentioned sustainability, how it came up in the discussion, and if so, their perception of the topic and expectations for startups in that matter. However, here again, the most information was obtained thanks to the Acceleration Program. I met with potential speakers, who spontaneously came to the incubator or were recommended by the community, helped the selected ones to prepare their presentation, and debriefed the sessions with them to know what surprised them, in order to get a more precise view of the specificities of the incubator's entrepreneurs' community. The typology of speakers was very varied, and so was their expertise.

Overall, the direct observations contributed to seizing what Blumer (1969, 1989) calls "acting agents". Systematic notes were taken at the moment or just afterward, to grasp the interaction "as it

happened”. Notes were taken in a diary and described the setting, the interactions and my perception of them (Poppleton et al., 2008). Diaries are common in immerse settings (Bourgoin and Harvey, 2018) and they have been defended as a valid methodology for organizational studies (Ohly et al., 2010), particularly when focusing on social interactions (Tschan et al., 2005). Indeed, the information should capture informants in their natural context, and reflect “life as it is lived” (Bolger et al., 2003: 597), the real-world conditions under which the action took place, thus enhancing the “ecological validity” (Lischetzke and Könen, 2021) of the data collected.

Interviews

Symbolic interactionists advocate for interviews to clarify and modify their observations (Prasard, 1993). Each benefited from the others, as observations provided ideas for questions to deepen with respondents, while the time and privacy of the interviews contributed to decrypting interactions observed. Semi-structured interviews “offer great flexibility in that they may yield both expected and unexpected results” (Dumez, 2022, p. 73). They favored revelations of larger issues, dilemmas and ambitions. During each interview, respondents were encouraged to speak freely (Yin, 2018), while we also had an interview guide, which varied according to the type of interview.

From Michael Piore (2006), Hervé Dumez (2022) makes recommendations on how to conduct interviews to discuss and enrich theory. He suggests the researcher should conduct a first round of interviews during the exploration phase with the objective to let surprising facts emerge, in line with both abduction and symbolic interactionism principles. A second round of interviews (with new informants, or with those who had the most to say during the first round) is needed not to explore new ideas, but to test a theory. The researcher should here start with open questions to make the respondent comfortable, and then present a template (Dumez, 2021), i.e. a visual summary of the conclusions from the exploratory interviews, to the respondent. The line between the two categories is tight, considering that the abductive approach favors interactions between the respondent and the researcher's theoretical background since the exploration. Here, we will use this distinction to categorize the types of interviews conducted, even though “explorative” interviews were conducted during all the research period. Details on interviews conducted can be found in [Appendix B](#).

First, the “explorative interview” category gathers every interview made with the goal to discover the respondent's perception, with no goal of theory contributions. The objective for these interviews was to have an idea of their challenges and ambition and to explore what sustainability can mean to different types of founders (CEOs or not), from different sectors, at different levels of maturity (both incubated and alumni), and from the incubator or in a different entrepreneurial ecosystem (for the

interviews conducted in Berlin). Aside from founders, it includes interviews made with startups' stakeholders, such as employees, private investors, or other actors related to the entrepreneurial ecosystem, such as individuals working for other incubators or in professional networks. In total, 42 interviews are accountable as "explorative interviews".

Second, the "theory-oriented interview" category regroupes every interview that was used for the research papers written through the thesis. These interviews were conducted with founders, considering that their vision is key to understanding startups' challenges (Bridge, 2021). Some respondents were chosen based on the first "explorative interview" we already conducted with them (Dumez, 2022), as they appeared as "acute observers [...] who are well informed" (Blumer, 1969: 41). Others were chosen to complete the sample with similar and comparable startups, to confirm saturation. In total, 31 interviews are accountable as "theory-oriented interviews".

Archival Documentation

Archival documentation data were collected from the incubator or from external sources.

First, data collected from the incubator concerns every documentation obtained that was not public nor accessible online, and was mostly confidential. These sources were very precious for the research, as they allowed me to unveil interactions that cannot be observed, because the production of the documents occurred before the physical interaction. Therefore, they reflect how actors perceived their interlocutor before contact. First, startups' applications for the incubator allowed me to understand how candidates presented themselves to the incubator, while the experts' committee reports contributed to grasp how experts and the incubator evaluated the project at its beginning. These sources were precious to prepare interview guides. I also had access to startups' applications for this grant - but not only - and sometimes to their evaluations. Likewise, I could obtain startups' slides for pitch deck for private investors, at the time they were incubated. Startups also shared with me documents received from their stakeholders, mostly private investors but also other incubators or networks, which contained sustainability requirements. In particular, it concerns Environment Social and Governance documents to complete, or investment clauses that mentioned sustainability. I also paid attention to the messages sent in the incubator Slack. Finally, I had access to archival data kept by the incubator, such as the regulation of public grants since their creation, which was a precious source as most of them were no longer available online.

Second, data collected from external and public sources were mostly gathered thanks to the daily social media monitoring. It concerns the social media posts from various actors, with a special focus

on when, how and with whom they talked about sustainability. Every entrepreneur from the incubator was systematically added on LinkedIn, which allowed me to see not only their post, but also their reactions to others' posts. Press releases and documentations, with more formal rapports produced from different actors, were also collected when mentioning issues related to sustainability. Books written or recommended by entrepreneurs from the community were also read, to see whether they talk about sustainability, and if so how. This daily social media monitoring on sustainability as a topic within the entrepreneurial ecosystem was shared with the incubator staff later in the study, with the "Impact News".

Data Analysis

The goal of the data analysis is to make sense of the empirical data collected, and because of the setting, the volume and heterogeneity of the data collected was tremendous. I first used floating attention, reading the data without coding, with the objective to let discoveries emerge from the material, thus avoiding circularity risks (Ayache and Dumez, 2011). A multi thematic coding approach is recommended by authors, with a first step regrouping the material according to different themes, and a second one coding each of them. From the first step, multiple themes emerged, for example, with respect to entrepreneurs' individual path or personal ambition, to the incubator structure, to the very diverse challenges startups faced, to the pandemic experience. Considering the volume of each of these themes, we focused our attention on a specific one: "startups and sustainability".

The first five columns of our coding table allowed me to contextualize the data, two following columns concerned the coding, and the last column, "Notes", was open to note my ideas.

First, the date indicating when the data collected occurred or was produced. Second, the category of informant. While multiple types were first created, I progressively reduced the number of categories to keep only seven types: Founder, Employee, Private investor, Public Institution, Agoranov, Network, Others. Multiple selection is possible here, as one informant can have various roles - for example, if founders speak about a network they created - or when it concerns an interaction among different types of actors Third, a column is dedicated to the name(s) of the informant, whether it is one person or organization (for documents) that provides the information, more names if it is an interaction. Fourth, the type of source of the data: Observation, Interview, Online, Confidential. Fifth, where more information can be found on that data, for example, a link to the full document, to the complete transcription, or to where it is in the diary.

The next column concerns coding. From the first coding, I ended up with five categories: “internal vision and dilemma”, “interaction and tension with stakeholders”, “visible action”, “invisible action”, and “surprising fact”. Consistently with Ayache and Dumez (2011), one unit of sense could belong to one or multiple categories. For example, an entrepreneur said “I received an ESG formula from a potential investor, I think it’s crazy they asked that from us at that point, but yes I’ll do it”, and it coded in “internal vision and dilemma”, because the entrepreneur expresses their perception of this requirement; “interaction and tension with stakeholders”, as the demand comes from the investor; “invisible action”, because the fact that the entrepreneur did this exercise will not be seen from outside; and “surprising fact”, because, at that time, it was not common for such a project to receive such a document.

The sixth column aims to specify the content from the first coding, which allowed to make sense of the material, as ideas emerged from the first step from this “contemplative and creative” exercise (Dumez, 2022). Here, twelve sub-codes emerged, which can be regrouped in four categories. Three considered the sector, if a specific sector was mentioned. I used the classification from the incubator: “Health”, “Digital”, and “Industry/Greentech”. Three others paid attention to the type of topic that was addressed, if a specific topic was addressed, and I was inspired by the traditional ESG criteria: “Environment”, “Social”, and “Governance / Human Resources”. Three others aimed to specify the vision of sustainability: “Definition of sustainability”, “Critique of stakeholders’ vision for sustainability”, “Dilemma associated with sustainability”. The last three illustrated ideas for research articles: “Sustainable Entrepreneurial Process and Sustainability Impact Assessment” (see Article 1), “Ecosystem and Institutional Entrepreneurship” (see Article 2), and “i-Lab” (see Article 3). A deeper data analysis was conducted for these three items and are presented in each research article.

Sustainability for Startups From Different Perspectives, Investigated in Research Papers

Overall, a great amount of empirical material was collected through this research. During the exploration phase, different sub-research questions emerged from the field, while during the inspection phase, theoretical propositions were formulated more firmly and tied to the empirical world. To do so, different methods were used to investigate sub-research questions (see Table 4 and their methodology section). As symbolic interactionism considers that people act toward things on the basis of the meanings they gave to these things, Blumer (1969) stresses that “if the scholar wishes to understand the action of people it is necessary for him [or her] to see their objects as they see them” (:50-51). Through the research, sustainability for startups appeared as an object that can be considered according to different perspectives. Through research articles, this thesis follows a progressive complexification (Ayache and Dumez 2022), and the phenomenon is explored through

different “seen as” (Dumez, 2021). It is presented as a part of the entrepreneurial process (Article 1), as embedded in an entrepreneurial ecosystem (Article 2), and as a prerequisite required by public actors (Article 3). These perspectives emerged from an abductive process using surprises to identify research questions (see [Chapter 4. Empirical Surprises Leading to Sub-Research Questions](#)).

Table 5. Overview of the methodology used in each research article

	Article 1	Article 2	Article 3
Title	Where to start? Exploring how sustainable startups integrate sustainability impact assessment within their entrepreneurial process	Exploring the evolution of entrepreneurial ecosystems through institutional entrepreneurship: the case of sustainable entrepreneurship	Innovation policies’ fostering sustainability: exploring the case of a French public grant for startups
Research Question	How do sustainable startups integrate sustainability impact assessment in their entrepreneurial process?	How does the evolution of the entrepreneurial ecosystem affect institutional entrepreneurship?	What are the challenges of an innovation policy targeting responsible innovation for technological startups?
Key concepts	Entrepreneurial process; Sustainability impact assessment	Institutional entrepreneurship; Entrepreneurial ecosystem	Responsible innovation; sustainability impact assessment
Methodology	Case study of 8 startups	Case study of 4 startups	Single case study of i-Lab

The objective is to get closer to reality, through these three perspectives that emerged from the field. However, the thesis does not provide an exhaustive view: other “seen as” could have been investigated. Indeed, within the “startups and sustainability” theme, not all the data coded are used in the thesis, a regret probably shared with the reader. For example, data revealed that the emergence of sustainability in the entrepreneurial ecosystem led to the creation of new jobs, at the higher management of more mature startups, with the creation of the “Chief Impact Officer” (or its derivatives) job title, but even at an early-stage (fewer than 15 employees), with some startups hiring a junior to dig the topic. The mission handled varies greatly, as much as their experience, and startups face a lot of dilemmas while writing the job offer and choosing the appropriate candidate. Dedicated networked emerged and addressed the issue in different ways. This new kind of “joiner” (Roach and Sauermann, 2015) could be further investigated, to better understand the collective journey of entrepreneurship (Mustar, 2021). However, this phenomenon rather appeared as a

consequence of the rise of sustainability requirements in the entrepreneurial ecosystem - which first needed to be understood.

Challenges and Risks Related to the Methodological Approach

Difficulties faced through the study

Through the research, difficulties emerged both from the complexity of the topic, and from proximity with informants. The challenges it created are rather common considering the methodological approach adopted.

First, the methodology adopted requires a great attention to the language. Here, our topic is expressed through different and vague definitions, which creates difficulties, in particular to justify the criteria used to identify a sustainable startup.

The term “sustainability” and its derivatives not only embody difficulties and different understandings in the literature (Pizzi et al., 2020), but the word also has two distinct definitions in the Oxford dictionary: “the use of natural products and energy in a way that does not harm the environment”, and “the ability to continue or be continued for a long time”. A complexity appears, as an organization can answer the second definition without meeting the first one. While “sustainability” is used both in the literature and by English-speaking practitioners, in the French entrepreneurial ecosystem, it is rarely translated (“*durabilité*”). Instead, the term “impact” is more common, with either the idea to maximize the positive impact, or to reduce the negative impact, hence another ambivalence. Sustainable development was understood according to its initial definition: a “development that meets the needs of the present, without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). Attempts were made, both in the literature and from practitioners, to narrow this definition, with either a focus on environmental issues or a population at risk. However, it fails to reflect the systematic approach advocated in the sustainability literature (Lamine et al., 2015; Lescop et al. 2022), which stands that sustainability needs to jointly take into account environmental and social issues. Therefore, a first choice was made to define sustainable entrepreneurship according to the triple bottom line (Elkington, 1997; Cohen et al., 2006), a broad but shared definition.

While the newness of a phenomenon is an argument for such an approach (Yin, 2018), it also leads to some difficulties for researchers, as the phenomenon is not stabilized, and rather in constant movement (Girin, 2011; Blumer, 1969). I first considered an early-stage startup as sustainable if the

company has a social, environmental and economic strategy that the founder can clearly defend. At the beginning of the research, it was sufficiently rare to be a criterion of exclusion, as it was not common within the incubator's entrepreneurial community to found entrepreneurs with a triple bottom line strategy. However, as the research pursued, more and more stakeholders challenged startups with respect to sustainability, leading entrepreneurs to progressively address the topic. A turning point (Dumez, 2015) appeared when a major public grant in this entrepreneurial ecosystem added sustainability criteria (see Article 3). From that moment, no entrepreneur overlooked sustainability. While it created difficulties to define sustainability for startups, I also contribute to the interest of the thesis, which is to retrace the symbolic interactionist process through which a complex problem was collectively addressed. The study can therefore be considered longitudinal as I gathered data both before and after the mentioned turning point (Prasad, 1993).

Second, "the material does not just move [...] it thinks. It is very annoying, and it is very interesting" (Girin, 1989: 2). While advocating for proximity with informants, this methodology is often criticized as it raises questions about the subjectivity of the knowledge produced. However, subjectivity is not considered as a problem in management sciences, but rather sought for, as a part of the methodological approach (Avenier and Thomas, 2012). Reflexivity issues (Cazal, 2000) are common for "actor-researchers", i.e. management researchers who are also practitioners (Lallé, 2003). To avoid this bias, the position adopted in the organization has been clarified (Lallé, 2003). While the objective is to make the research trustworthy, researchers also need to apply the same attention to their informants, as ethical questions are at stake. In that respect, when the research project was accepted by the ANRT, I sent an email to entrepreneurs (both incubated and alumni), to inform them about the research, and changed my LinkedIn profile and my email signature so that other informants could be aware of my research. Through the thesis, I always explained the methodology adopted, and in particular the use of the interviews. Participants appreciated this effort and accepted every request, consistently with other academics' experience (Gioia et al., 2012).

The topic's complexity and the methodological approach come with challenges for researchers, but as the research advanced, it supported a symbolic interactionism perspective for the research. Indeed, it progressively appeared that the meaning given to sustainability, in the startup context, changed according to an interactive and interpretative process.

Rigor and Quality

The symbolic interactionism methodology (Blumer, 1969) provides principles for research. However, as one of his students advocated, "You cannot really figure out how to conduct your

research by following his precepts” (Becker, 1988: 18). Indeed, as the title of Blumer’s essay stands - *The Methodological Position of Symbolic Interactionism* (Blumer, 1969) - he provided precisely methodological principles, and not step-by-step instructions for how to collect and analyze data. Rather, his emphasis is on “how to think about the relationship between the nature of our subject matter and our approach to understanding that subject matter” (Schwalbe, 2009: 598). Schwalbe (2009) identified five risks that can arise from Blumer’s methodological position, and provides guidance on how to avoid them. They are presented in the following Table 6.

Table 6. The anti-discovery tendencies avoided through Blumer's methodological principles

Adapted from Schwalbe (2009: 603-608)

Anti-discovery tendencies	Characteristics	Countering the issue using Blumer (1969)
<i>Inadvertent theorizing</i>	Theorizing from a set of control variables, considering they might affect the phenomenon of primary interest. Risks: to be boxed-in by our assumptions and to miss the opportunity of discovery.	Avoiding strong theoretical commitments at the outset of the study, challenging classic approaches to gain a chance to see new processes and variables.
<i>Unreflective Mesearch</i>	Ignoring liabilities from personal ties to the study. For example, taking for granted tacit understandings shared by insiders, or advocating for a position rather than analyzing the phenomenon.	Honest, upfront examination of the position and the preconceptions that go with it. Searching for surprises, or insiders' challenges.
<i>Analytic Foreclosure</i>	Relating an unfinished analysis to a concept revered in the discipline.	Challenging the utility of popular concepts/ Looking at <i>what people are actually doing; what meanings are they acting on; how people are creating and using shared meanings to do things together?</i>
<i>Excessive Subjectivism</i>	Confusing meanings with materiality, i.e. reducing the social world into nothing but meanings.	Talking to people and trying to learn to see the world as they do. Documenting both meaning and obdurate realities to which these meanings apply, to identify potential discrepancies.
<i>Aprocessuality</i>	Failing to examine the action that creates the social world on all scales.	Placing the researcher as central, rather than marginal, to the sociological enterprise. Paying attention to the origins and diffusion of meanings, to reveal how meanings are used and transformed. For example, paying attention to how people use meanings to create new patterns of joint action.

While paying extra attention to these principles through the research, its rigor and quality are enhanced due to two additional considerations.

First, validity was obtained through a triangulation strategy (Dumez, 2016). Accordingly, various types of data were collected to make sure of their reliability and to avoid statements made based on a single point of view. However, research papers do not encompass all the material collected and analyzed. Each research article focuses on a given sample, while data mobilized reflect other observations made on the field that were not necessarily emphasized in each paper, considering their standard format. This approach explains why explorative interviews were conducted throughout the research, without necessarily being integrated into the papers, in order to continue to compare perspectives, and to verify the consistency of propositions.

Second, the goal of comprehensive research is to see actors act, to reveal the mechanism at stake, a consideration that is unfortunately absent in some qualitative research (Dumez, 2016). This can be explained by the fact that personal ties with the field and proximity with informants reduce the likelihood to identify what is interesting for the research field. As researchers share daily experiences with the individuals observed, they might start looking from their lenses (Woods, 1986), and more critically for the research, they might miss surprising facts (Dumez, 2012). In this respect, this research strongly benefits from an insider/outsider approach (Gioia et al., 2010), as regular discussions with my thesis Director, Professor Thierry Rayna, appeared necessary to understand what warranted deeper investigation. In addition, actors and their interactions are highlighted. Indeed, each research article is introduced with elaborated materials based on empirical experience and analyzed through background theories, thus acknowledging my own assumptions.

PART II

Chapter 4. Empirical Surprises Leading to Sub-Research Questions

The previous chapter introduced the methodological approach adopted, influenced by Hervé Dumez (2016), Jacques Girin (1989), and Herbert Blumer (1969). These perspectives have in common an empirical approach, inviting researchers to pay attention to actors and their interactions, and encouraging them to be creative in their research. The following chapter first emphasizes more in-depth how these methodological approaches have the potential to highlight the phenomenon at stake through the analysis of “surprising facts” (Dumez, 2016), “management situations” Girin (1989) or “joint actions” (Blumer, 1969). Inspired by these principles, research articles are introduced retracing the abduction process followed. It reveals how sub-research questions emerged from the field. Each research article in the following chapters is introduced with an elaborated material, constructed a posteriori from observations’ notes, and then put in perspective according to a background theory.

Section 1. Symbolic Interactionism in Management Sciences

As previously mentioned, this research is influenced by a symbolic interactionist perspective, which can be summarized into three main considerations (1) human act toward objects on the basis of the meaning they have for them; (2) meanings arise from the process of social interaction; and (3) meanings change according to an interactive and interpretative process (Blumer, 1969). Symbolic interactionism was widely promoted in the academic community, notably through Blumer’s position in the Chicago School and its influence on his students, which included Howard Becker and Erving Goffman. Symbolic interactionism studies were initially a coherent group of researchers, with a clear theoretical and research focus, but as it expanded, it scattered, thus leading to some criticisms. Gary Alan Fine retraces this path in *The Sad Demise, Mysterious Disappearance, and Glorious Triumph of Symbolic Interactionism* (2016). A “glorious triumph” is now advocated, in particular in management communities, who argue its “current relevance” (Dumez and Toussaint, 2022: 7) and “methodological power” (ibid: 19).

Symbolic interactionism has been used to analyze the implementation of technological change (Prasad, 1993), and past contributions also argued its relevance for entrepreneurship research (Sørensen et al. 2007). Indeed, this field had a tradition of focusing either on the outcome, with a

historical economic approach investigating what entrepreneurial activities do for the economy (Herbert and Link, 1988), or on the individual, from a psychological perspective (Gartner, 1988). Entrepreneurial studies significantly evolved in the nineteen to go beyond these two sole approaches. More emphasis is placed on how entrepreneurship is conducted. However, the emergence of a process-based approach rarely benefited from a symbolic interactionist approach, and the fertility of this perspective for entrepreneurship research surprisingly did not catch the attention of many scholars (see for exceptions Klyver et al., 2013; Shabbir and Gregori, 1996). The “glorious triumph” (Fine, 2016) of symbolic interactionism is still pending for entrepreneurship research. However, despite symbolic interactionism’s “risk and complexity” (Sørensen et al., 2007: 91), it can “reflect the entrepreneurial phenomenon in a suitable and realistic manner” (ibid).

Section 2. Joints Action and Situations

Inspired by George Herbert Mead’s “social act”, Herbert Blumer defended the concept of “joint action” to emphasize the “larger collective form of action that is constituted by the fitting together of the lines of behavior of the separate participants” (Blumer, 1969: 70). There are various identifiable and distinctive forms of joint action, which are characterized by an articulation of acts including more than one participant. Participants in a joint action necessarily occupy different positions, and act toward it. Participants first identify the social act they engage in, orient their action in consequence. Every participant shares a common and pre-established meaning of what is expected from a given social action. For example, before a job interview, both candidates and recruiters have an idea of what the interaction will look like. Then, once the joint action is formed, participants adapt their actions according to their interpretation of others’ actions.

Blumer insists on the fact that there are repetitive and pre-established forms of joint actions, but also “new situations”, which are “problematic and for which existing rules are inadequate” (Blumer, 1969: 18). These new situations invite participants to construct new forms of actions, thus leading to social change. Such a social change is constructed through interpretations of “acting units”, i.e. participants who interpret situations in which they are confronted, and act on the basis of their interpretation. Blumer considers that established rules do not define a social group. Rather, it is the social process in which the group engages in that creates and upholds rules. Participants’ previous experience and set of meanings also play a key role in the social process. Therefore, joint actions cannot be separated from their context, as well as participants’ previous joint actions. They have to be understood as a formative process in which meanings arise from interactions.

Despite the central place Blumer gives to joint actions, this notion remains underdeveloped and empirically underused, a pity considering its potential (Azarian, 2017). However, the relational perspective of situations, in which joint actions take place, has been further developed (Goffman, 1991). It concerns “the ordering and organization of a world made up of our experiences” (von Glasersfeld, 1984: 27), and echoes with phenomenology (Husserl, 1970; Simmel, 1950) and pragmatism (Mead, 1977). While phenomenology considers experiences from their intentionality, and studies the structures of consciousness as experienced from the first-person point of view; pragmatism rather insists on agency: concepts should be tested through scientific experimentation, and need to be useful. The symbolic interactionist perspective calls for the exploration of situations.

“Management situation” is a concept popularized by Jacques Girin, which is experienced “as participants are gathered and have to accomplish, in a determined time, a collective action leading to a result externally judged” (Girin, 1989: 166). Collective actions are not necessarily the result of a consensus among actors, their outcome is more often a compromise among participants. The interest of situations has been highlighted by entrepreneurship scholars to better grasp the phenomenon at stake. It considers the complexity of entrepreneurial situations, to the extent that these situations regroup a lot of interactions and uncertainty (Le Moigne, 1990; Morin, 2008). In particular, their temporality and problematization have to be considered (Schmitt and Husson, 2017).

First, the temporality of entrepreneurial situations reflects entrepreneurs’ intentionality (Cossette, 2001; Kureger and Carsrud, 1993), as it links the current situation with a desired and projected future (Sarasvathy, 2001; Simon, 1996). From that perspective, an entrepreneurial situation might be less affected by the past than by the future. Second, they are a human construct, where entrepreneurs attempt to construct meaning. They ask themselves questions and develop hypotheses, thus constructing a scenario that they will test according to stakeholders and social norms (Meek et al., 2009). The problematization space is where entrepreneurs test their scenario. For example, they build a scenario while determining a price for their solution, which will more likely evolve through interactions with stakeholders.

Section 3. Identifying Research-Questions From Surprises

While the attention on situations has the potential to reveal mechanisms at stake, these researches provide little evidence on how researchers should use these situations, and what are the characteristics that make a situation relevant for research. In that respect, abduction principles appear useful. Hervé Dumez insists on the need to seek for “surprising facts” (Dumez, 2016), which appear in relation to researchers’ theoretical background (Aliseda, 2006). According to Dumez, “Every

moment of qualitative research must be actively engaged in bringing out astonishing facts and data” (Dumez, 2012: 40). The focus on joint actions, management situations, or surprising facts, invites entrepreneurial researchers to consider creative methodologies (Schmitt and Husson, 2017) to anchor actions and practices in their research. In that perspective, action-research appears as a particularly relevant setting to reflect the empirical world (Avenier and Schmitt, 2010).

Following Pierce, Hervé Dumez (2016) insists on the three-step process of abduction. First, a surprise is considered as such because researchers who observed it had a hypothesis. This hypothesis benefited from both a deduction - considering the theory, this is what I should observe - and an induction - I trust the hypothesis because it is operative. Induction created expectations for researchers, who can then be surprised when facts do not meet their theory. The second step occurs with a surprise. According to Aliseda (2006), surprising facts are either new, when the background theory does not explain the phenomenon, or abnormal, when the theory predicts something different than what is observed. Third, researchers seek new hypotheses to explain the phenomenon. Abduction will not stand whether the hypothesis is true or false, it will rather result in possible or impossible explanations.

Overall, symbolic interactionism assumes that multiple - and frequently conflicting - interpretations and meanings are at stake in every organizational situation. It emphasizes the process whereby actors make sense of and articulate for themselves and other different situations and contexts. Following this perspective, the study examines how startups tackle sustainability according to the meaning entrepreneurs give to this concept, and the influence of their interactions in the construction of this meaning. The abduction process presented for each research article shows how situations and interactions among actors were interpreted as surprises, and then translated into sub-research questions. Each of the three following sections starts with the presentation of an “elaborated material”. It was constructed a posteriori from observations’ notes, to highlight joint-actions or situations that appeared as “surprising facts” (Dumez, 2016). These elaborated materials are then put in perspective according to a background theory, arguing why they were considered as surprises, and how they led to the investigation of research questions.

Chapter 5. Sustainability for Startups: A Part of the Entrepreneurial Process

Section 1. The Abductive Process

The Elaborated Material - “They already save lives!”

As I arrived one morning, three colleagues were chatting over coffee in the team's open space. When they spotted me, they rushed over to me: “Are you available this afternoon? We absolutely must talk about impact. We should build a roadmap to work on the topic, so that we can quickly support entrepreneurs in addressing these issues”. We took the time we have before the weekly team meeting.

The four of us settled down in the small team room. One Startup Manager began: some investors were asking entrepreneurs about their impact, and i-Lab also included a new dedicated question - but it was not very clear at that point what were their expectations, and how they will be evaluated. Still, it was an opportunity to grasp the topic.

The Young Entrepreneur in Residence explained that they are passionate about these issues and are keen to work on it. They created a dedicated page on the incubator's collaborative tool. They showed us the page on their computer. There was a section entitled “Contacts to meet”, to engage with experts. Several contacts were already identified, e.g. potential service providers for startups, or people in the ecosystem communicating on impact. The goal was to include our meeting notes for follow-up. Another section, “Library”, gathered a few key references they have already filled in. Here too, the aim was for everyone to contribute.

The Digital Startup Manager stepped in, as they had a resource to share. They recently read *Digital Hell. The inner-workings of the “like”*, a wake-up call for them. So much so that they shared it with the incubator's director. They suggested that impact may be less critical for digital entrepreneurs, who generally investigated the topic less than greentech entrepreneurs, but they were determined to make entrepreneurs aware of the environmental impact of their solutions. In short, they were ready to help raise awareness among entrepreneurs.

The brainstorming started. On the left side of the whiteboard “impact evaluation / measurement”, on the right, “improving their impact”. Through the exchanges, ideas of formats and interlocutors began to emerge. The board took shape. The left-hand column began with “VCs”. Two objectives: to have a catalog of impact investors, and to know their impact KPIs. Public funders came next, with the same objectives. Ideas were then put forward for formats to educate entrepreneurs on these issues with methods and feedback: which external speakers, which Alumni to mobilize. On the right, “Improving their impact”. The discussion was less lively. After some hesitation, it refocused on the need for KPIs. A four-stage roadmap emerged: (1) to raise awareness and provide information; (2) to help them with an initial assessment; (3) to suggest a deeper assessment by a third party; (4) to follow their action plan.

The session was rich. However, when I asked why the Health Startup Manager was not here, they exchanged glances, surprised by the question. They suggested that, perhaps, the impact is more obvious for health startups: “They already save lives!”.

Background Theories

Background theories need to be presented in order to justify how such a situation appeared as a surprise. First, my initial hypothesis was that health startups, considering their social impact, were likely to be considered as sustainable startups if they initiate an environmental strategy. Indeed, they would thus address a triple-bottom line of economic, social and environmental goals (Terán-Yépez et al., 2020; Cohen et al., 2006; Elkington, 1997). From that perspective, I believed that Health and Industry and Greentech startups might be more similar - having a rather obvious double-bottom line - than Digital and Industry and Greentech startups. I did not expect Health startups to be considered aside from Industry and Greentech and Digital startups.

The situation mentioned above was in contrast with my expectations. However, it was not the first time - or the last - that I have noticed a discomfort with respect to the relationship between sustainability and health startups. This might be due to the fact that I did not have previous expertise in this specific sector, and my background theory is therefore influenced by a naive approach. For example, I had discussions with a successful Alumni entrepreneur in the health sector. They asked me about my research topic, and were curious about what startups traditionally do with respect to sustainability. When I mentioned - among others - carbon footprint reports, they told me they did their own. I was surprised, because I looked regularly for this kind of

information on startups' communications, and I did not spot this information. They told me that they did not want to communicate on it, as they consider it as "not much". A few months later, I wanted to organize an event dedicated to sustainability for the incubator's community of entrepreneurs. The objective was for entrepreneurs to benefit from Alumni's experience and to confront their different perspectives. I asked three successful Alumni, one in each sector represented at the incubator. I contacted the Alumni that did their carbon footprint report, so they could explain why they did it, and why they chose not to communicate on it. They replied that they were not comfortable discussing this topic, but happy to contribute on another one. Such a refusal is rare enough to be underlined - in three years, it was only the second time it happened. I asked another successful entrepreneur in the Health sector. They also answered that they rather spend their turn on this subject for which they were not the most relevant, considering that their ecological impact is limited, and they only incentivize their team to come by bike to the office.

Aside from the incubator, I observed other evidence suggesting a gap. A study, *ESG Impact in Health*, launched in 2022 by Bpifrance Le Hub caught my attention. From my watch, it was one of the first in the entrepreneurial ecosystem directly addressing the health sector. It asserts that there were in France 1,100 medtechs, 750 biotechs and 200 startups in e-health. However, in the chapter "Health entrepreneurs' stakes and positions", it only mentions e-health startups, thus excluding biotech and medtechs, despite the fact that they are more numerous. Examples of sustainability practices for biotech and medtech startups are rather scarce. I asked a representative of B Corp, a certification increasingly popular in the entrepreneurial ecosystem, whether they had certified a French health startup, they only identified one e-health startup. It creates a situation where only little information is available for biotech and medtech startups wishing to target sustainability.

From these observations, one hypothesis could be that health startups are less motivated by environmental concerns. However, empirical materials collected do not seem to support this hypothesis. Prestigious Alumni, such as Alan or Doctolib, developed a strategy with respect to environmental goals during the research. When Agoranov launched a specific program of 13 startups seeking more support to accelerate their development, the only one who asked for support with respect to its CSR policy was a healthtech startup. Likewise, when Agoranov organized workshops dedicated to the public grant i-Lab, I mentioned that I could take more time with startups curious about the sustainability criteria. Both in 2021 and 2022, more Health startups have contacted me than startups from other sectors. Through these meetings, they asked a lot of questions about what can be done with respect to their environmental impact, e.g. "Where should I start?", "What are other startups doing?".

Some health startups at the incubator went beyond their obvious social impact and were proactive to identify what they could do with respect to their environmental impact. This perspective confronts the dominant idea in the literature that startups have a narrowed perspective on sustainability: “Being involved with one specific innovation, sustainability startups have a tendency towards single issue campaigning. They invest all their resources and attention in optimizing one particular environmental or social issue at which they try to excel. [...] This might be due to the fact that their entrepreneurs are simply obsessed with one issue. [...] Given their limited resources, sustainability startups are, however, less good at addressing a broad range of sustainability issues.” (Hockerts and Wüstenhagen, 2009: 487). Authors argue their statement from previous studies (Williamson, 2008; Lal and Israel, 2006; Hockerts, 2006; Bird et al., 2002; Christen and Cook, 2001; Robins and Roberts, 1997), and overall conclude that this single focus can be explained by startups’ lack of resources.

Scarce resources constraint entrepreneurs’ ambition, but empirical evidence suggests that some entrepreneurs are motivated to address a broad range of sustainability goals. However, they do not seem to necessarily communicate about their actions, whereas the literature suggests that sustainability impact assessment is often done with stakeholders (Costa and Pesci, 2016). Entrepreneurs’ key question on sustainability is often “Where to start?”. This issue met in the field, for which the literature provided little evidence, called for further research. An abductive process, confronting empirical material with the literature, led to the sub-research question: “How do sustainable startups integrate sustainability impact assessment in their entrepreneurial process?”, addressed in the following research article.

Section 2. Article 1. Where to start? Exploring how sustainable startups integrate sustainability impact assessment within their entrepreneurial process

Abstract

While startups are acknowledged for their potential to address sustainability issues, little is known on how to assess their impact, given the uncertainty they deal with and their lack of resources. This paper investigates the ones that are supposed to be ‘best-in-class’ in that matter, that is, startups targeting sustainability, in order to explore how they integrate sustainability impact assessment in their entrepreneurial process. We conducted a multiple case study of eight sustainable startups, based on a 2-year longitudinal research in their incubator to gather multiple sources of information. Our results revealed that the integration of the triple bottom line in the

entrepreneurial process has a major effect on startups' sustainability impact assessment practices. 'Born-sustainable startups', which have aimed for the triple bottom line since idea generation, have more robust tools and routines than 'Transitioned sustainable startups', which integrated the triple bottom line during prototype/validation.

Keyword: sustainability impact assessment; startups; entrepreneurial process

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Introduction

Traditionally acknowledged for their economic contribution (Audretsch & Thurik, 2001), startups, that is, young, innovative, and growth-oriented ventures (Dee, Gill, Weinberg, & McTavish, 2015), are increasingly considered as key actors to address grand challenges (European Commission, 2013). In France, for instance, the 'Tech for Good' movement highlights the entrepreneurs' ambition to go beyond sole financial targets and tackle sustainability issues (Acquier & Tse, 2021). Such a movement supports the idea that technologies may represent valuable opportunities to tackle environmental and social challenges, which echoes with a time of increased public scrutiny (Scheyvens, Banks, & Hughes, 2016), where entrepreneurs need to convince their stakeholders and society at large that they can contribute to the common good. This, however, comes as an additional burden for these entrepreneurs, who possess limited resources to address these new constraints. Yet, providing evidence of their contribution to sustainability is critical to avoid accusations of green- and social-washing (Delmas & Burbano, 2011; Rizzi, Gusmerotti, & Frey, 2020) and also to legitimize the hopes that entrepreneurship can indeed be instrumental to address environmental and social challenges (Hall, Daneke, & Lenox, 2010).

This matter directly relates to the issue of sustainability impact assessment (SIA) (Malesios, Skouloudis, Kumar Dey, Ben Abdelaziz, Kantartzis, & Evangelinos, 2018), that is, the process by which ventures 'identify, structure and evaluate the sustainability impact of past, current and/or planned actions' (Trautwein, 2021: 3). SIA for startups is a recent and emerging field of research (Fichter, Lüdeke-Freund, Schaltegger, & Schillebeeckx, 2023), which has so far mostly explained why the topic at stake is complex (Di Vaio, Hassan, Chhabra, & Arrigo, 2022; Trautwein, 2021) or tried to find a suitable framework to measure startups' outcome in terms of contribution to

sustainability (Hornes, 2019). Yet, there is a general lack of understanding of the shape SIA can take for startups, at different stages of the entrepreneurial process, from idea generation, prototype, validation, production, to commercialization (Belz & Binder, 2017; Dean & McMullen, 2007; Matzembacher, Raudsaar, de Barcellos, & Mets, 2019; Pacheco, Dean, & Payne, 2010; Terán-Yépez, Marín-Carrillo, Del Pilar Casado-belmonte, & de Las Mercedes Capobianco-uriarte, 2020). In that respect, focusing on sustainable startups, that is, startups aiming for the triple bottom line (TBL) of social, environmental, and economic objectives (Cohen, Smith, & Mitchell, 2006; Elkington, 1997), provide a way to investigate what the ‘best-in-class’ and most motivated entrepreneurs (Voinea, Logger, Rauf, & Roijackers, 2019) are able to do in relation to sustainability. Investigating how such ventures incorporate SIA in their entrepreneurial process is therefore instrumental to shed a light on the related opportunities and challenges that could be relevant to all startups, whether sustainable or not, as they all face increasing scrutiny from their stakeholders (Antarciuc, Zhu, Almarri, Zhao, Feng, & Agyemang, 2018; Johnson, 2015; Magbool, Amran, Nejati, & Jayaraman, 2016). Consequently, this research aims to address the following question:

How do sustainable startups integrate sustainability impact assessment in their entrepreneurial process?

To answer this question, we carried out an exploratory longitudinal study, with a multiple case study design (Yin, 2018) of eight sustainable startups. Thanks to an immersive setting, we gathered multiple data sources, including 19 semi-structured interviews, observations, and archival data, which enabled us to provide an in-depth comprehensive and dynamic understanding of the manner in which those startups integrated SIA at different stages of their entrepreneurial process. While, at the end, all of them can be considered as sustainable startups, to the extent that they all target the TBL, our study reveals the different paths followed.

The main results emphasize two different approaches to SIA among sustainable startups. A first group – that can be qualified as ‘born-sustainable startups’ – embeds a TBL approach within the entrepreneurial process from the very beginning. From idea generation to prototype stage, they make structural choices, enabling them to ensure a contribution to sustainability goals as a whole. Although such an extensive approach to sustainability creates an additional burden, it enables a more solid approach to SIA that is continually improved in an iterative process. In contrast, a second group, designated as ‘transitioned sustainable startups’, focuses first on double bottom line (DBL) objectives, only considering either social or environmental aspects in their impact assessment in the earlier stages of their entrepreneurial process. They shift later to adopt a TBL. While this may appear easier, our research indicates that subsequently ‘upgrading’ their impact

assessment to a TBL and encompassing both environmental and social impacts may be quite challenging. In both cases, the construction of the SIA as a part of the entrepreneurial process is explored.

Our paper is organized as follows. First, we review the literature on sustainable entrepreneurship, entrepreneurial process, and SIA, in order to clarify the literature gap addressed. Second, we describe the qualitative methodology. The third part presents the results, emphasizing the different approaches adopted by sustainable startups. A final section concludes this paper by discussing the contributions of this research and providing avenues for further research.

Literature review

The objective of this research is to investigate the manner in which sustainable startups establish their SIA as a part of their entrepreneurial process. Consequently, the following subsection reviews the literature on sustainable entrepreneurship, with the objective to emphasize specificities of integrating the TBL while launching a startup. We then define SIA and outline the challenges it represents for startups, while also evidencing the dearth of knowledge existing in the literature on startups' practices.

The specificities of the TBL in entrepreneurship and for startups

The idea that entrepreneurs – and consequently startups – have a great innovation and economic potential can be traced back to – at least – Schumpeter (1934). However, their ability to tackle environmental and social challenges has been less obvious. Entrepreneurs' capacity to create value, economic development, and job opportunities are commonly acknowledged (Audretsch & Thurik, 2001). However, doubts emerge with respect to entrepreneurship's ability to have a meaningful impact on sustainable issues (Hall & Vredenburg, 2003). Still, evidence shows that not all entrepreneurs are profit-driven; some of them simultaneously pursue economic, environmental, and social goals (Acs, 2007; Zollo, Cennamo, & Neumann, 2013). Previous research indeed emphasizes that 'entrepreneurship should be seen as an important channel for sustainable products and services' (Ferreira, Fernandes, Veiga, & Caputo, 2022: 8), thus the emergence of the field.

Consequently, the question of the ability of entrepreneurship to contribute to sustainable development has been investigated in the literature, which identifies different types of entrepreneurship depending on their objectives. 'Traditional entrepreneurship' (Santos, 2012), or 'commercial entrepreneurship' (Smith, Bell, & Watts, 2014), follows a single bottom line, that is,

pursues economic objectives only. ‘Environmental entrepreneurship’ (Bennett, 1991), or ‘ecopreneurship’ (Schaltegger, 2002), aims a double bottom line (DBL), that is, targets economic and environmental objectives. ‘Social entrepreneurship’ (Saebi, Foss, & Linder, 2019; Zahra, Gedajlovic, Neubaum, & Shulmand, 2009), also follows a DBL, but this time pursuing economic and social objectives. ‘Sustainable entrepreneurship’ (Dean & McMullen, 2007; Schaltegger & Wagner, 2011) targets a TBL.

The literature has clearly established differences between these different forms of entrepreneurship (Austin, Stevenson, & Wei-Skillern, 2006; Belz & Binder, 2017; Zahra et al., 2009). For example, a healthtech startup can be considered as traditional entrepreneurship if it only takes into account economic objectives. It can be social entrepreneurship if it explicitly aims to address patients’ needs (and may be in a position when it has to balance this social objective against economic goals). Finally, it can be sustainable if its objectives also integrate environmental goals. Some academics (Belz & Binder, 2017; Matzembacher et al., 2019; Schaltegger, Lüdeke-Freund, & Hansen, 2016) investigated how integrating the TBL affects the entrepreneurial process, highlighting the differences with the regular entrepreneurial process (George, Parida, Lahti, & Wincent, 2016; Gregori, Wdowiak, Schwarz, & Holzmann, 2019). Some considered that the sustainable entrepreneurship process starts with the DBL, to reach the TBL during the solution development (Belz & Binder, 2017), while others observed that some entrepreneurs manage to address the TBL since idea generation (Matzembacher et al., 2019).

Matzembacher et al. (2019) were the first to integrate impact assessment into the sustainable entrepreneurial process, considering that this step is what distinguishes the sustainable entrepreneurial process from the regular entrepreneurial process. Nonetheless, further research is needed as authors admitted mixed results due to their heterogeneous sample. They found out that non-for-profit and for-profit organizations have different dynamics, and incubated startups and non-incubated startups follow different patterns as well. The authors stated that ‘The process of the sustainable entrepreneurship ends when it produces the effective positive economic, environmental, and social impact on society’ (Matzembacher et al., 2019: 22) but did not provide evidence on what is produced, at different steps of the process, to assess such impact.

SIA for startups

SIA can be defined as ‘any process aiming to achieve sustainability goals and to make sustainability issues tangible and understandable based on a decision-guiding approach that helps to identify, structure and evaluate the sustainability impact of past, current and/or planned actions’ (Trautwein,

2021: 3). This concept is the result of an increasing proximity between the literature on sustainability assessment and impact assessment (Waas, Hugé, Block, Wright, Benitez-Capistros, & Verbruggen, 2014). While some consider sustainability assessment as an umbrella notion that included impact assessment (Hacking & Guthrie, 2008), others argue that sustainability assessment is a new form of impact assessment, a process of interpreting sustainability challenges, integrating these issues into decision-making by assessing sustainability impact, and fostering sustainability objectives (Waas et al., 2014). Impact assessment is described as ‘the process of identifying the future consequences of a current or proposed action’ (International Association for Impact Assessment, 2020), and academics emphasize that it relies on the integration of the TBL (Visser, Matten, Phi, & Tolhurst, 2009). While acknowledging the proximity of the two concepts, we will use the term SIA for the purpose of this research, consistently with previous papers focusing on startups (Trautwein, 2021).

SIA concerns the business model (Pizzi, Corbo, & Caputo, 2021), and is also related to sustainability reporting or Corporate Social Responsibility-reporting (Fernandez-Feijoo, Romero, & Ruiz, 2014). Bengo, Arena, Azzone and Calderini (2015) reviewed different methodologies used by academics and practitioners to create non-financial reporting and highlighted the proliferation of different approaches. Some efforts have been made to guide firms on how to create their sustainability report. In 2006, the United Nations Global Compact and the Global Reporting Initiative jointly provided a framework of processes and indicators to assess companies’ sustainability. The ISO 26.000, launched in 2010, also provided guidelines for firms to define their social responsibility. SIA researchers take into account such tools and techniques that are used for sustainability reporting, but some consider that ‘they play a less significant role’ (Bond, Morrison-Saunders, & Pope, 2012: 55) than their use in the decision-making process.

However, the literature informs us that most entrepreneurs do not implement such methodologies to assess their contribution to their targeted objectives (Håbek, 2014). Some even argue that startups are less likely to address many sustainability goals (Hockerts & Wüstenhagen, 2010), considering the challenges they already face at an early stage (Picken, 2017). Despite the fact that they generally do not provide proof of their contribution (Håbek, 2014), startups are often promoted for their new environmental and social innovations (Hockerts & Wüstenhagen, 2010; Schaltegger & Wagner, 2011) and supported by public policies (Adler, 2011; Bergmann & Utikal, 2021). In that context, the dearth of knowledge on SIA for new ventures (Fichter et al., 2023) appears problematic. So far, the few papers on the topic emphasize that SIA is particularly challenging in the first years of a startup considering the uncertainty it deals with (Hornes, 2019). Entrepreneurs’ intention is key in that context (Di Vaio et al., 2022), and they should measure their contribution according to their stakeholders (Stojanović et al., 2021). Hence, each SIA should be unique and can be considered as a social construction relying on various stakeholders (Matzembacher et al., 2019).

The fact that ‘no previous study has addressed the gap created by the dearth of SIA studies focusing on entrepreneurial ventures’ (Di Vaio et al., 2022: 2) is critical for two additional reasons. First, for stakeholders (Freeman, 1984; Voinea et al., 2019), it is useful to clarify how SIA can be measured to better assess the startups’ sustainability contribution (Hornes, 2019). Moreover, the triple objective of sustainable entrepreneurship corresponds to different stakeholders, and there are complexities in measuring it according to each stakeholder goal (Costa & Pesci, 2016). Second, for startups, which have to cope with the very many different methodologies (Bengo et al., 2015) used by stakeholders (Hassan & Marimuthu, 2018). In particular, investors (Arjaliès, Laurel-Fois, & Mottis, 2022; Bocken, 2015) recently developed various different tools dedicated to startups. This lack of a common framework confuses entrepreneurs, and it takes them a lot of their – scarce – resources to find the most suitable framework (Trautwein, 2021).

To conclude, SIA is an emerging field that has only started to investigate the case of sustainable startups. Recent contributions have either developed more suited frameworks (Hornes, 2019) or emphasized startups' difficulties while providing SIA (Trautwein, 2021), but none have empirically investigated how, in practice, sustainable startups assess their contribution to sustainability, during their entrepreneurial process.

Methods

Design and sample

To investigate how sustainable startups integrate SIA in their sustainable entrepreneurial process, we conducted exploratory qualitative research. This design is suited considering the phenomenon investigated and the question raised. First, such an approach is appropriate when the ‘focus of the study is contemporary (as opposed to an entirely historical) phenomenon’ (Yin, 2018: 4) that unfolds over time (Alvord, Brown, & Letts, 2004). In addition, Yin (2018) argues that these types of studies favor comprehension of a complex and underexplored phenomenon (Di Vaio et al., 2022; Fichter et al., 2023). Previous authors have indeed emphasized that ‘sustainable entrepreneurship research is still in its infancy’ (Gast, Gundolf, & Cesinger, 2017: 52), and academics are only starting to investigate their SIA practices (Fichter et al., 2023). Second, our research question focuses on actors and their discourse, and is thus suited for comprehensive research (Dumez, 2021). In this approach, researchers seek closeness to actors, which is why it is also considered as ‘engaging research’ (Gioia, Corley, & Hamilton, 2013: 19): proximity with informants should generate new hypotheses (Yin, 2018).

This research was carried out as a part of a long-term research project at a particular French incubator, a setting that has several advantages. First, it enabled access to sustainable startups to conduct a multiple case study (Yin, 2018). This methodology favored the comprehension of similarities and discrepancies among practices (Gustafsson, 2017) and was thus suited for our research question. This provided the researcher with detailed and longitudinal information and documentation, with the opportunity to observe and interact with startups on a regular basis for a significant duration. The proximity with informants revealed itself critical for our topic, as we discovered that sustainable startups actually do a lot more than what is visible externally, or than what they are willing to share with most of their stakeholders. The researcher observed the sustainable entrepreneurial process ‘as it happened’, rather than through a posteriori reconstitution (Demil & Lecocq, 2015). Last, previous research has concluded to mixed results due to sample heterogeneity (see Matzembacher et al., 2019), and our setting provided comparable startups. The focus on incubated startups is consistent with the fact that in France, even if there are exceptions, it is more common for a startup to join an incubator, according to Bpifrance's website. We choose startups from the same incubator because if startups from different incubators had been considered, there would always have been a doubt that differences observed across startups in the entrepreneurial process or in the SIA were related at least to some extent to the differences between the incubators themselves (training, programs, selection, etc.). Therefore, we argue the ‘revelatory potential’ (Gioia et al., 2013: 15) of our research design.

First, we analyzed startups’ applications to the incubator to determine whether they could be labeled ‘sustainable startups’. We considered ‘startup’ companies that are (i) young – created less than 5 years, and (ii) innovative – with at least one person in the team in charge of research and development. Consistently with Blez and Binder’s (2017) perspective, we considered ‘sustainable’ startups mentioning at least a DBL, that is arguing economic, and social or environmental benefits. To assess that, we looked at startups’ applications to the incubator. We contacted startups’ founders meeting these criteria, and eight of them agreed to participate in our longitudinal research. This number appeared consistent with Yin’s (2018) recommendation to have between 2 and 10 cases for this kind of study. This sample size also enhances the validity and reliability of the study (Crouch & McKenzie, 2006). Table 7 provides summarized information on the cases.

Table 7. Brief description of cases used for the multiple case study

ID	Year of creation	Sector	Description
S1	2017	Agritech	Promoting made in France agriculture using innovative farms
S2	2018	Health	Developing IA to support pathologists
S3	2019	Clean energy	Enhancing the methanization sector through innovation
S4	2020	Foodtech	Innovative food product for food professionals
S5	2020	Recycling	Computer vision for the transition to circular industry
S6	2021	Health/Data	Enhancing public research through data valuation
S7	2021	Fashion	Lowering the fashion industry emissions using an innovative process
S8	2018	Digital purchase	Making purchasing smarter and more accessible

Data collection

Our immersive setting is consistent with an ethnographic approach (Atkinson & Hammersley, 1994). One author has been included into the incubator’s staff since the beginning of the research in 2020. She was present on-site 4 days a week, thus having privileged access to startups. Following an insider–outsider approach (Gioia et al., 2013), the other author was external to confront the different views, thus strengthening the reliability of our results.

To analyze sustainable startups’ SIA and their sustainable entrepreneurial process, we gather multiple data sources.

First, different types of documents were collected for each of our cases: applications to the incubator (about 7 pages per startup), selection committee reports (about 2 pages), applications to public grants (about 30 pages), and pitch decks for investors (about 10 slides). We also monthly checked their social media, in particular their LinkedIn page (all of the startups in our sample have at least created a LinkedIn page), and their interactions on the incubator’s Slack, restricted to startups incubated (in 2021, 97% of incubated startups counted at least one founder as an ‘active member’ on Slack), alumni, and the incubator staff.

Second, regular informal and formal discussions with informants took place and the researcher took notes spontaneously and systematically each time this happened, and then shared them with the other author (Laszczuk & Garreau, 2018). They retraced both direct informal interactions with informants

(founders, employees, stakeholders, and incubator staff) and various participant observations (Spradley, 1980), in particular thematic events ‘founders only’ organized by the incubator (about 70 per year), weekly meetings with the incubator staff, and monthly startups selection committee.

Third, we conducted in-depth semi-structured interviews with startups’ founders. We chose CEOs because they appeared as the most legitimate to provide information on their startups. Previous research also emphasized the importance of the founders’ vision while considering startups’ challenges (Bridge, 2021). During the interview, entrepreneurs were asked about the topics defined in the interview guide (see [Appendix C](#)) and encouraged to speak freely (Yin, 2018). Our goal was to identify what they did in terms of SIA and different stages of their development. The interviews were recorded with the participant agreement and lasted from 1 hour and 6 minutes for the shortest to 2 hours and 5 minutes for the longest. These interviews were scheduled in 2021, and in 2022, we conducted additional semi-structured interviews with each founder, which lasted between 35 minutes and 1 hour 02 minutes. The objective was to have a longitudinal approach to the process to confirm some statements made during the first interviews and to observe potential evolution.

Triangulation was guaranteed by the collection of many sources of information. In particular, we presented our results to each Startups’ Manager individually to have their opinion on our findings and check the validity of our findings. Table 8 summarizes the data collected for our multiple case study and their use in the analysis.

Table 8. Data collected

Data source	Type of data	Use in the analysis
Interviews	Sixteen in-depth interviews with CEOs in 2021 (14 hours) and in 2022 (6 hours)	In-depth entrepreneurs’ interpretations and intentions for their SEP and SIA with a longitudinal perspective
	Three interviews with Startups’ Managers (3 hours)	Triangulation
Observations	Field notes, gathered in a digital siblylline research diary, collected from: <ul style="list-style-type: none"> • direct informal interaction with different informants (employees, founders, stakeholders, and incubator staff) • about 140 ‘founders’ events • Entrepreneurs’ discourse in front of peers and stakeholders 	Additional data on entrepreneurs’ interpretations and intentions for their SEP and SIA Employees, stakeholders, and incubator staff’s interpretations of the SIA conducted by the case Eighty weekly meetings with the incubator staff
Archival data	Applications to the incubator (56 pages), to public grants (240 pages), pitch deck, startups’ social media (LinkedIn and Slack)	Chronology of communications, both confidential, for close stakeholders and public for larger audience

CEO, chief executive officer; SEP, sustainable entrepreneurial process; SIA, sustainability impact assessment.

With respect to our ethical protocol, the incubator allowed us the access to startups, events, and weekly meetings. It was agreed with interviewees that the audios and interviews transcriptions

would only be available to authors and destroyed after the research. Authors guaranteed the anonymity of the startup in a rigorous manner as no information provided in any articles should allow identification of the interviewees. We validated with entrepreneurs our anonymization process, and they agreed to the publication of any quote used.

Data analysis

We coded our material altogether and organized it by information source. First, the ‘personal’ code was dedicated to any data collected during one-to-one interactions. It mostly concerned interviews and also any other discussion with them noted in the diary. We considered this source of information to be the most reliable with respect to our research question. Second, the ‘confidential’ code was used for any information the entrepreneur shared with close stakeholders and for any comments made by a stakeholder with respect to the case. It concerned in particular the data collected from documents (applications to the incubator and to public grants, pitch deck, and Slack messages) and observations (weekly meetings with the incubator team, founders events, and any information brought by a stakeholder of a case and noted in the diary). Third, the ‘external’ code concerned any public information, mostly published in the startup’s social media.

We encoded our material following Gioia et al.’s (2013) recommendations. First, we conducted first-order analysis with codes very close to informants’ words (e.g., ‘disgusted by greenwashing’, ‘team’, ‘personal ambition’, ‘talent’, ‘normal choices’, etc.). Then, our objective was to identify similarities and differences, so we created more readable second-order themes consistent with our research question (e.g., ‘sustainability impact assessment tools’, ‘stakeholders implication’, ‘resource allocation’, ‘communication’, ‘legitimacy’, etc.). We then aggregated these themes into four maturity levels: idea generation, prototype, validation, and production and commercialization.

At that point, we used the literature on sustainable entrepreneurship process and decided to look at whether startups started by recognizing a DBL problem, followed a DBL opportunity, constructed a DBL solution, and then developed a TBL solution – consistently with Belz and Binder (2017), or if some of them managed to start the TBL since idea generation – as Matzembacher et al. (2019) suggest. Our results align with the later suggestion, as we identified two clear groups, one who sought the TBL since idea generation and another one who integrated the TBL later in their development. Figure 7 presents – in a very simplified way – our data structure.



Figure 7. Summary of the data analysis

Results

In this section, we will present in detail how startups in our panel integrated SIA in their entrepreneurial process, emphasizing choices made, activities conducted, and concerns that emerged in different stages.

Idea generation

Idea generation is related to motivation, previous knowledge and experience, and entrepreneurs' capabilities. All respondents had main concerns about one or several social and environmental issues, for which they had or developed a lot of knowledge, and desired to tackle through the form of a startup. However, while some focused on one specific issue (S1, S2, S4, and S8), others adopted a rather systematic approach (S3, S5, S6, and S7). S1 was concerned about market practices with respect to the production of a specific product; S2 was deeply interested in enhancing pathologists' decision-making process; S4 wanted to find a solution to avoid food waste in the food industry sector; and S8 cared about the decreasing purchasing power of a part of the population.

Others were also deeply concerned with one specific topic, but were as well very demanding to themselves about both social and environmental stakes, and did not want to neglect one aspect for the other. Two of them, one in clean energy (S3) and the other in health (S6), developed a revenue

model in which populations with less income contribute to the value creation and perceive revenues for it. They included their mission into their legal status when creating the startup and adopted a specific French status called mission-driven companies (*'société à mission'*). Two others (S5 and S7) did not know about this status but investigated the possibility of becoming a mission-driven organization at the commercialization stage. During idea generation, they asked themselves a lot of questions with respect to how they could develop an exemplary startup, how they could positively change their industry's market practices toward more responsibilities, and how their environmental solution could be more inclusive.

The integration of a DBL, on the one hand (S1, S2, S4, and S8), and of a TBL, on the other hand (S3, S5, S6, and S7), impacted the design of their business model, the company's values, and the choice of stakeholders.

Prototype

The prototype phase is set when startups initiate their first studies for their innovative products and test with some clients what could be their minimum viable product. In this phase, the goal is to formulate hypotheses from the problem identified during idea generation. It is also when the first key performance indicators are set and first structuring decisions made.

Those who focused on a DBL (S1, S2, S4, and S8) defined their business models accordingly, as well as their stakeholders and key performance indicators. For example, the ones following economic and environmental objectives (S1 and S4) tried to assess which alternative would benefit the most to the environment. Likewise, the ones addressing social issues (S2 and S8) aimed for the most social performance. Their approach was pragmatic at that point, and they did not investigate in-depth the question of SIA, for which they had, at that point, little knowledge. They considered that focusing on a DBL, in comparison to a triple one, reduces the risk of green- or social-washing: 'The less we use dubious artifacts, the less we do greenwashing' (S4). Another mentioned reason was their lack of resources: 'I would have loved to invest time in assessing our contribution to sustainability from the beginning, but a resource invested there is not invested elsewhere' (S1). Finally, they argued that they felt no pressure from their stakeholders to invest such resources for SIA at that point: 'No one ever asked me that question for our seed' (S2), 'We did things when it appeared it was time to do them, not before' (S8).

On the other hand, those who started with a TBL appeared more concerned about SIA (S3, S5, S6, and S7). For some (S3 and S6), it was included in their process due to their driven-mission

status, which requires a ‘mission board’, composed of key stakeholders, who will determine and enforce indicators, in order to attest whether the firm is pursuing its mission according to stakeholders’ needs. In addition, such companies will later face an annual audit led by a trusted third-party organization. Both S5 and S7, environmental solutions, identified key performance indicators for the all TBL. They also made structuring internal decisions for their startups according to their values. One chose to boycott some providers for ethical reasons and adopted a responsible digital strategy (S5), while the other declined professional events for environmental reasons (S7).

They considered governance and internal culture as key issues, and chose to address it at an early stage (S3, S5, S6, and S7). To them, the first impact a company generates is on their employees. They conduct their first recruitment interviews insisting on their sustainability ambition and favored candidates that seem to share this vision and care for such concerns. All of them considered that talents pay attention to SIA, e.g. ‘During the interview [the candidate] kept asking questions about what we do for sustainability. It motivated me to make him a proposition, but I also felt like passing a test, he would not have come if he felt we were not serious’ (S5).

While aiming for the TBL (S3, S5, S6, and S7), this group also chose not to communicate about it externally (S5, S6, and S7). They also feared being accused of green- or social-washing, as they considered that they will have a ‘real’ impact only later in their development. Indeed, all of them also identified gaps in their first SIA, e.g. ‘The assessment is not perfect, there is too much uncertainty to be accurate anyway’ (S3). Nonetheless, their objectives were clear to them and they identified their partners accordingly, e.g. ‘we chose our stakeholders and employees accordingly’ (S5). Some stakeholders were supportive, ‘They encourage us to pursue our first assessments, it provides concrete evidence, it makes them proud to be on the adventure’ (S7); while others were less enthusiastic: ‘At best, it’s the cherry on the cake, but it does not drive their decision’ (S7).

Validation

In the validation phase, startups ensure the validity of hypotheses made in the prototype phase as well as customers’ interest. They also have more financial means as they raised funds to increase their capabilities.

From prototype to validation, startups that started with the DBL explored the TBL (S1, S2, S4, and S8). Different factors motivated them. Overall, they pointed out external and internal reasons. Some

stated that sustainability concerns increased with the pandemic (S1, S2, and S8). They observed that talents became more demanding (S1, S2, and S8); that private and public investors started to dig further into sustainability criteria (S1, S2, and S4); and that being acknowledged for their sustainable contribution could lead to media attention and business opportunities (S1 and S4). Aside from these exogenous factors, they all mentioned personal interest in these topics. They were also convinced that addressing sustainability before they reached a certain maturity level was incoherent. At a later stage, they considered that they could invest resources to assess their contribution to sustainability. Like for the first group in the prototype phase (S3, S5, S6, and S7), the second group started by investigating their impact on employees, and all of them built an internal well-being strategy. They also needed to improve their comprehension of sustainability management, as they all admitted their scarce knowledge on that matter. Their main difficulty was to determine ‘where to start’ (S2), as they just acknowledged that ‘assessing is so time consuming... but before even assessing anything, just having the data is a challenge’ (S1). They asked for help to better understand what can be done in that respect, asking their employees for suggestions (S1 and S8), seeking advice from their incubator (S2 and S4), or looking for advice from more experienced entrepreneurs (S2 and S8).

Startups from our sample which started with the TBL since idea generation (S3, S5, S6, and S7) had, during the validation phase, a clear idea of the SIA they wanted to conduct and invested resources in. They worked either with an external provider (S3, S5, and S7), or with academics (S6) to perform life cycle assessment (S3, S5, and S7), to obtain a carbon footprint report (S5), or to assess their business model’s sustainability (S6). Some (S5, S6, and S7) investigated the B Corp certification, which assesses companies based on five impact criteria: governance, workers, community, environment, and customers. These three completed the long questionnaire to obtain a score and one applied to the certification (S7). They also invested in internal resources to implement a SIA strategy. They all designated a manager in charge of this topic, and two recruited an intern dedicated to this task (S3 and S5). The two mission-driven companies (S3 and S6) designated a dedicated employee responsible for the Mission Committee, where stakeholders assess their SIA.

Production and commercialization

At production and commercialization phase, proof of concept and technology have been validated and the company now faces clients management. The startup and its team are therefore more structured.

The group who just explored the TBL (S1, S2, S4, and S8) discovered the work and resources SIA requires. While deciding to establish sustainable impact measurement, these entrepreneurs adopted a

bricolage approach. For example, one started by developing recycling at work (S2). They tested different approaches, rather than structuring a strategy. They felt overwhelmed as they ‘still discover new challenges, new things to implement, changes needed to be conducted ... it’s a lot’ (S8). A great difficulty arose from integrating the TBL because the first bricks of their development were based on DBL objectives. Such a shift required changing the foundations of their startup, e.g. ‘To follow a social purpose, which is new, we need to review our initial mission’ (S1). In that context, SIA was mostly done by founders alone, who needed to prepare the announcement of their new mission to their stakeholders: ‘I cannot wake up one day and say this is the way it is going to be. I know that I will have to convince’ (S4). They anticipated that investors would not be enthusiastic about this engagement for SIA: ‘If my investors knew I started to spend time on these matters, with all the other challenges we are still facing, they would kill me’ (S2); ‘I did not present my roadmap on these matters clearly to my investors. I came up with a strategy on what I could say to whom ... well, let’s say they agree when it is done and it’s better if you present it with good news’ (S8).

Overview of the process

Our results distinguishes two distinct groups who integrated the TBL at different stages of their entrepreneurial process, which affected their SIA practices. We designated the first group (S3; S5; S6; S7) ‘born-sustainable startups’, as they integrated the TBL since idea generation. We labeled ‘transitioned sustainable startups’ the second group (S1; S2; S4; S8), composed of born-environmental and born-social startups that have created their companies based on a DBL, and integrated the TBL later in their development, during the prototype/validation phase.

On the one hand, born-sustainable startups (S3; S5; S6; S7) made structural decisions in line with their economic, social, and environmental objectives since idea generation and have chosen their stakeholders accordingly and shared with them their first SIA. In later phases, they constructed a more robust approach to SIA, using external and internal resources. Soon, they developed a SIA routine and constructed a roadmap with a continuous iterative process. On the other hand, ‘transitioned sustainable startups’ (S1; S2; S4; S8) focused on their first steps on a DBL and defined their indicators accordingly, while not considering SIA as a priority. As they explored the TBL, they discovered sustainability management and SIA requirements. They adopted a bricolage approach (Lévi Strauss, 1962) to cope with their delay, scarce knowledge and resources, and stakeholder misalignment. Figure 8 summarizes how they, respectively, integrated SIA in their entrepreneurial process. To have a clearer synthesis, we regrouped idea generation and prototype, as well as validation and production and commercialization.

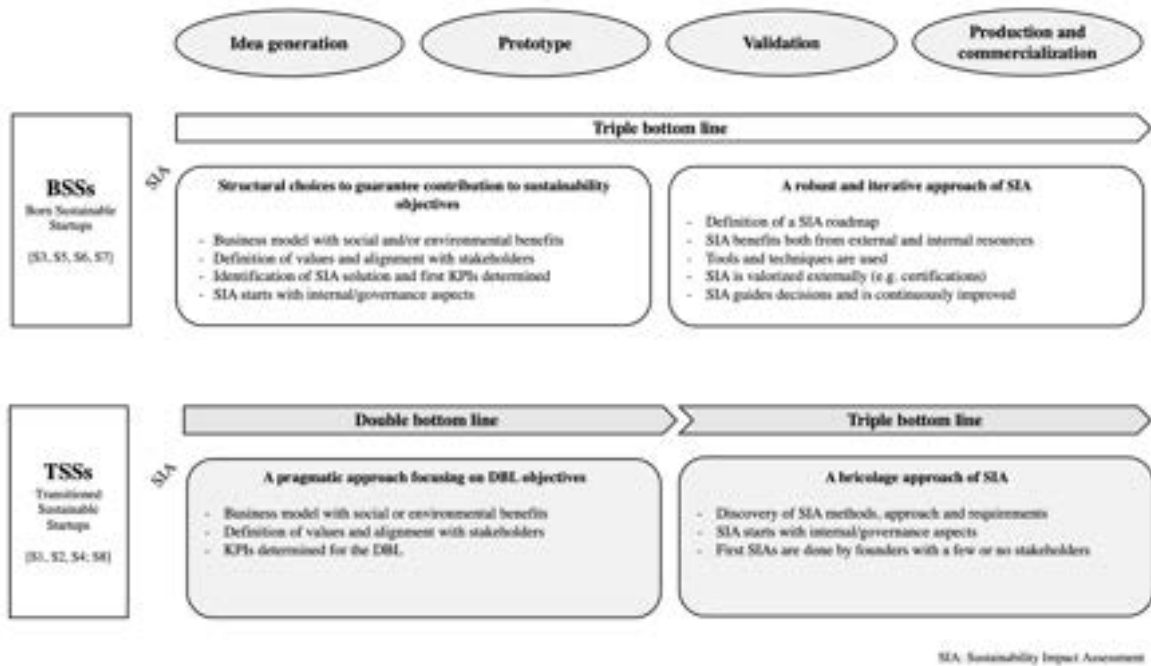


Figure 8. Overview of the sustainable impact assessment practices used by born-sustainable startups and transitioned sustainable startups

Discussion and conclusion

Summary and discussion of main findings

Sustainability practices of companies have retained the attention of some scholars, but a gap remains with respect to SIA for sustainable startups (Fichter et al., 2023). Such knowledge is critical not only to guide practitioners, who wish to foster sustainability, but also to better understand the entrepreneurial process, and to draw a line between traditional startups and sustainable startups (Matzembacher et al., 2019). Recent contributions have started to investigate SIA for startups (Di Vaio et al., 2022; Hornes, 2019; Trautwein, 2021), but we still know little about how sustainable startups integrate SIA at different levels of maturity.

This paper addresses this gap by exploring a multiple case study of eight sustainable startups with 2 years spent on the field. As we opened the black box of their SIA practices (Álvarez Jaramillo et al., 2019), we discovered two distinct approaches. In the end, both can be considered ‘sustainable startups’, as they address the TBL, but thanks to our longitudinal approach, we were able to reveal different paths that can be adopted. On the one hand, some startups have targeted the TBL since their beginning. From idea generation to prototype, they made structural choices to guarantee contribution to sustainability objectives, which allowed them to have a rather robust approach to SIA, continually

improved in an iterative process. On the other hand, other startups have focused on DBL objectives – economic, and social or environmental – from idea generation to prototype, and their indicators were narrowed to these two objectives. They adopted a TBL later, from prototype to validation, which led them to have a bricolage approach to SIA.

We labeled the first group ‘born-sustainable startups’, inspired by the emerging concept of ‘born-sustainable’ firms. It designates firms ‘which were established with explicit strategic intent to operate in a sustainable manner from the outset. BSFs [born-sustainable firms] seek to contribute directly to regenerating the environment and driving positive societal changes’ (Knoppen & Knight, 2022: 1790). It echoes with the wider literature on ‘born-global’ firms and has been, to that point, especially studied in relation to the fashion industry (Dicuonzo, Galeone, Ranaldo, & Turco, 2020; Ostermann, da Silva Nascimento, Kalil Steinbruch, & Callegaro-de-Menezes, 2021; Todeschini, Nogueira Cortimiglia, Callegaro-de-Menezes, & Ghezzi, 2017). The second group is named ‘transitioned sustainable startups’. This choice is consistent with the ‘transition’ stream of the literature on sustainable entrepreneurship (Terán-Yépez et al., 2020), investigating how firms integrate the TBL in their business development.

We emphasized that the integration of the TBL has an effect on SIA practices. Doing so, we provided an in-depth analysis of sustainable startups' practices and challenges. We questioned how sustainable startups integrate SIA in their entrepreneurial process, and showed that it is the result of different initial motivations and choices made, according to different prioritizations, which have consequences on the SIA produced and also on stakeholders' management and communication. We showed that SIA is less a static object, but rather a process, in which entrepreneurs choose to put their companies, with different trajectories according to trade-offs made.

Contributions

Our research demonstrates the interdependence between SIA and the entrepreneurial process. The SIA is built during the entrepreneurial process but also results from it. Such results strengthen the literature on sustainable entrepreneurship by providing evidence of how it can pursue the TBL. Our results are therefore consistent with Matzembacher et al. (2019), and contradict the ‘convergent’ sustainable entrepreneurial process suggested by Belz and Binder (2017): sustainable startups can start with the TBL since idea generation. Therefore, we argue that sustainable startups can indeed address a broad perspective of sustainability, even though it requires additional efforts, whereas previous research mostly emphasized their narrowed perspective (Hockerts & Wüstenhagen, 2010).

Our paper also answered a call for more investigation of SIA for startups (Fichter et al., 2023). Not much is currently known in that field, but some academics have already offered a literature review (Di Vaio et al., 2022), investigated the challenge it represents for startups (Trautwein, 2021), and offered a suited framework (Hornes, 2019). Consistently with these findings, we observed entrepreneurs' difficulties, considering their lack of knowledge, their scarce resources, and the uncertainty they deal with. SIA starts for these startups with the investigation of their impact on their employees and with their governance. This result is consistent with many studies connecting Environmental, Social and Governance criteria with sustainable development (e.g., Theodoraki, Dana, & Caputo, 2022). We emphasized the exploration conducted by sustainable startups to establish their contribution to sustainability, and insisted on the iterative process of SIA, which goes further than just tools and techniques (Bond et al., 2012).

SIA is often considered useful to manage stakeholders' different expectations with respect to the TBL, and to better communicate with them (Costa & Pesci, 2016). Our investigation on the field showed that sustainable entrepreneurs often do more in terms of SIA than what is visible to the outside, and even to their stakeholders. In the literature, SIA is often portrayed as the result of a collaboration among stakeholders (Di Vaio et al., 2022; Hornes, 2019). While it was the case for those who chose their stakeholders according to the TBL, we observed that SIA can be done, in some cases, without key stakeholders, as entrepreneurs fear they might not align with this new ambition. Entrepreneurs also meticulously prepared every communication related to sustainability, as they feared more than all being accused of green- or social-washing (Delmas & Burbano, 2011; Rizzi et al., 2020). In that context, SIA appears as an interesting 'non-human actor' (Akrich, Callon, & Latour, 2006), that takes various forms, and is shared cautiously with the sustainable startup network.

Limitations and further research

We acknowledge several limitations to our research that call for further investigations. Exploratory studies are difficult to extend to a broader population. Our material investigated incubated, innovative, and nascent startups aiming for the TBL. As Matzembacher et al. (2019) found out different results for incubated startups, further research could compare our results with non-incubated startups. We only observed startups in the same ecosystem - the Parisian context in the 2020s. Previous research insisted on the importance of the context on entrepreneurial organizational behavior (Caputo & Ayoko, 2021), and in particular of the geographic context on social startups (Corner & Kearins, 2018). Therefore, a comparative analysis of different countries might reveal discrepancies. Further research could also investigate the discrepancies among the two groups as

startups grow, for example, in terms of financial performance (Bartolacci, Caputo, & Soverchia, 2020).

We also found additional results, not directly related to our research question, that emerged more inductively and echoes previous literature. Born-sustainable startups seem to have more talent attraction when compared to transitioned sustainable startups (Nangoy, Mursitama, Setiadi, & Pradipto, 2020), but more difficulties raising funds (De Lange, 2017). Further research could provide more evidence of this first insight, and also dig into the stakeholders' misalignment described by transitioned sustainable startups from our sample. Moreover, the two categories could also be further investigated in the light of the motivation literature (Voinea et al., 2019). Last, some nascent sustainable startups employed a dedicated person for SIA. This appears rather new for such small companies, and this new kind of 'joiner' (Roach & Sauermann, 2015) could retain academic attention to better understand the collective journey of entrepreneurship (Mustar, 2021).

Practical implications and recommendations

Our study has practical implications for startups in particular, and for stakeholders aiming to help them with respect to SIA. From the field, we were able to see that the first question entrepreneurs ask themselves is: 'Where to start'. When entrepreneurs' 'intention' (Di Vaio et al., 2022) to address sustainability is expressed, a long path remains with respect to the appropriate steps. We observed that defining values is key, as the first choices made often concern internal and governmental aspects. Entrepreneurs should then dedicate time to understand SIA's requirements, and they can learn from our study in that regard. Last, the uncertainty they deal with creates frustration due to a fear of green- or social-washing. We rather argue that they should consider SIA as an iterative process, continually improving as the uncertainty reduces and their experience increases. We also consider that green- and social-washing can easily be avoided, to the extent that first attempts of SIA do not need to be communicated.

Last, we answered a call for research for 'a more profound analysis of the sustainable entrepreneurial dynamics at play during the pre-seed and seed stages of an entrepreneurial venture's life cycle would provide a more accurate picture of the policies that should be employed to promote sustainable development projects' (Di Vaio et al., 2022: 15). Public policies could play a significant role in guiding startups with respect to SIA. Governments could support sustainable entrepreneurship with an external perspective and expertise that founders usually do not have (Johnson, 2015), thus reducing the heterogeneity of practices (Brammer et al., 2012). Finally, sustainable startups' stakeholders and founders themselves can better understand what can be expected from a sustainable

startup in terms of SIA, at different stages of maturity, and according to which path the entrepreneur wants to follow.

Chapter 6. Sustainability for Startups: Embedded in An Entrepreneurial Ecosystem

Section 1. The Abduction Process

The Elaborated Material - “We Are a Mission-Driven Company”

The alarm went off early this morning, “there is a CE” (understand Experts Committee). The incubator team was present half an hour before, the Office Manager had prepared the room - a beautiful library - printed candidate files, and set out the pastries. Some Startup Managers send text messages to their entrepreneurs, to check that they will be on time. Young Entrepreneurs in Residence were present, sending each other messages on the internal communication tool, followed by knowing smiles. Members of the committee are arriving gradually. About fifteen innovation managers in different public organizations take part in the committee, in the same way that Agoranov is invited to theirs. The nominative name tags are installed to the left of the entrance. There are some absentees, some nameplates will remain there. Last informal discussions under the heavy noise of the coffee machine, and we will soon be able to begin. The door is closed to the entrepreneurs from the first project, who are waiting to be invited to enter. A few introductory words from the Director who thanks the loyal members of the committee, and then a Startup Manager invites the first project to enter.

Pitch - questions/answers - internal and external expertises - committee deliberation - next project. We are switching from a Cloud solution to a project in ocular pathologies. Some project leaders are in their early thirties, others in their fifties. Few women are pitching this morning, even though they are in majority in the room. The same logos from prestigious universities often come back. As candidates present, I take notes on whether they discuss social and environmental issues, or whether questions are asked on the matter. This exercise becomes routine, and yet we continue to be surprised by the diversity of the problems addressed and by the passion that entrepreneurs are ready to put into trying to solve them.

“Good morning everyone, today I am going to introduce you to Beyond Fossil Fuels⁴, we are a mission-driven company”. I raise my head in curiosity. I don't know what it is. It appears I am not the only one. Indeed, entrepreneurs explain that it is a new legal status for companies, from the PACTE law enacted a few months prior. The pitch continues. Afterward, no questions are asked to entrepreneurs about this status. During the deliberation, without entrepreneurs, the committee briefly discussed it.

The Background Theory

From my perspective, this situation was considered as a “new situation” (Blumer, 1969), as it contrasted with “recurrent situations” I observed through the other committees. The surprise comes from the very structure of entrepreneurs’ pitch. The pitch is supported by slides that often address the same key points. problem and solution; technology; market, competition and business model; key performance indicators and roadmap; the team; and why the project wants to join the incubator. While the order varies, these are consistently the key elements presented. This standard reflects a norm within the entrepreneurial ecosystem, but also entrepreneurs’ preparation for the Experts Committee, often facilitated by their Startup Manager. Entrepreneurs have ten minutes to pitch, requiring them to be concise and straight to the point. Their intervention is timed, and they are notified when they only have one minute left. Here, just after the cover slide, the second one was dedicated to the specific mission-driven status. As this status is new, entrepreneurs chose to dedicate a significant part of their pitch to its explanation. As a result, they had less time to address other key points.

One hypothesis to analyze this surprise - that an entrepreneur prefers to dedicate time to talk about startups’ responsibility instead of performing on the evaluation criteria - could be that entrepreneurs misinterpreted the evaluation criteria. This interaction could be interpreted as a “mistake” from entrepreneurs (Dumez and Toussaint, 2022), who might have had “blind spots” (Morrione and Fabermann, 1981) with respect to the pitch exercise. However, the interest is less on the sole individual than on the collective interactions observed. Indeed, despite the fact that one actor - the entrepreneur pitching - seems to act alone, situations should be considered as a “joint action” (Blumer, 1969/1998: 70). It reflects an “entrepreneurial situation”, i.e. a situation reflecting entrepreneurs’ intentionality, but also their attempt to construct meaning (Schmitt and Husson, 2017). Entrepreneurs’ intention here is to get the committee’s approval, and considering this objective, they test a scenario where their mission-driven status might play in their favor. Through

⁴ Names have been changed.

this process, a problematization space emerged, with the committee attributing meaning to this status. It led to a discussion among committee members with respect to this specific status. Even though they did not conclude with a positive or negative opinion on it, and rather evaluated the project according to traditional criteria, entrepreneurs raised awareness. Later, during an interview with the founder, they mentioned that most of their interlocutors did not seem to appreciate this status, but they chose to continue mentioning it, as they consider they could influence their stakeholders to consider more startups' responsibility.

The literature emphasized that sustainable entrepreneurs need to act as institutional entrepreneurs, i.e. provide efforts to change institutions such as market regulations despite pressures towards stasis (Pinkse and Groot, 2015; Schaltegger and Wagner, 2011; Pacheco et al., 2010). These articles explore entrepreneurs' actions conducted to change their market's norms, and explain they are needed for the startup to thrive and survive. From that perspective, entrepreneurs are presented as rational agents, acting toward their startups' success. However, these studies rarely consider the institutional entrepreneurship conducted to influence the entrepreneurial ecosystem as a whole, and not a specific industry, nor do they present another vision of the entrepreneur, who might not always be performance-oriented.

Another surprise appeared as I explored the literature. I discovered that the sustainable entrepreneurs' environment was more often described as very hostile (Pacheco et al., 2010; Beveridge and Guy, 2005; Aldrich and Fiol, 1994), which justified the need for institutional entrepreneurship. However, considering the current fad on sustainability, my initial question was whether the need for institutional entrepreneurship for these entrepreneurs was still relevant, in a context where sustainability seemed to be widely promoted. The abductive process led to the sub-research question: "How does the evolution of the entrepreneurial ecosystem affect institutional entrepreneurship?", addressed in the following Article 2.

Section 2. Article 2. Exploring the Evolution of Entrepreneurial Ecosystems Through Institutional Entrepreneurship: The Case of Sustainable Entrepreneurship

Abstract

While the literature emphasized that sustainable entrepreneurs have to carry out institutional entrepreneurship against their own adverse environment, we still know little about entrepreneurs' perception of their entrepreneurial ecosystem and how its evolution might influence the need for institutional entrepreneurship. We address this gap by combining multiple data sources, used through

an in-depth case study of four Parisian sustainable startups, two founded in the 2010s and two founded in the 2020s. Results indicate that the entrepreneurial ecosystem was considered hostile for sustainable startups in the 2010s, which led entrepreneurs to conduct rather isolated institutional entrepreneurship. While influencing their entrepreneurial ecosystem toward sustainability, they opened opportunities for similar new entrants, who now face fewer difficulties. However, sustainable entrepreneurs still act as institutional entrepreneurs in a favorable environment, beyond the sole interest of their startup. This qualitative study emphasizes sustainable entrepreneurship's challenges with respect to each component of their entrepreneurial ecosystem according to their context.

Keyword: Entrepreneurial ecosystems; sustainable entrepreneurship; institutional entrepreneurship; startups

Status: Under review for *Creativity and Innovation Management*

Introduction

Creating a new venture has been largely acknowledged as one of the most difficult endeavors – entrepreneurs have to battle with funding issues, technological issues, staffing issues (Acs and Szerb, 2006). But sometimes, entrepreneurs are so radically innovative that what they seek to achieve simply does not fit within the existing institutional framework and, in addition to all the above, they also have to carry out institutional entrepreneurship, i.e. “efforts to change institutions such as market regulations despite pressures towards stasis” (Schaltegger and Wagner, 2011: 223), in order for their startup to thrive and survive (Santos and Eisenhardt, 2009). This may be the case with many forms of ‘disruptive’ entrepreneurship, like Uber or Airbnb in the sharing economy (Acquier et al., 2019), or with fintechs (Lee and Shin, 2018). Past research has emphasized that such institutional entrepreneurship is particularly critical for sustainable entrepreneurs (Schaltegger and Wagner, 2011; Pinkse and Groot, 2015), who face a particularly unfavorable environment (Aldrich and Fiol, 1994; Beveridge and Guy, 2005; Pacheco et al., 2010). At a time when sustainable entrepreneurship is widely promoted (Hockerts and Wüstenhagen, 2010), it is critical to understand the specific challenges such entrepreneurs face in relation to the institutional framework, and how they attempt to overcome them by engaging in institutional entrepreneurship.

In this context, the entrepreneurial ecosystem in which the entrepreneur is placed plays a major role. Entrepreneurial ecosystems, also called entrepreneurial environment (Dubini, 1989), are “combinations of social, political, economic, and cultural elements within a region that support the development and growth of innovative startups and encourage nascent entrepreneurs and other actors

to take the risks of starting, funding, and otherwise assisting high-risk ventures” (Spigel, 2015: 50). The literature has investigated what could be an entrepreneurial ecosystem that favors sustainable entrepreneurship, and identified the components that characterize a sustainable entrepreneurial ecosystem (Cohen, 2006; Bischoff and Volkmann, 2018). The literature stresses in particular the importance of entrepreneurial support (Theodoraki et al., 2018) and communities (De Bernardi and Tirabeni, 2018). There were also attempts to identify the success factors of sustainable entrepreneurial ecosystems (Bischoff, 2021). However, so far, the vast majority of the research carried out adopted a static perspective. Following recent articles that underlined the dearth of knowledge on how entrepreneurial ecosystems evolve through time (Cho et al., 2021; Theodoraki et al. 2022), we address the following research question:

How does the evolution of the entrepreneurial ecosystem affect institutional entrepreneurship?

To answer this question, we focus on a particular type of entrepreneurship – sustainable entrepreneurship, as the literature identified it as one of the forms of entrepreneurship that required the most institutional adjustments, and for which institutional settings have extensively evolved in the past years. Because of the complex nature of institutional entrepreneurship, we opted for an in-depth case study methodology, relying on various data thanks to an immersive setting. Through the case study of four sustainable startups, two launched in the 2010s and the other two in the 2020s, we investigate the nature of institutional entrepreneurship according to the entrepreneurial ecosystem in which startups launched their new venture.

Our main contribution is to show how entrepreneurial ecosystems evolve through time, shifting from a rather hostile environment for sustainable entrepreneurship to a more favorable one. We identify which components of the entrepreneurial ecosystem were the first to promote sustainability and which ones were more reluctant. We emphasize the different nature and drivers for institutional entrepreneurship between the two groups. The institutional entrepreneurship conducted evolved according to the context, from individual actions to collective institutional entrepreneurship. First sustainable entrepreneurs in the entrepreneurial ecosystem create opportunities for new entrants. However, our research emphasizes that even when the environment is rather in favor of sustainable entrepreneurs, sustainable entrepreneurs still make efforts to change institutions. Indeed, their institutional entrepreneurship appears to be less a means to an end, i.e. actions conducted to guarantee the startup survival, than driven by a will to steer the entire entrepreneurial ecosystem toward sustainability, beyond the sole intrinsic interest this has for their startup. Our study contributes to the literature on sustainable entrepreneurship, institutional entrepreneurship and entrepreneurial ecosystems, and provides recommendations for decision makers.

Our article is organized as follows. The first section reviews the literature on sustainable entrepreneurship, and emphasizes its need for institutional entrepreneurship, due to an adverse environment, which can be understood thanks to the entrepreneurial ecosystem literature. Second, we describe the case study methodology used to address our research question. Third, our results demonstrate the evolution of an entrepreneurial ecosystem, and the consequences it has on drivers and forms of institutional entrepreneurship for sustainable startups. Fourth, we discuss our results in the light of previous findings. Fifth, we conclude and provide avenues for further research.

Literature review

Sustainable Entrepreneurship's Promises and Challenging Environment

The vast literature on entrepreneurship identifies sub-groups according to the main objectives of the activity conducted. First, traditional entrepreneurship (Santos, 2012), or commercial entrepreneurship (Smith et al., 2014), follows a single bottom line, pursuing economic objectives only. Second, environmental entrepreneurship, ecopreneuring (Bennett, 1991), or ecopreneurship (Schaltegger, 2002), follows a double bottom line, i.e. pursues economic and environmental objectives. Social entrepreneurship (Saebi et al., 2018), also follows a double bottom line, but this time following economic and social objectives. Finally, sustainable entrepreneurship (Dean and McMullen, 2007), follows a triple bottom line, pursuing economic, environmental and social objectives (Elkington, 1997; Cohen et al., 2006). While scholars have different approaches to study the phenomenon, this broad definition has reached a consensus among the scientific community. To reach a sustainability transformation, both market incumbents and sustainable startups are needed (Hockerts and Wüstenhagen, 2010), hence a major promotion of sustainable entrepreneurship (Markman et al. 2019; Jones et al., 2019).

Nonetheless, sustainable entrepreneurs are said to evolve in an adverse environment. In a first period, academics questioned whether only “Fools rush in” (Aldrich and Fiol, 1994), considering the “messy” environment such entrepreneurs deal with, and overall deplored the lack of knowledge we have on the few individuals who succeeded despite this such unfavorable context (Beveridge and Guy, 2005). About a decade later, authors still portrayed the passion required to launch a sustainable venture (Kirkwooda and Waltona, 2014), as it implies to “escape the green prison” (Pacheco et al., 2010), i.e. the fact that sustainable actions are “more punished than rewarded” (Pacheco et al., 2010: 466). Even though it seems that sustainability has been largely promoted in the past years, recent studies still indicated that being sustainable does not necessarily pay (Neumann, 2021; Lammers et al., 2022), and overall, that it is not easy to be green (York et al., 2017).

Nonetheless, we lack information on what makes their environment so adverse, and to understand it, the literature on entrepreneurial ecosystems appears relevant.

Understanding Startups' Environment Through Entrepreneurial Ecosystems (EE)

EE characterizes a territory's ability to develop technology and innovation through entrepreneurship (Acs et al., 2017). They describe the environment surrounding entrepreneurs, whereas clusters are generally used at an industrial level (Auerswald and Dani, 2017). Previous research emphasized the key role entrepreneurial ecosystems have on startups, as they can contribute to influencing business models (Xu et al., 2022). Many tools have been developed to study EEs (Theodoraki et al., 2022; Cloitre et al., 2022), which integrate various components that collectively enhance innovation and entrepreneurial activities. However, we still know little about how EEs evolve through time (Cho et al., 2021), a surprising gap considering their dynamic nature (Spigel and Harrison, 2018).

Inspired by the EE literature, researchers identified the different components that characterize sustainable entrepreneurial ecosystems (SEE) (Cohen, 2006), stressing in particular the importance of the entrepreneurial support (Theodoraki et al., 2018) and communities (De Bernardi and Tirabeni, 2018). The framework offered by Bischoff and Volkmann (2018) is particularly relevant as it identified nine components of a SEE and stressed what it means, for each of these components, to be considered sustainable. Employees can contribute to a SEE if there is a demand for sustainable employers; customers if they ask for sustainable goods and services; business partners if they supply sustainable goods and services; financial institutions if they provide specialization in sustainable finance and investments; incubators and accelerators if they offer sustainability-focused support; higher educational institutions if they adopt sustainability-focused education; governmental organizations if their policy incentivizes sustainability; non-governmental organizations (NGOs) if they are focusing on sustainability themes; and communities if they promote cultural awareness for sustainability. We will use this framework in this paper, and tailor it according to the context observed, as suggested by the authors.

While quantitative studies have begun to identify factors of success for SEE (Bischoff, 2021), the literature is rather silent with respect to how these SEEs emerged, and in particular, if and how an EE can evolve toward a SEE through time (Theodoraki et al., 2022; Cho et al., 2021; Terán-Yépez et al., 2020).

Cloitre et al. (2022) argue that institutional theories are useful to the entrepreneurial ecosystem research, notably to grasp their socio-technological transformation process. The concept of “institutional entrepreneur” (Battilana et al., 2009; Maguire et al., 2004; DiMaggio, 1988) describes the interplay between actors’ agency and their structure, and balances the influence of each component (Hoogstraaten et al., 2020). Indeed, as institutional theorists began to address the issue of change, they identified a “paradox of embedded agency” (Lange, 2019; Seo and Creed, 2002). It designates the fact that actors are conditioned by the very institution they want to change. Past research investigated institutional entrepreneurship through the lens of digital innovation (Trittin-Ulbrich and Böckel, 2022; Allen and al., 2020; Geissinger et al., 2019; Tumbas et al., 2018), or focusing on the health sector (Babae et al., 2022), but we know little about the case of sustainable entrepreneurship (Gasbarro et al., 2018; Thompson et al., 2015).

As previously mentioned, their institutional setting is said to be rather adverse, and authors therefore argued that sustainable entrepreneurship requires institutional entrepreneurship, i.e. “effort to change institutions such as market regulations despite pressures towards stasis” (Schaltegger and Wagner, 2011: 223). Shepherd and Patzelt (2011) recommended investigating the institutional work (Lawrence and Suddaby, 2009) conducted by sustainable entrepreneurs through the framework offered by Hillman and Hitt (1999). It describes how entrepreneurs can influence institutional changes: (1) by providing political decision makers with information through lobbying, commissioning of research projects, or providing technical reports, (2) by providing them with financial incentives through contributions to parties, paid travel, or honoraria for speeches, (3) by influencing them indirectly through public relations, press conferences, or political education programs.

To conclude, a literature gap remains on how entrepreneurial ecosystems evolve through time, and institutional theories are a fertile ground to understand the phenomenon. The case of sustainable entrepreneurship is critical, as it seems to face an adverse environment and to require institutional entrepreneurship. Through the literature review, we understand that to analyze how sustainable entrepreneurs use institutional entrepreneurship according to their entrepreneurial ecosystem context, attention must be paid both to the institutional setting and the institutional work conducted.

Methodology

Design and Sample

The aim of this research was to obtain a better understanding of how EEs can evolve through time and to observe how this affects in turn the institutional entrepreneurship carried out by sustainable startups. In light of the complexity of the matter at hand, as outlined in the literature, we opted for an exploratory methodology, which is particularly recommended for research related to little studied phenomena (Cho et al., 2021), in particular when issues are still evolving (Yin, 2018). The objective is to provide an in-depth understanding of the multiple facets of the phenomenon, rather than converging toward general findings.

An immersive setting appeared critical to obtain a deeper comprehension of the EE and to obtain information on institutional entrepreneurship, which involves mechanisms that are not always visible from the outside. Therefore, the study required a comprehensive qualitative approach, focusing on actors and their discourse (Dumez, 2016) through proximity with informants (Yin, 2018). Hence, we decided to conduct the investigation of our topic within an incubator, which provided privileged access to data and startups. The study took place in a Parisian non-profit incubator created in 2000, a rare seniority particularly relevant in regard to the topic at hand. Overall, this incubator has been involved with more than 500 startups, which have created more than 14.500 direct jobs and raised more than 4 billion euros of private funds. The incubator selects around 30 new startups per year that are incubated for a period of two years, and then become “Alumni”. One of the authors of this research has been part of the incubator's staff since the beginning of the research in 2020. She was on-site four days a week, thus having privileged access to startups and confidential data.

In line with the literature (Cho et al., 2021), we conducted multiple case study research to address this little studied topic. Multiple case study is considered a robust and reliable methodology (Baxter and Jack, 2008), that enables us to understand similarities and differences between the cases, and to predict similar results in similar contexts (Yin, 2018). To understand the evolution of the EE and its consequences on institutional entrepreneurship, we decided to compare sustainable startups launched in the 2010s and in the 2020s. We had access to startups' applications for the incubator, and contacted founders that mentioned social, environmental and economic goals in their application. For the startups in the 2020s, we needed startups with at least one year of existence, so we contacted sustainable startups launched in 2019. For the sustainable startups in the 2010s, the sample of startups mentioning social, environmental and economic goals was smaller, so we opened to startups launched from 2006 to 2011. We investigated their perception, practices and challenges at the time

they launched their startup, so the approach is retrospective ex-post for the 2010s startups, and for the other group, we were able to observe them daily, thus capturing the phenomenon as it happened.

Two startups launched in the 2010s matched the criteria defined for this study, while the sample of sustainable startups created in 2019 was wider. We selected the two which agreed to dedicate the most time for our study.

Group 1 - Sustainable startups launched in the 2010s:

Alumni 1: This startup was launched in 2006, joined the incubator during its first year of creation, and offers a B2B SaaS solution for various kinds of companies which want to engage in social and environmental issues. While such solutions existed abroad, they were the first one in France, so they entered a market that was not mature. In 2020, they had raised up to a Serie B and employed about 100-150 employees.

Alumni 2: This startup was launched in 2011, joined the incubator during its first year of creation, and develops an innovative industrial process in the field of agronomy. The project required a long R&D period and a lot of funds before being able to launch its first factory. Its goal is to reduce the need for meat and to re-industrialize France to create jobs. In 2020, they had raised up to a Serie B and employed about 100-150 employees.

Group 2 - Sustainable startups launched in the 2020s:

Incubated 1: This startup was launched in 2019, joined the incubator during its first year of creation, and develops an innovative industrial process in the field of energy. The project requires a R&D period and a lot of funds before being able to reach the market. Its goal is to offer clean energy, while providing farmers with a new source of revenue. In 2020, they had raised up to a Seed and employed about 5-10 employees.

Incubated 2: This startup was launched in 2019, joined the incubator during its first year of creation. It offers a B2B SaaS solution with a hardware device for industries, to improve the quality of the environment, therefore benefiting society as a whole. Their aimed clients were rather traditional actors, and they also had to enter a market that was not mature for such innovative tools. In 2020, they had raised up to a Seed and employed about 5-10 employees.

Data Collection

Our immersive setting is consistent with an ethnographic approach (Atkinson and Hammersley, 1994), as one author has been on the field four days a week since 2020. The incubator supports this research, which is part of a larger research project. Entrepreneurs were informed of the position of the author on the site and the context of her research. Following an insider-outsider approach (Gioia et al., 2010), the other author was external to confront the different views, thus strengthening the reliability of our results. The study combines multiple data sources, summarized in Table 9.

Table 9. Data collection

Data collection	Source	Sub-Total	Total
Secondary Data - Documentation	Application for the incubator	28 pages	457 pages
	Incubator's selection committee reports	8 pages	
	Application for public grants	120 pages	
	Pitch deck for investors	40 slides	
	Additional documentation: press releases, press articles, LinkedIn posts, a book	261 pages	
Primary Data - Notes from direct observations	Notes from regular informal and formal discussions (emails) with founders and their stakeholders	100 pages	168 pages
	Notes from 17 "founders only" events	68 pages	
Primary Data - Interviews	First round of interviews with founders	05 hours and 14 minutes	12 hours and 03 minutes
	Second round of interviews with founders	3 hours and 34 minutes	
	Interviews with the incubator's Startups Manager in charge of the Industry and Greentech sector	3 hours and 15 minutes	

First, different types of documents were collected for each of our cases: application form for the incubator, the incubator's selection committee reports, application form for public grants and pitch deck for investors. For Group 1, one founder wrote a 133-page book that we used, and for both we had access to all media communication on the cases in their first three years as the incubator kept them. We collected the same data for Group 2, and also used their LinkedIn posts. Our attention was in particular on their interactions with their EE and on their institutional practices.

Second, regular informal and formal discussions with informants took place and the researcher took notes spontaneously and systematically each time this happened, and then shared them with the other author (Laszczuk and Garreau, 2018). They retraced both direct informal interactions with informants (founders, employees, stakeholders and incubator staff) and various participant observations (Spardley, 1980), in particular thematic events “founders only” organized by the incubator. Founders from Group 1 each attended twice to these events, while for Group 2, Incubated 1 participated in 14 events in two years and Incubated 2 to 7. The field immersion allowed us to understand in-depth entrepreneurs’ perceptions, actions and challenges.

Third, we conducted in-depth semi-structured interviews with startups’ founders, considering the importance of entrepreneurs’ vision while considering startups’ challenges (Bridge, 2021). The interviews were very rich as they were keen to open to the author on the field. We recorded the interviews with the participants' agreement, who were informed of the research. The interview took place face to face, in a private meeting room at the incubator, or online due to the pandemic. During the semi-structured interviews, participants were encouraged to speak freely (Yin, 2018), and the interview guide served as a checklist for the interviewer. Each topic was at first introduced with very broad questions, then specified according to the interview guide.

We conducted a first round of interviews with the four founders in 2020, using an interview guide composed of two main sections. First, entrepreneurs’ perception of the EE in which they launched their sustainable startups. The objective was to get a general overview, but also an in-depth understanding of the different components. Second, we questioned them about their institutional practices, using both open questions and the framework designed by Hillman and Hitt (1999), cited by Shepherd and Patzelt (2011: 148-149).

As interviews generated new topics not identified by the researcher at first (Kaplowitz, 2001), additional information appeared in some interviews with respect to institutional entrepreneurship, so we decided to conduct a second round of interviews in 2021. Interviewees were invited to express themselves on each component of their EE, and then to express whether it was considered overall favorable, unfavorable, ambiguous or not applicable. We pursued several questions with respect to their institutional practices, insisting on their drivers for pursuing it, on their potential difficulties and on the potential support they received. The interview guide foresaw different questions related to their perception of change in the institutional context during the past decade, and its potential influence on institutional practices. Finally, we asked them what their objectives were in further years.

We also conducted interviews with the incubator's Startup Manager in charge of the Industry and Greentech sector - the one in which the four startups are included at the incubator - who has occupied this position since 2008. In 2020, the interview was exploratory, questioning her perception of the evolution of the EE and the need for sustainable entrepreneurs to pursue institutional entrepreneurship. In 2021, the goal was to present our first findings and to collect her reaction. In 2022, we presented our more robust results and also collected her feedback.

Data Analysis

The method of analysis we used is a hybrid approach to qualitative methods of thematic analysis (Fereday and Muir-Cochrane, 2006), with both a deductive approach using an a priori template of codes (Miller and Crabtree, 1999) and an inductive approach allowing the emergence of new themes from the data (Boyatzis, 1998). This methodology suited our ambition to capture the perceptions, actions and challenges met by entrepreneurs, by relying on both previous research and discoveries made in the field.

The deductive approach used a codebook template (Miller and Crabtree, 1999). To capture entrepreneurs' perception of their EE, we used the framework offered by Bischoff and Volkmann (2018), and to code their institutional entrepreneurship practices, the one developed by Hillman and Hitt (1999), cited by Shepherd and Patzelt (2011). We selected these frameworks as they appeared, from our literature review, the most recently used and cited ones. This approach allowed us to frame our case, providing a better analysis of their EE and the institutional work conducted, before highlighting the main challenges it created according to each context.

The inductive approach requires capturing the richness of different moments surrounding the phenomenon studied (Boyatzis, 1998). It appeared necessary considering the complex articulation between their perceptions and their actions. It also favored the discovery of new key related topics, such as the different forms of institutional entrepreneurship conducted, beyond the framework selected, or the main drivers of it. According to our research question, we focused in particular on the challenges different respondents expressed.

We implemented a triangulation methodology to check the validity of our findings (Dumez, 2016), by confronting the different sources of data (Yin, 2018). From the interviews with the founders, we were able to capture their perception of their EE, while the interviews with the Startups Manager confirmed that our first results were consistent with her perception of the evolution of the EE. To

analyze the institutional entrepreneurship conducted, we combined all the sources mentioned above, thus reducing the biases that entrepreneurs may have when telling their own story.

To conclude, our exploratory research uses multiple-case studies of four sustainable startups, two launched in the 2010s and two launched in the 2020s, thus allowing us to understand the evolution of the EE and its consequences on institutional entrepreneurship. Thanks to our immersive setting, we rely on 625 pages of documentation and notes from the field, and 12 hours and 03 minutes of interviews.

Results

To answer our research question, i.e. how the evolution of the EE affects institutional entrepreneurship, we start by analyzing entrepreneurs' perception of the EE in which they launched their sustainable startups, tailoring the Bischoff and Volkmann (2018) framework. It provides evidence of their challenges according to each component of their EE. Then, we emphasize the institutional entrepreneurship conducted, using both the Hillman and Hitt (1999) framework and results obtained more inductively.

Entrepreneurs' Perception of the EE in Which They Launched Their Sustainable Startups

Bischoff and Volkmann (2018) provide a theoretical framework to analyze the EE based on nine components. They argue that the framework should be tailored according to specific EE (Isaak, 2002; Isenberg, 2011), as each stakeholder can have direct or indirect involvement for the startup according to its context. When asked about the stakeholders that are critical for their survival, sustainable entrepreneurs identified in particular employees, customers, financial institutions, governmental organizations. Table 10 presents our results using the Bischoff and Volkmann (2018) framework, tailored according to informants' perception of the stakeholders directly involved in the startup success.

Table 10. Founders' perception of critical stakeholders for the startup survival

Perception of the Entrepreneurial Ecosystem	Group 1 2010s Sustainable Startups		Group 2 2020s Sustainable Startups	
	Alumni 1	Alumni 2	Incubated 1	Incubated 2
Employee	Ambiguous	Ambiguous	Favorable	Favorable
Customers	Ambiguous	Not Applicable	Not Applicable	Ambiguous
Financial Institutions	Unfavorable	Unfavorable	Ambiguous	Ambiguous
Governmental Organizations	Not Applicable.	Not Applicable	Favorable	Favorable

Employees

According to Bischoff and Volkmann (2018), employees and candidates can contribute to a SEE if they value highly sustainability. This component is said to be key in a context of war for talents, and indeed, entrepreneurs interviewed deeply rely on human resources to develop their startups.

Group 1 considered that it was not common in the 2010s to join a startup, thus recruiting was a challenge for all startups. In particular, Alumni 1 had difficulties finding some specific profiles. Both believe that their sustainable values greatly helped to close recruitment with some candidates: "Joining a startup was not common at that time, but we managed to sign talents that were motivated by the project" [Alumni 2].

Group 2 also identified its sustainability values as an asset to close recruitment with candidates when compared with other startups. During their interview process, candidates clearly stipulated that they accepted the job - less paid compared with their other offers - because of the startups' sustainability mission and values: "Hiring has always been difficult, but talents like to work in meaningful companies" [Incubated 1].

Overall, recruiting could be a challenge for every startup in the 2010s, and whereas it remains a challenge for startups in general in the current war for talents, talents are highly motivated by sustainable projects according to data collected.

Customers

Customers can facilitate sustainable startups if they choose to buy from them, motivated by sustainability values (Bischoff and Volkmann, 2018). New ventures highly depend on them to generate revenue. Here, all entrepreneurs interviewed are business-to-business (B2B) companies, but both Alumni 2 and Incubated 1 developed an industrial solution that required a long period of research and development (R&D) and therefore did not rely on customers in their first years. They mostly survived through private and public funds.

Alumni 1's value proposition directly relied on providing sustainability outcomes for firms. At first, they only had a few clients, but all of them were deeply interested in the solution offered by the startup: "Our only clients were vanguards and visionaries" [Alumni 1].

Incubated 2 is also an industrial startup, but their hardware solution requires a shorter time to market. Their first clients are interested in the solution mainly for its efficiency, but some are also motivated to become a client in order to be associated with a sustainable startup. The founder is skeptical about this particular kind of client, as they fear that such kind of collaboration mainly done for communication motives will not last: "We want them to adopt the solution for its purpose, but we know they are glad to mention us in their press release. We do it, but to last, we need to rely on efficiency, not on communication needs" [Incubated 2].

Thus, although customers make up an important part of the success of sustainable startups, the most radically innovative ones need time to develop their solution before having any clients. For the ones with a shorter go-to-market, one of the challenges faced a decade ago was that only few clients were motivated by sustainability values. In contrast, nowadays sustainable startups seem to face the opposite effects, i.e. clients interested more by the sustainability aspect of the startup for communication purposes, rather than for the sole merits of the solution itself.

Financial Institutions

Technological startups deeply rely on external funding to ensure their survival, and private investors can encompass sustainable finance (Bischoff and Volkmann, 2018). All the startups in the sample had to raise private funds in their first years in order for their project to survive.

Group 1 reported that finding early-stage venture capital (VC) in France was more of a challenge than what it seems to be nowadays. They argued that most private investors pictured them as idealists: "They told us: 'it's a project to plant little blue flowers and then restore, preserve biodiversity with butterflies, you are idealists, you won't achieve anything'" [Alumni 1]; "Honestly, most of the time they thought we were crazy" [Alumni 2]. It was very rare that this audience cared

about sustainability, and sustainable finance was scarce. The fund-raising experience for those entrepreneurs was thus made particularly challenging.

In contrast, Group 2 reported that the context is now more favorable for startups raising private funds, as significant funds are currently available. This group noted two elements that can play in their favor, as sustainable startups. First, new venture capitalist funds have been launched with the aim to directly address sustainability. Secondly, traditional venture capitalists have now added environmental, social and governance (ESG) criteria in their selection process. However, entrepreneurs expressed that despite these claims, VCs models did not genuinely evolve towards sustainable practices: “just because they say they're doing greentech doesn't mean they're able to embrace the contingencies that come with working on greentech” [Incubated 2].

Only a few financial institutions were dedicated to sustainable startups in the 2010s. Entrepreneurs perceived their sustainability ambition as a liability, considering that VCs were not interested in such topics. In the 2020s, sustainability is becoming a rather common topic for financial institutions. However, their models did not evolve so much according to entrepreneurs, who deplore the lack of VCs aligned with their ambition.

Governmental Organizations

To enhance sustainable startups, governments can provide them strong financial and non-financial resources (Bischoff and Volkmann, 2018). Entrepreneurs indeed rely heavily on public funds to develop their startup. Yet sustainability has not always been a criterion to secure public funding.

Nonetheless, Group 1 reported that while they did manage to have access to public funds offered to startups in general. However, they did not identify specific public funds devoted to sustainable startups: “We had the possibility to find the public support we needed, but sustainability was not key” [Alumni 1]; “They valued technological transfer, if it had a positive impact, good, but that was not why the money was spent” [Alumni 2].

In contrast, Group 2 mentioned that while startups in general are still heavily supported by public funds, sustainability is now a criterion to secure public funding: “They said they wanted more startups, so they did what they had to do to increase that number. (...) All they talk about now is sustainability” [Incubated 1].

The results indicate that governmental organizations made efforts to provide financial and non-financial incentives for sustainable startups, whereas in the 2010s, no dedicated support existed.

Other Important Components in the EE: The Facilitators

While acknowledging the paramount importance of employees, customers, financial institutions and governmental organizations for their startup's survival, entrepreneurs also considered key for their development business partners, incubators and accelerators, higher educational institutions, non-governmental organizations, and local communities. According to sustainable startups, they can play the role of facilitators in their development.

Business partners can foster sustainable startups by requesting and financially rewarding sustainability (Bischoff and Volkmann, 2018). Interviews revealed that such practices did not exist a decade ago and are still rare. Incubators and accelerators, higher educational institutions, non-governmental organizations and local communities are said to play a role in a SEE, as they contribute to cultural awareness, acceptance, education and dedicated support for sustainability. From the field observations and interviews with the Startups Manager, it was possible to observe that these stakeholders mostly investigated such topics in the 2020s, and some earlier than others. I took various forms, such as more dedicated training, highlighting sustainable startups or promoting sustainable practices. Yet, informants consider this process toward sustainability is still in progress: "Nowadays, you cannot say that sustainability is more punished than rewarded. It is not punished anymore, but it is also not rewarded" [Startup Manager].

The perception of the EE in which sustainable startups launched their venture is possible to seize thanks to this framework. Overall, entrepreneurs who launched their sustainable startups in the 2010s consider the context as rather hostile to launch a sustainable startup. Entrepreneurs who launched their sustainable startups in the 2020s perceive the context rather favorable for sustainable startup. Nonetheless, customers and financial institutions can still be ambiguous in their opinion. Our interviews also revealed that sustainable startups' institutional context is dependent on startups' context and on sustainability context. Both of these components seem to gain interest in the past years, according to the data collected.

Institutional Entrepreneurship for Sustainable Startups: A Contextual Analysis

The Regulation Issue For Sustainable Startups

Startups from our sample are innovative, and relied on regulation change to develop their startup.

The two startups in Group 1 are affected by different kinds of regulation. For Alumni 1, some evolution in the regulation, inspired by the US or the UK, would have helped the startup attract new clients: “Regulation was not in our favor, but it was not a constraint either” [Alumni 1]. For Alumni 2, the current law did not allow them to sell their product: “Our solution required regulation change” [Alumni 2].

Regulation was also a challenge for the Group 2, but they could test their solution and potentially sell it thanks to different programs in favor of sustainable and industrial startups. For Incubated 1, such programs allowed them to circumvent the regulation that was initially incompatible with the startup future product: “The regulation could have been a problem, but a recent decree allows us to overcome it” [Incubated 1]. For Incubated 2, regulation was not an issue, but some evolution could have boosted their development: “We did not need to change the current regulation, but if it changes, our selling argument will be way much stronger” [Incubated 2].

Overall, sustainable startups from our sample needed to make “efforts to change institutions such as market regulations despite pressures towards stasis” (Schaltegger and Wagner, 2011: 223).

Institutional Entrepreneurship Practices According To The Context

Using the Hillman and Hitt (1999) framework, we were able to classify the diverse actions led by entrepreneurs when asked about their efforts to change the status quo (see Table 11). Both startups launched in the 2010s and the one launched in the 2020s tried to indirectly influence political decision makers, and none provided them with financial incentives. Group 1 did provide political decision makers with information, but Group 2 considered it was not key for them yet.

Table 11. Entrepreneurs' actions for institutional changes

How entrepreneurs influence institutional changes (Hillman and Hitt, 1999)	2010s - Group 1		2020s - Group 1	
	Alumni 1	Alumni 2	Incubated 1	Incubated 2
Provide political decision makers with information through lobbying, commissioning of research projects, or providing technical reports	Technical reports (Source: interviews + archival data)	Lobbying actions to change regulation, technical reports (Source: interviews + archival data)	N.A.	N.A.
Provide them with financial incentives through contributions to parties, paid travel, or honoraria for speeches	N.A.	N.A.	N.A.	N.A.
Influence them indirectly through public relations, press conferences, or political education programs	Public relations and conferences to raise awareness on sustainability issues (Source: interviews + archival data + LinkedIn post)	Professional conferences (Source: interviews + archival data + LinkedIn post)	Business clubs, communities, public relations and conferences (Source: interviews + archival data + LinkedIn post)	Public relations, conferences (Source: interviews + archival data + LinkedIn post)

Entrepreneurs did not limit their effort to change the regulation, but tried to influence the whole entrepreneurial ecosystem toward sustainability. In addition to obtaining information on what institutional practices entrepreneurs led, data reveal how entrepreneurs conducted such institutional entrepreneurs.

Group 1's institutional entrepreneurship appeared very isolated. Both startups expressed their need to take up their "pilgrim's staff" [Alumni 1] to raise awareness. They could rely on a small number of individuals with similar claims, but overall, they felt most of their interlocutors did not understand the problem at stake. Alumni 1 was frequently invited to intervene on round tables for public events, and later refused any invitation that required him to oppose climate skeptics. One cofounder of Alumni 2 explained that they decided overtime not to let one cofounder answer questions related to climate change: "When he understood that they did not care about climate change, he could spend the whole meeting explaining it, instead of our solution" [Cofounder Alumni 2]. Group 1 considers that during their incubation period, sustainability was not a topic among the entrepreneurial ecosystem, aside from a few exceptions. Founders therefore initiated or joined other communities, very distant from the entrepreneurial ecosystem, dedicated to social or environmental objectives.

Group 2's institutional entrepreneurship appears more collective now than it did a decade ago, and likewise, Group 1's institutional entrepreneurship evolved to become "a joined effort" [Alumni 2].

Incubated 1 soon joined numerous communities dedicated to firms working in favor of common good, and took managerial positions in some of them. Incubated 2 also identified communities of companies dedicated to sustainability and joined some of them: “You need to find the one that fits your vision” [Incubated 2]. They advocate for more sustainability in the entrepreneurial ecosystem, often with startups that are not at all in the same sector as them. However, the favorable context for sustainability does lead to a competition among startups addressing sustainable issues: “I don’t always agree with the solution, but at least we are all here to address the problem” [Incubated 1]. Entrepreneurs perceived this competition as healthy, as it led them to be even more rigorous on the environmental and social benefits of their solution: “You find ideas and inspiration from the collective action” [Incubated 2].

Drivers For Institutional Entrepreneurship

Our interviews also questioned sustainable entrepreneurs with respect to their drivers for institutional entrepreneurship in the current favorable context.

With Group 1, institutional entrepreneurship was needed during their launching phase to guarantee the startup survival, but entrepreneurs went beyond the sole interest of the startup. Both of them mentioned that their objective will be achieved when their startup will no longer be relevant. Now that their startup is a success, they pursue institutional entrepreneurship by trying to influence the ecosystem toward more sustainable practices. The current context allows them to be perceived as pioneers in terms of sustainable entrepreneurship. They feel that the speech they defended for many years is now ready to be heard and spread. They often mentor sustainable startups projects, “I dedicate some of my time to help new sustainable projects” [Alumni 1], and do a lot of webinars on sustainability for entrepreneurs: “I take time for it because I think there are still so many things to do” [Alumni 2]. They are also active in terms of lobbying to promote sustainability practices for startups. Sustainability seems to act as a driver itself, and their startup appears as a means to this end. Indeed, Alumni 1 now observes that the startup is working by itself and plans to pursue another project dedicated to sustainability, and Alumni 2 is currently still on the startup board, but left operational missions recently to start a training program for manual labor.

Group 2 pursues institutional entrepreneurship even if it does not appear critical for their development: “I would have spent my time differently if it was all just for my startup” [Incubated 1]. Both of them were asked by other entrepreneurs of the incubator about their sustainability strategy and dedicated time to help them in that regard. Their institutional practices are rather collective, but they also sometimes feel different from most startups in their entrepreneurial ecosystem: “What we just hear in the workshop from other entrepreneurs, I cannot believe” [Incubated 1]; “You read

things, scandals, and you think, ‘how can this even exist?’” [Incubated 2]. Like Group 1, sustainability seems to be the main driver. Incubated 1 claims he wishes to have more competitors, as it will contribute to maximizing their impact. Incubated 2 considers their startup might be bought out later, therefore structures it so that their sustainable values could not be compromised later on. If the company is sold, the entrepreneur wishes to do something completely different than a startup, like field journalism. Overall, none entrepreneur interviewed predestined themselves to entrepreneurship. They rather launched a startup as a means to address an issue they considered key.

To conclude, an unfavorable entrepreneurial ecosystem for sustainable startups leads to individual institutional entrepreneurship, which then opens opportunities for similar new entrants. A more favorable entrepreneurial ecosystem for sustainable startups does not prevent institutional entrepreneurship from these actors. Indeed, institutional entrepreneurship seems actually less driven by the sole interest of the startup than by entrepreneurs’ motivation to influence their entrepreneurial ecosystem toward sustainability.

Discussion and Conclusion

Summary and Discussion of Main Findings

Sustainability is more and more promoted, but despite acknowledging that sustainable startups evolve in a rather unfavorable environment and therefore need to act as institutional entrepreneurs, the literature fails to inform us on entrepreneurs’ perception of their entrepreneurial ecosystem and their specific challenges. While acknowledging the dynamic nature of entrepreneurial ecosystems, we explored how the evolution of the entrepreneurial ecosystem affects institutional entrepreneurship, taking the case of sustainable entrepreneurship as it is considered critical. From a field immersion combining multiple data sources, we were able to provide an in-depth analysis of multiple facets of the evolution of the entrepreneurial ecosystem and the consequences on the institutional entrepreneurship led by sustainable startups.

First, our results explore how an entrepreneurial ecosystem can evolve from a rather hostile environment for sustainable startups to a rather favorable one. Employees, customers, financial institutions and governmental organizations are considered of paramount importance for startups’ survival. While employees and governmental organizations are more likely to support sustainable startups, entrepreneurs find customers and financial institutions’ behaviors rather ambiguous, as their discourses do not meet their practices yet. Business partners, incubators and accelerators, higher education institutions, non-governmental organizations and local communities can play the role of

facilitators, and the number of them directly promoting sustainability increased. Overall, evidence indicates that the entrepreneurial ecosystem is evolving toward sustainability, but cannot be considered as a sustainable entrepreneurial ecosystem yet, as not all the critical components do not answer the conditions under which the entrepreneurial ecosystem can be considered sustainable according to our framework. Sustainable startups still face specific challenges. It is worth mentioning that the entrepreneurial ecosystem is also more mature for all startups in the 2020s than it was a decade before, and difficulties met by sustainable startups in the 2010s should also be understood accordingly.

Second, we explored the institutional entrepreneurship conducted by entrepreneurs according to the entrepreneurial ecosystem in which they launched their sustainable startups. Consistently with past research, we found that in an adverse environment, they did need to act as institutional entrepreneurs. Their institutional entrepreneurship appeared rather isolated. While making efforts to change the status quo, they paved the way for similar new entrants. Doing so, they influenced the whole entrepreneurial ecosystem toward sustainability, which later reduced the need for sustainable entrepreneurs to conduct institutional entrepreneurship. However, despite the more favorable environment for sustainable startups, efforts are still made in that sense. It changed the way institutional entrepreneurship is done, as it appears more collective, but more importantly, it revealed that the motivation for institutional entrepreneurship goes beyond the sole startup interest. They try to influence their entrepreneurial ecosystem toward more sustainability practices, but also imagine other ways to fulfill sustainability issues. Their startup is perceived as a means to address one of them, but they already identify or choose other means of action, outside the startup, and potentially outside from the entrepreneurial ecosystem.

Contributions and Practical Implications

Through this paper, we emphasized the dynamic nature of entrepreneurial ecosystems (Spigel and Harrison, 2018) and explored the consequences in terms of institutional entrepreneurship for sustainable startups. Doing so, we addressed the “paradox of embedded agency” (Lange, 2019; Seo and Creed, 2002), investigating actors who are conditioned by the very institution they want to change. Our study is in line with the continuous innovation research, as it considers operational aspects, with key stakeholders and society being central in the paper; innovation aspects, as innovative startups practices and challenges were evaluated; and strategic aspects, as our results might guide actors’ strategic choices. We also provided deep insights into the process of sustainable continuous innovation, in a collaborative approach as we highlighted sustainable startups’ point of view.

We contributed to the literature on entrepreneurial ecosystems, by investigating in-depth how one can evolve through time, a gap identified by recent contributions (Cho et al., 2021; Theodoraki et al. 2022). We also supported the argument that this literature can benefit from an institutional theory perspective (Cloitre et al., 2022). While addressing the case of sustainable startups, our contribution benefits the emerging literature on sustainable entrepreneurial ecosystems (Cohen, 2006; Theodoraki et al., 2018; De Bernardi and Tirabeni, 2018; Terán-Yépez et al., 2020). More broadly, the study provides a better understanding of sustainable entrepreneurship, and in particular contextualizes and specifies its need for institutional entrepreneurship (Aldrich and Fiol, 1994; Beveridge and Guy, 2005; Pacheco et al., 2010; Schaltegger and Wagner, 2011). Thus, the paper pursues recent contributions made in Creativity and Innovation Management, which investigated institutional entrepreneurship for responsible digital innovation (Trittin-Ulbrich and Böckel, 2022).

Our study also has managerial implications for sustainable entrepreneurs and their stakeholders, who can learn more about the specific challenges and actions adopted by sustainable startups to cope with different components of the entrepreneurial ecosystem, according to the context. Decision makers from other comparable cities can use this research to better understand how to act in favor of sustainable entrepreneurship. In particular, the first successes of sustainable startups need to be promoted to favor a lighthouse effect (Tiba et al., 2020).

Limits and Further Research

We acknowledge several limitations to our research that calls for further investigations. Exploratory studies are difficult to extend to a broader population. We only selected Parisian incubated technological startups, and considering that new technologies have specific challenges (Schaeffer, 2016), further research could test whether similar results are obtained when using a different sample. We provide an in-depth understanding thanks to the access to confidential data and proximity with informants. However, as we focused solely on four startups, further research could enrich our results by testing our results on different startups. More importantly, our results evidenced that sustainable startups studied were all driven by sustainability more than the sole survival of the startup. However, as the institutional context evolves in favor of sustainable startups, it is possible that other new entrants will be more profit-driven.

Chapter 7. Sustainability for Startups: A New Criterion Required by Public Actors

Section 1. The Abduction Process

The Elaborated Material - “What Happens If I Write N.A.?”

Attendance at the Accelerator Program’s sessions varies, but if there are some that draw the crowds every year, it is those dedicated to i-Lab - a highly competitive contest that can provide startups with large amounts of funding. The incubator has specific expertise in this grant. Every year, a dedicated information session is organized, led by the three Startup Managers - the only session where they are the speakers. They mention the new criterion dedicated to environmental and social impact. It creates some reactions among entrepreneurs. While some entrepreneurs are very curious about best practices and ask for help in drafting this section, others are quieter. I see one rolling his eyes.

This entrepreneur comes to see me at the end of the session. They want to share their opinion on this criterion, which they do not understand from the standpoint of an innovation competition. Most i-Lab candidates do not yet have products or customers, so how can their impact be assessed? It cannot. So, to get points in this section, you have to lie and assure that the project will have such and such an impact, when it is not certain that the company will survive at all. The entrepreneur argues that they are forced to greenwash, like the big corporations, which is precisely what they wanted to avoid by launching their own company. Everyone can write something about impact, but you must not mix everything up. On the one hand, there are companies that directly address a social or environmental problem, all right, maybe they should even receive even more support. But there are also all the others, for whom impact is not the main foundation. And an innovation competition, which values innovation, should not exclude them. Or they should stop talking about digital sovereignty.

I am familiar with this reaction, having observed it in several interviews and informal discussions with startups which do not have an obvious environmental or

social impact. Usually, and unlike this example, there are often several phases when I question them about these new requirements. The initial “yes, it is good to ask these kinds of questions” or “it is legitimate to ask”, quickly gives way to a certain bitterness: “actually, that surprised me” or “what can I say to them?”. Then, it becomes more assertive: “I’m not going to bullshit, we have zero environmental contribution. It’s just not our focus” or “what happens if I put ‘N.A.’ in this section?”. These reactions mainly come from projects that do not consider themselves to have a significant social or environmental impact. In the course of our discussions, I encountered a number of initiatives undertaken by these entrepreneurs. However, they had no intention of using them to “win points”: “these are things that go without saying, there is no need to make them a criterion”.

They ask: “Is that considered as an impact?”. Is creating jobs, when you’re a growing startup, impact? What about integrating a person in difficulty into a small team? Taking time out to pass on your knowledge? Having parity on your team? Defining your company’s values and culture? Boycotting a supplier perceived as less than sustainable? Avoiding air travel? Recycling waste? Do these practices only “count” if you write a dedicated charter?

The Background Theory

Here, my surprise came from the fact that the term “greenwashing” came more than I expected. For some entrepreneurs, writing about their social and environmental impact in an application for a public grant can be considered as “greenwashing”. My background theory considered that greenwashing concerned only “any advertising message that may mislead the public about the actual ecological quality of a product or service, or about the reality of an organization’s sustainable development approach” (ADEME, Guide de la communication responsable, 2020: 81). Therefore, I did not expect that this term would be used by entrepreneurs in this context, as they are not compelled to disclose statements about their impact. The application form they wrote is not an advertising message, it is confidential. Aside from evaluators, their stakeholders will not read it, unless they share it with them.

Therefore, I rather perceived this criterion as an opportunity for entrepreneurs to question themselves about their social and environmental impact in a non-compelling manner. The literature stresses that entrepreneurs’ lack of knowledge about sustainability (Johnson, 2015) can be explained by the fact that they generally receive less pressure from society, regulation, market (Brammer et al. 2012,

Agudo Valiente et al., 2012) and their stakeholders (Nielsen and Thomsen, 2007). In that context, financial incentives, such as grants, have been studied and they are said to be particularly effective for small firms (Bradford and Fraser, 2008), who are more reactive than voluntary in terms of responsibility (Burch et al., 2016). Public actors also have the legitimacy and power to encourage responsible practices (Streurer et al., 2012). The fact that this requirement came from a well-established public contest should therefore make it more acceptable.

As I investigated the literature to learn from similar initiatives, it appeared that most research was on public policies targeting directly sustainable innovations, by developing programs for climate startups for example (Bergmann and Utikal, 2021; Adler, 2011). Only a few research was available on traditional public grants, which added sustainability criteria to evaluate young innovative startups (a notable exception: Gay et al., 2019). This gap reflects the novelty of this type of requirement. One hypothesis adopted is that these practices are more likely to spread. Therefore, the objective of this research was to provide knowledge for decision makers wishing to follow that path. In particular, a valuable input considering the setting was to provide beneficiaries', i.e. startups', point of view. Indeed, the fear of greenwashing is something that entrepreneurs mentioned a lot during in-depth interviews and informal one-to-one discussions, but they never mentioned it openly during collective sessions. Therefore, the following research question was investigated: "What are the implementation challenges of an innovation policy targeting responsible innovation for technological startups?"

Section 2. Article 3. Implementation Challenges of Innovation Policies Fostering Sustainability: Evidence from a French Public Grant for Technological Startups

Abstract

Innovation policies have a tradition of targeting entrepreneurship, but more recently some have investigated their ability to foster responsible innovation. These approaches are emerging, and they might spread. However, as the literature emphasizes startups' sustainability impact assessment issues, challenges might arise. We conducted an exploratory study in the field, using the original case of i-Lab, a public grant for startups which added environmental and societal criteria in its evaluation. It provided an in-depth understanding of implementation and sustainability impact assessment challenges created by an innovation policy targeting responsible innovation for technological startups. We demonstrated the importance of the anticipation phase, which can be better prepared to extend acceptability and to guide entrepreneurs on the meaning of such requirements, thus reducing the heterogeneity of startups' responses.

Keywords: Entrepreneurship, Start-up, Public Policy, Responsible Innovation, Case Study

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<https://www.cairn.info/revue-journal-of-innovation-economics-2023-0-page-1152.htm>

Introduction

Startups have been acknowledged as a key driver for innovation and for the economy, which led many states to implement public policies to support entrepreneurship. With the rise of global challenges, many advocated for more responsible innovation, defined as the voluntary and proactive integration of social and environmental considerations into the innovation process (Ingham, 2011). Traditionally, regulations and academics paid attention mostly to large firms' practices (Pinkse, Groot, 2015), as small and medium enterprises (SMEs) face many difficulties, reducing their likelihood of implementing sustainability reporting (Johnson, 2015). Academics observed that sustainability was indeed little known and implemented by entrepreneurs (Hąbek, 2014). The literature emphasizes how a sustainability impact assessment can be challenging for small firms, but it appears as “an almost unsolvable challenge” (Horne, 2019, p. 1) for technological startups, characterized by uncertainty.

States are key actors in promoting sustainability practices for private companies. European countries have a longstanding tradition of adopting social and environmental policies (Steurer et al., 2012), which led European firms to be more active in terms of sustainability practices (Kolk, 2008). In particular, France is in first place worldwide when observing large firms' extra-financial reporting, as it implemented mandatory reporting laws (Kanya, 2016). Enforced regulations are not the only way one state can promote responsible innovation. It can also use other financial instruments that favor companies with sustainable practices (Steurer et al., 2012). In this context, public grant contests have been identified as public policy tools able to encourage, support, and guide innovation (Edler et al., 2016).

Recent research has investigated these through the lens of responsible research and innovation (Gay et al., 2019). Most studies analyzed public policies directly targeting sustainable innovations, for example through cases of programs for climate startups (Bergmann, Utikal, 2021; Adler, 2011). Aside from these mechanisms dedicated to startups that directly address sustainability issues, we know little about the paradigm shift that is coming, i.e. that sustainability might become an imperative for all startups. Moreover, guiding startups toward responsible innovation appears relevant in the light of recent debates on the “dark side” of innovation (Coad et al., 2021).

The research question is the following: What are the implementation challenges of an innovation policy targeting responsible innovation for technological startups?

To address this question, we conducted a two-year exploratory research program in a French incubator dedicated to technological startups. We use the case of i-Lab, a public grant initiated in 1999 to support technological early-stage startups which has, for the first time in 2022, included environmental and social criteria on its application form. The methodology in the field allowed us to obtain confidential data and a privileged insight into entrepreneurs' impressions. This is a case of a public policy targeting responsible innovation and is rather unique, as it is highly unusual to condition a grant for early-stage innovative startups on sustainable requirements. However, such pioneer practices might spread (Schot, Steinmueller, 2018). Therefore, this paper provides useful insights for decision-makers, startups, and their stakeholders, and contributes to the emerging literature on responsible innovation research (Gay et al., 2019).

The paper is organized as follows. First, we review the literature, emphasizing the tension between the increased demand for a sustainability impact assessment and the difficulties faced by startups to provide these, and we highlight the role public policies can play to foster responsible innovation. Second, we present the exploratory methodology, suited to address this new phenomenon through the case of i-Lab. The results demonstrate the various implementation challenges observed in the field. We conclude by providing a discussion on our findings in the light of previous research, identifying limitations and suggesting guidelines for future research.

Literature review

An increased trend toward sustainability requirements for private companies

In 1987, the Brundtland report "Our Common Future" defined "sustainable development" as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Soon, the private sector began to take this into account, and sustainable development for companies became mainstream. The concept of Corporate Social Responsibility (CSR) emerged, defined as "context-specific organizational actions and policies that take into account stakeholders' expectations and the triple bottom line of economic, social, and environmental performance" (Aguinis, 2011, p. 855). Sustainability reporting, or CSR reporting, was identified as a tool adopted by some companies to publish their contribution to sustainability (Fernandez-Feijoo et al., 2014).

Bengo et al. (2016) reviewed different methodologies used by academics and practitioners to create this non-financial reporting and highlighted the challenge it represents. However, some efforts have been made to guide firms on how to create their sustainability report. In 2006, the United Nations Global Compact and the Global Reporting Initiative (GRI) united to provide a framework of processes and indicators to assess companies' sustainability. ISO 26000, launched in 2010, also provided guidelines for firms to define their social responsibility. Bouten et al. (2011) argue that such reports should reflect the company's aims and intentions, actions, and subsequent performance with respect to different sustainability issues.

While both incumbents and smaller companies are required to address great challenges (Hockerts, Wüstenhagen, 2010), their practices diverge. Large firms are more likely to disclose their CSR activities when compared to SMEs (Perrini et al., 2007; Simnett et al., 2009). Indeed, when studying reports published on GRI, Bos-Brouwers (2010) evidenced that SME reports are very rare. As a result, SMEs deprive themselves of several benefits. Sustainability reporting improves a company's relations with stakeholders (O'Connor, Spangenberg, 2008), as it becomes a tool to communicate with them (Gray, 2006). It benefits the image of the company (Prado-Lorenzo et al., 2009) while it also minimizes reputational risk (Deegan, Unerman, 2006). Finally, it contributes to building a firm's legitimacy (Jahdi, Acikdilli, 2009).

Overall, different concepts emerged in the literature to describe a firm's practices and strategy with respect to social and environmental objectives. The paper will investigate more specifically responsible innovation, because the concept has a broader understanding of society impacts when compared to traditional CSR policies. The literature on sustainability reporting emphasized the tools used and opportunities it creates for companies, while stressing the divergences between large companies and SMEs. This knowledge is helpful to grasp the research question, but as it implies public disclosure, we will rather use the term sustainability impact assessment in this paper.

Difficulties faced when assessing sustainability impact

The fact that SMEs are less likely to implement sustainability impact assessments can be explained by several factors. They might have less pressure from society, regulation, the market (Brammer et al., 2012a; Valiente et al., 2012) and their stakeholders (Nielsen, Thomsen, 2007). Brammer et al. (2012b) also demonstrated that smaller companies obtain significantly fewer benefits from engaging in sustainability when compared with larger firms. They also have little awareness about sustainability practices (Johnson, 2015), and therefore we cannot expect that they will adopt them

(Ozaki, 2011). Authors argue that willingness is key in that context (Hsu, Cheng, 2012), but even with great willingness, SMEs lack the management capability and resources to implement sustainability tools (Cassells, Lewis, 2011).

The same applies to startups (Esmailian et al., 2020; del Brío, Junquera, 2003), a subcategory of SMEs, defined as young, innovative, and growth-oriented companies. Great hopes are placed on startups to target great challenges (European Commission, 2013), but we know little about how startups - not only the ones dedicated to social or environmental issues - deal with sustainability. The literature on SMEs' sustainability practices is constrained by available data (Johnson, 2015), which can explain the fact that “no previous study has addressed the gap created by the dearth of sustainability impact assessment studies focusing on entrepreneurial ventures” (Di Vaio et al., 2022, p. 2), a gap this paper aims to address.

The lack of knowledge in the literature is the result of the difficulties startups face when assessing their sustainability impact. Horne described it as “an almost unsolvable challenge” (2019, p. 1) for startups. Trautwein (2021) linked five startup characteristics to five of their difficulties while assessing their contribution to sustainability. (1) Their informal and evolving internal structure reduces the likelihood of providing a continuous and replicable model of the assessment. (2) Their limited resources do not favor completion of the assessment, nor its communication. (3) Their volatility makes them deal with uncertainties with respect to their business model and value chain, which makes the assessment even more difficult. (4) Their newness prevents them from having the needed data. (5) Their lack of sustainability knowledge provokes hesitations with respect to the right assessment tool.

From the literature review, we showed that sustainability and responsible innovation are no longer the concern of only a few motivated companies. As global challenges became greater, so did expectations toward private firms. It is highly likely that the number of companies concerned with sustainability objectives and responsible innovation will increase in the coming years. Nonetheless, smaller companies, and in particular startups, seem unprepared for these new requirements (Håbek, 2014; Esmailian et al., 2020).

Interventionism for responsible innovation

The literature investigated the drivers for responsible innovation for small firms (Burch et al., 2016; Haigh, Jones, 2006). They mentioned that regulation and public policies - existing and the threat of future ones - can pressure small firms to behave in a responsible way. Similarly, the CSR literature

also identified the key role played by the government (Kanya, 2016). Steurer et al. (2012) emphasized that governments have the legitimacy and power to foster responsible innovation, and they can use various tools to pressure private firms. Aside from mandatory regulation, public policies can also use ‘soft’ policies, like financial instruments - described as ‘carrots’ by the authors.

Bradford and Fraser (2008) demonstrated that financial incentives, such as grants, are particularly effective for small firms (fewer than 50 employees). Burch et al. (2016) argued that such companies are usually more reactive than voluntary in terms of responsibility - aside from some exceptions of highly dedicated firms. Such results seem to indicate that public policies could be proactive and effectively foster responsible innovation in their innovation policies. These public policies have other benefits. They can provide an external perspective and expertise that founders do not usually have (Johnson, 2015) and reduce the heterogeneity in the engagement in responsible innovation (Brammer et al., 2012a). According to Steurer et al. (2012), financial instruments have the potential to raise awareness, to improve disclosure and transparency, to favor socially responsible investment, and governments can also lead by example.

However, state interventionism has a long tradition of being criticized. In the case of our topic, previous research demonstrated that such public policies could add regulatory complexity (del Brío, Junquera, 2003), which already represents a challenge for startups. Pinkse and Groot (2015) emphasized that sustainable startups are highly dependent on government support, but their application might lack transparency. In addition, we highlighted the challenge faced by entrepreneurs when voluntarily trying to assess their sustainability impact; it is possible that decision makers will face the same difficulties. Indeed, startups navigate through uncertainty, as technologies are, by definition, ambivalent and unpredictable (Ellul, 1988). Therefore, public policies cannot fully control their outcomes (Burch et al., 2016).

Responsible research and innovation (RRI) and financial incentives

The field of responsible research and innovation integrated such criticisms and adopted a critical view on innovation by acknowledging its negative externalities. The ambition to assess innovations’ risks is inadequately efficient with new technologies (Owen et al., 2012), and integrating various stakeholders in the assessment is not enough to guarantee its responsibility (Blok, Lemmens, 2015). To overcome these challenges, Stilgoe et al. (2013) developed a four-component framework for responsible innovation. First, “Anticipation” requires defining desirable futures and the resource allocation to reach them. Second, “Reflexivity” aims at understanding the goals, drivers, and possible consequences of the innovation, as well as integrating the uncertainties. Third, “Inclusion” favors the

integration of diverse stakeholders through large-scale consultation. Last, “Responsiveness” emphasizes the need for a dynamic, iterative, and inclusive learning process.

Schot and Steinmueller (2018) identified three frames of innovation policies. The first one initiated post-World War II institutionalized government support for science and R&D in the quest for growth. The second one started in the 1980s and advocated for competition and for fostering entrepreneurship. Many academics provided evidence with respect to these policies for entrepreneurship guided by the search for high growth (Mason, Brown, 2013; Acs, Szerb, 2007). Schot and Steinmueller (2018) observed the rise of a third frame, inspired by the sustainable development goals, that could be driven by RRI. Recent studies investigated to what extent financial incentives could represent a relevant policy instrument for responsible innovation and invited further research with empirical evidence (Gay et al., 2019).

The literature review identified a tension between, on the one hand, greater monitoring of private companies with respect to sustainability issues and, on the other hand, difficulties that existed while assessing one’s own firm’s contribution on sustainability, in particular in the case of startups. Governments are key actors in this context, but they rarely engage all startups toward responsible innovation, i.e. not only the ones aiming at sustainability. The literature on responsible research and innovation recently investigated public policies’ ability to implement sustainability requirements, but advocate for more empirical evidence, a gap we address with the following research question: What are the implementation challenges of an innovation policy targeting responsible innovation for technological startups?

Methodology

Design and Sample

To investigate our research question, we chose to conduct a qualitative exploratory methodology (Dumez, 2016) for two main reasons. First, such an approach is suited to analyzing contemporary phenomena (Yin, 2018). This research is indeed one of the first to address this topic, as a sustainability impact assessment is a practice that is only emerging for new ventures (Fichter et al., 2023), and so are the public policies implementing these new requirements (Gay et al., 2019). Second, our paper’s question investigates actors and their discourse, which is the core of comprehensive research (Dumez, 2016). Such an approach promotes proximity with actors, considering that it will generate new hypotheses (Yin, 2018). The aim is to provide an in-depth

understanding of the many facets of one phenomenon, rather than converging toward general findings.

This study has its roots in a larger research project, conducted in partnership with a Parisian public incubator. Such a setting has three main advantages to observe and analyze the implementation challenges of an innovation policy targeting responsible innovation for technological startups. First, exploratory research in the field allowed us to observe evolution ‘as it happened’ rather than through a posteriori reconstitution (Demil, Lecocq, 2015). Second, it allowed us to have privileged access to data and startups. The incubator specializes in innovative startups. It was created in 2000 by universities and laboratories and is supported by local, national, and European funds. Its longevity and experience with public policies for startups were an asset in addressing our topic. This setting has its specificities, of course, that will lead to some limitations for our research, but is suited to exploratory research as we argue its “revelatory potential” (Gioia et al., 2013, p. 15). Our research investigates the implementation challenges that might arise while targeting responsible innovation for technological startups, a question that also emerged from the field with the public grant i-Lab, a case we chose to use for this paper.

The French Ministry has designed three contests to foster the development of new innovative projects: i-PhD, created in 2019, to support young academics through entrepreneurship; i-Lab, created in 1999, for researcher-entrepreneurs to launch their startup; and i-Nov, created in 2017, for startups to become leaders in their field. These are innovation policies, defined as a “public intervention to support the generation and diffusion of innovation, whereby an innovation is a new product, service, process or business model that is to be put to use, commercially or non-commercially” (Edler et al., 2016, p. 3). In particular, i-Lab has supported more than 3,700 laureates, with a budget of 526B€ and an overall success rate of 15% (France 2030, 2022). Its main characteristics are presented in [Appendix D. 1](#). Aside from financial support, the Ministry emphasizes four other reasons to apply: international support through access to the New Technology Venture Accelerator (NETVA) device for the North American market; a dedicated entrepreneur godfather; visibility with investors; and a Forum connecting laureates to increase their network. Its high competitiveness gives the laureates a certain prestige and, since 2022, allows them to skip the first selection phase of the EIC Accelerator, an even more selective European grant, targeting more mature startups.

The i-Lab application form has remained almost the same since its creation: (1) presentation of the project, (2) team, (3) market and commercial goals, (4) innovation program, (5) legal aspects, (6) financial needs and provisional financing. In 2022, it added one section in its application form, “Environmental and societal impacts”, which makes it interesting for our topic. The originality of the

i-Lab case lies in the fact that it is not designed for startups targeting environmental or social issues, contrary to other public support for sustainability, such as EIT Climate KIC, that have been previously studied by academics (Klapper et al., 2021; Bergmann, Utikal, 2021), or more broadly European initiatives related to the Green Deal (Rowan, Galanakis, 2020). i-Lab laureates develop innovative solutions in different sectors, such as pharmaceutical and bio-technologies, digital, software technologies, communication, materials, mechanics and industrial processes, medical technologies, electronics, signal processing and instrumentation, chemistry, and environment. Other devices are comparable worldwide. For example, the EXIST business start-up grant in Germany provides early funding for researcher-entrepreneurs with an innovative project (Cagarman et al., 2020). In 2014, the EXIST grant added new questions to its application form to take into account gender equality, non-discrimination, and sustainability - consistently with the European Social Funds prerogatives.

The setting in this particular incubator was particularly suited to observe the case of i-Lab. Indeed, it has experience with this particular grant, as the incubator was created in the same period. It provided access to data and experts' information and perspective on our topic (Gioia et al., 2013). The incubator acquired some experience over the years as it has startups that apply to the contest every year: 17% of i-Lab laureates were incubated by this incubator in 2021, 16.5% in 2020. It offers support for the application to its startups, based both on its experience with past editions and on the information it gathered, thanks to its close ties with public actors, as it is itself both founded and supported by public structures. Immersion in the grant operators could have provided us with the same access to archives and experience, but from our position in the incubator, we were also able to observe different stakeholders, and in particular entrepreneurs' insights with respect to the new requirements. Indeed, the new questions added on the i-Lab application, with respect to the environmental and social impact of the startup, offered a great opportunity, from our setting, to observe and analyze the implementation challenges of an innovation policy targeting responsible innovation for technological startups.

Data collection

Our immersive setting is consistent with an ethnographic approach (Atkinson, Hammersley, 1994). The author was integrated into the incubator's staff in 2020 and was on site four days a week, along with the sixty startups incubated. As case studies should "rely on a variety of sources" (Yin, 2018: 156), the data collection includes four main materials, presented in Table 12. In total, the research relies on the analysis of more than 1,448 pages of archival records and documentation, 16 hours of participant observations, and 14 hours of interviews.

Table 12 - Data collection

Data collection	Source	Total
Archival records (See Appendix D.1.)	<ul style="list-style-type: none"> - i-Lab rules since 2005 - i-Lab application form since 2005 - Incubator's i-Lab notes since 2005 	<ul style="list-style-type: none"> - 90 pages - 90 pages - 54 pages = 234 pages of archival records
Documentation (See Appendix D.2.)	<ul style="list-style-type: none"> - 26 i-Lab 2022 candidates' application form - 11 evaluations from i-Lab operators 	<ul style="list-style-type: none"> - 1,170 pages of documentation - 44 pages = 1,214 pages of documentation
Participant-observations (See Appendix D.3.)	<ul style="list-style-type: none"> - Two private sessions organized by i-Lab coordinators with selected incubators, in 2021 and 2022 - Six incubator support sessions for its i-Lab candidates 	<ul style="list-style-type: none"> - 4 hours - 12 hours = 16 hours
Interviews (See Appendix D.4.)	Nine semi-structured interviews with startup founders applying to i-Lab 2022	= 14 hours

Data analysis

The method of analysis we used is a hybrid approach to qualitative methods of thematic analysis (Fereday, Muir-Cochrane, 2006), with both a deductive approach using an a priori template of codes (Crabtree, Miller, 1999) and an inductive approach allowing the emergence of new themes from the data (Boyatzis, 1998). This methodology suited our ambition to capture the implementation challenges of an innovation policy targeting responsible innovation, by relying on both previous research on innovation policies and discoveries made in the field.

The deductive approach used a codebook template (Crabtree, Miller, 1999) based on the Stilgoe et al. (2013) theoretical framework which determines four principles for responsible research and innovation (RRI): anticipation, reflexivity, inclusion, and responsiveness. We selected this framework because it was used by previous research investigating innovation contests as tools for RRI (see Gay et al., 2019). This approach allowed us to frame our case, providing a better analysis of the public policy developed before highlighting the main challenges it created.

The inductive approach requires capturing the richness of different moments surrounding the phenomenon studied (Boyatzis, 1998). This approach was necessary considering the novelty of our topic, as no previous study - to our knowledge - has investigated in-depth the entrepreneurs' point of view on such new environmental and social prerogatives for early-stage technological startups.

According to our research question, we focused in particular on the challenges expressed by different respondents.

Triangulation was possible thanks to the use of multiple sources of evidence (Yin, 2018). The archival records were analyzed to create a chronology of the i-Lab public grant and its effective modifications. Combined with the incubator's notes on every contest, it allowed us to understand the incremental changes over the years, with particular attention to every topic related to responsible innovation. From the private sessions organized by i-Lab coordinators with selected incubators, we identify the drivers for such modifications and the challenge they faced. Combined with the evaluations, we were able to understand how operators constructed their understanding of "Environmental and societal impacts" and what they valued. Documentation on the i-Lab 2022 candidates' application form highlighted what entrepreneurs valorize in terms of environmental and societal impacts. Added to the incubator's yearly notes, as well as sessions for entrepreneurs and interviews, we were able to identify the main challenges faced by entrepreneurs and their insights on such policies.

To conclude, an exploratory methodology was suited to address the research question, as we know little about public policies targeting responsible innovation for startups, a recent phenomenon. The case of i-Lab has a "revelatory potential" (Gioia et al., 2013, p. 15) to better understand a possible evolution of public policies toward responsible innovation (Gay et al., 2019). The objective was to provide an in-depth comprehension of the implementation challenges that arose when an innovation policy targets responsible innovation for a technological startup.

Results

We first present implementation challenges, using Stilgoe et al. (2013)'s theoretical framework to provide an in-depth understanding on how the grant rules evolved. Then, we emphasize the heterogeneity of the answers provided by the candidates, demonstrating the challenge that sustainability impact measurement represents for startups. Finally, we point out different factors of confusion for many of the stakeholders involved, highlighting framing, transparency, and acceptability challenges.

Implementation challenges: i-Lab in the lens of responsible research and innovation

Anticipation

The phase “Anticipation” concerns the design of the contest. The data revealed that the objective of the contest did not change with the addition of environmental and social criteria. Incremental evolution can be observed through time and reflects the influence of other public policies. When in 2012 the rules added sustainable development, it followed European Union guidelines with, for example, the use of the principle “Do No Significant Harm”. Again, when it added the “Environmental and societal impacts” section, it used the European taxonomy developed the same year to orientate investments on activities designated as “Green”. Overall, the operators did not define desirable futures themselves, but rather diffused the ones expressed by the European Union. The “Societal impacts” section also reflected recent government-led public initiatives to foster diversity in the French startup ecosystem, such as the French Tech Impact Board or the French Tech Tremplin, whose missions are to respectively close the gender gap and strengthen diversity. Anticipation also reflects resource allocation. The money invested did evolve in the past year, to have more candidates benefiting from greater amounts. In addition, the operators of the contest benefited in 2022 from gender-bias training. Indeed, the percentage of women laureates were increasing in the past few years, reaching 20% in 2020, but the number for 2021 declined to 13%, meeting the average of 11% of women since the contest creation. Operators said they did not want to implement a positive discriminatory policy to increase the number, but rather allocated resources to reduce any gender bias that evaluators might have.

Reflexivity

Reflexivity consists in identifying the goals and drivers. The operators of the contest stipulated that they “could not just do nothing” with respect to sustainability. After the pandemic crisis, French public policies targeting startups shifted from a focus on digital startups to a focus on “deeptech” startups, i.e. startups with a radical innovation. As a result, a contest such as i-Lab gained in visibility. In addition, some informants considered that the integration of sustainability criteria legitimized deeptech startups. To others, it seems that France has a tradition of challenging private firms with respect to CSR, and therefore this evolution is in continuity with the French ambition to be a pioneer. Overall, i-Lab is perceived to have the legitimacy and influence to guide startups toward responsible innovation. Reflexivity also concerns the possible consequences of the innovation and integrates the uncertainties. i-Lab operators stated during private sessions that the 2022 applicants will serve as testers to improve their methodology. They acknowledged that a sustainability impact assessment for startups is challenging, and they shared these difficulties. They also mentioned that the goal of the environmental and societal section was to evaluate the level of reflection of the project and its ability to take into account sustainability, as the low maturity of the technologies makes sustainability assessment ambiguous. The oral exams will test the veracity of the statements provided in the application form.

Inclusion

Inclusion favors the integration of diverse stakeholders through large-scale consultation. Here, no large-scale consultation was implemented, but some stakeholders were taken into consideration in the process. At least operators initiated a dialogue with incubators to answer their questions. It is more likely that different stakeholders were involved in the construction of the new section, as the contest gathers together many actors: representatives of the region dedicated to technology, representatives of Bpifrance (the French public investment bank), recognized experts, and representatives of the Minister of the Economy and Research. However, informants were reluctant to disclose who was involved in the creation of the new section. In addition, some entrepreneurs received the evaluation of their application. The operator explained that a grade was created based on their results on the “Environmental and societal impacts” but did not accept to share the methodology after the 2022 contest, as it would change again in 2023.

Responsiveness

Responsiveness takes into consideration the dynamic, iterative, and inclusive learning process. First, even though the change in the rule was implemented for the 2022 contest, some 2021 candidates were questioned during oral exams about their contribution to environmental and societal issues. Second, the section evolved for the 2023 edition, integrating more specific questions, which demonstrates the operators’ ability to learn from the previous edition. Third, i-Lab operators were aware of their initial lack of knowledge on environmental and societal impact assessment, so they chose to progressively take it into account in the evaluation. In 2022, this section was evaluated “at the discretion of the evaluator”, and for the 2023 contest, the grade is integrated in the global assessment scale.

The challenge of heterogeneity: Sustainability impact assessment by technological startups

The 2022 candidates had to establish their environmental and societal impacts in the application file (see [Appendix D. 2.](#)). For the purpose of the analysis, we regroup the “societal impact” mentioned in the first subsection: “A project’s impacts with respect to sustainable development”, and the “social impacts of the project”. We first present the societal and social impacts, and then the environmental impacts.

Societal and social impacts

First, most candidates presented their internal functioning, commitments, and governance to argue their societal and social impacts (76% of files). 50% of application files emphasized their contribution to gender equality, a high rate that can be explained as there was a direct requirement to complete this in the application file. However, one female-led startup did not stress that point in their response. Some candidates have no women in their founding team but pointed out the women on their board and/or their team and argued that parity was more important in their startup than the usual rates in their sector. 42% mentioned their diversity policy and their promotion of equality of opportunities. 23% also presented their actions for society, with ONGs, schools, or feminist programs. 11.5% of application files mentioned the startup mission. The term *raison d'être* was included in the French legal system with the PACTE law, and some respondents developed their ambition to become a *société à mission* (mission-driven companies). However, one *société à mission* did not mention it. 11.5% declared their commitments for their employees, with, for example, employee ownership, flexibility, and wellbeing policies, as well as training. 11.5% of them indicated they follow governance indicators. 8% mentioned internal environmental policies, such as promoting public transportation for employees. Only one project expressed itself on ethics commitments.

Second, most candidates argued the benefits of their solution for society (73%). 27% advocated their continuity with other public policies that have been launched, like France Relance 2030, European or local programs. 19% stressed the inclusion of stakeholders, mostly with public research centers. Their contribution to a critical issue diverged according to sector. Health candidates wrote that they address a public health concern, such as lack of care, access to care, reducing mortality, or fighting against biases. Industry/Greentech candidates emphasized how they contribute to the remuneration of isolated populations, to avoid catastrophes, or to democratize access to environmental solutions. Digital candidates identified other issues, such as deepfake, cyber-attacks, access to creation, steering public policies or reducing the digital divide.

Third, about half of the candidates emphasized their contribution to the economy (58%). 42% mentioned the jobs they will create, high-value jobs, researchers or young academics, local and industrial jobs. 31% advocated their contribution to sovereignty, to contribute to France's international influence, or for the sake of security. 19% insisted on the benefits of their startup for the French economy as they improve its resilience and efficiency. 19% of candidates, mostly from the Industry/Greentech sector, included their project in a local or reindustrialization process.

Environmental impacts

First, most candidates found indirect positive environmental impacts in their projects (86%). Their indirect impacts were very diverse depending on their solution: improving energy efficiency, using fewer consumables, avoiding waste, and limiting the need for transportation. Digital responsibility was the most cited indirect impact (27%), with a predominance of digital startups using this argument. 11.5% of candidates, again mostly digital startups, argued that their solution will contribute to the emergence and development of environmental innovations. 19% of them emphasized that their technology will prevent or avoid disasters.

Second, many candidates, mostly from the Industry/Greentech sector, argued that their startup will have direct positive impacts on the environment (42%). These positive impacts are obtained by reducing the use of rare materials, providing an alternative to polluting wastes, favoring biodiversity, or enabling better water treatment. The most cited direct impact concerns the significant improvement of energy efficiency (19%). 27% also suggested that the development of their startup will have a direct effect on their industry, favoring a circular economy, developing regenerative agriculture, or decarbonizing the whole industry.

Third, many candidates provided evidence to support their positive contribution to the environment (42%). 11.5% presented the tools they used or planned to use, with a particular focus on life cycle analysis. 11.5% identified the providers they will work with to improve their environmental strategy. 8% mentioned labels and certifications they received or targeted. 23% of candidates also supported their statements by connecting them with recommendations made from public policies or from the scientific community.

Fourth, some candidates went further and provided a more complete approach to their contribution to environmental stakes (27%). 23% of them imagined solutions to go deeper in their environmental assessment, by measuring the actual environmental gains of their technology or by realizing their carbon report. Only 8% of them acknowledged their negative impacts and thought of potential alternatives to develop later.

The challenges and confusions surrounding the integration of environmental and social criteria

Framing challenges

The interviews revealed great confusion with respect to the meaning of the integration of environmental and societal criteria in such a contest. Both entrepreneurs and the incubator staff consider that it is not clear whether the contest will later accept a project with no impact on the environment and on society. One entrepreneur stated: “I provide a digital solution, using consuming data servers, that will increase efficiency in a particular sector, and therefore reduce the need of humans to do these tasks. That is the truth. If I wrote that, or simply ‘n.a’, in the environmental and societal section, would I be rejected?”. In addition, i-Lab operators mentioned during the 2022 private sessions for incubators that they will not carry out positive discrimination. In the 2023 edition, the application file clearly asked about the number of women in the founders’ team. One entrepreneur asked during one of the incubator support sessions for candidates: “Should I put myself forward as a candidate even if I am not the CEO? If they demand the number of women, does this mean that female-led teams will obtain more points?”. The formulation of questions led to confusion. Moreover, because the “Environmental and societal impacts” section was “at the discretion of the evaluator” for the 2022 edition, entrepreneurs admitted they spent less time on these questions. The support sessions organized by the incubator for the 2023 edition demonstrated that entrepreneurs are globally more likely to demand advice when the section is actually evaluated.

Transparency challenges

For the 2022 contest, the “Environmental and societal impacts” section was not very detailed, which led to significant difficulties for the candidates. For most of the interviewees (88%), it was the first time they were asked about their contribution to such goals. Every interviewee said they would have preferred to have a common tool to use, rather than open questions. The results emphasized the heterogeneity of candidates’ responses but, at the same time, the quantity of answers envisaged by the candidates. During the incubator’s support sessions for entrepreneurs, one of them asked whether the “governance” criteria were considered by evaluators, as private investors would rather use Environmental, Social and Governance (ESG) criteria to evaluate startups’ contribution to sustainability. The answer is not evident. When analyzing quantitative environmental evaluations, we observed that Industry/Greentech startups obtained the most points. All the five evaluations that we obtained from these startups attributed environmental points to the candidates, whereas only two startups in the Health sector managed to gain points in this section and none in the Digital sector. In addition, the evolution revealed some discrepancies. Some evaluators valued job creation, whereas others did not. The application file invited candidates to stress the inclusion of gender equality and

diversity, but most mentioned the social impact in evaluations concerned with public health issues. To conclude, the operator's lack of transparency in the expectations and in the evaluation created confusion for candidates.

Acceptability challenges

More surprisingly, interviews revealed great frustration with respect to the simple fact of asking an early-stage startup for its contribution to society or the environment. This resentment was shared by all interviewees, even by environmental startups, with the term "greenwashing" largely used by respondents: "We are currently nothing, fewer than five people, with great ambition but currently we just have two slides. Our environmental impact is not significant, but for i-Lab we have to do greenwashing, just like large companies". Another explains: "They force you to lie. Even if we had the resources to assess our contribution to the environment, it is not possible to know for sure, as it will depend on so many factors we cannot determine. It is very frustrating to be forced to lie and pretend it is possible to assess". Another frustration came from the social impact. Interviewees perceived their social actions as "natural", rather than rational. One entrepreneur argued: "It turns out that I have parity in my team, but I never did positive discrimination. I am forced to mention it in the file, it is degrading for the women in my team". Another entrepreneur argued that "We will not get points in this section because we do not have women in the team. But let's be clear, the team today is me and my cofounder, so yes 0% but what does it really mean?". The addition of environmental and social criteria faced an acceptability challenge due to the difficulties of a sustainability impact assessment for early-stage startups.

Discussion and conclusion

Summary and discussion of main findings

The number of companies constrained by sustainability requirements is likely to evolve over time. While we know a lot about large companies' practices, a scarce amount of knowledge is available on smaller firms, and in particular startups, which are nonetheless identified as promising actors to address economic, environmental, and social challenges. Through exploratory research in the field, using the original case of i-Lab, a French public grant targeting early-stage technological startups, we were able to analyze in-depth the implementation and the sustainability impact assessment challenges that arise when targeting responsible innovation for startups.

First, we analyzed our case through the Stilgoe et al. (2013) theoretical framework. Our study revealed that low anticipation creates confusions and frustrations, expressed by the entrepreneurs' impression of conducting greenwashing. To our knowledge, no previous study had expressed this risk for responsible innovation policies. Even if the contest has legitimacy, it is not enough to attain acceptability (Banister, 2008). The case revealed little transparency and inclusion in the process, yet these two elements are key for responsible innovation. Stakeholders were rarely involved in the process, but responsiveness was effective as modifications were integrated every year, learning from past contests.

The case also reflects the need to control outcomes, even when it is clear that technologies are by nature ambivalent and unpredictable (Ellul, 1988). By questioning the environmental and societal impacts, public policy seems to acknowledge that some innovations are not desirable (see Soete, 2013). The literature stresses the importance of drawing desirable futures (Stilgoe et al., 2013), but even drawing undesirable futures could be a guide to mitigate entrepreneurs' confusions. The integration of social and environmental criteria in the contest does not meet Schot and Steinmueller (2018)'s expectations for a third framing of innovation policies. Indeed, it did not question the current system itself, but rather offered an incremental evolution. However, policymakers in the sample were pioneers in the integration of sustainability criteria and demonstrated their responsiveness. Therefore, one can be optimistic about further public policies to come.

The results demonstrated entrepreneurs' low awareness of sustainability practices (Johnson, 2015). One main positive outcome of the integration of environmental and societal criteria in public policy was to raise awareness (Steurer et al., 2012), as almost none of them ever had to answer to such criteria before. Indeed, they are under little pressure from their stakeholders on these matters (Brammer et al., 2012b). Johnson (2015) advocated that public policies can contribute to diffusing expertise that founders do not usually have. However, with open questions, it failed to attain this benefit for entrepreneurs. By simply building on previous public policies, they also offered a narrow view of responsible innovation, missing key points such as ethics or governance. This result is consistent with previous research indicating that startups are less likely to address a broad range of sustainability issues (Hockerts, Wüstenhagen, 2010), and we argue that this is due to both a lack of knowledge and a fear of green- or social-washing.

None of the entrepreneurs used frameworks traditionally mentioned in the literature or adopted by practitioners (Bengo et al., 2016). To overcome their lack of preparedness for such requirements (Håbek, 2014; Esmaeilian et al., 2020), entrepreneurs used a bricolage approach (Lévi Strauss, 1967; Baker, Nelson, 2005). The results demonstrated that smaller companies are indeed more reactive than voluntary in terms of responsibility (Burch et al., 2016), as none of the startups in the sample

had prepared responses to such criteria before the contest. We emphasized the ability of a ‘soft policy’ (Steurer et al., 2012) to overcome the sole willingness for a sustainability impact assessment (Hsu, Cheng, 2012), as startups are highly motivated by the prize. Without such incentives, early-stage startups are not likely to measure their contribution to environmental and social issues.

Contributions and practical implications

We pursue recent research on the ability of public actors to foster responsible research and innovation for startups (Gay et al., 2019), and connected it to the emerging literature on the problematic of sustainability impact assessment for startups (Horne, 2019; Trautwein, 2021; Di Vaio et al., 2022; Fichter et al., 2023). The results have implications for practitioners, policymakers, startups, and their stakeholders.

We acknowledge that such initiatives play a major role with respect to sustainability awareness. However, we demonstrated that legitimacy alone is not enough to obtain acceptability when implementing sustainability criteria. Much work has to be done during the anticipation phase to efficiently attain acceptability and to educate on the meaning of such new requirements.

While open questions on environmental and societal impacts failed to guide entrepreneurs, the study provided an insightful overview on what entrepreneurs consider to be their environmental or social contribution. We demonstrated that entrepreneurs are more likely to identify their indirect positive environmental impact, to argue that their internal structure is coherent with sustainability goals, or to emphasize the benefits of their solution for society. On the other hand, they more rarely consider economic contributions, advocate for direct environmental impacts, or identify ways to mitigate their negative environmental impact. Entrepreneurs can draw inspiration from this study and learn what can be defended as a contribution to responsible innovation.

This case is original, as it is highly unusual for startups to be challenged in their early stages on sustainability criteria. This phenomenon was observed in France, a country known to be a pioneer in terms of environmental and social requirements for companies (Kanya, 2016; Habek, Wolniak, 2016). However, if such practices spread, policymakers and private companies from different countries can draw inspiration from this research. For example, both i-Lab in France and EXIST in Germany first reacted to European prerogatives, but then i-Lab was proactive in terms of sustainability requirements. Perhaps EXIST will also follow that path, and if so, this paper could provide useful feedback. Moreover, we emphasized that such changes in innovation policies are rather incremental, as this added a question in the application form for a well-established grant. One

may wonder whether responsible innovation should require a more extensive questioning of the actual system and its current tools.

Limits and further research

While enriching the literature, the paper also identifies avenues for further research as it contains certain limitations. First, exploratory studies are difficult to extend to a broader population. As mentioned, public grants are, at that point, not challenging technological startups with respect to their contribution to sustainability so much, and our case could remain an exception worldwide. While current public policies, such as the Green Deal in Europe, seem to go in that direction, implementation is still in its infancy.

The research setting also influenced the results. We acknowledge that we provided a certain view of the implementation challenges raised by such new requirements from public policies. The incubator had access to the operators of the contest, which led to more information; non-incubated candidates might face even more challenges. The incubator is not dedicated to sustainability, perhaps startups from an incubator specialized in that field would have been less challenged.

One may also wonder whether the sustainability impact assessment carried out for this specific grant had an impact on the development of the startup. Complementary research could analyze how the startups evolved in their growth, in comparison with other startups, from France or abroad, who did not obtain this grant. Replicating the study in other contexts should strengthen the results presented here, for example using the case of EXIST in Germany.

Moreover, the study investigated the first years of implementation of environmental and social criteria and demonstrated a high responsiveness capability from operators. No doubt the evolution to come will be insightful and will require further investigation. Finally, further research should observe if this initiative is an isolated case, or if public policies will increasingly expand the scope of companies concerned by sustainability issues. If so, this paper could act as a starting point to pursue investigations on how they are implemented and with what consequences for startups.

PART III

Chapter 8. Discussion and Conclusion

In a context where environmental and social crises are increasing and accelerating, different perspectives are emerging in the public debate to address critical sustainability issues. On the one hand, some argue for degrowth as the only reasonable approach to the current situation, while on the other hand, others defend green growth, asserting that technologies and innovations can offer valuable solutions to mitigate increasing issues. Startups - as the quintessential fast and high growth organization - are more often caricatured by the former position, and championed by the latter. While a lot is assumed about their potential contribution, little is actually known, considering the uncertainty they deal with. This problem is only beginning to be addressed in the literature, which started by investigating a sustainability impact assessment suited for these new ventures, a complex task given the uncertainty they deal with. However, a gap remains with respect to their actual practices and challenges, hence the research question:

How startups tackle sustainability in a context of great uncertainty?

Given the novelty and the complexity of the topic, a comprehensive research was necessary to address this question. While different approaches could have been taken into account, this research's originality lies in emphasizing the point of view of the first to be concerned, namely startups. The objective was to demystify the current debates, and to explore what startups actually do with respect to sustainability. An abductive process led to the identification of sub-research questions from surprises, which were investigated through three academic papers. This research was not intended as an exhaustive overview but as an in-depth exploration of several specific aspects of the phenomenon. Sustainability for startups has been understood as a part of the entrepreneurial process (Article 1), as embedded in a specific entrepreneurial ecosystem (Article 2), and as a prerequisite required by public actors (Article 3). Overall, sustainability for startups appeared as a social process, where the meaning given to sustainability evolved through interactions. The symbolic interactionist lens of this research aims at reflecting how startups and their stakeholders collectively attempt to give sense to a complex object, for organizations characterized by uncertainty. Through the analysis of practices and discourses, this thesis reflects a possible interpretation of the phenomenon at stake. From the results obtained, the discussion emphasizes an entrepreneurial ecosystem in transition, questioning the current knowledge on sustainable entrepreneurship. It suggests a new definition of sustainable startups, and uses the concept of improvisation to understand sustainability in the context of startups.

Section 1. Summary of Findings

This research is rooted in the field of sustainable entrepreneurship, which investigates entrepreneurial ventures targeting a triple bottom line (Terán-Yépez et al., 2020; Cohen et al., 2006; Elkington, 1997). This broad definition fails to inform us on their actual characteristics and practices. The first paper explored this gap through the following research question: how do startups integrate sustainability impact assessment in their entrepreneurial process? While at the end of the process, all startups from the sample can be labeled as sustainable startups, as they all aim for social, environmental and economic objectives, the study revealed two distinct approaches. On the one hand, born-sustainable startups targeted a triple bottom line from the idea generation phase. On the other hand, transitioned sustainable startups started with a double bottom line and addressed the third component later in their development. While the former group ends up with a robust, inclusive and iterative sustainability impact assessment, the latter rather adopt a bricolage approach to deal with their delay and stakeholders' misalignment. This research emphasized different paths adopted to cope with the intrinsic difficulty of sustainability impact assessment for startups. In addition to initial motivation, sustainability impact assessment requires knowledge, data, time, and resources, which are particularly scarce for startups (Trautwein, 2021). The entrepreneurial process lens therefore appears relevant to emphasize what can be done by startups, at different steps of their development, in terms of sustainability practices.

By taking the case of sustainable startups, the first paper showed that some startups can go beyond what is expected from them, and manage their organization using different forms of sustainability impact assessment. While sustainability impact assessment has often been described in the literature as a collective tool constructed with stakeholders (Costa and Pesci, 2016), the study revealed that startups do not necessarily share with them what they are doing in terms of sustainability practices, as they fear some stakeholders might be reluctant. This questions how entrepreneurs interact with their stakeholders in their entrepreneurial ecosystem. The second paper explored the link between sustainable entrepreneurship and institutional entrepreneurship, and revealed that the need for institutional entrepreneurship depended on the entrepreneurial ecosystem in which entrepreneurs evolved. In an entrepreneurial ecosystem perceived as hostile for sustainable startups, institutional entrepreneurship was critical for startups' survival, and appeared rather isolated. Sustainable startups in this context paved the way for new entrants, who benefited from a lighthouse effect (Tiba et al., 2020). The study suggests that institutional entrepreneurship can influence a whole entrepreneurial ecosystem, and not just a specific industry. Indeed, sustainable entrepreneurs pursued institutional entrepreneurship beyond startups' sole interest, to support sustainability goals within the entrepreneurial ecosystem.

The two first papers highlighted sustainable startups' practices, which chose to allocate resources to meet their sustainability ambition. However, recently, some stakeholders in the entrepreneurial ecosystem started to investigate sustainability, and decided to add new requirements for startups. This phenomenon is emerging, and there is only little research on the topic (Gay et al., 2019). The third paper investigated the original case of a key public grant for early-stage technological startups, which integrated new environmental and social criteria in its application form. It emphasized the challenges it led to, considering the complexity of sustainability impact assessment for startups. First, the paper analyzed the implementation's challenges. The grant's legitimacy and operators' responsiveness were not enough to reach acceptability, as anticipation and transparency could have been better addressed (Stilgoe et al., 2013). Second, the study investigated startups' answers and explored their perceptions of this new criterion. It provided information on what startups considered as their environmental and social impact, and pointed out in particular framing, transparency and acceptability challenges. As environmental and social criteria might spread within the entrepreneurial ecosystem, sustainability for startups might shift from a matter of personal motivation to a new norm for every startup.

Through the three papers, a contextual and collective approach to sustainability for startups was highlighted, reflecting how actors make sense of this complex matter. As a transition in the entrepreneurial ecosystem was observed through the research, the definition of sustainable startups needs to be reconsidered. Last, the concept of improvisation is introduced to better understand how startups tackle sustainability.

Section 2. Discussion of Results

An Entrepreneurial Ecosystem in Transition

Through the three research papers, a transition in the entrepreneurial ecosystem can be observed. With the second paper, it is possible to go back to a time when the entrepreneurial ecosystem seemed to reinforce itself to better address startups' needs, with no specific attention paid to sustainability. Hiring talent was a challenge for all startups, and sustainable startups faced this difficulty like others. Governmental organizations dedicated to innovation valorized technological transfer, and there was no specific program for sustainable startups. Likewise, generalist venture funds were not seeking sustainable projects in particular. Overall, entrepreneurs who launched their sustainable startups in the 2010s perceived their entrepreneurial ecosystem as difficult for their project at that time. This is

consistent with the literature portraying sustainable entrepreneurship's environment as rather hostile (Aldrich and Fiol, 1994; Beveridge and Guy, 2005; Pacheco et al., 2010). In that context, these entrepreneurs needed to conduct institutional entrepreneurship for their startup to thrive and survive. They educated their stakeholders with respect to sustainability, produced technical reports, participated in conferences, and engaged in lobbying actions in an attempt to change institutions. They felt rather isolated in their actions, as sustainable startups were in a minority in the entrepreneurial ecosystem.

A decade later, more startups targeted sustainability. The entrepreneurial ecosystem appeared more in their favor, as past successes from sustainable startups paved the way for their project (Tiba et al., 2020). In particular, they considered that talent attraction was easier for them, and were able to find dedicated support from public organizations. They engaged in sustainability with the support of their stakeholders, whether it was their employee, their peers, or their network. In the entrepreneurial ecosystem, networks dedicated to sustainability emerged, and traditional actors started to investigate the topic. These aspects are emphasized in the three papers, and in particular, the first and third ones showed that sustainable entrepreneurs had different interpretations of what could be done and defended in terms of sustainability for their startups. The meaning they gave to sustainability and their actions evolved through their interactions with stakeholders or peers. More and more actors within the entrepreneurial ecosystem tackled sustainability, but at that point, no common framework or standard emerged. Rather, actors collectively attempted to make sense of sustainability in startups' context.

This reflects an evolution within the entrepreneurial ecosystem. Recent work in this field started to question how entrepreneurial ecosystems evolve through time (Cho et al., 2021; Theodoraki et al. 2022), or how they take form (Thompson et al., 2017). In that respect, the theory of fields (Fligstein and McAdam, 2012) appears relevant to understanding stability and change in a given field, as it studies how social actors fashion and maintain order. To overcome the agent / structure debates, it pays attention to meso-level structures. From this perspective, which builds upon symbolic interactionism, an entrepreneurial ecosystem is formed through daily and practical interactions. As they are repeated, they create collective beliefs and values (Hinings et al., 2003). Studies using the theory of fields usually stresses how rules evolve, insisting on the role played by "skilled social actors" (Fligstein and McAdam, 2012). The concept of "social skills", which originates in symbolic interactionism (Mead, 1934; Goffman, 1967), defines actors' ability to provide meaning and to induce cooperation in others (Fligstein, 2001), thus creating collective action. Evolution in a field, here the entrepreneurial ecosystem studied, is understood as a process, starting with an initial situation that actors attempt to change, leading - in case of success - to new conventions. Following

this theory, the process needs to be looked at according to an initial situation, to the types of actors, and last, to the types of actions conducted.

First, the initial situation needs to be characterized. In the entrepreneurial ecosystem, capitalist rules apply, which “prioritize monetary exchange, profit maximization, a short-term orientation, a transactional arm’s-length ethos, and venture growth” (Thompson et al., 2017: 99). This shared meaning affects conventions, which are agreed-upon rules guiding interpretation and interaction, allowing to make actions predictable (Biggart and Beamish, 2003). Even though sustainability emerged as a topic recently, economic criteria still appear dominant.

Second, the question is who can challenge established meaning and conventions. The theory of field is inspired by Pierre Bourdieu’s structuralism, which considers individuals’ characteristics as results of their position. While Bourdieu stresses actors’ interest and power, Fligstein and McAdam rather explain strategic action through a complicated blend of material and existential considerations. Material considerations take into account resources that can be invested, and existential considerations stress how actors make sense of their actions. In this thesis, while other actors’ perspectives could have been studied, the role played by entrepreneurs’ and public actors’ have been emphasized. Public actors have the potential to set new conventions, as they benefit from an authority position reinforcing their legitimacy (Weber, 1978). The third article showed that, indeed, entrepreneurs adapt to new rules when they are enforced by a public actor. Sustainable entrepreneurs’ have also been presented in the two first papers as skilled social actors, who produce meaning for others, and in doing so, produce meaning for themselves. They build upon established conventions to see what is possible and impossible to do. They induce cooperation, and they do not have individual fixed goals, and rather aim for collective ends, i.e. more sustainable practices in their startup and beyond, in the entrepreneurial ecosystem.

Third, the theory of fields investigates actions conducted to initiate change in a given field. Collective actions reflect a framing process (Snow et al., 1986), which often starts with a diagnostic framing (Snow and Benford, 1988). The concept of frame derives from Goffman’s “schemata of interpretation” (1967: 21) which enables individuals to identify and label situations, so they can make sense of interactions. Collective action frames also have this interpretive function as they are action-oriented sets of beliefs and meanings that guide actions. In a study dedicated to how a social entrepreneurial ecosystem was formed in Seattle, Thompson et al. (2017) analyzed four categories of actions (Thompson et al., 2017). First, cultural-cognitive activities: how shared language is created and leads to new conventions. Second, material activity: how a community is built and gains legitimacy. Third, profile of activity: how independent efforts are progressively organized. Fourth, level of social interaction: how groups form organizations. As these actions succeed, a new

entrepreneurial ecosystem emerges, with collective action frames able to inspire and legitimize actions.

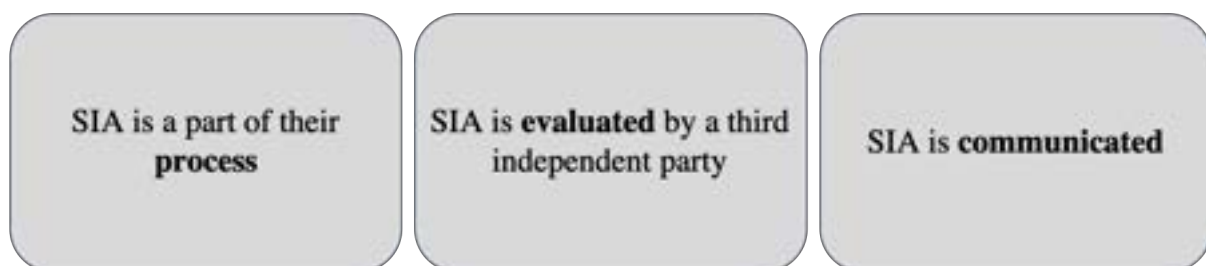
In this research, the entrepreneurial ecosystem appears still in transition. The common language to speak about sustainability in the case of startups is not established. Diverse concepts are used, such as impact, sustainability, environmental, social and governance criteria, or corporate social responsibility. It is still not clear at that point what is included under these umbrella terms, nor what distinguishes a sustainable startup from a traditional one. Collective action frames suppose an existential reflection questioning the initial situation, highlighting what should be changed in the entrepreneurial ecosystem. At that point, different visions emerged, but in practice, there is not a clear and shared view of what should change. On the one hand, public actors studied offered an incremental change, with no evident vision of its meaning. On the other hand, sustainable entrepreneurs conduct responsible actions according to the meaning they want to give to their startup, but are constrained by preexisting rules and conventions. Different types of communities are still emerging, therefore, several action frames might progressively enter in competition. At this point, it is not possible to observe a new or transformed entrepreneurial ecosystem, like Seattle's social entrepreneurial ecosystem studied by Thompson et al. (2017). This thesis rather retraces how, in the absence of collective action frames, startups make sense of sustainability in their context.

A Call for A More Stringent Definition of Sustainable Startups

While the entrepreneurial ecosystem studied seems still in transition, a turning point (Dumez, 2016) appeared when innovation grants added environmental and social criteria in their application form. Sustainability was acknowledged by a legitimate actor (Weber, 1978) as a key topic for every startup, along with classic criteria, such as innovation, economic viability, or quality of the team. From that point, sustainability shifted from a matter of highly motivated entrepreneurs, to a topic investigated by almost every early stage technological startup. This shift questions the common definition in the literature of sustainable entrepreneurship, based on the triple bottom line (Terán-Yépez et al., 2020; Cohen et al., 2006; Elkington, 1997). Indeed, the first and second papers were written before this new requirement, and therefore the criterion to identify sustainable startups relied on founders' ability to defend social, environmental and economic objectives. After i-Lab's evolution, analyzed in the third paper, most entrepreneurs from the incubator answered this criterion as they had to write about it in their application file. It calls for a new definition of sustainable startups, to distinguish them from traditional startups.

From the three papers, and based on what most advanced entrepreneurs did (Article 1, Article 2), sustainable startups can be defined as startups which (1) integrate sustainability impact assessment in their process, (2) evaluate it by a third independent party, and (3) communicate on it (see Figure 9). First, integrating sustainability impact assessment in a startup process means that there are several social and environmental indicators that are regularly followed, challenged and improved by the company. To assure that, one or more people need to be responsible for sustainability impact assessment, and it should be integrated in their job description. Currently, only 4% of startups employ a person dedicated to the analysis of the startup's social and environmental impact (France Digitale, 2023)⁵, a number that is more likely to evolve in the coming years considering the increasing pressure that startups receive from their stakeholders. Second, a third independent party needs to evaluate the sustainability impact assessment produced, to guarantee its veracity and credibility. In that respect, the number of providers dedicated to sustainability for startups considerably evolved throughout this research. Third, the communication of a startup's sustainability impact assessment not only increases transparency, but also allows sharing best sustainability practices within an entrepreneurial ecosystem.

New Criteria for Sustainable Startups



SIA: Sustainability Impact Assessment

Figure 9. Proposition of new criteria for sustainable startups

This definition of sustainable startup emphasizes the importance of sustainability impact assessment, following the emergence of this research field. Current approaches state that a framework suited for startups should bear some key characteristics (Fichter et al., 2023). First, because of the specificities of startups, it needs to be future-oriented, and focus on potential impact rather than actual sustainability effects (Fichter et al., 2023; Hörish., 2015; Clarke-Sather et al., 2011). Second, it should be business models oriented (Bhatnagar et al., 2022; Aagaard et al., 2021; Alonso-Martinez et

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<https://business.lesechos.fr/entrepreneurs/ressources-humaines/0901738886423-french-tech-le-chief-impact-of-ficer-magique-ou-illusoire-352610.php>

al., 2021), rather than using the startup as the unit of analysis, as its structure evolves a lot. Third, because startups challenge current markets and industries, their sustainability impact assessment requires a dynamic process perspective acknowledging effectuation. Fourth, startups have an influence on meso- and macro-level, and therefore, their sustainability impact assessment should take into account higher scales, such as their influence on their entrepreneurial ecosystem, market, region, or society.

While acknowledging the specificities of startups, the research suggests that measuring solely startups' potential impact and only through a business model leads to some issues. On the one hand, it favors a risk of green- or social-washing, and on the other, it raises normative questions.

First, startups studied rely on technological innovation. Attempting to evaluate their potential impact denies the fact that technologies are inherently uncertain, unpredictable and ambivalent. Such a proposition has been defended by Jacques Ellul (1988). While Ellul is sometimes caricatured as technology adverse, he is more accurately portrayed as having criticized excessive and unreasonable speeches associated with technology, e.g. technology is able to solve every problem. Likewise, the research conducted emphasized that entrepreneurs are aware of the limits of their sustainability impact assessments and of their current actual impact (Article 1, Article 3). In that context, encouraging a sustainability impact assessment for startups solely based on their potential impact creates an "economy of promise" (Joly, 2015), where entrepreneurs' ability to obtain resources depends more on approximate assumptions than on actual practices. Such an economy of promise reached its limits as it led to criticism, and company are now expected to argue and demonstrate their actual current impact. Moreover, the focus on the business model's promise should not occult its limits. In that respect, one entrepreneur said during an Acceleration Program event, "it is not because you are a greentech that you cannot do greenwashing". It supports the idea that sustainability impact assessment for startups should gather both potential and actual impact, while acknowledging the limits of their estimations. Such a consideration favors the integration of sustainability practices at an early stage and, in particular, encourages startups with a business model including sustainability goals to go above and beyond their promises.

Indeed, some startups with a business model aiming for social and/or environmental goals are often *de facto* considered sustainable. Aurélien Acquier (2020) stressed this point while studying the "Tech for Good" movement in France. He emphasized, with Jacques Ellul, that labeling some technologies as inherently good raises questions with respect to which businesses can be labeled as such, and according to which criteria. For example, sustainable development goals (SDGs) are a common reference to categorize different kinds of impacts. In that respect, they can be considered as a legitimate framework, reflecting taken for granted beliefs, largely diffused in the entrepreneurial

ecosystem. It is not rare to find one or many SDGs in startups' pitch deck, or private funds evaluating their portfolio through this lens. Startups are thus portrayed as sustainable if they target for example good health and well-being (SDG 3), clean water and sanitation (SDG 6) or life on land (SDG 15). However, if they target economic growth (SDG 8) or innovation (SDG 9), it does not seem enough to be labeled sustainable, considering that it is the purpose of every startup. Such a framework has limits, as a startup's impact may not always match an SDG, and it does not account for the startup's potential for failure. For example a startup aiming at developing the next quantum computer has a huge potential to address environmental and social issues, but it is not clear in which SDG it should be affiliated to, and if the startup fails, its environmental contribution will be solely negative. Therefore, rather than mapping startups according to the key goal of their business model, and thus include or exclude some startups *de facto*, a business model should play the role of a tool to continuously improve their contribution to sustainability goals.

From these considerations, a sustainable startup is not defined according to its initial business model's potential, which is likely to evolve and is hardly measurable. A sustainable startup is characterized by a stringent approach to sustainability impact assessment, which (1) includes both the startup's actual impact and potential impact - while acknowledging underlying assumptions; and (2) uses these findings to increase its positive impact and to identify ways to reduce its negative impact. This approach, and the definition of a sustainable startup offered above, suggest the need for a process oriented perspective on sustainability for startups relying on management practices, rather than a business model-focus, considering the specificities of early-stage technological startups.

Managing Uncertainty and Complexity Through Improvisation

The emphasis on sustainability impact assessment is undeniably part of a quest for rationalization, although its limitations have been underlined (Ellul, 1988). Max Weber's work on large bureaucracies, analyzed through the prism of the search for rationality, had a major influence on management science, stressing in particular organizations' rational management. Another approach was developed in the 1970s with the notion of legitimacy (Meyer and Rowan, 1977). In this perspective, organizations interact with their environment and need to argue their legitimacy in front of their stakeholders in order to survive. They use different tools, which are acknowledged as legitimate in a given institutional environment (Sponem & Lambert, 2010), to increase their legitimacy through shared meanings. For example, management control is a standard tool for organizations, commonly used and associated with shared meaning. Chatelain-Ponroy and Sponem (2011) retrace how it emerged as a legitimate tool, and characterize it as a "rational myth", i.e. an institutionalized structure that gives the illusion of rationality (Meyer and Rowan, 1977). Such

rational myths emerge through a process, where organizational practices are progressively standardized (DiMaggio and Powel, 1983). All myths have a strong institutional aspect, as they impose themselves or not because a group of authors legitimized it.

As previously mentioned, in the entrepreneurial ecosystem studied, no standard framework currently emerged for startups to produce their sustainability impact assessment. However, the increased attention it received, and different attempts to measure startups' contribution to sustainability, demonstrate the need to create shared meaning and to rationalize sustainability. Most frameworks currently available attempt to provide a score, or at least rely on key performance indicators. Scores lend legitimacy to a framework, and reflect an institutional environment where numbers are considered as a guarantee of truth and objectivity (Porter, 1995). For example, the Impact Assessment from B Corporation evaluates a company's impact on a scale from zero to two hundred. Likewise, Mouvement Impact France, ESSEC Business School and the Boston Consulting Group (2023)⁶ attempted to replace the valorization indicator, dominant in the entrepreneurial ecosystem, with a "costs avoided to society" indicator. It suggests that organizations and public policies can only manage what they can measure (Berland et al., 2008), which has consequences on how environmental and social issues are understood.

Armand Hatchuel (1994) encouraged management researchers to adopt both a taylorist and a weberian perspective, i.e. to both learn how to do better and to understand social dynamics at stake. Researchers integrated in organizations have the ability to retrace dynamics that led to the construction of rational myths, and at the same time, they might themselves produce them. Researchers should explain their choices, and acknowledge other paths. Below is presented a sustainability impact assessment for startups analyzed through the concept of improvisation. This approach is consistent with discourses and practices observed on the field. This choice is also strongly influenced by a long proximity with entrepreneurs, but following the principle of incompleteness (Hatchuel, 1994), it does not intend to exclude other possibilities. Other approaches to manage sustainability might emerge, from regulators or markets, for example.

Sustainability for startups reflects improvisation, a concept introduced in the entrepreneurial literature to think about entrepreneurial action (Schmitt, 2015), beyond the traditional dichotomy of causation and effectuation. Causation implies a certain determinism, emphasizes rationality and focuses on what is entrepreneurship and who is the entrepreneur, while effectuation pays attention to practices, to understand how entrepreneurs take decisions (Schmitt and Julien, 2020).

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Entrepreneurship academics advocated that these approaches are complementary to explain entrepreneurship (Chandler et al., 2011; Smolka et al., 2016; Alsos et al., 2016). Indeed, rationality is embodied in the evolving decision process (Simon, 1996). Another concept, improvisation, was introduced in the 1990s (Weick, 1998; Moorman & Miner, 1997) to understand organizational action. Improvisation exists when there is substantial convergence between planning and implementation in response to unforeseen events. It describes an unplanned but purposeful response to a changing environment (Moorman and Miner, 1998). It adapts to situations, to quickly respond and conduct change, both external and internal (Barrett, 1998; Eisenhardt & Brown, 1998). Improvisation differs from creativity, intuition, adaptation or opportunism (Chelariu et al., 2002) to the extent that it simultaneously integrates creation and execution of plans (Main & Solomon, 1986). It is also different from bricolage (Lévi-Strauss, 1966), which rather characterizes small actions conducted in a short period to respond to an immediate need (Stinchfield et al., 2012), but does not assume planning.

Improvisation is a lens suited to understanding sustainability for startups for many reasons. First, it occurred in the study in a changing environment, where stakeholders' expectations were quickly evolving, thus creating new situations to which entrepreneurs had to adapt. Second, improvisation is needed considering the complexity of the topic. If there were one standard to address sustainability, commonly shared in the entrepreneurial ecosystem, the phenomenon could rather be explained through causation or effectuation. Sustainability for startups could therefore be seen as a rational action to meet stakeholders' demand, or a process in which entrepreneurs cope with the demand with available resources. Third, if sustainability for startups might start with a bricolage approach, it then requires sustainability impact assessment, which simultaneously involves planning and action, and affects both the internal structure and its external relationships, thus requiring improvisation.

The improvisation lens to understand sustainability for startup does not imply numbers, and rather advocates for a process approach to the phenomenon. This choice has the advantage of being suited for different types of startups, with the potential to engage all startups toward this path, without excluding any of them *de facto*. To respond to a complex and uncertain environment and object, the goal is to learn how to improvise, and to improvise to learn (Chelariu et al., 2002). With the concept of improvisation, sustainability impact assessment is seen as a “circular process of learning occurring through moving and processing information, acting on that learning and as a result learning more” (Chelariu et al., 2002: 142). It is the result of a collective sensemaking process in the entrepreneurial ecosystem. This process involves entrepreneurs, who in turn influence the sense given to sustainability according to their own perception and practices. The collective sense attributed to sustainability in the entrepreneurial ecosystem is then interpreted by entrepreneurs, which affects their sustainability practices. As they engage in this path, they improvise a sustainability impact

assessment, and build an artifact which has effect both on external coherence (Chelariu et al., 2002) and on organizational memory (Chelariu et al., 2002; Hubert, 1991). Sustainability impact assessment is seen as a four step circular learning process. It starts with knowledge acquisition, to then interpret sustainability in the startup context and according to its ambition. Then, it requires mapping sustainability impact assessment tools and identifying the one(s) in line with the context ambition previously defined. Last, the organization learns from the sustainability impact assessment conducted, thus creating new knowledge. This circular approach emphasizes the iterative characteristic of sustainability impact assessment. Figure 10 retraces this overall process of learning and improvisation.

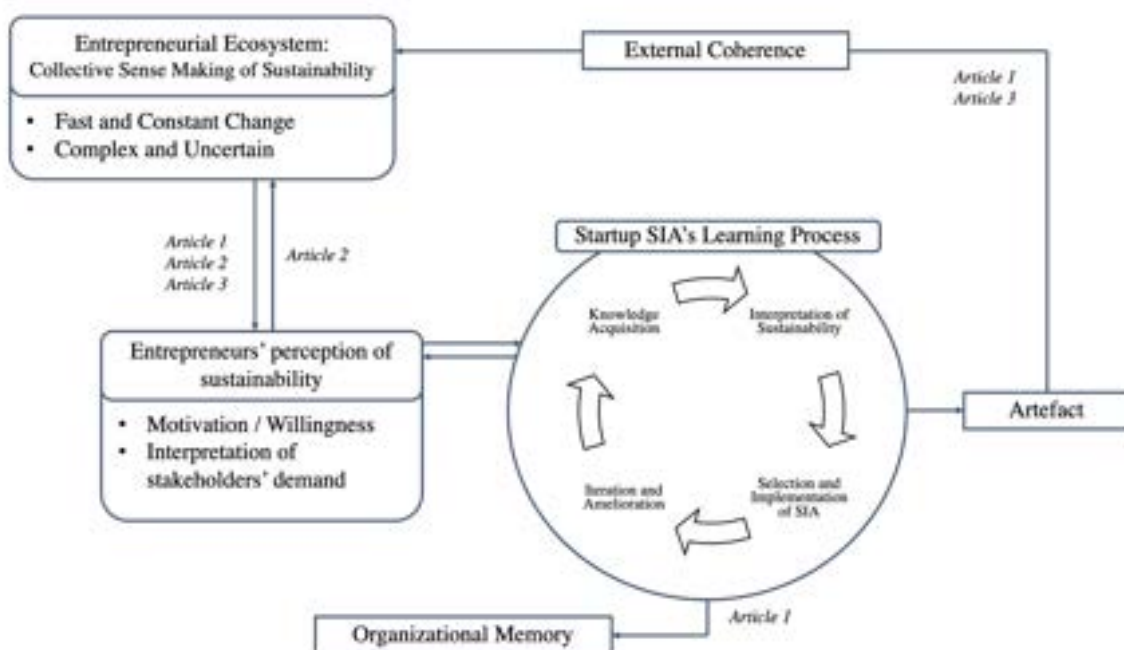


Figure 10. Sustainability for startups: A collective process of learning and improvisation

The sustainability impact assessment process starts with knowledge acquisition, a classical first step in any learning process (Hubert, 1991). This is a key point considering that entrepreneurs often have little initial knowledge on the matter (Article 1, Article 3). Acquiring knowledge with respect to sustainability is so critical that the French Ministry of Higher Education and Research made it mandatory for every higher education program (Campus France, 2022), and that it is advocated to be part of entrepreneurial education (Hsu and Pivec, 2021; Rachid, 2019; Linder, 2018; Lourenço et al., 2012). Concretely, it suggests for entrepreneurs to be trained to understand a systematic approach to sustainability issues, and in particular to learn about causes and consequences of climate change

from major scientific contributions, such as the ones developed by the Intergovernmental Panel on Climate Change (IPCC).

Once entrepreneurs have this knowledge, the next step for them is to ask themselves questions about what sustainability can mean for their startup. It requires determining what the startup's values and ambition are, and thus clarifying the organization's culture and mission (Muñoz and Kimmitt, 2019; Ormiston and Seymour, 2011; Lounsbury and Glynn, 2001). This step is critical to coordinate actions, to give them meaning, and to determine what resources will be dedicated for social and environmental goals. Moreover, early-stage startups' impact often starts with their impact on their employees (Article 1), and orienting the team toward a purpose is necessary to legitimize and guarantee further actions. Last, having a clear mission reduces the risk of stakeholders misalignment (Article 1).

After determining the startup's mission, the next step is to identify, select and implement a sustainability impact assessment. In the study conducted, no framework collectively established itself as legitimate, therefore, startups' actions evolved through interactions. However, some standards progressively gained in legitimacy, such as carbon footprint reports, life cycle assessments, the European Green taxonomy, the B Corporation certification, or mission-driven committees (Article 1, Article 3). As mentioned, some are still emerging, and entrepreneurs need to find the appropriate one, suited for both their organization and their stakeholders. Sustainability impact assessment plays the role of a tool for the startup to identify relevant indicators with respect to social and environmental goals, to implement some practices, and to challenge their business model to extend their positive impact.

Then, when a first sustainability impact assessment is produced, entrepreneurs learn from it. Despite the potential gaps of their first attempt, entrepreneurs increase their knowledge with respect to sustainability, refine their appropriate key performance indicators, and might explore other more appropriate tools. It influences organizational memory (Hubert, 1991) with both new knowledge and new practices. Indeed, one of the key challenges for startups to measure their impact is to collect data (Trautwein, 2021). By producing a first sustainability impact assessment, entrepreneurs can implement data collection in their process, as they now know which data are relevant for them. Finally, the learning process is circular to the extent that this new knowledge might also lead to new questions, thus influencing the startup's mission.

Section 3. Contributions

This manuscript attempted to be both useful to researchers and practitioners. One key interest of CIFRE thesis is to bring practitioners' insights to the scientific community, and academic insights to practitioners. Both researchers and practitioners had expectations about the other, which were illustrated through questions they asked me. On the one hand, I have been asked in scientific conferences "Do entrepreneurs really care about these issues?", "Is it not all greenwashing?", or "How can we be sure they will really have a positive impact?". The thesis does not respond to these questions - each should require its own investigation. However, the goal was to make their concerns, trade-offs, ambition and difficulties apparent. On the other hand, entrepreneurs often asked "What should be done?", "Which action should I start with?", or "Is doing that good enough?". The thesis rather argues that a process based approach is needed given the complexity of sustainability impact assessment for startups. Sustainability impact assessment is considered as a learning process, improvised according to startups' evolving context. From this general perspective, which has implications both for research and for practitioners, more detailed contributions can be made.

Contributions to Research

Theoretical Contributions in the Field of Sustainable Entrepreneurship

The thesis contributes to the field of sustainable entrepreneurship by exploring and cross-referencing existing research.

First, Article 1 offered an original view on the sustainable entrepreneurial process by establishing a link with sustainability impact assessment. The article revealed the importance of the integration of the triple bottom line in the entrepreneurial process and emphasized two paths, "born-sustainable startups" and "transitioned-sustainable startups". It suggested that the sustainable entrepreneurial process can start with the triple bottom line from the idea generation stage, which supports Matzembacher et al. (2019) view, and contradicts the "convergent model" argued by Belz and Binder (2017). Throughout the research, sustainability impact assessment practices are emphasized, which contributes to this emerging field (Fichter et al., 2023) by highlighting empirical evidence.

Second, Article 2 answered a call for more research on the dynamic nature of entrepreneurial ecosystems, exploring their evolution through time (Cho et al., 2021; Theodoraki et al. 2021; Cho et al., 2021; Theodoraki et al. 2022). In line with prior recommendations (Cloitre et al., 2022), it used institutional theories to stress the "paradox of embedded agency" (Lange, 2019; Seo and Creed,

2002) of sustainable entrepreneurship. While most research established that sustainable entrepreneurship requires institutional entrepreneurship (Pinkse and Groot, 2015; Schaltegger and Wagner, 2011), to overcome a hostile environment (Aldrich and Fiol, 1994; Beveridge and Guy, 2005; Pacheco et al., 2010), this research offered more nuanced results. It suggested that sustainable entrepreneurs conduct institutional entrepreneurship beyond the sole interest of their startup, to influence the whole entrepreneurial ecosystem toward sustainability.

Third, Article 3's contribution was to emphasize public actors' ability and challenges to engage entrepreneurs toward sustainability. The study explored it through the case of a public grant which added sustainability criteria for candidates, a recent and understudied phenomenon (Gay et al., 2019). It seemed that such tools are useful to raise awareness (Streuer et al., 2012) and to increase entrepreneurs' knowledge with respect to sustainability, thus reducing heterogeneity in their answers. Entrepreneurs initially had only little knowledge on the matter (Johnson, 2015), considering they received little pressure from their stakeholders (Brammer et al., 2012). This chapter contributed to the literature on sustainable entrepreneurship, by showing how public grants can influence startups, and how entrepreneurs might react to such new requirements.

The thesis thus explored several literatures related to sustainable entrepreneurship: the entrepreneurial process, sustainability impact assessment, institutional entrepreneurship, and responsible research and innovation. Through the discussion of the results, a holistic view of the empirical phenomenon observed was provided.

The discussion emphasized the evolution of the entrepreneurial ecosystem, which began to integrate sustainability, but cannot be considered yet as a sustainable entrepreneurial ecosystem. The theory of field (Fligstein and McAdam, 2012), inspired by symbolic interactionism principles, appeared as a useful lens to retrace different characteristics of this evolution. It contributed to the literature on entrepreneurial ecosystems, by suggesting a possible path that others might follow, if the phenomenon spreads beyond the geographical area covered. The research can be considered longitudinal, to the extent that a turning point was identified and required to rethink the definition of sustainable startup. Another contribution was thus to suggest a new definition of sustainable startup. Based on the results obtained, and in particular inspired by what most advanced startups did, a sustainable startup was defined as a startup that (1) integrates sustainability impact assessment in its process, (2) evaluates it by a third independent party, and (3) communicates the results.

The emphasis on sustainability impact assessment for new ventures reflected the emergence of this research field (Fichter et al., 2023). However, while many academics argue that startups' impact should be evaluated *ex-post* (Fichter et al., 2023; Hörish et al., 2015; Clarke-Sather et al., 2011), the

thesis supports a process based approach to sustainability impact assessment, focusing on organizational practices, to engage startups, regardless of their initial business model. Sustainability impact assessment is thought of as a collective learning process, requiring improvisation in a context where sustainability for startups is subject to interpretations, in the absence of a common framework. An artifact is created by startups through this process, and should (1) include both the startup's actual impact and potential impact - while acknowledging underlying assumptions; and (2) use these findings to increase its positive impact and to identify ways to reduce its negative impact.

Overall, the literature on sustainable entrepreneurship was enriched by an empirical approach, focusing in particular on startups' perspective and challenges. The thesis investigated in-depth several aspects of the phenomenon, to then provide a holistic view, which - consistently with the methodology used - reflects a possible interpretation of sustainability for startups.

Methodological Contributions

The symbolic interactionism lens emphasized how actors acted toward sustainability according to the meaning they give to it, which arose through a process of social interaction, and changed according to an interactive and interpretative process. Such an approach allowed to reveal the mechanism at stake, while also answering a call for more management research using the symbolic interactionism approach, given its potential (Dumez and Toussaint, 2022; Sørensen et al., 2007; Prasad, 1993). While the “glorious triumph” (Fine, 2016) of this orienting theory is still pending, the thesis provides an example of how to use it for research.

Another contribution can be for qualitative researchers in CIFRE thesis. This research strongly benefited from the opportunistic methodology defended by Jacques Girin (1991), and the abduction process (Dumez, 2016). By introducing research articles with a section dedicated to the process that led to the identification of a sub-research question, the manuscript offers an example of how to use these principles in practice. It offered a certain approach, using narratives. These “elaborated materials” were written ex-post, but thanks to important notes taken on the field, thus stressing the importance of diaries in such a setting.

Practical Contributions

For Startups

This research advocated a process approach for sustainability management for startups, considering the current absence of shared and legitimized frameworks or standards. It emphasized the critical role of sustainability impact assessment, and suggested that engaging in such a learning process offers some opportunities, notably in terms of talents and clients, and reduces the risk of stakeholders misalignment (see Article 1). From the results obtained, it is possible to provide some guidance on how to address sustainability criteria for early-stage technological startups⁷.

The framework introduced (see Figure 11) is inspired by the Environmental, Social and Governance (ESG) classification, to adopt a holistic view on sustainability (Theodoraki et al., 2022; Siemieniako et al., 2021; Higgins et al., 2020). Such an approach has the advantage of being used in the private sector, and in particular by investors (Duque-Grisales and Aguilera-Caracuel, 2019). In the entrepreneurial ecosystem studied, more and more startups are receiving ESG criteria from their investors, at an increasingly declining level of maturity. It often takes the form of a spreadsheet, with diverse key performance indicators. The ESG framework was an inspiration, but was adapted according to results. First, rather than providing a score, the goal is to inspire entrepreneurs through concrete questions and practices, in order to engage them in the learning process. Second, in line with the discussion with respect to the sustainability impact assessment process, the framework starts with “how the startup operates”, inspired by governance criteria, considering that questioning this point is paramount to then address environmental and social criteria, which were also translated into questions.

⁷ Some of these results were first presented in research articles, but then removed through the reviewing process.

	How the startup operates?	What is the environmental impact of the solution?	What is the impact on stakeholders?
Key Questions and Common Tools and Practices	<ul style="list-style-type: none"> • What is the startup's mission, culture and values? <i>See mission-driven company status</i> • What are processes with respect to environmental and social goals? <ul style="list-style-type: none"> - SIA: is part of an or many employees' job description? Is evaluated by an independent third party? - How does HR processes guarantee diversity? E.g. reduction and diffusion of job offers; parity for candidates received for job interviews; fair raises and promotions... (See Index Parity, OMS) inclusion and diversity plan...) - How employees thrive? E.g. well-being and flexibility (See ParentalAct); training and volunteering opportunities; employee shareholding; transparency... - How environmental concerns are shared? E.g. training employees to sustainability; promoting sustainable; digital responsibility; responsible purchasing; recycling... - How are efforts guaranteed and accounted? KPIs followed, charters, labels, certifications, communications... 	<ul style="list-style-type: none"> • What is the current environmental context of your industry? What are the current alternatives and their environmental impact? <i>Sources examples: IPPC or other specialized scientific papers; ADEME; Shift Project...</i> • What is the potential future positive and negative impact of your solution? What is the current positive and negative impact of your solution? <i>See European Green Taxonomy, Life Cycle Assessment, Carbon Footprint Report, Eco-conception...</i> • How can you reduce your negative impact and increase your positive impact? <ul style="list-style-type: none"> - Identification of possible alternatives to reduce negative impacts and construction of a roadmap - Collective promotion of sustainable practices 	<ul style="list-style-type: none"> • Which stakeholders have to be taking into account in your development? <i>See Reyna and Georget, 2022 for a typology of stakeholders</i> • How do you take them into account in your development? <i>See Materiality matrix to map and prioritize economic, financial, societal and environmental issues</i> • What impacts do you consider? <i>See Logic Model:</i> <ul style="list-style-type: none"> - Inputs: What resources do you invest? - Activities: What you do with them? - Outputs: What is produced? - Outcomes: What changed? <i>See Morris, 2019</i> • How do you communicate your impact?
General Assessment	Impact gov by the French Government; B Impact Assessment by B Corporation; Impact Score by Mouvement Impact France...		

Figure 11. Proposition of framework for startups to engage in the SIA learning process

The framework is in line with the process and improvisational approach defended, to the extent that it was constructed to guide entrepreneurs with respect to key sustainability principles. It was first created in December 2022, and then tested and improved in 2023 with the incubator staff and startups feedback, and with information obtained from the watch conducted for the incubator. It is presented here to be useful for entrepreneurs and their stakeholders, but it will require further elaboration to be scientifically defended. Different tools and techniques are mentioned, and they reflect current practices in this specific ecosystem. However, they “play a less significant role” (Bond, Morrison-Saunders, & Pope, 2012: 55) than the learning process. The tools and techniques presented should be considered as a picture which freezes a reality, in a certain ecosystem, for a certain category of startups, and at a specific time. They are indeed likely to evolve, thus requiring improvisation from entrepreneurs according to their context. Confronting this picture to other entrepreneurial ecosystems might be useful to learn from the Parisian entrepreneurial ecosystem, and to potentially observe divergent approaches.

For Decision-Makers

Through the research, it appeared that a lot of decision makers started to question entrepreneurs with respect to their contribution to sustainability. A lot of them admitted that they lacked knowledge to determine what they could expect from early-stage technological startups. Decision-makers can learn

for this manuscript about startups concerns and difficulties, but also from the process approach suggested. In particular, the case of i-Lab revealed that public grants could be used as an opportunity to guide entrepreneurs on what sustainability can mean in their context. However, open questions create difficulties for entrepreneurs, whereas public actors could use this tool to diffuse knowledge. Results suggested that being transparent about how sustainability criteria are taken into account and providing for example the grading scale could help entrepreneurs to better answer these requirements, and, above all, understand their meaning. In addition, the process approach to sustainability impact assessment defended goes against punctual and isolated requirements. For example, entrepreneurs could answer these criteria for the application file, and the assessment be done by grant operators on their progress later in their development. Indeed, the financial support from these grants is often provided in several installments, which could be milestones to assess the startup progress in terms of sustainability.

The case of i-Lab showed one type of sustainability criteria addressed to startups. However, as many actors investigated the topic, from incubators to venture capitalists, it created a proliferation of different frameworks. Entrepreneurs expressed that answering different types of requirements, for the same goal, added complexity for them and was time-consuming. One may consider that public actors have the legitimacy and influence to suggest one framework to guide entrepreneurs, with stringent but realistic expectations. To reinforce the legitimacy of one framework, policymakers could use Stilgoe et al. (2013) approach, in order to pay attention to different phases, i.e. anticipation, reflexivity, inclusion, and responsiveness. In particular, it seems that incremental changes favor “responsiveness”, but fail to clarify their meaning. To address that point, policymakers could draw desirable futures (Stilgoe et al., 2013), or at least undesirable ones. Such a stand could initiate a transition to the third framing of innovations policies suggested by Schot and Steinmueller (2018), which could fully integrate environmental and social stakes.

Last, policy-makers aiming for a sustainable entrepreneurial ecosystem can learn from the second article. Sustainable entrepreneurs have a key role to play in developing a sustainable entrepreneurial ecosystem, as they can pave the way for new entrants, thus creating a lighthouse effect (Tiba et al., 2020). Therefore, public actors can support and promote first sustainable startups successes in order to encourage new similar startups.

Section 4. Limitations and Further Research

This thesis investigated several aspects of sustainability for startups, inspired by issues seen in the field, which led to theoretical and practical contributions. An explorative approach was suited to the

study of a new and understudied phenomenon. Nonetheless, such an approach comes with some limitations, thus suggesting future research may be necessary.

First, the choice to submit academic papers meant adapting to the editorial requirements. In particular, their format needed to be succinct, while many ideas could have been further developed. As we focused on answering each research question targeted, all the questions raised from data and surprises were not fully answered. This calls for further investigation on many aspects. While it seems that startups can start with a triple or a double bottom line, we did not investigate whether there were discrepancies in practices according to different sectors. In addition, the focus of the study was on startups' integration of environmental and social objectives, but the consequences in terms of economic gain was not elaborated on. Further research could pay attention to this point by, for example, comparing sustainable startups' development, with others that neglected these issues. The development of sustainability requirements for startups also led to the creation of new jobs. Having one person in charge of sustainability in an early stage technological startup is something new, which might retain the attention of scholars. They can be seen as a new kind of "joiner" (Roach and Sauermann, 2015), and it could be interesting to both better understand their profile and their impact on startups, by comparing with startups which did not choose to recruit such profiles in their early development. In addition, as we investigated the second sub-research question, we observed that sustainable entrepreneurs in our sample were indeed highly motivated by sustainability, and acted toward that goal rather than the sole interest of the startup. This mirrors the way such entrepreneurs are portrayed in the literature. However, as the success of first sustainable startups paved the way for new entrants, one can wonder whether founders of sustainable startups will have the same motivation. Indeed, while only "fools rush in" (Aldrich and Fiol, 1994) in an adverse environment for sustainable startup, if actors of the entrepreneurial ecosystem favor sustainable startups in the future, the motivation to launch one could be economic gain, which might affect the typical portrait of sustainable entrepreneurs.

The interest of the explorative approach is to raise these kinds of questions, rather than aiming for generalization. However, the focus on a sole incubator comes with a lot of limits, calling for further research. While one interest of this incubator was to be generalist, thus allowing the study of startups in different sectors, it has specificities that affected the results obtained. It is located in one geographical area, Paris, and we argued that sustainability for startups was a complex matter strongly influenced by startups' context. Additional studies could test whether similar results are obtained for startups launched in other entrepreneurial ecosystems. In addition, the incubator selects projects with the most potential, and provides guidance for entrepreneurs, which certainly has biased results. Previous research suggested that incubated startups behave differently in terms of sustainability than those who were not (Matzembacher et al., 2019). Therefore, comparing our results with startups

from different incubators, or with startups that do not belong to an incubator could yield useful insights. The incubator has a focus on early-stage deeptech startups, which have certain characteristics that reinforce their difficulties to assess their sustainability impact. The ways to address sustainability might be easier when startups have a team, a final product and clients, which might lead to different results. Last, the methodological approach adopted accepts subjectivity, considering its potential to reveal certain aspects of complex phenomenon. However, to confirm hypotheses raised, other methodological approaches should be considered, in particular to extend the sample size.

Final Words

While environmental issues are on the rise, their significance is, understandably, overshadowed by the urgency of current wars. The complexity of the landscape we navigate is such that crafting a conclusion on the role of startups may appear disconnected from pressing realities.

In turbulent times, the challenge lies in the ability to “organize pessimism”, as Benjamin Walter wisely pointed out. In their pursuit of understanding how collective actions take shape, management sciences have a pivotal role to play.

This research journey had an impact on my personal choices and revealed, through interactions with entrepreneurs, that knowledge tends to be a catalyst for tangible actions. Entrepreneurs, with their capacity to foster engagement and orchestrate collective efforts, have the potential to contribute to positive change. Yet, this contribution is contingent upon two critical factors: a robust foundation of knowledge and a deliberate prioritization of sustainability on our collective agenda. This underscores the imperative for a shift in our prevailing model of success - one that actively values and rewards contributions to environmental and social issues, fostering a path towards a more sustainable and responsible future.

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Appendices

Appendix A. - Deeptechs startups through the crisis: Resilience, support and their vision for the future. Agoranov, 2020



À PROPOS DE CETTE ÉTUDE

L'enquête en quelques mots

Agoranov a interrogé les startups deeptech accompagnées par l'incubateur. Cette étude est le résultat de l'analyse de 110 réponses de fondateurs de startups : 40% des répondants sont actuellement incubés chez Agoranov et 60% sont Alumni. Lors de l'enquête, réalisée du 18 au 25 avril 2020, les interrogés avaient le choix de répondre anonymement ou non. En complément de l'enquête, nous avons analysé la communication de l'ensemble des startups accompagnées par Agoranov. Les actions relayées ci-dessous sont uniquement celles qui ne sont pas confidentielles.

L'objectif est de présenter un panorama de leurs problèmes, de leurs réactions, de leurs incertitudes, de leurs adaptations et de leurs visions pour l'avenir, face à la crise sanitaire. En restituant les principaux enseignements de cette enquête, nous espérons donner à la fois de l'information sur la réalité des défis auxquels font face ces startups, mais aussi d'anticiper les changements à venir à l'issue de la crise.

À propos d'Agoranov

Agoranov accompagne des startups innovantes dans les domaines de l'industrie, du numérique et de la santé. Agoranov a notamment accompagné les licornes Criteo, Dataiku et Doctolib. En 20 ans, Agoranov a incubé plus de 430 projets (Insect, Alan, Deepki, DNA Script, Shift Technology...), qui ont d'ores et déjà créé plus de 12 000 emplois et levé au total plus d'1,5 milliard d'euros en fonds privés. En 2020, Agoranov a été classé par Dealroom 3er acteur français dans le domaine de l'amorçage et 6^{ème} au niveau européen.



SECTION 1. La résilience des startups deeptech face à la crise

- 5 Les ressources humaines, indicateur de résilience
- 6 Stratégies et réactions des startups deeptech
- 7 Des startups résilientes, malgré l'impact de la crise

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- 10 Les startups santé particulièrement mobilisées contre le Covid-19
 - Les startups santé impliquées dans la recherche sur le Covid-19
 - Les startups santé mettent à disposition leurs solutions et leurs équipes
- 12 En dehors de la santé, un très grand nombre de startups ont redoublé de créativité afin de contribuer à l'effort collectif
 - Soutenir le personnel soignant
 - Améliorer la situation pendant la crise

SECTION 3. « Le monde d'après » selon les startups deeptech

- 16 Continuer et se réinventer
- 17 Vers des modèles plus durables

SECTION 1
LA RÉSILIENCE DES STARTUPS
DEEPTECH FACE À LA CRISE



Les ressources humaines, indicateur de résilience

Un mois après la crise, plus de **60%** des startups deeptech n'avaient pas recouru au chômage partiel

À noter que le recours au chômage partiel n'est pas particulièrement conseillé au secteur de la startup, à son ancienneté ou à son nombre d'employés.

Seulement **1%** des startups s'estiment très inquiètes pour leurs ressources humaines

Certaines startups ont continué de recruter, en dépit de la période. Elles se sont adaptées à distance et de nombreux "onboardings" (accueil de nouveaux employés) ont été réalisés pendant le confinement. Les startups ont mis l'accent sur la cohésion au sein de leur équipe.

“ Nous n'avons pas opté pour le chômage partiel pour maintenir l'équipe à bord et préparer l'avenir avec une nouvelle offre. ”

Gillaume Daut - Fondateur Continuum

“ Nous avons imposé le télétravail pour tous pendant au moins la durée du confinement afin de ne pas prendre de risque. Nous avons identifié la cohésion, la motivation et la productivité comme des sujets à risque pendant le confinement. Nous avons mis en place un sondage hebdomadaire pour demander l'humeur de chacun sur ses sujets. ”

Emmanuelle Mathieu, COO Agoria



Stratégies et réactions des startups deeptech

75% des startups deeptech ne sont pas ou peu inquiètes vis-à-vis de leur R&D durant cette crise

Le valeur ajoutée d'une startup deeptech réside en grande partie dans sa R&D. Malgré les obstacles posés par cette crise, nous remarquons que c'est surtout l'occasion pour les startups deeptech de se recentrer et de passer plus de temps sur l'évolution de leur R&D. Leur objectif est ainsi de construire un avantage compétitif fort avant la sortie de crise.

33% des startups interrogées ont repensé leur modèle économique

Elles ont changé notamment leur structure de coûts et leur modes de revenu. Enrichies autres décisions, les startups identifient des nouveaux marchés, sur des segments moins impactés par la crise. Par ailleurs, la disponibilité de certains interlocuteurs, débordés en temps normal mais confinés pendant la crise, a pu être saisie comme une opportunité pour certaines startups, leur permettant d'entamer des discussions avec des acteurs clés.

70% des startups deeptech ont revu leur organisation interne

En télétravail, les startups ont été créatives sur les outils et les process mis en place. Elles ont aussi initié de nouvelles manières de communiquer. Elles ont développé leur communication (à 90% notamment digitale, avec par exemple l'organisation de webinars). Elles ont mis l'accent sur l'inbound marketing en proposant du contenu utile pour leurs clients.



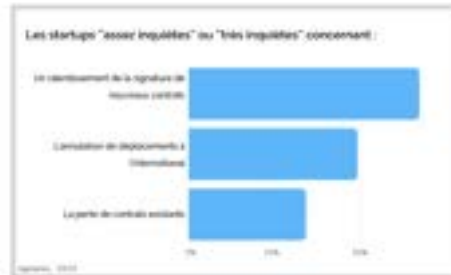
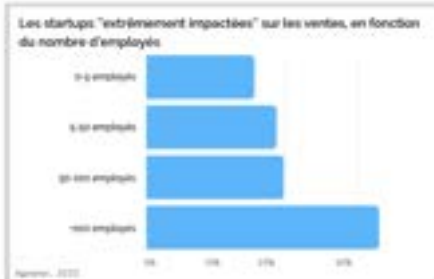
Des startups résilientes, malgré l'impact de la crise 1/2

70% des startups deepbetch ont vu leurs ventes affectées par la crise

Logiquement, le premier phénomène observé avec l'apparition de cette crise est son impact direct sur les ventes et en conséquence, son impact sur le chiffre d'affaires des startups.

On constate une relation proportionnelle entre l'intensité de l'impact et l'ancienneté de la startup. Plus une entreprise est développée et son nombre d'employés élevés, plus le contre-coup sur son chiffre d'affaires est fort.

Ainsi, les entreprises de plus de 100 employés interrogées sont deux fois plus impactées que les startups entre 0 et 10 salariés.



La moitié des startups interrogées sont inquiètes quant à l'éventuelle perte d'une partie de leur clientèle

A nouveau, il semble que les startups les plus avancées cristallisent le plus fort taux d'inquiétude à ce sujet. Les startups sorties d'incubation sont cinq fois plus nombreuses à être "très inquiètes" (2,3%) que les modèles actuels (0,5%).

Cependant, c'est au niveau du ralentissement sur l'obtention de nouveaux contrats et/ou clients que l'inquiétude est la plus soutenue.

Les cycles de ventes sont déstabilisés et deux tiers (67%) des startups sont inquiètes sur leur future capacité à acquérir des clients.



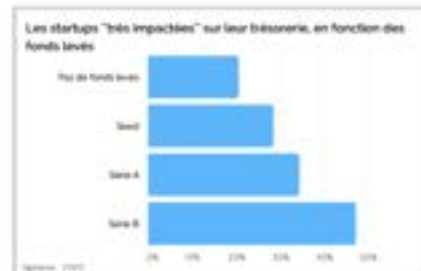
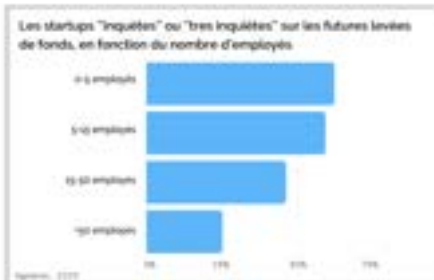
Des startups résilientes, malgré l'impact de la crise 2/2

57% des startups sont "inquiètes" ou "très inquiètes" vis-à-vis de leur capacité à lever des fonds dans le futur

L'inquiétude est sensiblement supérieure parmi les startups les plus petites en terme de nombre d'employés. Les startups qui ont atteint le stade de la Série B ou de la Série C sont significativement moins inquiètes que celles qui ont moins levé.

En revanche, les startups ayant déjà levé en Série A sont davantage préoccupées.

Les incertitudes quant au bon fonctionnement de l'écosystème du capital-risque et du financement dans l'avenir proche sont nombreuses. La moitié des startups estiment que dans l'après-crise, l'accessibilité des financements prévus sera réduite.



Les startups les plus matures sont les plus touchées par les problèmes de trésorerie

Avec l'impact sur les revenus et les ventes, le problème le plus récurrent pour les startups deepbetch concerne leur trésorerie (BCH). Celles qui se sentent les plus impactées au niveau de leur trésorerie sont souvent celles qui ont levé le plus de fonds. Les startups les plus jeunes et qui ont moins levé de fonds apparaissent au contraire comme les plus stables en terme de trésorerie.

Les délais de paiement peuvent également être un sujet de préoccupations pour certaines entreprises. 25% des startups s'estiment "inquiètes" ou "très inquiètes" à ce sujet.



SECTION 2

LES STARTUPS EN RENFORT FACE À LA CRISE

AU-DELÀ DE L'ENQUÊTE MENÉE, NOUS AVONS ANALYSÉ LA COMMUNICATION DE L'ENSEMBLE DES STARTUPS ACCOMPAGNÉES PAR AGORANDV. LES ACTIONS PARTAGÉES CI-DESSOUS SONT UNIQUEMENT CELLES QUI NE SONT PAS CONFIDENTIELLES.



Les startups santé particulièrement mobilisées contre le Covid-19 1/3

Une grande partie des startups santé s'est impliquée sur un projet lié au Covid-19

Pour cela, elles ont mobilisé tout leur écosystème : des associations de patients, des laboratoires pharmaceutiques, des hôpitaux... La majorité a monté des partenariats avec ces acteurs, mais également avec d'autres startups ou des grands groupes.

1. Les startups santé impliquées dans la recherche sur le Covid-19

AOEMIA

Aoemia contribue à trouver des sites de reposicionement de médicaments contre le Covid-19 grâce à ses algorithmes de recherche de molécules thérapeutiques 10 000 fois plus rapides que le marché.

DNA SCRIPT

DNA Script travaille sur un test LAMP, qui permet de détecter le virus sans équipement et huit fois plus rapidement que les tests actuels.



Endycap évalue des solutions de refroidissement pour le stress thermique induit par les EPI chez le personnel de santé Covid-19.



Hemaera met au point d'une molécule, M32, capable de traiter le syndrome de détresse respiratoire qui est responsable de la mort par le Covid-19.



Biophylis lance un nouveau programme de développement clinique COVID, un traitement potential de l'insuffisance respiratoire associée au Covid-19.



Lumedix contribue à la lutte contre la pandémie avec le développement d'un nouveau test rapide hyper-sensible basé sur la nanotechnologie.

Cardiolog

Cardiolog lance une étude clinique utilisant IA pour surveiller à distance la sécurité cardiaque des patients Covid-19.



Les startups santé particulièrement mobilisées contre le Covid-19 2/3

11

2. Les startups santé mettent à disposition leurs solutions et leurs équipes 1/2

Sur le terrain, auprès des établissements de santé



En Chine, Airspace installe des chambres d'isolement modulaires en pression négative BIOCAR™ dans les sites où les patients infectieux sont pris en charge. L'air y est décontaminé par leurs unités PLASMAIR™.



Doctoib propose son service gratuitement depuis le 5 mars et équipe gratuitement les SAMU et les centres Covid-19 pour contribuer à désengorger l'hôpital. Doctoib a également déployé un nouveau service pour permettre aux professionnels de santé de relancer leur activité sans surcharge de travail et en sécurité.



Gleamer utilise l'IA pour faire de la pré-analyse et faciliter le travail des radiologues.



Implicitly met à disposition gratuitement ses équipes, professionnels de santé, afin d'accompagner les patients porteurs de dispositifs cardiaques implantables.



Les startups santé particulièrement mobilisées contre le Covid-19 2/3

11

2. Les startups santé mettent à disposition leurs solutions et leurs équipes 1/2

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Les startups santé particulièrement mobilisées contre le Covid-19 3/3

1.2

2. Les startups santé mettent à disposition leurs solutions et leurs équipes 2/2

En situation de confinement, avec des téléconsultations et des aides aux particuliers

- 

Tutan Alan met à disposition sa plateforme d'assurance en ligne gratuitement pendant la durée de la crise.
- 

Cercilio réalise des téléconsultations et met à disposition sa solution à prix coûtant pour permettre aux entreprises de couvrir leurs salariés et leurs familles (120 000 personnes supplémentaires couvertes depuis le début de la crise).
- 

Continuum crée un parcours d'accompagnement #AViGadom pour maintenir le lien avec les patients traités par anticonvulsifs à domicile.
- 

EzyGain aide à la rééducation à la marche pour les patients en rééducation post Covid-19, avec la solution emati. Les équipes livrent aux structures dans le besoin.
- 

FeetMe se mobilise avec URPS Kiné EDF pour assurer la continuité de la prise en charge des patients atteints de Parkinson. Pendant la période de crise, FeetMe gère l'envoi du matériel aux patients et leur formation à distance.
- 

LIBMED met à disposition sa plateforme pour relayer les offres de remplacement du personnel de santé et faciliter le soutien au personnel soignant, prise en charge des frais de déplacements et de logements.
- 

Lifein met à disposition gratuitement sa plateforme à destination des personnes âgées.
- 

Neurodom offre le premier mois de sa plateforme pour les personnes en situation d'handicap - télééducation avec un système de visio pour la pratique du télécoaching.
- 

Point Vision réalise des téléconsultations pendant la période de crise.

Le Ministère des Solidarités et de la Santé référence les outils numériques Covid-19 dédiés au professionnels. Parmi elles, plusieurs startups incubées par Agoraviv.



En dehors de la santé, un très grand nombre de startups ont redoublé de créativité afin de contribuer à l'effort collectif 1/2

13

1. Soutenir le personnel soignant

	Dons de matériel / service	Faciliter le quotidien du personnel soignant	Participer à la recherche
	Actonika imprime des masques en 3D		
	Enovap a créé une cognote, Enovaplets, en soutien au personnel soignant.		
	Les couturiers et couturières Hercac qui fabriquent traditionnellement des couches, produisent désormais des masques.		
	En soutien à la plateforme #ProtègeTonDocteur, Elo aide recueillir des dons et prestations gratuites.		
	Les équipes MyBrainTech travaillent avec la plateforme 3D4Care pour réunir les fabricants de visières de protection pour les soignants.		
	Perna Pharma réalise des dons de gants.		
	Scientific réalise des dons de gel hydroalcoolique.		



En dehors de la santé, un très grand nombre de startups ont redoublé de créativité afin de contribuer à l'effort collectif 2/2

14

2. Améliorer la situation pendant la crise

	Soutenir les entreprises	Maintenir la continuité pédagogique
	Docline crée une page dédiée à l'information juridique sur l'impact de la crise sanitaire sur les activités professionnelles.	
	Flexity, logiciel d'optimisation des stocks, lance une offre gratuite pour aider les entreprises françaises en difficulté.	
	Hirelevel crée un projet #ContratsRecrutés pour mettre en relation les entreprises qui recrutent en période de crise et les candidats en recherche.	
	Hyperia lance un audit facth pour identifier les obligations, risques et opportunités des contrats.	
	Skello, startup proche des réseaux de restauration, met à disposition gratuitement un simulateur de chômage partiel.	
		
	Afin de réduire les inégalités liées au télétravail, Onbound offre six semaines anti-fretail TSLDES AIR.	
	En temps de télétravail généralisé, Récis offre son produit qui permet d'améliorer la posture du dos et réduit les douleurs.	
	Rogerveco diffuse sa solution pour permettre aux personnes sourdes et malentendantes de télétravailler.	



SECTION 3

« LE MONDE D'APRÈS », SELON LES STARTUPS DEEPTECH



Continuer et se réinventer

70% des entrepreneurs interrogés pensent que les startups seront aussi importantes dans l'après-crise qu'auparavant

Seuls 3% d'entre eux pensent que les startups seront beaucoup moins importantes qu'avant la crise

71% des entrepreneurs pensent que les startups elles-mêmes vont être amenées à changer

La plupart des startups deeptech pensent qu'il sera nécessaire pour elles de se réinventer

44% des entrepreneurs interrogés considèrent que leur façon d'envisager l'avenir, en tant qu'entrepreneur, a évolué avec la crise

“ L'innovation, la croissance et un impact important resteront les promesses des startups (tant auprès de leurs salariés que de leurs clients et de leurs investisseurs), mais les questions de rentabilité et de résilience, quasi absentes dans le passé, ne pourront plus être occultées. ”

Jean-François Welter - CEO CALISTO

“ Nos paris à long terme sur l'accélération de la transformation digitale liée à une meilleure exploitation de la donnée chez nos clients nous laisse penser à un gisement d'opportunités pour Indexima. ”

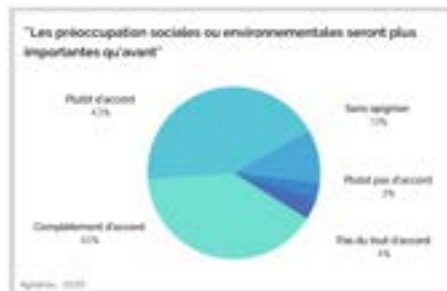
Emmanuel Dubois - CEO Indexima



Vers des modèles plus durables

83% des startups estiment que les préoccupations environnementales et sociales seront plus importantes qu'avant la crise

Seuls 5% des startups deeptech-itéragées pensent que les enjeux environnementaux et sociaux redescendront au même niveau. Les startups deeptech peuvent être des catalyseurs de ces changements profonds.



“

Je pense que le maître mot d'avant crise pour beaucoup était l'optimisation (que ce soit la fiscalité, les marges, les process, etc.). Je pense que pendant et après la crise du Covid-19, beaucoup vont placer le mot résilience au dessus du mot optimisation, et c'est une très bonne chose.

J'espère qu'elle va pousser plus de créateurs d'entreprises vers des produits et solutions vraiment utiles et vers des modèles de croissance et de création de valeur résilients et durables.

”

Thibaut Guerin - CEO Coma



18

“

Le rôle de l'entrepreneur passe de navigateur, définir précisément la course du bateau, pour optimiser l'impact des courants et des vents, à celui de capitaine, gérer les fondamentaux, réduire la voile, garder de la visibilité et mobiliser l'équipe pour rester attentif aux récifs.

”

Jean-François Morize - CEO CALabs



Appendix B - Interviews conducted

N°	Date	Duration	Type	Classified as
73	15/05/2023	00:57	CEO - Industry Startup	Explorative
72	13/05/2023	01:04	Ecosystem	Explorative
71	09/05/2023	01:19	Investor - Berlin	Explorative
70	19/04/2023	01:21	CEO - Startup Berlin	Explorative
69	06/04/2023	01:43	CEO - Startup Berlin	Explorative
68	09/03/2023	01:59	Investor - Berlin	Explorative
67	09/03/2023	01:43	Investor	Explorative
66	10/02/2023	01:02	Ecosystem	Explorative
65	23/12/2022	01:16	Ecosystem	Explorative
64	08/12/2022	01:39	CEO - Health Startup	Theory-oriented
63	29/11/2022	00:58	Ecosystem	Explorative
62	25/11/2022	00:59	Employee - Digital Startup	Explorative
61	24/11/2022	01:17	Employee - Health Startup	Explorative
60	02/11/2022	00:35	CEO - Industry Startup	Theory-oriented
59	22/10/2022	01:01	CEO - Industry Startup	Theory-oriented
58	21/10/2022	01:31	CEO - Digital Startup	Theory-oriented
57	19/10/2022	01:12	Ecosystem	Explorative
56	05/10/2022	00:49	CEO - Digital Startup	Theory-oriented
55	28/09/2022	00:37	CEO - Industry Startup	Theory-oriented
54	05/09/2022	01:03	CEO - Startup Berlin	Explorative
53	26/07/2022	01:00	Ecosystem	Explorative
52	12/07/2022	01:46	Ecosystem	Explorative
51	07/07/2022	00:36	CEO - Industry Startup	Theory-oriented
50	05/07/2022	01:07	CEO - Digital Startup	Explorative
49	30/06/2022	01:41	CEO - Digital Startup	Theory-oriented
48	29/06/2022	01:55	CEO - Industry Startup	Theory-oriented
47	28/06/2022	01:52	CEO - Digital Startup	Theory-oriented
46	27/06/2022	00:35	CEO - Industry Startup	Theory-oriented
45	16/06/2022	00:42	Ecosystem	Explorative
44	16/06/2022	01:26	CEO - Industry Startup	Explorative

43	09/06/2022	01:12	Ecosystem	Explorative
42	25/05/2022	01:14	Ecosystem	Explorative
41	24/05/2022	00:45	CEO - Health Startup	Theory-oriented
40	11/05/2022	00:50	CEO - Digital Startup	Explorative
39	04/05/2022	01:45	CEO - Health Startup	Theory-oriented
38	29/04/2022	00:48	CEO - Industry Startup	Explorative
37	28/04/2022	00:57	CEO - Industry Startup	Explorative
36	20/04/2022	01:43	CEO - Industry Startup	Theory-oriented
35	20/04/2022	01:02	CEO - Health Startup	Theory-oriented
34	23/11/2021	01:04	CEO - Industry Startup	Explorative > Theory-oriented
33	27/10/2021	1:33	Startup Manager	Theory-oriented
32	14/10/2021	00:50	CEO - Industry Startup	Theory-oriented
31	29/09/2021	2:03	CEO - Health Startup	Explorative > Theory-oriented
30	27/07/2021	01:06	CEO - Health Startup	Explorative > Theory-oriented
29	24/06/2021	00:53	CEO - Industry Startup	Theory-oriented
28	18/06/2021	00:53	CEO - Industry Startup	Theory-oriented
27	17/06/2021	00:56	CEO - Industry Startup	Theory-oriented
26	05/05/2021	01:05	Employee - Industry Startup	Explorative
25	27/04/2021	00:31	Investor	Explorative
24	21+28/04/2021	01:14	CEO - Industry Startup	Explorative > Theory-oriented
23	16/04/2021	01:47	CEO - Industry Startup	Explorative > Theory-oriented
22	13/04/2021	00:52	CEO - Industry Startup	Explorative
21	09/04/2021	01:20	CEO - Industry Startup	Explorative
20	31/03/2021	01:19	Ecosystem	Explorative
19	26/02/2021	01:57	CEO - Digital Startup	Explorative > Theory-oriented
18	25/02/2021	01:01	CEO - Digital Startup	Explorative
17	15/12/2020	01:42	Startup Manager	Theory-Oriented
16	07/12/2020	02:05	CEO - Industry Startup	Explorative > Theory-oriented
15	06/12/2020	01:01	CEO - Industry Startup	Explorative
14	13+19/11/2020	02:56	CEO - Industry Startup	Explorative
13	23/10/2020	00:49	CEO - Industry Startup	Explorative
12	15/10/2020	00:42	CEO - Health Startup	Explorative

11	07/10/2020	49:10	CEO - Health Startup	Explorative
10	23/09/2020	00:35	CEO - Industry Startup	Explorative > Theory-oriented
9	22/09/2020	02:04	CEO - Industry Startup	Explorative > Theory-oriented
8	02/07/2020	01:02	CEO - Digital Startup	Explorative
7	24/06/2020	01:24	CEO - Industry Startup	Explorative
6	18/06/2020	00:59	CEO - Health Startup	Explorative
5	18/06/2020	01:10	CEO - Industry Startup	Explorative > Theory-oriented
4	17/06/2020	01:23	CEO - Health Startup	Explorative
3	10/10/2020	01:23	Startup Manager	Explorative
2	10/10/2020	01:14	Startup Manager	Explorative
1	09/04/2020	01:16	Startup Manager	Explorative

Appendix C. Interview guide- First round of interviews (Article 1)

1. When was your startup created?
2. When did you join the incubator?
3. What is the current TRL of the startup?
4. Why did you create this startup?
5. What are the goals of the startup?
6. What are the main problems you face?
7. When have these goals emerged?
8. What is your ambition in terms of economic, social and environmental objectives?
9. Do you have examples of choices you made to follow social or environmental objectives?
10. Do you assess your contribution to these objectives?
11. Why do you assess your contribution to these objectives?
12. How do you assess your contribution to these objectives?
13. What are the difficulties you face while assessing these objectives?
14. If you had to do things differently, what would you do?
15. What are your next objectives in terms of sustainability impact assessment?

Appendix D. 1. i-Lab characteristics, from archival records (Article 3)

	Rules and procedures
Eligibility	- Legal person who has created his/her company in France for less than two years, or who has the project the creation of a French company.

	<p>- A rejected candidate can apply the further year(s) if it still matches the eligibility criteria (in 2021, 35% of laureates have applied to i-Lab in 2020).</p>
Setting and process	<p>Three institutional and professional bodies are represented:</p> <p>The regional technical secretariat (STR), composed by a representative of the region dedicated to technology, a representative of Bpifrance (the French public investment bank), and a recognized expert;</p> <p>The national technical secretariat (STN), composed by representatives the Minister of the Economy or Research;</p> <p>The national jury (“jury”), composed by a President designated by the STN, professional experts (entrepreneurs, industrials...).</p> <p>The process is the following:</p> <p>February: deadline for candidates to submit complete files. Bpifrance examines the applications, and the STR pre-selects candidates.</p> <p>March-May: selected candidates endure an in-depth audit - carried out by Bpifrance with the support of a service provider selected by tender - with an oral exam to assess candidates’ entrepreneurial skills. A list of best candidates is then established by the STN, taking into account the STR recommendations.</p> <p>June: selected candidates present themselves in front of a jury for an oral interview with the national jury.</p> <p>July: awards ceremony with laureates (about 70, depending on the years)</p>
Rewards	<p>A grant up to 600.000 euros, intended to finance up to a maximum of 60% of the eligible expenses of the company innovation program. The total budget increased in the past years (26B€ in 2021).</p> <p>Eligible expenses, up to a maximum of €1 million, are personnel, operating or equipment expenses directly related to the research and development program of the company created, which should last from 24 to 36 months.</p>
Selection criteria	<p>(1) innovation and established proof of concept</p> <p>(2) economic viability of the project</p> <p>(3) significant potential for development and value creation, including internationally</p> <p>(4) motivation, availability and ability of the candidate to create and develop a company and to build partnerships</p> <p>(5) quality and complementarity of the team</p> <p>(6) intellectual property</p> <p>Since 2022, the rules consider 9 criteria as it added “environmental impacts” and “societal impacts”</p>
Application form	<p>- A video of the founder</p> <p>- An Excel providing the financial planning</p> <p>- A Word document presenting the project:</p> <ol style="list-style-type: none"> 1. General presentation

	<ol style="list-style-type: none"> 2. Team 3. Market and commercial objectives 4. Innovation program 5. Legal aspects 6. Financial needs and provisional financing <p>In 2022, a new section was added after “Legal aspects”, and targeted “Environmental and societal impacts”.</p> <p>In 2023, this new section was divided into two distinct sections, and several questions were added.</p>
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Appendix D. 2. Confidential documentation (Article 3)

26 i-Lab 2022 candidates’ application form

The application form cannot extend 40 pages, not including Appendix. We obtained 26 files, with a certain representability across sectors and between laureates and rejected candidates.

	Industry/Greentech	Digital	Health	Total
Rejected	4	7	4	15
Laureates	5	2	4	11
Total	9	9	8	26

The section “Environmental and societal impacts” in the 2022 form is presented as followed in the application form:

6. Environmental and societal impacts

- Project’s impacts with respect to sustainable development

Explain its contribution to sustainable development, by presenting the effects, quantified as far as possible, direct or indirect, positive or negative, established on the following points:

- climate change mitigation;*
- adaptation to climate change;*
- sustainable use and protection of aquatic and marine resources;*

- *transition to circular economy;*
- *pollution prevention and reduction;*
- *protection and restoration of biodiversity and ecosystems,*
- *societal impacts.*

- *Social impact of the project*

Explain the social impact of the project, in particular in terms of promotion of gender equality and inclusion.

11 evaluations by i-Lab operators

Laureates and candidates rejected at the last step could ask for their evaluation to i-Lab operators, we collected 11 of them. The evaluation file is a 4 pages paper divided into two sections:

- “General Overview”: a general score of the project on 20 points and another score on its environmental impact
- “General comments on the project”: qualitative appreciation on several aspects of the projects, including a subsection on the societal and environmental impacts

Appendix D. 3. Participant observations (Article 3)

2 private sessions organized by i-Lab coordinators

The French Ministry of Research organizing i-Lab gathers some incubators about three months before the deadline for submission. The incubators are invited as they are known by the French Ministry for having a lot of candidates each year. The aim is to answer their questions. The researcher participated in the 2021 session, preparing for the i-Lab 2022, and for the 2022 session, preparing for the i-Lab 2023. Each session is held online, gathers about 40 participants and lasts about 2 hours. The first hour is a presentation of the result of the past years, learnings and evolutions, and the second hour is dedicated to questions.

6 support sessions organized by the incubator for candidates

The incubator organizes three sessions every year to guide i-Lab candidates, with an average of 30 participants per session.

The first one is organized by the three incubator Startups Managers. During this session, they present the contest and its specificities. They provide tips from their experience with past candidates and explain how to work with them in the coming months as they help the candidates on the proofreading of the files. The second hour is dedicated to entrepreneurs' questions. The second session is organized with two laureates of the previous edition and also lasts 2 hours. This session is more a discussion between laureates and candidates, but Startups Managers are also there to complete answers. The third session is dedicated to the video pitch, with an external professional challenging the candidates' scripts and providing shooting tips.

Appendix D. 4. Interviews

Semi-structured interviews (Yin, 2018), conducted with CEOs applying to i-Lab 2022, with an average of 1 hours and 33 minutes, to learn about their motivation, expectation and preparation for the contest, with an important focus on the “Environmental and Social” Impact question.

	Industry/Greentech	Digital	Health	Total
Rejected	1	2	1	4
Laureates	2	1	2	5
Total	3	3	3	9