THESIS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Managing tension in open and open-ended innovation

The role of intellectual property in digital and sustainable entrepreneurship

SARAH VAN SANTEN

Department of Technology Management and Economics

CHALMERS UNIVERSITY OF TECHNOLOGY

Gothenburg, Sweden 2026

Managing tension in open and open-ended innovation
The role of intellectual property in digital and sustainable entrepreneurship
SARAH VAN SANTEN
ISBN 978-91-8103-419-6

Acknowledgements, dedications, and similar personal statements in this thesis, reflect the author's own views.

Doktorsavhandlingar vid Chalmers tekniska högskola
Ny serie nr 5876
ISSN 0346-718X
https://doi.org/10.63959/chalmers.dt/5876

Department of Technology Management and Economics
Chalmers University of Technology
SE-412 96 Gothenburg
Sweden
Telephone + 46 (0)31-772 1000

Printed by Chalmers Reproservice
Gothenburg, Sweden 2026

Managing tension in open and open-ended innovation

The role of intellectual property in digital and sustainable entrepreneurship

SARAH VAN SANTEN

Department of Technology Management and Economics

Chalmers University of Technology

ABSTRACT

Decisions regarding intellectual property (IP) form a central though often overlooked priority in the process of new venture creation. For technology-based ventures in particular, IP is often one of the first, if not one of the most important assets under the venture's control. For digital and sustainable entrepreneurship however, innovation can be open as well as open-ended due to the nature of the venture's technology (digital) or value proposition (sustainable). This challenges traditional IP management as a way to prevent imitation of a fixed competitive advantage, creating tensions between stability and change and between openness and control. The studies in this thesis contribute to elucidating these tensions by examining how ventures practicing digital and sustainable entrepreneurship manage their IP. To this end, study I synthesized the existing literature on IP management, laying the groundwork for the empirical work in this thesis by scoping the field, identifying current debates and future developments. Study II visually and narratively mapped the role of IP in the process of new venture creation for digital technology-based ventures to find that ventures actively prepare for unknowable future dynamics, limiting path dependence and maximizing options. Modelling IP in an effectuation process moreover revealed a strong partnership focus and an intentional open-endedness in the design of IP artifacts. Building on these findings, study III used a cross-sectional sample of sustainable ventures in the fashion industry to show how the use of IP is shaped by paradoxical tensions between knowledge sharing and control as related to the pursuit of social, environmental and economic value creation and capture. Finally, while IP was considered necessary for funding, developing and legitimizing sustainable innovation, ventures noted a lacking ability to make use of collective structures that enable sustainable governance.

Keywords: Intellectual property, entrepreneurship, open innovation, effectuation, business models, paradox, digital entrepreneurship, sustainable entrepreneurship

LIST OF APPENDED PAPERS

STUDY I

Paper I: Holgersson, M., & Van Santen, S. (2018). The business of intellectual property: a literature review of IP management research. *Stockholm Intellectual Property Law Review*, *1*(1), 44-63.

Contribution: Data curation, analysis and methodology for sub-study 3 (systematic literature review), writing (revisions of original report).

STUDY II

Paper II: Holgersson, M., van Santen (2026). Managing Rigidity in Business Model Design: On the Dynamic Consistency of Intellectual Property. Submitted at Long Range Planning.

Contribution: Conceptualization, data curation, analysis, methodology, visualization, writing (original draft and revisions).

Paper III: van Santen, S., Holgersson, M., Berglund, H. (2026). Intellectual property as an entrepreneurial artifact in the process of new venture creation. Under review at Strategic Entrepreneurship Journal.

Contribution: Conceptualization, data curation, analysis, methodology, visualization, writing (original draft and revisions).

STUDY III

Paper IV: Van Santen, S., & Holgersson, M. (2026). Threading fashion's paradox knot: IP strategy in open and sustainable innovation. *European Journal of Innovation Management*, *29*(11), 151-171.

Contribution: Conceptualization, data curation, analysis, methodology, visualization, writing (original draft and revisions).

Paper V: van Santen, S. (2026). From Managing Innovation to Governing Value: Reconceptualizing the Role of Intellectual Property in the Sustainable Business Model. Under review with minor revisions at Business Strategy and the Environment.

Contribution: Conceptualization, data curation, analysis, methodology, visualization, writing (original draft and revisions).

ACKNOWLEDGEMENTS

He stood beside me in silence, his candle in his hand. Then the tall, lean figure inclined towards me. “I say, Watson,” he whispered, “would you be afraid to sleep in the same room with a lunatic, a man with softening of the brain, an idiot whose mind has lost its grip?”

“Not in the least,” I answered in astonishment.

“Ah, that’s lucky,” he said, and not another word would he utter that night.

– Arthur Conan Doyle, *The Valley of Fear*

To start this section, study I and II gratefully acknowledge financial support by Vinnova (grant 2016-04666) as part of the project *Intellectual property management in digitalizing businesses*. Next, I would like to thank the ventures that took part in this research for their time, their patience, and their candor in sharing their stories and guiding me towards understanding.

I truly never thought that I would finish this thesis. When I was first hired, I was keenly aware of my lacking skills and knowledge (zero background in IP or technology management, inter alia). However, I was hopeful that I would be able to make it up, read up on IP management and technology-based entrepreneurship, and gain my footing. When I conducted my first interviews and couldn’t follow even the simplest thread of conversation, I felt anxious. When I realized that there was no organization theory on IP, no established academic conversation like there is around institutional logics or transaction cost economics, I despaired. I realized that, not only did I not have the necessary skills and knowledge to do my job, I did not have the necessary absorptive capacity to *gain* the skills and knowledge that I would need to bring my thesis to completion.

For three years, I tried making up the difference by working harder and harder and harder – trapping myself in a vicious cycle of burnout and deteriorating mental health. My research was going nowhere, my papers were a collection of words I mashed together only because they sounded like they somewhat belonged, without any concept of argument, point or purpose. I didn’t know what I was doing to an extent that I can scarcely overstate. I alternatively tried broadcasting and hiding this fact from fear of how my colleagues would react if they found out just how incompetent I truly was, and I failed to communicate and seek the support that may have helped me overcome my difficulties.

I quit my PhD when I truly saw no other way out or forward – except through a fourth floor apartment window. I spent years doing an immense amount of self-work and picked up my PhD again remotely. Every day was a struggle, and I lost faith many times along the way. It took me until the fall of 2025 to finally feel like I knew what I was doing; I knew what kind of argument I was trying to make, knew that I believed it, and knew that I could write it. I surprised myself by loving the work so much that I never wanted it to end – I still don’t. Now that I know what I’m doing, I want to keep doing it forever. I’m terrified that I won’t be able to.

If anyone has helped me reach this point, it is undoubtedly my supervisor Marcus Holgersson, who stuck by me through some of the deepest personal and professional lows I hope to never see again. It’s an incredible understatement to say that none of this would have been possible without him – thank you. My gratitude goes out to Henrik Berglund as well, for continuing to

support me all these years and believing that I would be able to make it out. Thank you to the late Martin Wallin – I wish you could have seen me make it.

Thank you to all the colleagues who have given me their support and encouragement over the years. A special thanks to Rita Berggren, Charlotta Kronblad, Per Hulthén, Thomas Ewing, Maria Kandaurova, Alyona Khaslavskaya – you know why.

Thank you to Christine Loughlin and Xenia Valero-Schönhöft – you helped me become a person. You were the training wheels on my coming-of-age story, and I would have keeled over a long time ago if you hadn't been there to hold me up. Thank you to all the people at the MAW in Galway for helping me find my voice. Thank you to the staff at Corrib Teahouse, Ciarlantini, Kampanilen, BOHO, Semmelink. Thank you to Lenie, Hans, Marije, Francis, Anne, Eva, for sitting in the dark with me when there is nothing else to do; for sleeping in the same room with a lunatic, for trusting my worth as much as I doubt my own sanity. Thank you John, Kiyah, Lindsay, Brigit, for asking, for thinking to ask. Thank you Johanna – my dear Watson.

TABLE OF CONTENTS

INTRODUCTION

One of the first building blocks that founders of technology-based ventures acquire consists of intellectual property (IP) (Vimalnath et al., 2022). Yet as a decision-making priority, IP is seldom addressed in theories of new venture creation, which either exclude IP upfront (Dew et al., 2009) or assume its logic is geared towards competition (Reymen et al., 2015). In contrast, the literature on IP shows that both formal IP rights (IPRs) and informal appropriation mechanisms are used for a variety of purposes, including but not limited to capturing value from innovation (Blind et al., 2006; Candelin-Palmqvist et al., 2012; Holgersson, 2013; Teece, 1986), and that size and resource constraints influence their use (Morales et al., 2022; Thomä & Bizer, 2013). For instance, different types of IP are known to act as signals of appropriability and innovativeness when acquiring venture capital (Audretsch et al., 2012; Castellaneta et al., 2016; Conti et al., 2013), and can be used to shape and legitimize entrepreneurial narratives and interactions (c.f. Lounsbury & Glynn, 2001; Garud et al., 2014a).

Hence the role of IP in new venture creation is more complex than has at times been assumed. This is particularly true in settings where its traditional function of sustaining a more or less stable competitive advantage by means of a temporary monopoly is of limited importance (Granstrand, 1999; Teece, 1986; 2010), as is the case for both digital and sustainable entrepreneurship. That is, digital technology is often subject to significant change after initial development and spurs the creation of derivatives, and "wakes" of innovation (Yoo et al., 2012; Nambisan et al., 2017). As such, there is a risk of rigidity when the design of IP is fixed, or when IP decisions are hard to reverse, while business models are subject to continuous change (Demil & Lecocq, 2010; Massa & Tucci, 2013; McGrath, 2010).

Meanwhile, sustainable entrepreneurship is driven by value propositions that address complex problems for which there are limited precedents, meaning knowledge needs to be shared in order to find and disseminate solutions. Where ventures seek to create not only economic, but social and environmental value (Schaltegger & Wagner, 2011; Davies & Chambers, 2018), there is consequently an impetus towards collaboration and exploration that can result in tensions when it comes to IP (Eppinger et al., 2021; Vimalnath et al., 2022). Notably, both the complexity of the problems being tackled, including the diversity of (actor and non-actor) stakeholders that need to be considered, as well as the urgency of implementing solutions require sustainable innovation processes to be open as well as open-ended (Lüdeke-Freund et al., 2020; McGahan et al., 2021; Radziwon et al., 2022; Sarasvathy, 2023).

As such, there is a need to understand how potentially inflexible and exclusionary IP decisions can be managed to enable the open and open-ended nature of digital and sustainable entrepreneurship (Nambisan, 2017; Muñoz & Cohen, 2018). A helpful perspective on processes of this kind is effectuation, which has been applied to the context of both digital entrepreneurship (Nambisan, 2017) and sustainable (open) innovation (Radziwon et al., 2022; Sarasvathy & Ramesh, 2019), though it has paid limited attention to IP. Specifically, effectuation emphasizes available means over planned goals, affordable loss over expected returns, exploiting rather than avoiding contingencies and seeking alliances over pursuing competition (Sarasvathy, 2001). This means that ventures are guided by the means they have

available rather than the goals they would like to pursue, use these to unlock action potentials, and do so by leveraging unexpected events and stakeholder commitments.

Using effectuation as an overarching framework, this thesis explores the role of IP in processes of digital and sustainable entrepreneurship. For digital entrepreneurship, research mapped the way IP decisions and artifacts (e.g. patents, licenses, trade secrets) were designed to create options and mitigate rigidity (Sarasvathy, 2003; 2021; Berglund & Glaser, 2022). For sustainable entrepreneurship, research examined tensions, tradeoffs and complementarities between between knowledge sharing and knowledge protection on the one hand, and between social, environmental and economic value creation and value capture on the other hand. As openness is needed to develop and disseminate innovation for social and environmental outcomes while protection is needed to enable financial survival, tensions were argued to result from interrelated paradoxes (Bogers et al., 2020; Hahn et al., 2018; Heidemann Lassen et al., 2020; Lüdeke-Freund et al., 2020). Hence this thesis notes tensions between stability and change and between sharing and protection, both of which find their expression in a venture's IP. Combined, the studies included examine how IP is managed in processes of new venture creation that are open and open-ended as a function of the venture's technology (digital) or value proposition (sustainable).

Effectuation is used to conceptualize commonalities between these different settings, while the appended papers build on their own, respective frameworks, including business model innovation and dynamic consistency (Demil & Lecocq, 2010; Massa & Tucci, 2013), entrepreneurship as design (Berglund et al., 2020; Sarasvathy, 2003; 2004), sustainable (open) innovation (Bogers et al., 2020; McGahan et al., 2021; Radziwon et al., 2022) and sustainable business models (Laasch, 2018; Lüdeke-Freund et al., 2020; Stubbs & Cocklin, 2008). Differences in context and framing notwithstanding, implications for IP were found to be comparable, if not transferable. Together, they suggest the need to conceptualize IP as a boundary object rather than a competitive device, and IP management as an act of governance rather than exclusion. In this cover paper, findings and contributions from the appended papers are discussed and suggestions are made regarding future research.

THEORETICAL BACKGROUND

To provide a background to the work compiled in this thesis, I first provide a conceptualization and (working) definition of intellectual property as related to the appended papers. This is followed by a brief overview of existing IP strategy research. Next, I discuss effectuation as a process and design perspective, and the often overlooked role of IP therein. Finally, digital and sustainable entrepreneurship are discussed as settings in which the process of new venture creation is characterized by openness and open-endedness, which challenges traditional IP management.

Defining intellectual property

While it is now common for studies in innovation management to make reference to IP, it is rare for a definition to be provided unless what is referred to is IP rights (IPRs) in the meaning of patents, trademarks and copyrights (Candelin-Palmqvist et al., 2012). However, even this leaves some confusion as to whether a trade secret should be considered an IPR, and if so, whether a secret is only a secret if its boundaries can be clearly identified, or whether secrecy as a general tactic should be included as well. The most common way of conceptualizing IP, prevalent in studies on appropriation, distinguishes between formal IPRs and informal appropriation mechanisms, where the combination of both makes up a firm's appropriation strategy (c.f. Hall et al., 2014; Thomä & Bizer, 2013; Zobel et al., 2017).

As can be gleaned from this, there is some implicit vagueness around the meaning of IP, including whether the term should refer to a firm's intangible resources or to the rights and mechanisms used to delineate their boundaries (e.g. is the "IP" in a patent the rights that it confers, or the technology it protects – this is in some way related to scope). Moreover, at what threshold of control should a resource be considered part of a firm's IP, and should this control be legally enforced or organizationally managed? Finally, if rights and mechanisms are not used for the sake of appropriation, should they still be considered part of the firm's IP? In other words, if an IP right is used for non-appropriation related reasons, should it still be considered IP? Conversely, if a resource, controlled by the firm through informal appropriation mechanisms, is used for non-appropriation related reasons, would *this* still be considered IP? And is this on account of the mechanism used to control it, the resource controlled, the scope of the firm's control over it, or none of the above?

Typically, the answers to these questions are dependent on the research problem. For the sake of this thesis, I define IP as "any intellectual resource in the form of knowledge, technology or a business model configuration that constitutes value or confers a competitive advantage to its owner who controls access and use of this resource by others." As such, IP is considered a function of value and control rather than legal rights per se, meaning IP does not have to be represented by an IP *right* such as a patent or trademark if control positions are strong or if value is proprietary on account of, for instance, secrecy, contracts, relationships or a certain value delivery structure. According to this definition, IP hence refers to the *resource* that is being controlled rather than the *means used to control it*, while these means include both formal rights as well as informal appropriation mechanisms, including organizational arrangements.

In practice, a broad definition such as this bears the potential for scope creep, whereby any kind of intangible resource ends up being included in the firm's IP. However, by honing the definition in on *access, use* and *control* on the one hand and *competitive advantage* on the other hand, I aim to manage the extent of scope creep inherent in this kind of definition. Given the relative lack of work conceptualizing IP (c.f. Candelin-Palmqvist et al., 2012), I believe this definition will suffice at present. In the discussion, a more expansive conceptualization is developed, building on the work done in the appended papers.

An overview of IP strategy research

Having defined IP, this next section provides a brief introduction to the current state of research on IP strategy, focusing specifically on those caveats that the appended papers sought to address. Notably, IP strategy as a concept is relatively new, initially used to refer to the often underrated potential of IP as a source of value in its own right (c.f. Granstrand, 1999; Holgersson & van Santen, 2018; Reitzig, 2004; Reitzig, 2007; Rivette & Klein, 2000). As research on the topic has grown, to use IP "strategically" has come to mean that IP is either used to increase the (economic) value captured from a firm's intellectual assets (MacDonald, 2004; Reitzig, 2004; Somaya, 2012), or that it is used as part of a firm's strategy to advance alternative ends, including blocking, collaboration, marketing, (cross-)licensing and many others (Ceccagnoli, 2009; Chesbrough, 2003; Grindley & Teece, 1997).

Hence IP strategy has grown on such fundaments as the literature on appropriation (c.f. Levin et al., 1987), including the seminal profiting from innovation framework (Teece, 1986), and the resource-based view (RBV) (Barney, 1991), though it has been criticized for lacking theoretical fundaments of its own (Candelin-Palmqvist et al., 2012). Notably, the previously advanced definition of IP builds to some extent on the RBV to define IP as the resources conferring value rather than (only) the mechanisms by which these resources are controlled. That is, the RBV argues that enduring competitive advantage originates in resources that are valuable, rare, as well as hard to imitate and substitute. IP, in the meaning of its controlling mechanisms, can be seen as a way to make valuable, rare resources harder to imitate by creating barriers to mimicry, and harder to substitute by setting standards and creating lock-ins (Teece, 1986; 2018). Yet IP as *property* rather than property *rights* consists of the resources themselves, with IPRs and appropriation mechanisms serving as the means of control, essentially *creating* IP by making valuable, rare resources harder to imitate and substitute.

As such, this definition distinguishes IP from intangible assets or intellectual capital (IC) by necessitating some definitive means of ownership or control to establish the *property* requirement of intellectual *property* over the more broadly defined intellectual *capital*. Specifically, where IC refers to any intangible, typically knowledge-based, resource that confers value to a firm, IP includes only those resources that the firm has taken conscious efforts to control access and use of (c.f. Edvinsson, 1997). This excludes many more loosely delineated sources of competitive advantage in the form of diffused (employee) knowledge, experience and goodwill, yet includes the kind of knowledge that the firm has sought to control through for instance HR-based secrecy (Hannah, 2005).

Having painted the field in these broad strokes, it is important first to acknowledge the significant advancements that have been made with regard to our knowledge of IP, including appropriation mechanisms, their various uses and relative efficacies (c.f. Arundel, 2001; Cohen et al., 2000; Thomä & Bizer, 2013). Notably, IP strategy research has made great progress in advancing the concept of "motives" that inspire the use of different forms of IP (c.f. Blind et al., 2006; Olander et al., 2014). In doing so, it has revealed a palette of strategic options for firms in different industries at different sizes and maturity levels (Ceccagnoli, 2009; Hall & Ziedonis, 2001; Hanel, 2006).

By emphasizing the strategic importance of IP as a management priority, research has moreover highlighted the relationship, and indeed the embeddedness, of IP in the overall management of the firm (Al-Aali & Teece, 2013; Conley et al., 2013; Fisher III & Oberholzer-Gee, 2013). Finally, combining both, research has shown how IP can be organizationally managed (c.f. Eppinger & Vladova, 2013). A salient example of this is IP modularity, a tactic whereby different modules of a firm's technology have different IP statuses, i.e. different terms of access and control, as a way of combining value capture and value creation in an IP architecture (Henkel et al., 2013). This means that, for instance, part of a technology can be open to invite user innovation without sacrificing the proprietary, closed part of that same technology which ensures the firm's value capture potential. **Paper I** describes the evolution of research on IP management and highlights emerging conclusions and debates, including the growing relevance of IP to management – and management to IP.

Often, however, IP strategy has taken a more or less static, configurational approach to the outcomes it seeks to explain, meaning studies have sought to identify appropriate configurations of mechanisms for optimizing certain outcomes. Hence research on patenting strategy has presented its results in the form of ideal patterns or configurations (Granstrand, 1999; Somaya et al., 2011; Somaya, 2012), whereas appropriation strategy has either tested the relative efficacy of different appropriation mechanisms (Levin et al., 1987; Arundel, 2001) or matched certain (combinations of) appropriation mechanisms to firm conditions and/or desired outcomes (Cohen et al., 2000; Hall & Ziedonis, 2001; Holgersson & Wallin, 2017; Thomä & Bizer, 2013).

Increasingly, research has shifted its focus to the evolution of appropriability over time (Ahuja et al., 2013; Holgersson et al., 2018), and to the use of different kinds of IP throughout the innovation process (Manzini & Lazzarotti; 2016; Soranzo et al., 2017; Vimalnath et al., 2022). As such, the study of IP has become increasingly attuned to the reality of firm dynamics, including the importance of process in understanding where and how to use certain kinds of IP (Hurmelinna-Laukkanen & Yang, 2022).

IP in entrepreneurship

Process is especially important to entrepreneurship, characterized as it is by uncertainty, which has been argued to favor a logic of control over prediction (Sarasvathy, 2001; Shane & Venkataraman, 2000). Entrepreneurial ventures form a unique context when it comes to IP for three reasons. First, ventures are an important source of innovation and hence generate a wealth of IP (Audretsch et al., 2020; Kasana et al., 2024). Second, for technology-based ventures in

particular, this IP will be central, as it is often one of the first assets that founders are able to control and start building their venture around (c.f. Sarasvathy, 2003; Sarasvathy & Dew, 2005; Vimalnath et al., 2022). Finally, as ventures are lacking in terms of both resources and legitimacy (Gimenez-Fernandez et al., 2020) they often have limited competence and options when it comes to IP (Holgersson, 2013), especially its enforcement (Audretsch et al., 2020; Athreye et al., 2021).

Operating under conditions of uncertainty, a venture's every decision has a big impact, and there are no existing routines to build on (Shane & Venkataraman, 2000). A lack of resources and legitimacy means that IP management is characterized by the need to establish credibility, obtain stakeholder commitments and increase the venture's resource base in accordance with existing means and experience (Garud & Giuliani, 2013; Lounsbury & Glynn, 2001; Saemundsson & Candi, 2017; Williams Middleton, 2013). In general, founders are concerned with increasing their options rather than pursuing planned goals, hence strategies are open-ended while motives are emergent (Sarasvathy, 2001).

This creates a paradox for the management of IP, as many IP decisions imply commitments that can result in path dependence, or rigidity. A patent, for instance, forms a significant capital investment that can last up to 20 years. As a result, it may force ventures into a planning horizon they are not willing to commit to. **Paper II** explores this dilemma while aiming to provide insights that are transferrable beyond the entrepreneurial context to other settings where change is imminent and the future uncertain, which may be the case for digital innovation in general (Yoo et al., 2012; Nambisan et al., 2017). Meanwhile, **paper III** uses effectuation as a theoretical and analytical framework on the process of new venture creation, conceptualizing IP as an entrepreneurial artifact in the design of the final artifact of the venture (Berglund & Glaser, 2022; Jiang & Rüling, 2019; Sarasvathy & Dew, 2005).

The next section goes into detail to describe effectuation as a process and design perspective on new venture creation (Sarasvathy 2003; 2004; 2021), highlighting its relevance to the appended papers, specifically their combined contributions.

Effectuation as a process and design perspective

Effectuation was first developed as a set of decision-making principles that together explain how expert entrepreneurs make the decisions that drive the process of new venture creation. Specifically, when entrepreneurs use effectuation rather than its (often complementary) counterpart, causation, they base their decisions on available means over planned goals. This means that goals are chosen to fit the means that entrepreneurs have available, rather than means being gathered to pursue selected goals. Contingencies are exploited instead of avoided, partnerships are preferred over competition and courses of action are selected on the basis of what decision-makers can afford to lose rather than what they expect to gain (Sarasvathy, 2001). Combined, these principles translate into a decision-making style that works especially well in open-ended contexts of exploration (Jiang & Tornikoski, 2019; Koller et al., 2022; Reymen et al., 2015), including digital and sustainable innovation (Nambisan, 2017; Radziwon et al., 2022; Sarasvathy & Ramesh, 2019).

More than a decision-making logic however, effectuation was first advanced as a process perspective (Sarasvathy & Dew, 2005; Davidsson & Gruenhagen, 2020), although it has often been used as a categorical variable instead (Gupta et al., 2016; Jiang & Rüling, 2019). Finally, effectuation was raised as a theory of entrepreneurial design, using a metaphor of quilting to represent the new venture creation process (Sarasvathy 2003; 2004). Specifically, the venture's design is described as something emergent, like the design of a quilt, dependent on which new pieces are gathered, asked for, received and assembled into a growing patchwork whose pattern is constantly evolving as patches are moved and matched. There is no planning the final design because a quilter has no idea what kind of patches she will obtain next, or how she will decide to combine them. Patches may be added, removed and reassembled depending on the way pieces fit together and the design looks at any given point in the process.

Effectuation describes the process whereby intermediate artifacts, i.e. patches, are created and assembled into the final artifact of the venture, i.e. the quilt. This means that new patches are gathered in order to increase options, while matching or aligning patches together creates commitments to a certain pattern that to some extent determines where subsequent patches will fit. In other words, by expanding its available means, the venture increases its available action potentials, yet selecting certain courses of action creates commitments that lead to converging constraints (Sarasvathy & Dew, 2005).

Conceiving of entrepreneurship in this manner, the centrality of IP quickly becomes apparent. For a technology-based venture in particular, IP forms one of the quilter's first patches, as the venture's very founding hinges on having (owning or controlling) a technology "patch" whose management creates an "IP patch" by default. The design of the quilt's patches consequently has an impact on the way patches are matched into the overall design of the quilt. Simply put, the design of the venture hinges on the process by which it is designed, including (the design of) the components that drive, instantiate and make up this design (Berglund et al., 2020; Berglund & Glaser, 2022). Research on the role of intermediate entrepreneurial artifacts is lacking however, which highlights an important gap as well as a significant opportunity to better conceptualize the role of IP.

As a final note, while artifacts are often designed to be incomplete so as to enable flexibility and stakeholder engagement (Garud et al., 2008; Berglund et al., 2020), the potential for *IP* artifacts to be anything but complete is seldom acknowledged (see Zobel & Hagedoorn, 2020 for an exception in the context of contract design). A trade secret, for instance, may seem like a clearly delineated entity, and indeed its legal status depends on a firm's efforts to protect, and so to some extent define it (c.f. Granstrand, 1999). The boundaries of a trade secret are often not that stark however, and are subject to many (incremental and radical) changes and adjustments over time. Moreover, "secrecy" is often used as a more general tactic where the boundaries of each secret are vague, internally defined on a need-to-know basis, and externally on a basis of fair use.

A firm may for example initially delineate a very clear trade secret around its proprietary formula, yet improvements to said formula, knowledge regarding its production, machine settings, materials, suppliers, etc. will constitute a growing tangle of more or less discrete, interconnected and continually growing trade secrets. Managing this expanding web of IP

requires continual adjustment and overarching, guiding principles to decide the day-to-day handling of sensitive information and new developments, as well as concrete (one-off) decisions. Consequently, it is argued that not only the venture as a final artifact, but its IP as a series of intermediate entrepreneurial artifacts are often incomplete in their design.

Digital and sustainable entrepreneurship: the role of openness and open-endedness

It has been argued that effectuation is most effective in contexts that are high in uncertainty (Jiang & Tornikoski, 2019; Koller et al., 2022; Sarasvathy, 2001), where decision-makers explore an open-ended opportunity space (Reymen et al., 2015). What is meant by open-endedness is that decision-makers do not, and often cannot, anticipate the end result of their decisions. Hence they select a direction rather than a destination, and seek to expand their options rather than converge upon any single goal. This requires flexibility in terms of their means and intentions, so that ventures can adjust to emerging circumstances and developments, and practice not only sudden, but mindful deviations from the path they have set (Agogué et al., 2015).

Two contexts in which this kind of open-endedness is particularly relevant are, first, digital entrepreneurship, as digital technologies have the potential to keep (open-endedly) evolving and diverging into new versions (Nambisan, 2017; Nambisan et al., 2017; Yoo et al., 2012). Second is sustainable entrepreneurship, as sustainability issues are complex, with few precedents for solving them (Bogers et al., 2020; Schaltegger & Wagner, 2011). In both cases, entrepreneurs hence find themselves engaged in an open-ended process, either because of their technology (Garud et al., 2008) or because of their value proposition, which aims to address (some part of) a societal grand challenge (McGahan et al., 2021; Sarasvathy & Ramsesh, 2019). As such, ventures engage in open-ended search, using open innovation to bundle knowledge and commitments and hence create options (Bogers et al., 2020; Radziwon et al., 2022; Yoo et al., 2012). The principles of effectuation can facilitate this, yet the role of IP in this process is unclear, if not contested.

Specifically, it is unclear how potentially rigid IP artifacts are created as part of the "fluid," evolving design of digital technology-based ventures, including their business models (Massa & Tucci, 2013; Nambisan, 2017; Nambisan et al., 2017; Yoo et al., 2012). Likewise, it is unclear how IP can be used to facilitate the open-ended combination and dissemination of knowledge and innovation needed to find and implement solutions to pressing sustainability issues (Eppinger et al., 2021; Ooms & Piepenbrink, 2021; Radziwon et al., 2022). In both cases, innovation and new venture creation are open, open-ended processes, and in both cases, IP plays a central role. Specifically, digital and sustainable innovation both generate a wealth of knowledge and technology whose use and access the venture needs to manage according to potentially paradoxical aims and principles (Bogers, 2011; Hahn et al., 2018; Hillman et al., 2011; Morales et al., 2022).

Notably, it has been suggested that IP can inhibit the spread of sustainable innovation by erecting barriers to adoption and diffusion (Athreye et al., 2023; Bustamante et al., 2023; De Rassenfosse & Palangkaraya, 2023). In the case of digital innovation, IP can inhibit self-selection into processes of user innovation (Baldwin & Von Hippel, 2011; Von Hippel, 2009).

On the other hand, IP can facilitate open innovation (Chesbrough, 2003; Holgersson & Granstrand, 2017; Zobel et al., 2016) and open software development (O'Mahony, 2003). Likewise, it can create incentives for innovation and enable financial survival in service of social and environmental value creation (Eppinger et al., 2021; Hirschmann & Block, 2022; Lüdeke-Freund, 2020). In this context, the literature on sustainable entrepreneurship has argued that ventures are capable of achieving hybrid outcomes, meaning economic, social and environmental value are pursued using the same value proposition (Davies & Chambers, 2018; Muñoz & Cohen, 2018). This raises the question whether IP too can be managed to facilitate not only parallel, modular outcomes, but an integration of aims.

Paper IV and **paper V** both explore this possibility. **Paper IV** focuses on tensions resulting from paradoxes between knowledge sharing and control on the one hand, and between economic and sustainability outcomes on the other hand in a context of sustainable open innovation. Specifically, the paper explores venture-level IP management that enables a resolution of tensions arising at the intersection of these two related, or knotted, paradoxes (Bogers et al., 2020; Smith & Lewis, 2011; Lewis & Smith, 2022). Meanwhile **paper V** examines ventures' motives for using IPRs and appropriation mechanisms and relates these to economic, social and environmental value creation and capture in the context of sustainable business model design. As such, the paper shows how traditional motives, as have been identified in the context of the commercial business model, have changed in response to an expansion of the value proposition to include not only economic, but social and environmental value. Hence, the paper provides a reconceptualization of the role of IP in the sustainable business model, highlighting the evolution of IP management but also caveats in its practice and design.

Notably, tensions arise in the course of both digital and sustainable entrepreneurship. The work in this thesis identifies tensions between stability and change in study II, and between knowledge sharing-protection and economic-sustainability outcomes in study III. In some cases, managing these tensions results in tradeoffs, whereas in others, tensions are indicative of underlying, enduring paradoxes. Specifically, a "tension" refers to a situation of competing demands. These demands may be opposed but may also include complementarity. A tradeoff is a (one-off) situation in which a venture has to, or chooses to, prioritize one demand over another. Over time, ventures may choose to prioritize different demands at different points in time in order to achieve a number of different outcomes (Hahn et al., 2018). A paradox refers to an enduring situation of contradictory yet interrelated demands, which hence favors responses that address tensions dynamically, circularly and simultaneously (Lewis & Smith, 2022; Smith & Lewis, 2011). Where relevant, these concepts are further discussed and developed in the appended papers.

METHODOLOGY

In the following, I discuss the methods used in the preliminary literature review and the two empirical studies making up this thesis, including sampling, data collection and data analysis. At the end of the chapter, I reflect briefly on epistemology and ontology.

Study I

The first study in this thesis consisted of a literature review on IP management, including three sub-studies which focused, respectively, on literature reviews, special issues and a systematic literature search. Hence the first sub-study summarized (findings from) literature reviews on IP management as conducted up to that point in time (2018), while the second sub-study summarized special issues discussing matters related to IP management. Finally, the third sub-study consisted of two separate systematic literature searches, one including all literature until 2016, and one including the literature from 2016 to 2018 to reflect recent trends and developments in the field. A systematic key word search through Google Scholar and Web of Science was used to identify relevant papers, which were then selected on the basis of (a reading of) their abstract.

The paper itself involved a summary and synthesis of findings, culminating in a discussion of developments in the field and suggestions for future research. In terms of analysis, findings were hence divided by topic, which meant that for sub-studies 1 and 2, findings summarized each review and special issue in terms of its scope, aims and constituent papers. For sub-study 3, findings were discussed per type of IP, as many studies focused specifically on one type of IPR or appropriation mechanism. Additionally, this sub-study included a summary of papers that discussed IP management as a whole. Finally, the paper concluded with a reflection on the evolution of the field over time, signaling emerging topics and current debates and offering suggestions for future development.

Study II

Study II consisted of an inductive multiple case study, conducted between the summer of 2017 and the spring of 2020 (Eisenhardt, 1989). The aim was, at first, to study the IP decisions taken by entrepreneurial ventures with a focus on both decision content and decision process. Through cumulative interviews, it became apparent that content was more varied than initially assumed, while the process was in large part emergent rather than planned. Motives, priorities and considerations changed over time, sometimes from one interview to the next, so that the "motive" behind any one decision turned out to be a function of process, namely the development of the venture and the founders' own cognition, more so than a stable fact across time, even when accounting for the influence of memory and recall. As such, the project increasingly began to focus on process and emergence in IP management, reflecting how both form and function were often open-ended and incomplete, and how this in turn helped ventures stay flexible in responding to uncertainty.

Although entrepreneurship scholars were quick to point out that this is "simply how entrepreneurs make decisions," IP is almost never included in the entrepreneurship literature in this way, or seriously taken into account as a decision-making priority. Nor had we (myself

and my co-authors) seen this argument within the IP management literature before. Overall, process perspectives seemed to be lacking within research on IP, and so the IP artifact was assumed to be stable, static and complete by entrepreneurship and IP management scholarship alike. The papers written on the basis of this study aimed to address this in- and oversight and conceptualize what we saw as lacking in the existing literature.

Sampling and data collection

Sampling for study II was theoretical, meaning that sampling aimed to fulfill the sampling criteria until saturation had been reached, while meeting these criteria on a basis of convenience (Eisenhardt, 1989; Yin, 2009). Specifically, given the in-depth nature of this study, sampling targeted ventures whose business model was based on digital technology (c.f. Nambisan, 2017; Nambisan et al., 2017), who were willing and able to provide extensive access to their founding team in order to conduct interviews with all decision-makers involved in making the venture's IP management decisions. As such, ventures in Sweden, Denmark, Australia and the US were selected on a basis of convenience, access and relevance. This meant that ventures could be easily and extensively accessed on account of their geographical location, and that decision-makers themselves could immediately reflect on the ways in which IP had been an important consideration in the early stages of their venture.

We hence sought cases that clearly reflected the phenomena of interest in our research (Eisenhardt, 1989), and kept sampling until saturation had been reached. This meant that, one, additional cases no longer added significant diversity in terms of the types of digital technologies and/or business models under study. Two, that case narratives began noticeably repeating themselves in terms of the considerations and dynamics involved in IP management. Comparability was sought by focusing on one type of technology, while diversity was sought in terms of the technologies used in order to cover as broad a range of digital innovation as possible (Davidsson & Gruenhagen, 2021). This resulted in the selection of seven ventures in the case of **paper III**, and eight ventures in the case of **paper II**. An overview of the sample, including technology, respondents and number of interviews, is shown in table 1 below.

Table 1. Study II sample (case names as used in paper II)

Venture	**Interview Respondent**	**No. of interviews**	**Time (recorded)**	**Country**	**Technology**
DataCorp	CEO, CTO, COO, community manager, intern	6	234 min.	US/Sweden	Database software
3DPrintCorp	CEO, COO	3	183 min.	US	3D printing (industrial and desktop)

AudioCorp	CEO, CTO, developer	4	222 min.	US/Denmark	Audio electronics
BlockchainCorp	CEO, COO, lead developer, consultant	4	161 min.	Sweden	Blockchain
MiningCorp	Founders	5	249 min.	Sweden/ Australia	Mining/ scanning
DisplayCorp	CEO, CTO, inventor	8	320 min.	Sweden	Optical electronics
HydraulicsCorp	CEO, CTO, product developer, IP consultancy	7	192 min.	Sweden	Water utilities
FintechCorp	CEO, CTO	3	155 min.	Sweden	Fintech

A topic list was used to ensure comparability across interviews, which can be found in appendix A. As the study progressed, it became apparent that process, more than just a scope through which to delimit the study of IP, was a particularly rich subject in its own right. Hence follow-up interviews focused more specifically on the role of IP in the process of new venture creation, including interdependence between decisions.

Data collection consisted of 40 in-depth, semi-structured interviews averaging around an hour each in terms of time, and secondary data in the form of website publications, blog posts, white papers and internal communications, including emails. Of these interviews, 32 were recorded, transcribed and coded, while a further 8 were documented through careful note-taking. At most interviews, two interviewers were present who took turns asking questions and recording notes and observations (Bryman & Bell, 2007).

In terms of respondents, a key informant approach was used whereby the first interviews for each case were conducted with the venture's (initial) founder(s), who were asked at the end of the interview if they could identify additionally relevant interviewees, in or external to the venture, who were or had been actively involved in decision-making around IP (Aguinis & Solarino, 2019). Snowballing was then used until all relevant decision-makers had been interviewed. Where possible, founders were interviewed again after several months had passed to see how a decision had developed, or how considerations regarding IP had evolved since the last interview.

Data analysis

To analyze this data, interviews were transcribed and subsequently coded using three-stage open coding (Gioia et al., 2013). This coding was conducted in ongoing discussion with the co-authors to **paper II** and **III**, in order to check assumptions and reach consensus (Saldaña,

2013). Subsequently, data was analyzed according to the theoretical and analytical frameworks relevant to **paper II** and **III** respectively. This meant that for **paper II**, coding was supplemented by a within-case analysis based on a visual and narrative mapping of the development of each case's IP management as part of the venture's business model design, highlighting interdependencies between decisions and considerations over time (Langley, 1999; Johnsen & Holt, 2023). Combining cross-case coding with within-case analysis helped identify practices, principles and tactics within each case that were used by ventures to mitigate rigidity and enable dynamic consistency (c.f. Demil & Lecocq, 2010; Eisenhardt, 1989).

For **paper III**, coding was followed by a within-case analysis based on Sarasvathy and Dew's (2005) model of new market creation, which was used as both a theoretical and analytical framework of the new venture creation process (c.f. Jiang & Rüling, 2019). Hence each case was visually and narratively mapped (Langley, 1999; Johnsen & Holt, 2023) to show available means, available courses of action and interactions with stakeholders resulting in new means and available courses of action. These outcomes were then fed back into the process, recursively resulting in 2 – 3 effectuation episodes per case, which showed the design of IP as a series of entrepreneurial artifacts driving and instantiating the process of new venture creation, i.e. the design of the venture. Finally, cases were compared in terms of both the process as a whole (c.f. Jiang & Rüling, 2019) and the IP artifacts used (c.f. Berglund & Glaser, 2022), supplementing within-case analysis with cross-case comparison (Eisenhardt, 1989; Yin, 2009).

Study III

While study II involved a collaboration between myself and my main supervisor, study III was, methodologically, a solo project executed remotely. As such, it was possible to use a wider sampling frame and conduct interviews across a variety of geographical locations. On the flipside, there was less opportunity to follow cases over time. Building on findings from study II, study III aimed to further examine the role of IP in processes of new venture creation that were open and open-ended. Specifically, study II revealed the importance of process to the management and design of IP, and the centrality of IP to processes of new venture creation in which its role had scarcely been considered. As digital innovation is open and open-ended on account of its technology, the setting for study III included openness and open-endedness deriving from a different source, specifically the venture's value proposition.

Notably, this implied a shift from an opportunity to a necessity framing. That is, the characteristics of digital technology *enable* open-ended design, creating opportunities for derivative and follow-on innovation, as well as open and user innovation (Yoo et al., 2012; Nambisan et al., 2017). For a grand challenge like sustainability, innovation being open and open-ended is a necessary consequence of the nature of the problem(s) being addressed (Bogers et al., 2020; McGahan et al., 2021; Radziwon et al., 2022).

In order to target ventures practicing sustainable innovation, study III focused on the fashion industry as a research setting. This had the benefit of increasing comparability between ventures working on diverse types of sustainable innovation (Davidsson & Gruenhagen, 2020). Moreover, as the fashion industry has been identified as one of the most polluting in the world

(McKinsey & Company & Global Fashion Agenda, 2020), sustainability ambitions are especially topical, spurring a wealth of innovation, including a push towards digitalization. In consequence, an industry that has maintained an IP culture based on secrecy and imitation (e.g. "comp-shopping"), now sees an influx of technology-based ventures using a variety of IPRs and appropriation mechanisms. As such, fashion formed a uniquely fitting setting for the aims of this study.

Sampling and data collection

Sampling for study III targeted entrepreneurial ventures identified by credible sources, such as incubators, accelerators, universities, investors, sustainability contests, governments, etc. as operating in the realm of sustainable fashion. A broad web search was executed at repeated points in time, including the search terms "sustainable fashion venture," "sustainable fashion startup" and "sustainable fashion entrepreneurship" and all ventures identified as meeting the sampling criteria were contacted via email. In total, 24 ventures agreed to take part for a total of 32 interviews and 5 email interviews, while one venture consented to being interviewed via email alone. Notably, as this method was repeated several times, new ventures were contacted until additional ventures did not add additional diversity in terms of the technologies and business models used. This meant that, initially, mainly ventures for whom IP made up an important part of their business model responded favorably to taking part. As such, there was a risk of selection bias, as ventures using technological innovation were overrepresented as compared to ventures using social and organizational innovations (c.f. Bocken & Short, 2014). Subsequent searches hence selectively targeted ventures of the latter types to better balance the sample until no further diversity in terms of technologies and value propositions could be (reasonably) achieved. Table 2 provides an overview of ventures, respondents, technologies, geographical locations and number of interviews conducted.

Table 2. Study III sample

Venture	Interview Respondent	No. of interviews	Time	Country	Technology / Part of the value chain
1	Head R&D	1	40 min.	Sweden	Sustainable materials / recycling
2	Co-founder / COO	2	50 min.	Sweden	Dyeing / recycling
3	Founder / CEO	1	52 min.	Germany	Repair / re-use / clothing culture
4	Co-founder / marketing and PR	2	58 min.	Netherlands	Platform / transparency / sustainability data
5	Co-founder / managing partner	1	39 min.	Netherlands	Sustainable materials / recycling / clothing culture

6	CFO	2	68 min.	Netherlands	Platform / design / production / sourcing
7	Founder / CEO	2	89 min.	Spain	Materials sampling / production
8	Founder	1	60 min.	Italy	Design / clothing culture
9	Founder / CEO	1	29 min.	UK	Tracing / transparency
10	Founder	1	25 min.	US	Sustainable materials
11	Co-founder / CEO	2	69 min.	US	Sustainable materials
12	Co-founder / CEO	1 (+ 1 email interview)	30 min.	Chile	Recycling
13	CTO	1 (+1 email interview)	28 min.	Switzerland	Sustainable materials
14	Co-founder / CTO	1 (+ 1 email interview)	30 min. + email	Denmark	Sustainable materials
15	Co-founder / Head of product	1 (+ 1 email interview)	25 min.	Germany	Transparency / sustainability data
16	CEO	1	26 min.	Hong Kong	Transport / protection
17	Technical Lead	2	55 min.	Finland	Protection / sustainable materials
18	Co-founder / CEO	2	65 min.	India	Dyeing
19	CEO	2	58 min.	Austria	Sustainable materials
20	Co-founder / CEO	1	28 min.	India	Sustainable materials
21	Co-founder	1	52 min.	UK	Showroom / clothing culture
22	Co-founder / CEO	2	68 min.	Italy	Sustainable materials
23	Product development	1	29 min.	Italy	Dyeing / recycling
24	COO / director of development	1 email interview	NA	US	Sustainable materials

Notably, the sampling frame for this study was global, though equal coverage across geographical regions could not be accomplished. As is common for studies in management science, ventures in (western) Europe and the US were easiest to access and were therefore overrepresented in the sample. An effort was made to contact ventures outside of these territories where they could be identified, but this was not always possible, and did not always result in a (favorable) response. In general, preference was given to diversity in terms of innovation and business model over diversity in terms of geography, though the latter was pursued, resulting in the sample presented above.

Data collection consisted of semi-structured interviews supplemented with secondary data as available online or provided by the venture itself. A topic list can be found in appendix B. The first round of interviews hence focused on ventures' technology and business model, their (open) innovation, partners, IP and sustainability ambitions. Interviewees were probed to provide additional detail with regard to the design and development of their IP decisions (including considerations and trade-offs over time) and whether they experienced tensions between knowledge sharing for the sake of developing and diffusing sustainable innovation, and knowledge protection for the sake of surviving financially.

As data collection progressed, topics emerged that were incorporated in second round interviews in order to probe their relevance across the sample (Gioia et al., 2013). Notably, in discussing tensions between knowledge sharing and protecting, many ventures discussed limits to currently available forms of IP as well as current structures of collaboration. Moreover, many voiced limits to the potential for sustainable innovation alone to contribute to sustainable development and argued the need to change consumption and production patterns at the system-level, something they felt neither they nor their IP could impact. As a result, both the topics discussed and the focus of the research itself evolved to reflect inductively emerging themes (Strauss & Corbin, 2008).

In general, only one respondent was interviewed per venture as the aim was to conduct a study of the industry's IP decisions more so than those of each individual venture, as had been the aim in study II (Bryman & Bell, 2007). After the first interview, respondents were asked if they were willing to engage in a follow-up, to which most agreed. As mentioned, follow-up interviews diverged from the topic guide to focus more specifically on emerging issues regarding innovation, sustainability and IP as raised by respondents during the first interview. Interviews were recorded and subsequently transcribed.

Data analysis

Analysis for both **paper IV** and **V** consisted of a theory-building approach using inductive open coding (Glaser, 2016), to a greater extent than had been the case for study II. Hence initial coding resulted in a great number of in-vivo codes reflecting respondents' own descriptions and experiences of the industry, their innovations, business models and IP decisions (Strauss & Corbin, 2008). Based on this initial coding, accompanied by a more in-depth study of the existing literature, coding honed in on two specific themes (Gioia et al., 2013).

First was the way ventures experienced and subsequently resolved tensions between knowledge sharing and knowledge protection as related to tensions between economic and sustainability

outcomes. These two tensions being related, as well as enduring, made myself and my co-author (who joined for the writing of **paper IV**), conceptualize each tension as a paradox, and the relationship between them as a knot. Second was the role of IP in enabling balanced social, environmental and economic value creation and capture as part of ventures' sustainable business models, including caveats in the practice and design of IP that result in asymmetries.

Hence for **paper IV**, coding resulted in the identification of sustainability challenges that ventures sought to address, sustainability pathways pursued in addressing them, and the role of IP in enabling this. Within each of these categories, (paradoxical) tensions were identified, resulting from the interaction (i.e. "knot") of paradoxes of knowledge sharing-control and sustainability-profitability. Analysis subsequently modeled these tensions, and showed how ventures managed their IP as a way of orchestrating paradox.

For **paper V**, coding focused on the types of IP used by sustainable ventures, their motives as evolved from existing motives in the (innovation) management literature, and the way these motives related to social, environmental and economic value creation and capture. As such, analysis additionally highlighted ways in which IP created asymmetries between different kinds of value. The paper hence included a discussion of changes to the practice and design of IP that would improve its capacity for enabling balanced value creation and capture of all kinds. Specifically, it called for levelling the appropriability of different (kinds of) stakeholders in a venture's value network by practicing collective IP (in order to control value appropriation by economic actors) and facilitating IP as practiced by the social and environmental realms (in order to enable value appropriation by actor and non-actor stakeholders in society and the environment) (c.f. Meyer & Naicker, 2023; Vimalnath et al., 2022).

Summary of method and data

Having discussed each study in turn, table 3 provides an overview of the datasets making up the empirics of this thesis (N.B. study I was excluded from this overview as no empirical material was gathered). Following this summary, I reflect briefly on methodological similarities between the two studies in terms of advantages and drawbacks for the appended papers and for the thesis as a whole.

Table 3. Summary of data collected

	Aim	**Dataset**	**Primary data**	**Secondary data**	**Unit of analysis**	**Context**
Study II *(paper II & III)*	Mapping the (embedded) role of IP in the process of new venture creation for digital technology-based ventures	Semi-longitudinal comparative multiple case study	40 interviews at 8 ventures (of which 1 via email)	Websites, white papers, blog posts, news publications, internal communications (where made available)	Process of new venture creation/design	Digital entrepreneurship

Study III *(paper IV & V)*	Elucidating the role of IP in helping/hindering sustainable (open) innovation, including tensions between economic and sustainability outcomes	Cross-sectional interview study	37 interviews at 24 ventures (of which 5 via email)	Websites, white papers, blog posts, news publications, internal communications (where made available)	Ventures' innovation and IP management decisions	Sustainable entrepreneurship

As can be gleaned from table 3, both studies showed similarities in terms of using a key-informant, interview-based approach, though study II made use of a semi-longitudinal, process-based design whereas study III was cross-sectional with a focus on the decision-level. One obvious benefit of this for the thesis as a whole is comparability across papers, despite (other) methodological and theoretical differences. Another benefit for the studies as such was that interviews allowed for an in-depth exploration of relevant topics. This decision was inspired by the relative lack of empirical work in each domain, as well as the nature of the phenomena under study. That is, both studies focused on topics that required fine-grained accounts of ventures' decision-making, which was best obtained by talking to each of the decision-makers involved.

For this reason, a key-informant approach was used, which resulted in founders being interviewed as the principal decision-makers of each venture as they were the main, and sometimes only, decision-makers involved in the IP decisions under study. In case of multiple founders, respondents were selected on a basis of convenience, meaning that a query was sent out to the venture in general, and founders decided amongst themselves who was the most relevant decision-maker to speak on decisions regarding IP. Typically, either the venture's CEO or CTO was interviewed, first in the case of study II, and exclusively in the case of study III.

One drawback of this approach is the subjectivity of respondents. This forms a risk for any interview-based method, but focusing on founders first and sometimes exclusively meant that answers could reflect a narrative that the founding team had agreed upon post-hoc rather than the considerations that were relevant at the time the decision was actually taken. In study II, triangulation was sought by interviewing multiple respondents, checking secondary material and re-interviewing subjects over time. For study III, subjectivity of this sort was considered to be less of an issue as the variables of interest were themselves subjective in nature, resulting more from respondents' post hoc sense-making than their ex ante intent.

Epistemological and ontological assumptions

Given the inductive, theory-building nature of the work in this thesis, its ontology and epistemology are based on assumptions of social construction more so than objective reality, or positivism. Specifically, the nature of phenomena, including IP management, is assumed to be collectively constructed between stakeholders, given meaning by respondents through

interactions within their founding team as well as with the researchers involved (Bryman & Bell, 2007; Strauss & Corbin, 2008).

This approach can be seen in both study II and III, and is reflected in the framing of the appended papers. Importantly, study II took the new venture creation process as its unit of analysis, whose functioning can only be understood in the context of collective meaning-making (i.e. artifact design, effectuation, decision-making). In study III, IP decisions are taken as the unit of analysis, including motives and tensions, which again draws attention to constructed meanings – as both motives and tensions are subjectively experienced rather than objectively observed.

Notably, while phenomena of interest were considered to be socially constructed, it is precisely this construction that gives them meaning and influence over other variables. For instance, it is the perception of strategic urgency, or tensions regarding aspired outcomes, that drives action. It is hence argued that it is ontologically irrelevant whether there "is" urgency or tension, since it is the experience thereof that prompts behavior rather than its presence or absence.

SUMMARIES OF APPENDED PAPERS

Paper I: The Business of Intellectual Property: A Literature Review of IP Management Research

Authors: Holgersson, M., van Santen, S

Contribution: Data curation, analysis and methodology for sub-study 3 (systematic literature review), writing (revisions of original report).

Status: Published in Stockholm Intellectual Property Law Review, Volume 1, Issue 1, 2018

This literature review sought to provide a broad and varied overview of the research conducted on intellectual property management and its related topics and disciplines, e.g. technology trade and valuation To this end, three sub-studies were conducted, focusing respectively on literature reviews, special issues and a structural review of the academic literature on intellectual property management. Results consisted of a summary of the relevant research on the management of IP and its most commonly studied constituent rights and mechanisms (e.g. patents, trademarks, secrets), including a reflection on its progression over time. As such, the review concludes by discussing the evolution of IP management as a steadily growing field of research and offering suggestions for its future development.

Specifically, the paper highlights the propensity for research on IP to focus on a single type of IP right, often patents, to the exclusion of others, including informal appropriation mechanisms. It notes an overrepresentation of quantitative work based on secondary data and a lack of integration with (strategic) management issues, including organization of IP as an integral part of the firm. Consequently, the paper advocates a more holistic approach to IP management based on integration between different types of IP and different IP functions. Moreover, the importance of related research streams in the innovation literature is raised, including open innovation and business models, as relevant disciplines where the role of IP is increasingly important as a result of, for instance, digitalization.

Paper II: Managing Rigidity in Business Model Design: On the Dynamic Consistency of Intellectual Property

Authors: Holgersson, M., van Santen, S.

Contribution: Conceptualization, data curation, analysis, methodology, visualization, writing (original draft and revisions).

Status: Presented at World Open Innovation Conference 2017 (San Francisco), 2019 (Rome), Open and User Innovation Conference 2019 (Utrecht), Academy of Management 2020 (online), rejected in second round at Journal of Product Innovation Management special issue on Digital Transformation and Innovation Management (2019), submitted at Long Range Planning.

The aim of this paper was to examine how the rigidity inherent in many forms of IP is managed by entrepreneurial ventures operating in a context of change and uncertainty, specifically digital entrepreneurship. That is, given that decisions regarding IP imply certain more or less rigid

commitments, how do ventures retain the ability to innovate, i.e. design, their business models in response to external and internal developments?

In order to address this question, the design of ventures' business models was mapped longitudinally, showing interdependencies between decisions by visually linking them over time (c.f. Langley, 1999). Combining within-case analysis with cross-case coding of IP decisions revealed how founders deliberately took their decisions in the present with an eye to the unknown dynamics of the future. In other words, while decision-makers could not be sure what kind of dynamics would encroach on their venture, they were certain that dynamics *would* encroach, hence they made their decisions in such a way as to manage unavoidable rigidities and path dependencies.

Dependencies between decisions were subsequently analyzed to identify the types of rigidities created by IP decisions and the practices ventures used to mitigate them. From these practices, mitigation principles (timing, design and control) were abstracted, which were further translated into actionable tactics: delaying irreversible decisions, sequencing IP mechanisms, designing technological architectures, and contracting accessibility and control. In doing so, the paper contributes to the literatures on appropriation and IP, which have to date had a mostly static view of IP management, matching configurations to outcomes and motives to decisions with limited consideration for the role of process (see Ahuja et al., 2013 and Hurmelinna-Laukkanen & Yang, 2022 for notable exceptions).

Paper III: Intellectual property as an entrepreneurial artifact in the process of new venture creation

Authors: van Santen, S., Holgersson, M., Berglund, H.

Contribution: Conceptualization, data curation, analysis, methodology, visualization, writing (original draft and revisions).

Status: Presented at Academy of Management 2019 (Boston), R&D Management Conference 2019 (Paris), Academy of Management 2020 (online), under review at Strategic Entrepreneurship Journal.

Paper III built on effectuation as a process and design perspective to conceptualize IP as an entrepreneurial artifact in the process of new venture creation (Moroz & Hindle, 2012; Sarasvathy, 2003; Sarasvathy & Dew, 2005). To this end, seven out of eight cases studied as part of study II were mapped visually and narratively according to Sarasvathy & Dew's (2005) model for the creation of new markets, which has seen prior use as a theoretical and analytical framework of the effectuation process (c.f. Jiang & Rüling, 2019).

Comparing across effectuation episodes at the within-case level, and between cases at the cross-case level, showed that the design of IP artifacts reflected decision-making principles belonging to both effectuation and causation, though the dominance of one logic over the other was a function of process. Hence IP was designed to be more concrete once the venture settled on its goals and took measures to defend its competitive advantage, which usually occurred by the second effectuation episode. In contrast, during the first and third episodes, IP was designed to

be abstract and open-ended due to the venture's explorative, scope-widening approach (Reymen et al., 2015).

Moreover, comparing cases at the level of the process itself showed differences between cases that transitioned from effectuation to causation and back again when new means or goals presented themselves, and those that got "stuck" in an effectuation loop because they couldn't acquire the requisite means or decide on attainable goals. Hence while most cases managed to use their IP to acquire additional means and select achievable goals, some focused on goals that they did not have the means to achieve and/or did not manage to solicit the necessary means and commitments. Likewise, one case designed its IP according to causation-based principles from an early stage and failed to unlock new action potentials as it sought to protect a competitive advantage that had not been formed yet.

As such, this paper showed the centrality of IP as an early building block in technology-based ventures, specifically how IP could and indeed should be used as a way to acquire additional means, solicit commitments and unlock action potentials. The design of IP artifacts, regardless of the type of IP (e.g. patent, secret) that was used, was shown to change between episodes from conceptual, to advance an initial hypothesis and solicit commitments, to concrete, in order to define, delineate and protect the venture's competitive advantage.

Hence this paper contributes to the literature on effectuation as a process and design perspective by conceptualizing IP as an entrepreneurial artifact (Berglund & Glaser, 2022; Sarasvathy, 2003; 2004; 2021) and showing how the iteration of different decision-making logics throughout the new venture creation process relates to the design of the venture's IP (c.f. Jiang & Rüling, 2019; Reymen et al., 2015; Smolka et al., 2018). Additionally, it contributes to the literature on appropriation and IP by showing how both motive and design of IP are a function of process, which matters more to overall venture design than the "type" of IP that is used (c.f. Holgersson, 2013; Thomä & Bizer, 2013).

Paper IV: Threading Fashion's Paradox Knot: IP Strategy in Open and Sustainable Innovation

Authors: van Santen, S., Holgersson, M.

Contribution: Conceptualization, data curation, analysis, methodology, visualization, writing (original draft and revisions).

Status: Published in European Journal of Innovation Management Volume 29, Issue 11.

Paper IV focused on sustainable open innovation as practiced by entrepreneurial ventures in the fashion industry. The paper sought to examine how ventures used their IP to manage tensions emerging at the intersection of paradoxes between knowledge sharing and knowledge protection, and between economic and sustainability outcomes. Notably, while sustainable innovation often requires knowledge sharing as a way of bundling knowledge and organizing collective action, ventures' financial survival requires a certain degree of knowledge protection to retain competitive advantage (Bogers et al., 2020; Eppinger et al., 2021; McGahan et al., 2021; Vimalnath et al., 2022). Yet without venture survival, no sustainable innovation can take place, while sustainable innovation in turn fuels the venture's economic performance. Hence

ventures may be confronted with opposing demands when it comes to their IP, but also the opportunity to achieve complementarity.

Interviews conducted with founders were analyzed using three-stage open coding (Gioia et al., 2013), to arrive at 29 first-order codes, 9 second-order themes and 3 third-order dimensions reflecting the key considerations in ventures' decision-making regarding their IP in a context of sustainable open innovation. Specifically, ventures described sustainability challenges they sought to address, sustainability pathways through which to address them, and the role of IP in facilitating this. Analysis revealed how each of these dimensions in turn gave rise to different emergent tensions resulting from the knot between paradoxes of knowledge sharing-control and sustainability-profitability, respectively incumbent versus venture-led change, sustainability ideals versus economic incentives and innovation diffusion versus venture survival.

Notably, ventures managed their IP not to prioritize one outcome over another, e.g. knowledge protection for profitability, but to balance outcomes and resolve tensions. Specifically, they used their IP as a boundary object to facilitate conversation and delineate (competitive) boundaries, to profit from their innovation and ensure continued survival and, finally, to promote technology adoption and diffusion. Hence this study conceptualized IP as a boundary object and IP strategy as a dynamic orchestration of enduring paradox.

As such, we make three main contributions. One is to the literature on sustainable entrepreneurship by highlighting the role of IP in achieving hybrid outcomes through paradox orchestration. Two is to the literature on paradox by detangling the knot between paradoxes of knowledge sharing-control and sustainability-profitability, and illustrating the centrality of IP in managing emergent tensions. Three is to the literature on appropriation and IP by showing how IP strategy is itself emergent, as its pattern results from developing priorities and adjustments over time.

Paper V: From Managing Innovation to Governing Value: Reconceptualizing the Role of Intellectual Property in the Sustainable Business Model

Authors: van Santen, S.

Contribution: Conceptualization, data curation, analysis, methodology, visualization, writing (original draft and revisions).

Status: Minor revisions at Business Strategy and the Environment.

Paper V focused on the way IP, traditionally a means of creating and capturing economic value only, was used to enable social, environmental and economic value creation and capture as part of the sustainable business model of ventures practicing sustainable entrepreneurship in the fashion industry. Inductive open coding was used to identify IP decisions, the type of IP that was used and the motives driving its use (Gioia et al., 2013). Hence it was found that IP in the form of lead times, patenting, publishing, secrecy and trademarking, was used to communicate value and legitimacy, ensure freedom to operate, facilitate imitation and open innovation, and protect appropriability.

These motives were subsequently related to existing motives in the appropriation and innovation literature to compare the functioning of IP between commercial and sustainable business models. For each motive, a proposition was formulated in order to advance a reconceptualization of the role of IP. Finally, motives were related to social, environmental and economic value creation and capture to show that, though IP is capable of supporting all forms of value creation, trade-offs exist that result in a prioritization of economic over social and environmental value creation. Likewise, though IP supports economic value capture, social and environmental value capture is only promoted in the form of spillover value resulting from open innovation. The paper hence discusses limits to existing IP practice and design, arguing that ventures are often faced with an economic imperative versus a social and environmental incentive. Potential solutions are discussed, including industry-wide commitments, collective IP, and increased options to award IP rights to the social and environmental realm on par with economic actors.

This paper hence contributes to the currently limited research on the role of IP in the sustainable business model (Hernández-Chea et al., 2020), specifically in a context of sustainable entrepreneurship. By focusing on the relationship between IP and social, environmental and economic value creation and capture, this paper further contributes to research on the role of IP in sustainable development and sustainable innovation (Eppinger et al., 2021; Jain et al., 2024; Vimalnath et al., 2022). Specifically, paper V nuances the role of IP by going beyond the development and diffusion of sustainable innovation to look at innovation management in the sustainable business model in a broader sense. Finally, the paper lends its support to studies arguing the need to expand the options available for collective IP (Meyer & Naicker, 2023; Vimalnath et al., 2022) as a governance mechanism to address value asymmetries between the economic, social and environmental realm (Chon, 2018; Isil & Hernke, 2017; Ritala et al., 2021).

DISCUSSION

This thesis sought to examine the role of IP in processes of new venture creation characterized by openness and open-endedness as a function of the venture's technology or value proposition. Studies focused on digital and sustainable entrepreneurship respectively, while effectuation was introduced as an overarching framework to conceptualize similarities.

Having discussed the aims and outcomes of each of the appended papers, this next section synthesizes the work done in order to discuss contributions to the literature, practice and policy, limitations, and suggestions for future research.

Conceptualizing the role of IP in the effectuation process

To reiterate, effectuation was first conceived as a decision-making logic consisting of a set of principles that together explain the way expert entrepreneurs take decisions in contexts that are high in uncertainty (Sarasvathy, 2001). It was advanced as a process perspective to describe how new ventures are created through a recursive process of expanding means and converging constraints (Sarasvathy & Dew, 2005). Finally, it was linked to entrepreneurship as design in order to illustrate how the artifact of the new venture is created through the accumulation, assembly and reassembly of venture components (Sarasvathy, 2003; 2004), or entrepreneurial artifacts (Berglund & Glaser, 2022).

Hence while only **paper III** explicitly builds on effectuation as a theoretical framework, it forms a useful overarching perspective to discuss commonalities between the different studies and appended papers. As such, this section discusses contributions to effectuation and entrepreneurship as related to the role of IP.

Open-endedness as an underacknowledged characteristic of IP

When the new venture creation process is open-ended due to the venture's technology or value proposition, this impacts the design of the venture's artifacts. A key takeaway from study II in particular was the importance of incompleteness for IP decision-making and artifact design in order to increase options and mitigate rigidity. In the literature on information systems and digital technology, this principle is well-established (Garud et al., 2008; Nambisan, 2017). IP, in contrast, is often treated with an assumption of completeness, either in terms of its design or in terms of the motives and outcomes pursued.

For example, while secrecy has been extensively studied in terms of its effectiveness under different conditions (e.g. Arundel, 2001; Holgersson & Wallin, 2017; Veugelers & Schneider, 2018), the form and boundaries of the secret are seldom discussed, nor is its overlap with other (knowledge) artifacts (Hannah, 2005). As a result, secrecy is often treated as a binary variable, either present or not, whereas trade secrets (which have more clear and stringent legal conditions attached to their form and functioning) are treated as wholly discrete, clearly delineated artifacts whose boundaries are stark and permanent. Instead, the work in this thesis shows that most IP artifacts have boundaries that are porous, overlapping with other parts of the venture and open to renegotiation, either periodically or consistently.

Hence secrecy often involves many different knowledge and technology components, some of which are clearly demarcated and guarded through concrete efforts like the physical separation of production facilities, or the establishment of a trade secret in legal terms. Others may be more vague and involve a general consensus in the founding team not to discuss certain production processes outside the venture. Even a seemingly concrete artifact like a patent involves a degree of open-endedness along its boundary, for instance when the patent itself is underspecified to allow the venture to keep an overlapping trade secret, or when the application areas for a patent are deliberately limited in order to spur derivative innovation or imitation by partners and competitors, grow new markets and establish new value propositions. Likewise, the boundary for enforcing a trademark or establishing a copyright violation are a matter of (legal) argument and, importantly, a firm's own decision-making. Finally, even informal appropriation mechanisms such as lead times or complexity of design involve incompleteness, for instance in deciding how a "lead time" should be measured and what degree of development or protection should be considered part of the lead time or, instead, as more ambiguous territory where catch-up is not only possible but encouraged.

Similarly, many IP decisions are open-ended in the sense that, while the IP artifact is in use, motives may change to reflect serendipitous uses and unexpected outcomes. Studying decisions longitudinally makes it possible to distinguish, to some extent, between ex ante intentions and post hoc outcomes as separated by the punctuation point of the decision. In many cases however, it may not be possible to pin a decision down to a concrete point in time due to differences between world time, i.e. the chronology of events, and human time, i.e. the way entrepreneurs experience the progression and interdependence of events (Johnsen & Holt, 2023). Meanwhile, the design of an IP artifact may involve not just one, but a number of interconnected decision points across time.

For decision-makers, being aware of open-endedness can help them prevent path dependence (Sydow et al., 2009), costly lock-ins and rigidity caused by considering too narrow a scope for their IP. Meanwhile, actively using open-endedness to one's advantage can unlock options, promote serendipity and foster creativity (Agogué et al., 2015; Garud et al., 2010), culminating in new ways of designing IP to fulfill new functions or motives (c.f. Sarasvathy, 2021). Hence studying the design of IP artifacts throughout the early stages of new venture creation demonstrated how ventures designed their IP in abstract, open-ended ways at explorative parts of the process. This aligns with research that shows ventures use effectuation over causation when widening their scope or when encountering uncertainty or unanticipated consequences (Jiang & Tornikoski, 2019; Koller et al., 2022; Reymen et al., 2015), and that artifact design is abstract in this context (Berglund et al., 2020).

This thesis contributes by showing that, in contrast to what is typically assumed (c.f. Reymen et al., 2015; Dew et al., 2009), IP is not only used to defend a "complete" or clearly defined competitive advantage, but also to shape one that is not. The role of IP is an active one for technology-based ventures in particular, which constitute a large share of the ventures most likely to use effectuation as a decision-making process. Moreover, both **paper II** and **paper III** found that ventures maintained long-term strategic priorities that reverberated across decisions and effectuation episodes to guide overall venture design, even as founders based

their immediate actions and interactions on available means and commitments. This adds to research that conceptualizes a "planning effectuator" who combines principles of effectuation and causation for synergistic outcomes (Koller et al., 2022; Smolka et al., 2018).

Specifically, this thesis links design to process by showing how different (combinations of) logics used at different stages in the process impact the design of entrepreneurial artifacts, notably IP, and how the design of these artifacts in turn drives and instantiates the process of new venture creation, i.e. design of the venture as a final artifact. Where effectuation was used, IP was designed to create means and options, leverage contingencies and solicit stakeholder commitments. However, it was also designed to enable, or at the very least not inhibit, ventures' long-term ambitions. Design of a venture's IP became increasingly concrete as the venture developed its technology and business model. This meant that, regardless of overall venture maturity, newly developed technology with a novel or as of yet undecided value proposition prompted the design of abstract IP.

Finally, while this finding was at the heart of study II, study III revealed similar dynamics. Hence in study III, abstract artifacts were used to signal value, raise awareness about sustainability issues and prompt imitation. Meanwhile, concrete artifacts were used to protect appropriability, ensure financial survival and enable collaboration with incumbents in particular. Hybrid outcomes, or joint social, environmental and economic value creation and capture, were achieved through a combination of IP artifacts that differed in terms of motive and design. It is argued here that effectuation as a framework can be usefully applied to many (more) open-ended contexts (c.f. Radziwon et al., 2022), and that IP forms an important enabler of its partnership logic in particular, acting as a boundary object at the interface between the venture's internal and external environments (cf. Berglund et al., 2020; Zobel & Hagedoorn, 2020).

Interdependence between decisions and artifacts

Building on the previous, the papers in this thesis additionally highlighted the interdependence of IP decisions and artifacts within the new venture creation process. Specifically, when studying a single decision, like the decision to patent, publish or keep a trade secret (c.f. Holgersson & Wallin, 2017), this decision can be studied in relative isolation. However, when the unit of analysis is the process rather than the decision itself, the decision's embeddedness quickly becomes apparent. Interdependencies are harder to remove than to include, and the open-endedness of the IP artifact is made obvious in the way its design spreads itself across decision points and venture components.

Mapping this interdependence highlights the importance of chronicity (Garud & Giuliani, 2013), i.e. the influence of time and the sequential ordering of decisions, components and artifacts as experienced by the "world," i.e. chronologically, and as resulting from entrepreneurs' own sensemaking (Johnsen & Holt, 2023). This can be seen in the way decisions taken at an early stage are more likely to rely on effectuation-based principles while subsequent decisions rely increasingly on causation (Sarasvathy, 2001; Reymen et al., 2015). That is, as the venture matures, consecutive decisions create cumulative commitments, resulting in an accumulation of means and a constraining of action potentials (Sarasvathy & Dew, 2005).

In this thesis, this was manifested in the way the design of IP reflected not only timing, but sequence. Specifically, because artifacts stack up over time and have a cumulative effect on the growth of the venture (Sarasvathy, 2003; 2004), sequence matters. Certain IP decisions are a prerequisite or inhibitor of others, and some design choices have an impact beyond the single artifact. To provide an example, many ventures in both study II and III applied for a "conceptual" patent as their first IP. The aim was to provide an initial roadmap of the venture's technology (and sometimes business model) that could serve as a calling card towards investors, customers, partners, competitors and other stakeholders who might take an interest.

This first application was abstract precisely because the venture sought to solicit unspecified commitments, expand its means and unlock action potentials (Sarasvathy, 2001; 2021). In other words, because goals were undecided, the venture sought to widen its scope while still providing a clear signal as to what it considered its main competitive advantage to be (Reymen et al., 2015; Smolka et al., 2018). This decision was seen as a prerequisite for subsequent patent applications whose terms were specified to a much higher degree of precision. Likewise, patenting too specifically was thought to inhibit the venture's ability to practice secrecy. However, both abstract and concretely worded patents enabled disclosure and contracting, effectively forming a social lubricant in collaboration (Dominidiato et al., 2025; Zobel & Hagedoorn, 2020).

Finally, disclosing too much too soon, for instance by engaging in open source or open hardware, was thought to prevent more proprietary decisions later on, not only because IP was revealed that could thereafter no longer be patented or kept secret, but by setting expectations towards the venture's first stakeholders (c.f. Garud et al., 2014b). Likewise, as secrecy was considered a key appropriation mechanism for many ventures, creating an architecture of IP artifacts that allowed for competitive advantage to be kept secret while facilitating disclosure of distinctive merits constituted a priority (Henkel & Baldwin, 2013).

Open innovation as opportunity and necessity

In addition to effectuation, this thesis contributes to the literature on open innovation, the importance of which has been highlighted in the context of both digital and sustainable innovation (Nambisan et al., 2017; Bogers et al., 2020). As a theoretical framework, open innovation is often argued to be complementary to effectuation due to the latter's focus on fostering partnerships and leveraging contingencies (Nambisan, 2017; Radziwon et al., 2022; Sarasvathy, 2001). Hence openness is inherent to effectuation, while effectuation can be especially useful for modeling different types of open innovation process.

This is true for uncertain contexts like entrepreneurship (Spender et al., 2017), but also for innovation aimed at solving societal grand challenges like the sustainability crisis (McGahan et al., 2021; Radziwon et al., 2022). Hence sustainable entrepreneurship forms a context where both effectuation and open innovation are especially relevant. The same is to some extent true for digital entrepreneurship, which is conducive to both open-ended exploration (wakes of innovation, derivatives) and combinatorial innovation (Yoo et al., 2012; Nambisan et al., 2017; Nambisan, 2017). Notably, while the former presents a necessity, the latter presents an opportunity – although opportunity may spawn from necessity and vice versa.

IP as a boundary object

A theme that hence emerged from both studies II and III is that, whether IP is treated as a management priority, a decision or an artifact, it is a boundary object by its very definition. Notably, the way founders managed their IP was based on who they were aiming to talk to and what kinds of conversations they were intending to have. As such, IP was used to create conversation topics, or options in interaction. Decisions differed depending on who was expected to engage with the IP and how, even though this could not be entirely predicted. As ventures could not predict the identity of their stakeholders, or the role these stakeholders would assume, they designed their IP accordingly, something effectuation refers to as the logic of control over prediction (Sarasvathy, 2001).

The work in this thesis shows that options created by IP-mediated stakeholder interactions form an important medium for gaining control, and that this is particularly true in uncertain contexts with many potential collaborators. Sustainable open innovation makes for an especially relevant case, since addressing a societal challenge or "wicked problem" like sustainability involves many unknown actors (and non-actors, e.g. communities and natural environments) and artifacts (Zobel & Comello, 2025), as well as a great deal of open-endedness when it comes to finding solutions (Bogers et al., 2020; Lüdeke-Freund et al., 2020; McGahan et al., 2021; Ooms & Piepenbrink, 2021; Radziwon et al., 2022; Sarasvathy, 2023).

Study III, in particular, adds to this emerging literature by showing how entrepreneurial ventures as innovators and disruptors are well-positioned to find novel solutions to thorny sustainability problems (Gifford et al., 2021; Schaltegger et al., 2016), which IP can both enable and hinder. Hence it was found that IP fulfills an important signaling function, not so much by signaling appropriability (Audretsch et al., 2012), but by signaling credibility, which helped ventures get their "foot in the door". Additionally, IP helped ventures avoid a "door in the face" by being cut from collaborations or having their innovation misappropriated. Specifically, many ventures cited examples of incumbents changing the sustainability targets of a collaboration, attempting to take or sell the venture's innovation to a different partner that promised to produce it at a lower price, or swapping partners to gain greater control over the goals of the collaboration. In cases like these, IP formed ventures' main protection and leverage, and many argued that their financial survival through IP directly contributed to sustainability outcomes in the industry as a whole (c.f. Andersson Wänström et al., 2025; Lüdeke-Freund et al., 2020).

This latter scenario presents a case where economic outcomes (i.e. venture survival) are in alignment with sustainable development. However, ventures likewise recalled situations where competing demands resulted in tensions between different outcomes and forms of value (Eppinger et al., 2021; Hirschmann & Block, 2022; Vimalnath et al., 2022). In **paper IV** these tensions were conceptualized as paradoxes, and the point of their intersection as a knot (Jarzabkowski et al., 2022; Lewis & Smith, 2022; Sheep et al., 2017; Smith & Lewis, 2011). **Paper V** instead modeled social, environmental and economic value creation and capture as the constituent parts of ventures' sustainable business models, highlighting complementarities and trade-offs with regard to IP. Synthesizing findings, the next section discusses contributions to a conceptualization and orchestration of these tensions and trade-offs.

Tensions and the need for collective IP

Development and dissemination of sustainable innovation requires a degree of openness that can hinder economic value capture for entrepreneurial ventures in particular. Specifically, sustainability issues are often complex, meaning that solving them requires input from many different sources, and hence a combination of knowledge and commitments across (organizational) boundaries (Bogers et al., 2020; Chesbrough, 2020; Zobel & Comello, 2025). It may be impossible to predict upfront what kind of input will be required, while many different combinations may lead to a viable solution. Hence innovation benefits from a free sharing of knowledge, so that all potential problem solvers have access to all potentially relevant information. Moreover, if an innovation *has* been developed, there is a strong impetus to disseminate it as widely as possible so it can be adopted in all relevant contexts (Athreye et al., 2023). This may prevent the innovator from claiming a temporary monopoly through IP, and hence from recuperating the cost of their innovation. In turn, this can dissuade innovators from tackling certain sustainability issues or prevent them from sharing their knowledge as freely as needed.

Ventures suggested that the former may be true for incumbents (Bocken & Short, 2016; Magnusson & Werner, 2023), while the latter was often experienced by ventures themselves, as they had to prevent imitation in order to protect their own (financial) survival (Lüdeke-Freund, 2020). Given that incumbents may not pursue certain kinds of sustainable innovation, survival of entrepreneurial ventures may be a requirement for this innovation to be pursued at all (Andersson Wänström et al., 2025; Eppinger et al., 2021; Vimalnath et al., 2022). However, the IP protection needed to ensure this survival may subsequently hinder diffusion and adoption once developed (Athreye et al., 2023; Bustamante et al., 2023).

For incumbents, patent pools can be a way to overcome such dilemmas (Contreras et al., 2020; De Rassenfosse & Palangkaraya, 2023). Specifically, incumbents are often better able than ventures to pledge or pool their sustainable innovation since they are able to capture value elsewhere (Magnusson & Werner, 2023). As this is often not the case for ventures, there is a need to develop (IP) structures that facilitate openness while protecting ventures from being outcompeted by imitators capable of producing at larger scale and lower cost, i.e. prevent free-riding (Ostrom, 2017). In other words, there is a need to improve the appropriability regime for sustainable entrepreneurship in particular (c.f. Hurmelinna-Laukkanen & Yang, 2022; Teece, 1986). Collaborations between ventures and incumbents, even acquisitions and joint ventures, form one organizational solution to this problem (Andersson Wänström et al., 2025; Eppinger et al., 2021; Hillman et al., 2011). However, there is a need for these collaborations to be governed in such a way that it enables not only ventures, but other low-powered innovators to both share their innovation as well as recuperate their investment in a way that is equitable (Dietz et al., 2003; Hess & Ostrom, 2007; Meyer & Naicker, 2023; Vimalnath et al., 2022; Zobel & Comello, 2025). Herein lies the problem: IP as a governance mechanism has a bad track-record when it comes to low-powered actors in particular (Audretsch et al., 2020; Hanel, 2006; MacDonald, 2004; Rahmatian, 2009).

This thesis hence adds to the nascent literature on sustainable open innovation, specifically the role of IP therein, by advocating a shift in focus from erecting/removing barriers to *innovation*

diffusion, to creating structures that enable a diffusion and exchange of (social, environmental and economic) *value*. This means that IP is managed so as to facilitate social, environmental and economic value creation and capture – awarding substantial, structural priority to social and environmental value while ensuring sufficient economic value creation and capture. For ventures, this may be harder to achieve than it is for incumbents, as their limited size, routines, resources and legitimacy makes it harder to use the (existing) tools of the IP system to their full potential (Audretsch et al., 2020; Hanel, 2006). For example, while licensing may fulfil the requirements of both sharing an innovation as well as recuperating investments, ventures need to ensure they have sufficient leverage before they are able to license their innovation. Patent pools and pledges often leave a venture without an alternative source of value capture, and common pool IP structures, such as open source licenses, create the risk that the venture will be outcompeted by a firm in a superior resource position while giving the venture little power for enforcing the terms of its contract(s).

Tensions and tradeoffs like these suggest the need for governance that helps overcome the caveats of the current IP system and the options it offers low-powered actors (Macdonald, 2004). This means addressing problems of leverage and the potential for opportunism through organizational arrangements (c.f. Williamson, 1981). At the firm-level, managers may for instance take it upon themselves to develop fairer contracts with better guarantees for low-powered actors (N.B. this includes all kinds of actors, not just ventures, but firms in the global south, in rural areas, at the base of the pyramid, etc.) in sustainable (open) innovation, in order to promote the open sharing of knowledge and technology needed to effectively address sustainability issues (Dominidiato et al., 2025; Zobel & Hagedoorn, 2020).

Specifically, where social, environmental and economic value are pursued in tandem, it is rare for equal value to be created and captured across different realms (Lüdeke-Freund et al., 2020; Ritala et al., 2021; Upward & Jones, 2016). This thesis found that, though IP as part of ventures' sustainable business models was used to enable value creation of all forms, it also bore the potential for trade-offs and value "uncaptured," where social and/or environmental value was not created or captured because economic value was prioritized (c.f. Yang et al., 2017). As such, it is argued that IP currently underserves social and environmental value as compared to economic value by facilitating an economic imperative versus a social and environmental incentive (c.f. Linder et al., 2014; Massa & Tucci, 2013). That is, IP promotes economic value creation by enabling economic value capture, i.e. enabling temporary monopolies that allow innovators to recuperate their (economic) investment (Granstrand, 1999). Yet the social and environmental resources invested in this innovation are not recuperated (Hummels & Argyrou, 2021; Isil & Hernke, 2017; Upward & Jones, 2016), and IP is not designed to enable this (yet), even though a large part of the value in IP may be social or environmental rather than economic (Pihlajarinne & Ballardini, 2020).

Paper IV and **paper V** both addressed this issue from different angles but with complementary answers. Hence it was suggested that IP in its capacity as a boundary object can be used to resolve, or orchestrate, paradoxical tensions arising in sustainable entrepreneurship to achieve integration, or complementarity, between seemingly contradictory outcomes. On the other hand, it was suggested that the practice and design of IP can be improved through, respectively,

industry-wide commitments to sustainability, and by awarding intellectual ownership rights to the social and environmental realm on par with those enjoyed by the economic realm, in order to redress existing power asymmetries (c.f. Lüdeke-Freund et al., 2020; Yang et al., 2017). In doing so, equitable opportunity for capturing social and environmental value may be created by improving the appropriability of the social and environmental realms (Hurmelinna-Laukkanen & Yang, 2022). Essentially, this means giving society and the environment a legal "seat at the table" where economic interests tend to dominate (Rahmatian, 2009). Notably, this has been an ongoing priority at the World Intellectual Property Organization (WIPO) for years, with the "Treaty on Intellectual Property, Genetic Resources and Traditional Knowledge" making a tentative effort at strengthening IP protection for social actors and environmental resources (Alves, 2024).

This argument ties in to an earlier observation, i.e. the lack of (distinct) theoretical development when it comes to IP (Candelin-Palmqvist et al., 2012). Specifically, the work in this thesis has advanced a view of IP that is in some ways unconventional, and in some ways subsequential to conversations that have been ongoing in the field of IP for years. As such, an attempt is made, by no means comprehensively, at advancing a (re-)conceptualization of IP that builds on the work in this thesis to provide a suggestion of what IP *could* be as its practice and design continue developing under the influence of digitalization and sustainability. Notably, "no designed artefact, such as a business model or an ontology of business models, is value-neutral" (Upward & Jones, 2016, p.5), while assumptions regarding the primacy of economic value "reflect man-made properties of social systems that can be critically debated and designed" (Lüdeke-Freund et al., 2020, p.63). As such, the meaning of IP, including its scope, definition, practice and the system that upholds its legal boundaries, are itself value-infused artifacts, designed within a certain socio-economic (and political) paradigm. As this paradigm changes under the influence of technological and societal transformations – most urgently the need to solve our current sustainability crisis – so too should the design parameters of IP as a practice and as a system. Hence the next section makes a preliminary attempt at (re-)designing the concept of IP within a sustainable paradigm.

A reconceptualization of intellectual property

Earlier in this cover paper, a working definition of IP was given wherein IP was argued to consist of those valuable intangible resources whose access and use are managed through formal and informal means of control. This definition bears a kinship with the resource-based view, which argues that sustained competitive advantage results from valuable, rare, inimitable and hard to substitute resources (Barney, 1991). As such, any intangible (knowledge-based) resource that meets these criteria of being valuable and rare (thus conferring competitive advantage) as well as hard to imitate or substitute due to the firm's control position would be considered part of the firm's IP.

As previously argued, the way that IP has been used in the literature on both IP strategy and appropriation suggests that this definition is implicit in much work on IP. Indeed, the WIPO uses a similar definition of IP as "creations of the mind, such as inventions, literary and artistic works, designs, and symbols, names and images used in commerce" (WIPO, 2025).

Moreover, research has increasingly moved from statically testing the efficacy of different formal and informal IP rights and appropriation mechanisms (e.g. Arundel, 2001; Blind et al., 2006; Kitching & Blackburn, 1998; Thomä & Bizer, 2013) to dynamically studying appropriability (Ahuja et al., 2013; Holgersson & Granstrand, 2022; Miric et al., 2019; Hurmelinna-Laukkanen & Yang, 2022) as well as other governance functions executed through IP (Athreye et al., 2023; Gambardella, 2023; Holgersson et al., 2018; Teece, 2018). The work in this thesis has consistently sought to contribute to this conversation by highlighting the role of process in the practice of IP. As such, several if not all of the appended papers have, implicitly or explicitly, advanced a view of IP strategy as a processual, emergent act of boundary spanning, using informal and formal instantiations as (external) boundary objects (Carlile, 2002; Caccamo et al., 2023) and (internal) sense-making devices (Weick, 1995).

Specifically, the argument is that, though the legal options of an IPR or appropriation mechanism may be to some extent fixed, its design is not, and neither is its use or meaning (Hess & Ostrom, 2007). Options are generated and constrained whenever IP is created, and IP can be defined and redefined both within the confines of the venture and in interaction with its external stakeholders. As has been illustrated, even the boundaries of the most "fixed" instantiations of IP are subject to renegotiation, reshaping, expansion or reduction.

In addition, study III specifically challenged assumptions as to what kinds of value should be eligible for being counted as "IP" and who should have a say in its control. As study II already advanced the conversation on "control" over "ownership" as a criterion for IP (see Hurmelinna-Laukkanen & Yang, 2022 for a discussion on appropriability as "control" – or the ability to choose), the arguments of both can be combined to result in a new conceptualization of the "property" component in "intellectual property".

To reiterate, **paper V** argued that there is a need for the social and environmental realm to control IP within the same system as the economic realm in order to redress power imbalances that currently result in asymmetries between economic, social and environmental value creation and capture (c.f. Isil & Hernke, 2017; Lüdeke-Freund et al., 2020; Massa & Tucci, 2013; Upward & Jones, 2016). Indigenous peoples have called for just such an intervention at the WIPO for years, requesting cultural IP rights and protections for traditional knowledge that stand up to the power that economic actors are able to wield against societal actors using the IP system. In other words, this is a call to improve the options for the social realm to wield IP, arm itself against economic actors and, most importantly, become a conversation partner with a seat at the same table. Similarly, there is precedent for the use of IP when it comes to certain natural environments, specifically with regard to genetic resources. Collectively defined and managed, these rights promote a more equitable, fairer use of the knowledge and innovation obtained from natural ecosystems (Argyrou & Hummels, 2019; Lüdeke-Freund et al., 2020; Meyer & Naicker, 2023).

What is suggested by the previous is that there is a growing need to start taking asymmetries in value creation and capture seriously, if not within the IP *system*, then within IP *practice*, IP *strategy* and IP *policy*, as any (entrepreneurial) contribution to sustainable development requires systemic support in order to be effective (Dominidiato et al., 2025; Gifford et al., 2021; Magnusson & Werner, 2023; Upward & Jones, 2016). The WIPO does commendable work in

this regard, as do many NGOs, private legal actors and even some governments and corporate entities. Yet academic interest is mostly confined to law and the humanities (Bannerman, 2020; Chon, 2018; Nicholas, 2014; Phillips, 2016; Rahmatian, 2009), even though it is management that most directly interacts with, and bears responsibility for IP issues of this kind.

As a final contribution, this thesis hence reconceptualizes IP as any intangible resource that confers value to corporate, societal or environmental actors, including communities and (collective) intermediaries, who control its access and use by others. Note that this includes many rights and resources that originate in physical resources, such as natural ecosystems. This necessarily means that some of these resources are controlled at the collective level, by local, rural, cultural or ethnic communities who are most directly dependent on the value created and captured and have the strongest moral right when it comes to certain social and environmental resources. As mentioned, this "property" need not be "owned" as such if it can be controlled effectively in terms of access and use (Ostrom et al., 1999; Schlager & Ostrom, 1992).

As mentioned, this conceptualization falls entirely within the scope of the existing IP system, including IP policy and practice, and suggests alterations to its priorities and use more so than to its ontology. However, it is argued here that it is the "effectiveness" criterion that is very often not met. Indeed, societal and environmental actors *do* have rights (IP and otherwise), and can exert control, e.g. through compulsory licenses (Athreye et al., 2023). Yet they often lack power (financial and otherwise) to make effective use of the tools of the IP system to capture value vis-à-vis economic, i.e. corporate, actors (Bustamante et al., 2023; Lüdeke-Freund et al., 2020). This is especially salient where different forms of value are interchangeable, meaning that economic value creation destroys social and/or environmental value or that "value uncaptured" for society and the environment results in economic opportunity costs if it were to be captured through a new value proposition (Yang et al., 2017). As such, power asymmetries between different kinds of actors exacerbate imbalances in terms of value creation and capture (Ritala et al., 2021).

This problem need not be solved through IP. Indeed, there is a need for more extensive, more varied governance than IP alone can supply in order to address power differentials and enable equitable value distribution (Dietz et al., 2003; Ostrom et al., 1999; Ostrom, 2017). Yet IP has potential as a governance mechanism where such mechanisms are currently lacking. Stated at the level of the business model: "the [business model ontology] provides no consideration of the mechanisms by which an organization can consider (on a equal footing) the needs/purposes of actors who have made themselves explicitly known as wishing to be its stakeholders, and those who have not made themselves known but who are affected by the organization" (Upward & Jones, 2016, p.16). Consistently including society and the environment as actors and rights holders within (a firm's or ecosystem's) IP strategy would be one way of making them an equal conversation partner – something that would facilitate not only defense against economic value destruction, but fair use, as well as social and environmental valorization (Lüdeke-Freund et al., 2020).

I therefore argue that including society and the environment not just as stakeholders, who *receive* IP through e.g. transfer of technology from the global north to the global south, but as

rights holders, as sources of IP as well as actors that control it, will be a necessity for an IP practice that is resilient to future developments and paradigmatic shifts in the economic system.

Limitations and future research

Having discussed the main arguments and contributions resulting from this thesis, it is important to note some of its limitations and provide suggestions for future research.

First, while study II sought to explore the development of ventures' IP management over time, access to founding teams as well as practical limitations in terms of time and resources meant that the period during which ventures were studied was shorter, and the amount of interviews undertaken fewer, than would have been ideal if a proper longitudinal study had been conducted. Attempts were made to compensate by performing an especially fine-grained, in-depth analysis of the time covered by the data, showing dynamics at a smaller scope but at a high level of detail. Meanwhile study III relied on cross-sectional data, hence limitations with regard to time were addressed by casting a wide sampling frame and conducting interviews with a broad range of different ventures, countering a limited time horizon with an extensive scope in terms of the value propositions, supply chain positions, technologies and geographic locations studied.

Nevertheless, a limitation that was present in both study II and study III was a focus on western countries in the global north, for study II predominantly Sweden, while study III mostly focused on (western) Europe and the US, with one South-American and three Asian ventures among the sample. While this limitation is common for management research, it means that the transferability of some of the findings is limited to a western context. For study III especially, it was found that ventures from different regions provided important insights on account of their geographic location, suggesting the comprehensiveness of this particular study could have been improved by having a sample which was more equally geographically balanced. However, as it was harder to access ventures outside of Europe and the US, I have attempted to address this gap using secondary material and desk research where possible. Nevertheless, this creates not just an opportunity but a necessity for future research to examine exactly how the IP issues studied manifest in different parts of the world, especially how the north-south division and relations between different regions impact and are impacted by IP.

Second, in order to study processes of new venture creation that were open as well as open-ended, study II and study III focused on digital and sustainable ventures respectively. The benefits of this approach include improved comparability across cases and respondents within each study (Moroz & Hindle, 2012), further enhanced by focusing on a single industry in study III. The downside is that transferability may be limited to contexts that display similar characteristics, whereas certain aspects of open and open-ended processes may have been overlooked due to their lacking prevalence in the contexts under study.

By focusing on two contexts that differed in significant ways while sharing key process characteristics, an attempt was made at improving transferability. Notably, even though openness and open-endedness were a function of opportunity for digital entrepreneurship and necessity for sustainable entrepreneurship, many findings from study II were corroborated in study III and vice versa. This showed how similar processes included similar IP dynamics

despite differences in the origin of their shared characteristics. Nevertheless, differences were also encountered between study II and III, which suggests that additional nuance may be found by studying additional contexts and cases of the same phenomenon.

An interesting extension of not just the process but the content of digital and sustainable entrepreneurship would be to study the role, and indeed the meaning of "intellectual property" in low-powered, traditionally disadvantaged contexts with regard to IP, for instance rural, indigenous and base/bottom of the pyramid, including "jugaad" or "frugal," entrepreneurship (Agarwal et al., 2020; Dana, 2015; Dembek et al., 2020; Elsen & Tietze, 2024; Korsgaard et al., 2026). The meaning of "open and open-ended" in these contexts is likely to shape the process in interesting new ways (Korsgaard et al., 2021; Reypens et al., 2021; Singh et al., 2012), while the concept of "IP" as it has been defined in this thesis will take on a different shape. Unlocking, and empowering actors to make use of their IP to create social, environmental and economic value where it is most needed and least often captured should constitute a vital priority for the future of our global socio-economic system (Macdonald, 2004; Nicholas, 2014; Rahmatian, 2009; Shivarajan & Srinivasan, 2013).

Additionally, a third limitation lies with an empirical focus on early-stage ventures. While this formed the most fruitful setting for the phenomena under study (Eisenhardt, 1989), it limits generalizability and transferability. Notably, I believe that the dual focus on openness and open-endedness provides many opportunities for theoretical transference – even larger and more mature (corporate) settings should recognize (some of) the dynamics described in the appended papers. Many others, however, will likely be unique to settings where decision-makers are low in resources, routines and legitimacy, and hence constrained in their means and capabilities, yet quick and lean in terms of their decision-making.

Finally, opportunities for future research exist that aren't rooted in limitations per se, one of which involves an extension of the dynamics identified in study II. In contextualizing the findings from this study, I and my co-authors drew on business model innovation and effectuation, which provided both a theoretical grounding and an explanation of the concepts and mechanisms identified in **paper II** and **III** respectively. I believe, however, that there are additional opportunities to study how these principles act upon IP management specifically, and to develop theoretical constructs that explicitly account for the nature of IP as opposed to other artifacts, decisions and management priorities. In line with the previously advanced conceptualization of "IP," this entails opportunities to further develop IP as a theoretical construct beyond an empirical phenomenon in order to conceptualize, and problematize, what constitutes "IP" exactly, and hence what its constituent characteristics are and should be.

In relation to this, study III produced a number of suggestions regarding the practice and design of IP in order to promote sustainable entrepreneurship and corporate sustainable development in a broad sense, specifically equal value creation and capture across different realms. In response, I have called for increased use and development of collective IP structures that improve appropriability for low-powered actors and non-actors, including society and the environment (Lüdeke-Freund et al., 2020; Ritala et al., 2021). Based on existing research, the efficacy of patent pledges was stressed, as was the need to conceive of additional structures that are better suited to entrepreneurial ventures and other low-powered actors specifically,

including more equitable, relational contracting to overcome power asymmetries (Zobel & Hagedoorn, 2020). These suggestions are exploratory however, based on limited data and an as of yet limited research agenda. Hence I encourage more research that critically examines how existing institutions, including the IP system, can be used, adapted, designed, supplemented, circumvented and transformed to better enable sustainable innovation and corporate sustainable development in a broader sense (Upward & Jones, 2016).

Finally, having advanced the argument that society and the environment should be able to make use of intellectual ownership rights within the same system as the economic realm, I believe there is significant opportunity for future research in this area in particular. Notably, **paper V** argued that balancing the social, environmental and economic realms in terms of value created and captured requires equal opportunity for each to assert its rights. I believe this is a particularly fruitful area of study in which future research should seek to develop the principles for an IP system that supports a more equitable, sustainable economic paradigm.

REFERENCES

Agarwal, N., Chakrabarti, R., Prabhu, J. C., & Brem, A. (2020). Managing dilemmas of resource mobilization through jugaad: A multi-method study of social enterprises in Indian healthcare. *Strategic Entrepreneurship Journal*, *14*(3), 419-443.

Agogue, M., Lundqvist, M., & Middleton, K. W. (2015). Mindful deviation through combining causation and effectuation: A design theory-based study of technology entrepreneurship. *Creativity and Innovation Management*, *24*(4), 629-644.

Aguinis, H., & Solarino, A. M. (2019). Transparency and replicability in qualitative research: The case of interviews with elite informants. *Strategic Management Journal*, *40*(8), 1291-1315.

Ahuja, G., Lampert, C. M., & Novelli, E. (2013). The second face of appropriability: Generative appropriability and its determinants. *Academy of Management Review*, *38*(2), 248-269.

Al-Aali, A. Y., & Teece, D. J. (2013). Towards the (strategic) management of intellectual property: Retrospective and prospective. *California management review*, *55*(4), 15-30.

Andersson Wänström, A., Hjelmgren, D., Landqvist, M., & Lind, F. (2025). Exploring renting models for clothing items–resource interaction for value creation. *Journal of business & industrial marketing*, *40*(6), 1439-1450.

Argyrou, A., & Hummels, H. (2019). Legal personality and economic livelihood of the Whanganui River: a call for community entrepreneurship. *Water International*, *44*(6-7), 752-768.

Arundel, A. (2001). The relative effectiveness of patents and secrecy for appropriation. *Research policy*, *30*(4), 611-624.

Athreye, S. S., Fassio, C., & Roper, S. (2021). Small firms and patenting revisited. *Small Business Economics*, *57*, 513-530.

Athreye, S., Kathuria, V., Martelli, A., & Piscitello, L. (2023). Intellectual property rights and the international transfer of climate change mitigating technologies. *Research Policy*, *52*(9), 104819.

Audretsch, D. B., Bönte, W., & Mahagaonkar, P. (2012). Financial signaling by innovative nascent ventures: The relevance of patents and prototypes. *Research Policy*, *41*(8), 1407-1421.

Audretsch, D., Colombelli, A., Grilli, L., Minola, T., & Rasmussen, E. (2020). Innovative start-ups and policy initiatives. *Research Policy*, *49*(10), 104027.

Alves, A.D.V. (2024). WIPO's New Treaty on Intellectual Property, Genetic Resources and Traditional Knowledge – A Turning Point for Indigenous Heritage?, *ESIL Reflections*, 13:11.

Bannerman, S. (2020). The World Intellectual Property Organization and the sustainable development agenda. *Futures*, *122*, 102586.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99-120.

Berglund, H., Bousfiha, M., & Mansoori, Y. (2020). Opportunities as artifacts and entrepreneurship as design. *Academy of Management Review*, *45*(4), 825-846.

Berglund, H., & Glaser, V. L. (2022). The artifacts of entrepreneurial practice. *Research handbook on entrepreneurship as practice*, 168-186.

Blind, K., Edler, J., Frietsch, R., & Schmoch, U. (2006). Motives to patent: Empirical evidence from Germany. *Research policy*, *35*(5), 655-672.

Bocken, N. M., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of cleaner production*, *65*, 42-56.

Bocken, N. M., & Short, S. W. (2016). Towards a sufficiency-driven business model: Experiences and opportunities. *Environmental innovation and societal transitions*, *18*, 41-61.

Bogers, M. (2011). The open innovation paradox: knowledge sharing and protection in R&D collaborations. *European journal of innovation Management*, *14*(1), 93-117.

Bogers, M., Chesbrough, H., & Strand, R. (2020). Sustainable open innovation to address a grand challenge: Lessons from Carlsberg and the Green Fiber Bottle. *British Food Journal*, *122*(5), 1505-1517.

Bryman, A., & Bell, E. (2007). *Business research methods* (2nd ed.). Oxford University Press.

Bustamante, J., Oughton, C., Pesque-Cela, V., & Tobin, D. (2023). Resolving the patents paradox in the era of COVID-19 and climate change: Towards a patents taxonomy. *Research Policy*, *52*(9), 104850.

Caccamo, M., Pittino, D., & Tell, F. (2023). Boundary objects, knowledge integration, and innovation management: A systematic review of the literature. *Technovation*, *122*, 102645.

Candelin-Palmqvist, H., Sandberg, B., & Mylly, U. M. (2012). Intellectual property rights in innovation management research: A review. *Technovation*, *32*(9-10), 502-512.

Carlile, P. R. (2002). A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organization science*, *13*(4), 442-455.

Ceccagnoli, M. (2009). Appropriability, preemption, and firm performance. *Strategic Management Journal*, *30*(1), 81-98.

Chesbrough, H. (2003). The logic of open innovation: managing intellectual property. *California management review*, *45*(3), 33-58.

Chesbrough, H. (2020). To recover faster from Covid-19, open up: Managerial implications from an open innovation perspective. *Industrial Marketing Management*, *88*, 410-413.

Chon, M. (2018). Recasting intellectual property in light of the UN sustainable development goals: toward global knowledge governance. *Am. U. Int'l L. Rev.*, *34*, 763.

Cohen, W. M., Nelson, R., & Walsh, J. P. (2000). Protecting their intellectual assets: Appropriability conditions and why US manufacturing firms patent (or not).

Conley, J. G., Bican, P. M., & Ernst, H. (2013). Value articulation: a framework for the strategic management of intellectual property. *California Management Review*, *55*(4), 102-120.

Conti, A., Thursby, J., & Thursby, M. (2013). Patents as signals for startup financing. *The Journal of Industrial Economics*, *61*(3), 592-622.

Contreras, J. L., Eisen, M., Ganz, A., Lemley, M., Molloy, J., Peters, D. M., & Tietze, F. (2020). Pledging intellectual property for COVID-19. *Nature Biotechnology*, *38*(10), 1146-1149.

Dana, L. P. (2015). Indigenous entrepreneurship: An emerging field of research. *International Journal of Business and Globalisation*, *14*(2), 158-169.

Davidsson, P., & Gruenhagen, J. H. (2021). Fulfilling the process promise: A review and agenda for new venture creation process research. *Entrepreneurship Theory and Practice*, *45*(5), 1083-1118.

Davies, I. A., & Chambers, L. (2018). Integrating hybridity and business model theory in sustainable entrepreneurship. *Journal of Cleaner Production*, *177*, 378-386.

De Rassenfosse, G., & Palangkaraya, A. (2023). Do patent pledges accelerate innovation?. *Research Policy*, *52*(5), 104745.

Dembek, K., Sivasubramaniam, N., & Chmielewski, D. A. (2020). A systematic review of the bottom/base of the pyramid literature: Cumulative evidence and future directions. *Journal of Business Ethics*, *165*(3), 365-382.

Demil, B., & Lecocq, X. (2010). Business model evolution: In search of dynamic consistency. *Long range planning*, *43*(2-3), 227-246.

Dew, N., Read, S., Sarasvathy, S. D., & Wiltbank, R. (2009). Effectual versus predictive logics in entrepreneurial decision-making: Differences between experts and novices. *Journal of business venturing*, *24*(4), 287-309.

Dietz, T., Ostrom, E., & Stern, P. C. (2003). The struggle to govern the commons. *science*, *302*(5652), 1907-1912.

Dominidiato, M., Hjelmgren, D., & Lind, F. (2025). Towards a circular economy through collaborative product development in business relationships: a case study in the denim industry. *Journal of business & industrial marketing*, *40*(13), 186-198.

Doyle, Arthur Conan. The Valley of Fear. New York: George H. Doran Company; 1914.

Edvinsson, L. (1997). Developing intellectual capital at Skandia. *Long range planning*, *30*(3), 366-373.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, *14*(4), 532-550.

Elsen, M., & Tietze, F. (2024). Contributions from low-and middle-income countries to the development of climate change adaptation technologies: A patent analysis. *Technological Forecasting and Social Change*, *209*, 123660.

Eppinger, E., Jain, A., Vimalnath, P., Gurtoo, A., Tietze, F., & Chea, R. H. (2021). Sustainability transitions in manufacturing: the role of intellectual property. *Current Opinion in Environmental Sustainability*, *49*, 118-126.

Eppinger, E., & Vladova, G. (2013). Intellectual property management practices at small and medium-sized enterprises. *International Journal of Technology Management 11*, *61*(1), 64-81.

Fisher III, W. W., & Oberholzer-Gee, F. (2013). Strategic management of intellectual property: an integrated approach. *California management review*, *55*(4), 157-183

Gambardella, A. (2023). Private and social functions of patents: Innovation, markets, and new firms. *Research Policy*, *52*(7), 104806.

Garud, R., Jain, S., & Tuertscher, P. (2008). Incomplete by design and designing for incompleteness. *Organization studies*, *29*(3), 351-371.

Garud, R., Kumaraswamy, A., & Karnøe, P. (2010). Path dependence or path creation?. *Journal of management studies*, *47*(4), 760-774.

Garud, R., & Giuliani, A. P. (2013). A narrative perspective on entrepreneurial opportunities. *Academy of Management Review*, *38*(1), 157-160.

Garud, R., Gehman, J., & Giuliani, A. P. (2014a). Contextualizing entrepreneurial innovation: A narrative perspective. *Research policy*, *43*(7), 1177-1188.

Garud, R., Schildt, H. A., & Lant, T. K. (2014b). Entrepreneurial storytelling, future expectations, and the paradox of legitimacy. *Organization science*, *25*(5), 1479-1492.

Gifford, E., McKelvey, M., & Saemundsson, R. (2021). The evolution of knowledge-intensive innovation ecosystems: Co-evolving entrepreneurial activity and innovation policy in the West Swedish maritime system. *Industry and Innovation*, *28*(5), 651-676.

Gimenez-Fernandez, E. M., Sandulli, F. D., & Bogers, M. (2020). Unpacking liabilities of newness and smallness in innovative start-ups: Investigating the differences in innovation performance between new and older small firms. *Research policy*, *49*(10), 104049.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational research methods*, *16*(1), 15-31.

Glaser, B. G. (2016). Open coding descriptions. *Grounded theory review*, *15*(2), 108-110.

Granstrand, O. (1999). The economics and management of intellectual property: Towards intellectual capitalism. In *The Economics and Management of Intellectual Property*. Edward Elgar Publishing.

Grindley, P. C., & Teece, D. J. (1997). Managing intellectual capital: licensing and cross-licensing in semiconductors and electronics. *California management review*, *39*(2), 8-41.

Gupta, V. K., Chiles, T. H., & McMullen, J. S. (2016). A process perspective on evaluating and conducting effectual entrepreneurship research. *Academy of Management Review*, *41*(3), 540-544.

Hahn, T., Figge, F., Pinkse, J., & Preuss, L. (2018). A paradox perspective on corporate sustainability: Descriptive, instrumental, and normative aspects. *Journal of business ethics*, *148*(2), 235-248.

Hall, B., Helmers, C., Rogers, M., & Sena, V. (2014). The choice between formal and informal intellectual property: a review. *Journal of Economic Literature*, *52*(2), 375-423.

Hall, B. H., & Ziedonis, R. H. (2001). The patent paradox revisited: an empirical study of patenting in the US semiconductor industry, 1979-1995. *rand Journal of Economics*, 101-128.

Hanel, P. (2006). Intellectual property rights business management practices: A survey of the literature. *Technovation*, *26*(8), 895-931.

Hannah, D. R. (2005). Should I keep a secret? The effects of trade secret protection procedures on employees' obligations to protect trade secrets. *Organization science*, *16*(1), 71-84.

Heidemann Lassen, A., Ljungberg, D., & McKelvey, M. (2020). Promoting future sustainable transition by overcoming the openness paradox in KIE firms. *Sustainability*, *12*(24), 10567.

Henkel, J., Baldwin, C. Y., & Shih, W. (2013). IP modularity: Profiting from innovation by aligning product architecture with intellectual property. *California management review*, *55*(4), 65-82.

Hernández-Chea, R., Vimalnath, P., Bocken, N., Tietze, F., & Eppinger, E. (2020). Integrating intellectual property and sustainable business models: The SBM-IP canvas. *Sustainability*, *12*(21), 8871.

Hess, C., and E. Ostrom. 2007. “Introduction: An Overview of the Knowledge Common.” In Understanding Knowledge as Commons, edited by C. Hess and E. Ostrom, 3–26. Cambridge, MA: MIT Pres.

Hillman, K., Nilsson, M., Rickne, A., & Magnusson, T. (2011). Fostering sustainable technologies: a framework for analysing the governance of innovation systems. *Science and Public Policy*, *38*(5), 403-415.

Hirschmann, M., & Block, J. H. (2022). Trademarks and how they relate to the sustainability and economic outcomes of social startups. *Journal of cleaner production*, *376*, 134320.

Holgersson, M. (2013). Patent management in entrepreneurial SMEs: a literature review and an empirical study of innovation appropriation, patent propensity, and motives. *R&d Management*, *43*(1), 21-36.

Holgersson, M., & Granstrand, O. (2017). Patenting motives, technology strategies, and open innovation. *Management Decision*, *55*(6), 1265-1284.

Holgersson, M., Granstrand, O., & Bogers, M. (2018). The evolution of intellectual property strategy in innovation ecosystems: Uncovering complementary and substitute appropriability regimes. *Long Range Planning*, *51*(2), 303-319.

Holgersson, M., & Granstrand, O. (2022). Value capture in open innovation markets: The role of patent rights for innovation appropriation. *European Journal of Innovation Management*, *25*(6), 320-339.

Holgersson, M., & van Santen, S. (2018). The business of intellectual property: a literature review of IP management research. *Stockholm Intellectual Property Law Review*, *1*(1), 44-63.

Holgersson, M., & Wallin, M. W. (2017). The patent management trichotomy: patenting, publishing, and secrecy. *Management Decision*, *55*(6), 1087-1099.

Hummels, H., & Argyrou, A. (2021). Planetary demands: Redefining sustainable development and sustainable entrepreneurship. *Journal of Cleaner Production*, *278*, 123804.

Hurmelinna-Laukkanen, P., & Yang, J. (2022). Distinguishing between appropriability and appropriation: A systematic review and a renewed conceptual framing. *Research Policy*, *51*(1), 104417.

Isil, O., & Hernke, M. T. (2017). The triple bottom line: A critical review from a transdisciplinary perspective. *Business strategy and the environment*, *26*(8), 1235-1251.

Jain, A., Gurtoo, A., Eppinger, E., Vimalnath, P., & Tietze, F. (2024). Exploring the interplay between intellectual property models and sustainability transitions: A multi-level analysis. *Business Strategy and the Environment*, *33*(7), 7321-7351.

Jiang, Y., & Rüling, C. C. (2019). Opening the black box of effectuation processes: Characteristics and dominant types. *Entrepreneurship Theory and Practice*, *43*(1), 171-202.

Jiang, Y., & Tornikoski, E. T. (2019). Perceived uncertainty and behavioral logic: Temporality and unanticipated consequences in the new venture creation process. *Journal of Business Venturing*, *34*(1), 23-40.

Johnsen, C. G., & Holt, R. (2023). Narrating the facets of time in entrepreneurial action. *Entrepreneurship Theory and Practice*, *47*(2), 613-627.

Kasana, S., Chavan, M., Sedera, D., Cheng, Z., & Ganzin, M. (2024). Unlocking circular start-ups: A model of barriers. *Business strategy and the environment*, *33*(3), 2546-2577.

Koller, S., Stephan, U., & Ahmetoglu, G. (2022). Ecological rationality and entrepreneurship: How entrepreneurs fit decision logics to decision content and structure. *Journal of Business Venturing*, *37*(4), 106221.

Korsgaard, S., Müller, S., & Welter, F. (2021). It's right nearby: How entrepreneurs use spatial bricolage to overcome resource constraints. *Entrepreneurship & regional development*, *33*(1-2), 147-173.

Korsgaard, S., Bosworth, G., & Gaddefors, J. (2026). Entrepreneurship for the rural? A reflection on rural entrepreneurship in a time of multi-crisis: Korsgaard et al. *Small Business Economics*, 1-21.

Laasch, O. (2018). Beyond the purely commercial business model: Organizational value logics and the heterogeneity of sustainability business models. *Long range planning*, *51*(1), 158-183.

Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management review*, *24*(4), 691-710.

Levin, R. C., Klevorick, A. K., Nelson, R. R., Winter, S. G., Gilbert, R., & Griliches, Z. (1987). Appropriating the returns from industrial research and development. *Brookings papers on economic activity*, *1987*(3), 783-831.

Linder, M., Björkdahl, J., & Ljungberg, D. (2014). Environmental orientation and economic performance: A quasi-experimental study of small Swedish firms. *Business Strategy and the Environment*, *23*(5), 333-348.

Lounsbury, M., & Glynn, M. A. (2001). Cultural entrepreneurship: Stories, legitimacy, and the acquisition of resources. *Strategic management journal*, *22*(6-7), 545-564.

Lüdeke-Freund, F. (2020). Sustainable entrepreneurship, innovation, and business models: Integrative framework and propositions for future research. *Business Strategy and the Environment*, *29*(2), 665-681.

Lüdeke-Freund, F., Rauter, R., Pedersen, E. R. G., & Nielsen, C. (2020). Sustainable value creation through business models: The what, the who and the how. *Journal of Business Models*, *8*(3), 62-90.

Macdonald, S. (2004). When means become ends: considering the impact of patent strategy on innovation. *Information Economics and Policy*, *16*(1), 135-158.

Magnusson, T., & Werner, V. (2023). Conceptualisations of incumbent firms in sustainability transitions: Insights from organisation theory and a systematic literature review. *Business Strategy and the Environment*, *32*(2), 903-919.

Manzini, R., & Lazzarotti, V. (2016). Intellectual property protection mechanisms in collaborative new product development. *R&D Management*, *46*(S2), 579-595.

Massa, L., & Tucci, C. L. (2013). Business model innovation. *The Oxford handbook of innovation management*, *20*(18), 420-441.

McGahan, A. M., Bogers, M. L., Chesbrough, H., & Holgersson, M. (2021). Tackling societal challenges with open innovation. *California Management Review*, *63*(2), 49-61.

McGrath, R. G. (2010). Business models: A discovery driven approach. *Long range planning*, *43*(2-3), 247-261.

McKinsey & Company and Global Fashion Agenda, “Fashion on Climate,” (2020) retrieved from https://www.mckinsey.com/industries/retail/our-insights/fashion-on-climate

Meyer, C., & Naicker, K. (2023). Collective intellectual property of Indigenous peoples and local communities: Exploring power asymmetries in the rooibos geographical indication and industry-wide benefit-sharing agreement. *Research Policy*, *52*(9), 104851.

Miric, M., Boudreau, K. J., & Jeppesen, L. B. (2019). Protecting their digital assets: The use of formal & informal appropriability strategies by app developers. *Research Policy*, *48*(8), 103738.

Morales, P., Flikkema, M., Castaldi, C., & de Man, A. P. (2022). The effectiveness of appropriation mechanisms for sustainable innovations from small and medium-sized enterprises. *Journal of Cleaner Production*, *374*, 133921.

Morales, P., Flikkema, M., Castaldi, C., & de Man, A. P. (2023). Why use or forgo formal and informal appropriation mechanisms? A qualitative study of sustainable innovations from small- and medium-sized enterprises. *Business Strategy and the Environment*.

Moroz, P. W., & Hindle, K. (2012). Entrepreneurship as a process: Toward harmonizing multiple perspectives. *Entrepreneurship theory and Practice*, *36*(4), 781-818.

Muñoz, P., & Cohen, B. (2018). Sustainable entrepreneurship research: Taking stock and looking ahead. *Business Strategy and the Environment*, *27*(3), 300-322.

Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship theory and practice*, *41*(6), 1029-1055.

Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital innovation management. *MIS quarterly*, *41*(1), 223-238.

Nicholas, G. (2014). Indigenous cultural heritage in the age of technological reproducibility: Towards a postcolonial ethic of the public domain. *Dynamic fair dealing: Creating Canadian culture online*, 213-224.

Olander, H., Vanhala, M., & Hurmelinna-Laukkanen, P. (2014). Reasons for choosing mechanisms to protect knowledge and innovations. *Management Decision*, *52*(2), 207-229.

O'Mahony, S. (2003). Guarding the commons: how community managed software projects protect their work. *Research policy*, *32*(7), 1179-1198.

Ooms, W., & Piepenbrink, R. (2021). Open innovation for wicked problems: Using proximity to overcome barriers. *California Management Review*, *63*(2), 62-100.

Ostrom, E., Burger, J., Field, C. B., Norgaard, R. B., & Policansky, D. (1999). Revisiting the commons: local lessons, global challenges. *science*, *284*(5412), 278-282.

Ostrom, E. (2017). Polycentric systems for coping with collective action and global environmental change. In *Global justice* (pp. 423-430). Routledge.

Phillips, F. K. (2016). Intellectual property rights in traditional knowledge: enabler of sustainable development. *Utrecht J. Int'l & Eur. L.*, *32*, 1.

Pihlajarinne, T., & Ballardini, R. M. (2020). Paving the way for the environment: channelling 'strong'sustainability into the European IP system. *European Intellectual Property Review*, *42*(4), 239-250.

Radziwon, A., Bogers, M. L., Chesbrough, H., & Minssen, T. (2022). Ecosystem effectuation: creating new value through open innovation during a pandemic. *R&D Management*, *52*(2), 376-390.

Rahmatian, A. (2009). Neo-colonial aspects of global intellectual property protection. *The Journal of World Intellectual Property*, *12*(1), 40-74.

Reitzig, M. (2004). Strategic management of intellectual property. *MIT Sloan Management Review*.

Reitzig, M. (2007). How executives can enhance IP strategy and performance. *MIT Sloan management review*.

Reymen, I. M., Andries, P., Berends, H., Mauer, R., Stephan, U., & Van Burg, E. (2015). Understanding dynamics of strategic decision making in venture creation: a process study of effectuation and causation. *Strategic entrepreneurship journal*, *9*(4), 351-379.

Reypens, L., Bacq, S., & Milanov, H. (2021). Beyond bricolage: Early-stage technology venture resource mobilization in resource-scarce contexts. *Journal of Business Venturing*, *36*(4), 106110.

Ritala, P., Albareda, L., & Bocken, N. (2021). Value creation and appropriation in economic, social, and environmental domains: Recognizing and resolving the institutionalized asymmetries. *Journal of Cleaner Production*, *290*, 125796.

Rivette, K. G., & Kline, D. (2000). *Rembrandts in the attic: Unlocking the hidden value of patents*. Harvard Business Press.

Saemundsson, R. J., & Candi, M. (2017). Absorptive capacity and the identification of opportunities in new technology-based firms. *Technovation*, *64*, 43-49.

Saldaña J. *The coding manual for qualitative researchers*. 2nd ed. Los Angeles, CA: SAGE, 2013.

Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of management Review*, *26*(2), 243-263.

Sarasvathy, S. D. (2003). Entrepreneurship as a science of the artificial. *Journal of Economic Psychology*, *24*(2), 203-220.

Sarasvathy, S. D. (2004). Making it happen: Beyond theories of the firm to theories of firm design. *Entrepreneurship Theory and practice*, *28*(6), 519-531.

Sarasvathy, S. D., & Dew, N. (2005). New market creation through transformation. *Journal of evolutionary economics*, *15*, 533-565.

Sarasvathy, S. D. (2021). Ask for it: A practice based theory of venturing design. *Journal of Business Venturing Design*, *1*(1-2), 100008.

Sarasvathy, S. (2023). Questions worth asking for futures worth making: an effectual approach. *Small Business Economics*, *61*(1), 11-21.

Sarasvathy, S. D., & Ramesh, A. (2019). An effectual model of collective action for addressing sustainability challenges. *Academy of management perspectives*, *33*(4), 405-424.

Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: categories and interactions. *Business strategy and the environment*, *20*(4), 222-237.

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2016). Business models for sustainability: A co-evolutionary analysis of sustainable entrepreneurship, innovation, and transformation. *Organization & environment*, *29*(3), 264-289.

Schlager, E., & Ostrom, E. (1992). Property-rights regimes and natural resources: a conceptual analysis. *Land economics*, 249-262.

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of management review*, *25*(1), 217-226.

Shivarajan, S., & Srinivasan, A. (2013). The poor as suppliers of intellectual property: A social network approach to sustainable poverty alleviation. *Business Ethics Quarterly*, *23*(3), 381-406.

Singh, R., Gupta, V., & Mondal, A. (2012). Jugaad—From 'Making Do'and 'Quick Fix'to an innovative, sustainable and low-cost survival strategy at the bottom of the pyramid. *International Journal of Rural Management*, *8*(1-2), 87-105.

Smolka, K. M., Verheul, I., Burmeister–Lamp, K., & Heugens, P. P. (2018). Get it together! Synergistic effects of causal and effectual decision–making logics on venture performance. *Entrepreneurship Theory and Practice*, *42*(4), 571-604.

Somaya, D., Teece, D., & Wakeman, S. (2011). Innovation in multi-invention contexts: Mapping solutions to technological and intellectual property complexity. *California Management Review*, *53*(4), 47-79.

Somaya, D. (2012). Patent strategy and management: An integrative review and research agenda. *Journal of management*, *38*(4), 1084-1114.

Soranzo, B., Nosella, A., & Filippini, R. (2017). Redesigning patent management process: an Action Research study. *Management Decision*, *55*(6), 1100-1121.

Spender, J. C., Corvello, V., Grimaldi, M., & Rippa, P. (2017). Startups and open innovation: a review of the literature. *European Journal of Innovation Management*, *20*(1), 4-30.

Strauss, A., & Corbin, J. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (3rd Ed.). Thousand Oaks, London, New Delhi: SAGE Publications.

Stubbs, W., & Cocklin, C. (2008). Conceptualizing a "sustainability business model". *Organization & environment*, *21*(2), 103-127.

Sydow, J., Schreyögg, G., & Koch, J. (2009). Organizational path dependence: Opening the black box. *Academy of management review*, *34*(4), 689-709.

Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research policy*, *15*(6), 285-305.

Teece, D. J. (2010). Business models, business strategy and innovation. *Long range planning*, *43*(2-3), 172-194.

Teece, David J. (2018). Profiting from innovation in the digital economy: standards,

complementary assets, and business models in the wireless world. *Research Policy 47*(8), 1367–1387.

Thomä, J., & Bizer, K. (2013). To protect or not to protect? Modes of appropriability in the small enterprise sector. *Research Policy*, *42*(1), 35-49.

Upward, A., & Jones, P. (2016). An ontology for strongly sustainable business models: Defining an enterprise framework compatible with natural and social science. *Organization & Environment*, *29*(1), 97-123.

Veugelers, R., & Schneider, C. (2018). Which IP strategies do young highly innovative firms choose?. *Small Business Economics*, *50*(1), 113-129.

Vimalnath, P., Tietze, F., Jain, A., Gurtoo, A., Eppinger, E., & Elsen, M. (2022). Intellectual property strategies for green innovations-An analysis of the European Inventor Awards. *Journal of Cleaner Production*, *377*, 134325.

Weick, K. E., & Weick, K. E. (1995). *Sensemaking in organizations* (Vol. 3, No. 10.1002). Thousand Oaks, CA: Sage publications.

Williams Middleton, K. L. (2013). Becoming entrepreneurial: gaining legitimacy in the nascent phase. *International Journal of Entrepreneurial Behavior & Research*, *19*(4), 404-424.

Williamson, O. E. (1981). The economics of organization: The transaction cost approach. *American journal of sociology*, *87*(3), 548-577.

WIPO (2025). What is Intellectual Property? https://www.wipo.int/en/web/about-ip [Accessed on 28 September 2025.]

Yang, M., Evans, S., Vladimirova, D., & Rana, P. (2017). Value uncaptured perspective for sustainable business model innovation. *Journal of Cleaner Production*, *140*, 1794-1804.

Yin, R. K. (2009). *Case study research: Design and methods* (Vol. 5). Sage.

Yoo, Y., Boland Jr, R. J., Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization science*, *23*(5), 1398-1408.

Zobel, A. K., Balsmeier, B., & Chesbrough, H. (2016). Does patenting help or hinder open innovation? Evidence from new entrants in the solar industry. *Industrial and Corporate Change*, *25*(2), 307-331.

Zobel, A. K., Lokshin, B., & Hagedoorn, J. (2017). Formal and informal appropriation mechanisms: The role of openness and innovativeness. *Technovation*, *59*, 44-54.

Zobel, A. K., & Hagedoorn, J. (2020). Implications of open innovation for organizational boundaries and the governance of contractual relations. *Academy of Management Perspectives*, *34*(3), 400-423.

Zobel, A. K., & Comello, S. (2025). Striking a Balance: Navigating Tensions Between Collective and Member Goals in Boundary Organizations. *Organization Science*, *36*(6), 2185-2209.

APPENDICES

Appendix A. Topic List Study I

1. Introduction
Introduce yourself and the research **1a. Respondent's basic info** Can you briefly introduce yourself? > Role in the company > Background (if at all mentioned) **1b. Organization** Can you tell us a little bit about your organization? > How did it come into existence? > How did it develop until this point? **1c. Business model** What does your organization *do* precisely? (how does it create value, how does it capture value, where do revenue streams come from) *(may organically supply 'why')*
2. Antecedents
Why and how did you make the decisions involved in the development of your venture's IP strategy? **2a. Timeline** When did you first start considering making decision X, Y, Z? *(refer back to development until this point)* Why? Which considerations did you initially take into account? > What were the deciding considerations/reasons in your decision process? *(why, what was their relative significance)* > Who (which actors) played a role, who did you consult? > How did you reckon your decision would influence your business (model)? *(probe if relevant)* > Which external actors (in your environment) did you consider in your reasoning? Which technologies and innovations played a role? *(competitors, network partners)* How did your thoughts on the subject evolve? > What happened to your initial considerations? (did they remain valid, did prior considerations change or did new considerations emerge?) > Who/what informed your thinking? > How did your thoughts surrounding your business (model) evolve?

> What role did external actors, technologies and innovations (and your positioning with regard to these) play with regard to your decision?
3. Impact
Insofar that the consequences of your decisions have become apparent, we'd like to discuss the consequences of your decision for your business… **3a. Business model & strategy** Has this decision impacted your business model and organization's strategy? If so how? > Which elements of your business have been impacted? > What part of this was intended/expected? **3b. Ecosystem** How did your decision impact your collaboration and/or competition with other actors? And how did it impact the development and interdependencies with complementary and/or substitute technologies or innovations? **3c. Serendipitous outcomes** What other, unforeseen, impact from your decision have you experienced? **3d. Planning** Did the decision have the anticipated consequences? > Was your thinking about the decision accurate in hindsight?
4. Wind-down
4a. Wrap-up Anything relevant left unsaid? Was everything clear? **Thank for cooperation, introduce follow-up**

Appendix B. Topic List Study II

1. Introduction
Introduce yourself and the research **1a. Respondent background** Can you briefly introduce yourself? > Role in the company > Background **1b. Venture and value proposition** Can you tell me a little bit about your venture? > What motivated you into founding this venture? > What assets/contacts did you start out with? > What sustainability issue is your venture trying to address? **1c. Technology and IP** > What do you consider to be your venture's IP? > What technology is your venture based on? > What steps have you taken to protect it? > What other kinds of IP (rights, assets, mechanisms) does your company control? **1d. Stakeholders** What stakeholders are/have been relevant to your venture? (*refer back to actors mentioned in previous answers + partners listed in publications*) > What kind of partners have been important to you in your development? > What has your interaction with your partners been like? > Who interacts/is meant to interact with your IP? > How have your relationships shaped the choices you made regarding IP?
2. IP decisions / knowledge sharing and protecting
Ideally, your innovation would of course be adopted by everyone, but there may be reasons why this is not (currently) possible… **2a. IP decisions** > What reasons did you have for taking the IP decisions your venture took? > Did you consider whether this would promote or hinder the spread of your innovation? > What would have been the argument *not* to take IP? **2b. Tensions** > In what ways does your IP contribute to the spread of your innovation? > In what ways does your IP hinder the spread of your innovation? > Do you ever experience any tensions or trade-offs between the protection and sharing of your innovation? > How do you resolve those? (*why?*)

> What role, if any, does IP play in this? (*if mentioned/hinted in conversation*) Have you considered sharing/waiving/pledging/open sourcing your IP and why/why not?
3. Wind-down
3a. Wrap-up Anything relevant left unsaid? Was everything clear? **Thank for cooperation, request follow-up**