ENTREPRENEURIAL ECOSYSTEMS AND INNOVATION-BASED PERFORMANCE ADVANCEMENT

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"Creativity is thinking up new things, Innovation is doing new things" – Theodore Levitt

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List of abbreviations

AI	Artificial Intelligence
BM	Business model
R&D	Research and development
SME	Small and medium-sized enterprise

1. Introduction

In a constantly changing environment, full of uncertainty (Knight, 1921b; McMullen & Shepherd, 2006), there are individuals willing to dare; they take risks and try something new (Say, 1803). They are open to be challenged and are certain that their decisions will lead to success for their endeavors. These people are referred to as entrepreneurs. Even with differentiated definitions of the term entrepreneur over time, it is commonly stated both in the academic and business world, that entrepreneurs are the motor of recent economic advancement and by that, they create opportunities and change the habits of entire societies (Schumpeter, 1934).

Around 1730 Cantillon first introduced the term entrepreneur as a person "willing to buy at a certain price and to sell at an uncertain price" (see translation in Cantillon, 1931). Decades later, Schumpeter (1934, p.65) presented his work on the difference between innovation and invention and introduces a more conceptual process of entrepreneurship, arguing that entrepreneurship consists of creating innovations, making the active and individual creation of innovations and the "new combination of resources […] the actual activity of the entrepreneur" with risk just being a part and not the essential trade of an entrepreneur. In the 1930s, the world was far from globalized (digital) markets, and the international competition leading to the high level of uncertainty we see in today's economic markets. Still, in the literature the entrepreneur stood out as the proactive risk taker that we still associate with the term today.

The willingness to take risk is just one trait that differentiates an entrepreneur from a regular small business owner. In line with Garland et al. (1984) or Steward et al. (1998) the traditional small business owner sets out to secure an income to fulfill personal needs, put food on the table and a roof over the head of the individual and close family, the goal being to achieve personal security and comfort with the generated income. Entrepreneurs see the bigger picture and have a larger motivation to create something groundbreaking, often innovative and large in scale to benefit not the individual but a larger group of people or even humankind. While the small business owner works within existing markets, entrepreneurs are inventors and can create new markets and demands, customers did not even know they had. Using a digital map instead of paper navigation or ordering groceries right to our door step are just two examples how entrepreneurs change the way we live our everyday lives.

Scholars researched the individual entrepreneur, their individual abilities and business decisions. Entrepreneurs were found to have all kinds of outstanding abilities, such as the ability to identify and utilize opportunities (Kirzner, 1978); they seek innovations, open new markets, introduce new goods or methods of production (Kirzner, 1978; Swedberg, 2002). This can be rooted in Drucker's Theory of Entrepreneurship (1985), which investigates the entrepreneurial exploration of opportunity, building on Jean Baptiste Say's understanding (1834) of the entrepreneur as "economic agent" who "shifts economic resources out of an area of lower and into an area of higher productivity and greater yield" as cited in Dees (1998). For Drucker (1985) "the entrepreneur always searches for change, responds to it, and exploits

it as an opportunity". In this way, entrepreneurship can be understood more as a dynamic, open and ongoing active process as opposed to a closed static concept.

In retrospect, Friedrich von Hayek (1945), right at the time of the Second World War, contributed to the literature with his important findings around knowledge, emphasizing the importance for entrepreneurs to have practical knowledge from experience as opposed to explicit knowledge gained from documented information for example found in books. According to Hayek, the wise allocation of often scarce resources requires knowledge that is spread among different people, not one individual. With this take on the importance of collective intelligence for entrepreneurs, Hayek stressed the value of context and networks long before this was introduced to the entrepreneurship literature.

The academic discussion on entrepreneurship later moves away from the isolated individual entrepreneur to a more holistic, interconnected and interdependent view of entrepreneurship. This aerial perspective is embedded in the literature around entrepreneurial ecosystems (Stam & Spigel, 2016) investigating the effect of the external environment on entrepreneurs and the performance of their new entrepreneurial ventures (Acs et al., 2014; Aldrich & Fiol, 1994; Anderson et al., 2007; Bates et al., 2007).

This dissertation and its three underlying manuscripts aim to address different angels of the academic understanding of entrepreneurship to contribute to a more rounded and interlinked understanding of different aspects in the field. Figure one illustrates the interrelation between the manuscripts focusing on the various angles. The dissertation over time builds up different layers of research from the individual entrepreneur and the individual new venture to the overall entrepreneurial ecosystem and the interconnected stakeholders in them.

Following a call for more investigations on the competitive advantages of SMEs (Irwin et al., 2018), paper one quantitatively investigates innovation and technology orientation as drivers for performance on a new venture level and contributes to the literature around market performance. The results prove the positive effect of innovation and technology orientation on market performance and confirm the negative effect of uncertainty in the decision-making environment.

Building on these findings, we undertake two additional research activities to better understand how entrepreneurs can cope with uncertainty. Advancing the literature stream around entrepreneurial ecosystems, the second paper investigates the applied entrepreneurial mechanisms in the for entrepreneurial ecosystems successful geographical region of the Nordics. The Nordic countries, namely Denmark, Finland, Iceland, Norway and Sweden as economic successes produced the largest number of new ventures with a valuation over one billion dollars (unicorns) within the European continent. Besides this economic success, the Nordics at the same time are known in cultural terms for their powerful multi-country collaborations and human-centered positive culture, reflected by their continued leading positions on the World Happiness Index. Based on qualitative expert interviews the paper introduces a three-phased talent transformation process as a key factor of a flourishing

entrepreneurial ecosystem. An ecosystem with talent transformation structures in place acts as multi-level and circuit support system for the individual entrepreneur and positively influences the decisions of the individual entrepreneur and therefore the overall development of the new entrepreneurial ventures, leading to more added jobs to the market and taxes paid to the respective regional governments.

The third manuscript addresses dynamic reasoning and investigates two specific and contrasting decision-making logics in terms of their combined and parallel effects. These logics are called effectuation and causation, which are both commonly applied by entrepreneurs in the uncertain context of new entrepreneurial venture. In line with our second manuscript, the paper also confirms the importance of zooming out to appropriately factor in the influence of the external environment on internal decisions. Manuscript 3 discovers that the appropriate choice of decision-making logic is not only influenced by factors inside the venture or associated to the individual entrepreneur, but by the level of overall ecosystem support that the individual receives. Ecosystem support could in this case, for example, be the perceived support for entrepreneurs by national governments, business associations, or in the educational system.

The findings suggest that in environments with high ecosystem support, the situation-appropriate application of different decision-making logics—both experimental and analytical—can positively influence the market performance of the new entrepreneurial venture. When ecosystem support is low, causation as a more analytical and traditional approach to decision making is of benefit to the entrepreneur.

To ensure that all research pieces are appropriately grounded in theory, the different manuscripts consider different theoretical bases. Concretely the underlying main theories are: Dynamic capabilities (manuscript one), the resource-based view (manuscript one), cluster theory (manuscript two), regional innovation systems (manuscript two), entrepreneurial ecosystems (manuscript two), causation (manuscript three) and effectuation (manuscript three).

Condensing our findings, the thesis proves that the overall performance of new entrepreneurial ventures can not be evaluated or based on one single variable and does not lie internally in the new venture alone, but in the broader environment. The survival of new ventures very much depends on a combination of internal leadership and external support factors. Besides the internal and external factors, the individual abilities and personal characteristics of the entrepreneur, or entrepreneurial team furthermore, influences how well the new venture's strategic decisions, lead to opportunity exploration, exploitation, and overall performance.

The thesis evidences that the individual talent alone will seldomly reach their full potential and grow into a successful entrepreneur if there is no support. The often idealized world of the free, creative, and vital entrepreneur is—based on our data—really a high-pressure, high-stress, and high-uncertainty environment in which individuals are statistically more likely to

fail than to succeed. Creating and sustaining new ventures is a double-edged sword, where the new venture and the operating entrepreneur(s) must be independently able to rapidly adapt to change, take high risk and repurpose resources based on identified new opportunities, while at the same time contributing to an entrepreneurial ecosystem, making time and trust platforms for like-minded people to challenge older ideas, sharing positive and negative experiences, and creating common knowledge and benefit. The absence of one individual ability or ecosystem support can endanger the development of the entrepreneurs and by this the success of the overall entrepreneurial ecosystem

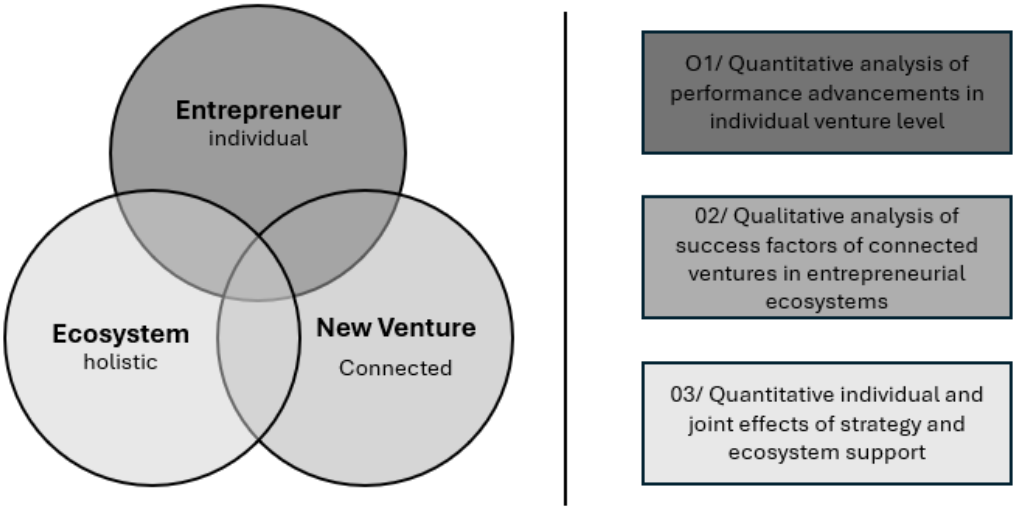

Figure 1: *Interrelation of research manuscripts*

The thesis makes contributions to both academics and practitioners, connecting theory and practice with the aim to provide actionable results for both. From an academic point of view the thesis is grounded in the resource-based view, dynamic capabilities and cluster theory. These theoretical grounds are applied both with qualitative and quantitative research to advance the literature in the areas of entrepreneurial ecosystems for new entrepreneurial ventures.

The different manuscripts (see figure 1) investigate the individual new venture, the interconnected entrepreneurial ecosystem and the individual entrepreneur. Having different units of analysis, we can investigate how academically established positive effects on new venture performance (innovation and technology orientation) can be explored and exploited by individual entrepreneurs and individual new ventures under difficult and uncertain market conditions but with the support of ecosystem environments.

	ENTREPRENEURIAL ECOSYSTEMS		
	Manuscript 1	Manuscript 2	Manuscript 3
VARIABLES	Pre-defined in academic literature	Extension of pre-defined variables by exploration	Combining personal and prior academic findings
UNIT OF INVESTIGATION	Individual firm	Interconnected ecosystem of firms	Individual entrepreneur in interconnected ecosystem
RESEARCH METHODOLOGY	quantitative	qualitative	quantitative

Table 1: Interrelation of methodology and units of research in the research manuscripts

2. Literature Review

2.1. Performance

New ventures even more than traditional business must perform to survive (McDougall et al., 1992). Rooted in strategic management literature, (Venkatraman & Ramanujam, 1986) performance has strong connections to business research. Acknowledging that performance is a multi-faced concept (Chandler & Hanks, 1993; Hult et al., 2008), plenty of research has been done on different aspects of it. This leads to different views on how performance should best be studied (Cook et al., 2010).

In light of this, performance has been considered not only on the individual venture level, but on the interacting market level. This includes i.a. the speed with which new markets have been entered, or the introduction of new products to the market (Wang et al., 2012). Measuring performance in a new venture context differs compared to traditional businesses and small and medium-sized enterprises (SMEs). For one thing, there often is no established market and therefore no available data on the market to consider for executive decisions. Furthermore, the venture itself is young and performance cannot be evaluated on the basis of long-term business data, such as costumer insights or sales markers. Additionally, in most new ventures, especially in the tech environment, the business is not expected to make a profit as soon as possible (McDougall et al., 1992). Instead, the strategic focus and performance measure is often set to market share and other growth-related measures of the business. Translating this to performance strategies, entrepreneurs and leaders of traditional SMEs or businesses often do not share the same mindset and business vision (Harsono & Fitri, 2020). The entrepreneurs set out to go big, or go home. They want to innovate, disrupt, and change the way established markets operate, or even create new markets and costumer behaviors. It is their intention to not only increase performance, but to outperform. Entrepreneurs are prepared to actively take risks and put their resources towards where they see the most promising opportunity.

Looking at the variables with proven positive effect on new venture performance, the traditional performance values of both small medium enterprises and companies are not identical. For example, investors such as private venture capital funds or business angels evaluate performance not purely based on hard financial metrics such as revenue or short-term return on investment (McGee & Peterson, 2019), but on growth, scalability and market innovation, as well as softer factors, such as knowledge generation or the experience and expertise of the founding team (Donbesuur et al., 2020).

West et al. (2009) equate new venture performance with strategy and measure performance "based upon the knowledge the firm has about its market, its opportunity in that market, and its appropriate conduct to take advantage of that opportunity". To take advantage of opportunities, these opportunities must be recognized, and resources must be actively allocated to pursuing the opportunity as strategic choice. In the new venture context, recognizing or exploring opportunities is an active and important element of performance that is strategically managed by the entrepreneur. Entrepreneurs can discover opportunities created by others, or create new opportunities themselves or within the founding team (Baron, 2007).

The nature of the entrepreneur and the ability to self-regulate (Higgins, 1998) influence the perception of an opportunity. Individuals that, for example, focus more on prevention may come to a different strategic decision than an individual focused on action and intervention. This is due, among other things, to their relationship to, and therefore tolerance or avoidance of, risk and uncertainty. Even if an opportunity is recognized by both types, the prevention-focused entrepreneur may restrain from engaging in the opportunity before having set up a clear plan and timeline (Brockner et al., 2004), while an action-focused entrepreneur may not feel the need to engage in planning activities and feels the urge to exploit the perceived opportunity as quickly as possible (Brockner et al., 2004). In entrepreneurial teams with different types of individuals this may add complexity when making strategic decisions. Management scholars have emphasized the benefits of new venture team heterogeneity for performance, especially for well-balanced but innovative decisions (Østergaard et al., 2011; Zimmerman, 2008). Academics, though, largely lack consensus on the core phenomenon regarding the implications of team diversity and new venture performance and in practice new venture teams, especially with university backgrounds, tend to be homogenous (Kaiser & Müller 2015; Knight et al., 2020).

Once the strategic decisions have been made, resources have to be allocated accordingly. New ventures have various types of resources: financial, social, technological, physical, and human (Brush et al., 2001). These resources are often scarce, which is a clear limitation for the entrepreneurs and the new ventures. With limited resources, superior market performance as competitive advantage can be achieved through the ability to intelligently allocate existing resources or develop new resources, which is academically established with the resource-based view (Alvarez & Busenitz, 2001; Barney, 1991; Penrose, 1959). While this is one way to look at the available resources, it is equally important to decide on strategies for how these

resources are to be considered. The same opportunity and resources may be approached very differently depending on the individual attributes and decision-making logics of the entrepreneur, leading to very different outcomes and positive or negative effects of the new venture's performance. Strategy is the decisive factor for performance, since performance will only be measurably increased if the transformation from opportunity to capability has been accomplished successfully (Symeonidou & Nicolaou, 2018).

Having established that, to achieve superior performance in a new venture context, there is no one strategy that fits all, pinning down what makes or breaks the performance of a new venture is a complex and multilayered phenomenon (Du & Kim, 2021). Rather than attempt to explain this complexity with one entrepreneurial theory or lens, performance in new ventures must be investigated from both inward- and outward-looking perspectives (Yu et al., 2024), for example by looking into the active decision-making styles of the entrepreneurs' and the external market conditions of the new venture.

2.2. Uncertainty

Where there is something new, there is always something unknown, or as Paul Hurst (1982) put it, "Innovation is a hypothesis, whose truth cannot be established with certainty." How we frame the "something new" can determine the effect it will have on performance. Frank H. Knight (1921) made this clear and defined the separation between risk and uncertainty that Phan et al. (2020) in the Acadamy of Management pinned down to knowledge. Risk is a known-unknown and uncertainty is the unknown-unknown, i.e. the things of which we do not know that we do not know them.

For organizational studies, scholars commonly agree that due to the lack of a stable and comprehensive set of values, a decision within an organization can never be made with the full information density and therefore most, if not all, decisions in organizations are being made under uncertainty (Hurst, 1982). Uncertainty exists in innovation ecosystems, but it is sometimes also purposely created and spread in innovation ecosystems. For example, founder Elon Musk announced the launch of an electric vehicle in a bold, loud, media-attracting way, leaving the automotive and aerospace industries to investigate their own products and possible use of electricity as one way to react to this new market information und to cope with the uncertainty on how Musk's ambitions would affect their own products and the overall automobile market (De Vasconcelos et al., 2021). Another example of a sudden, massive increase of perceived uncertainty is the COVID-19 pandemic, resulting in smaller founding teams or even habitual entrepreneurs producing more innovations or new introductions to the market compared to established market participants (Kuckertz, 2021).

For entrepreneurs, who are under investigation for this dissertation, incorporating uncertainty into decision making is of key importance, since the "ability […] to interpret and respond is often what determines the degree of success or failure achieved by a venture." (McKelvie et al., 2011, p. 273). The economic contribution of the new venture may even "depend on the

level of uncertainty that can be tolerated in the business environment" (Pacho & Mushi, 2020, p.1). Academically, uncertainty has always been of fundamental importance for entrepreneurial research (Knight, 1921a). This is, among other reasons, due to the specific and unique context in which entrepreneurs operate (Fisher, 2012).

When investigating uncertainty, scholars choose different types of uncertainty for their investigations, namely *state, effect,* and *response* uncertainty (Milliken, 1987). The first investigates the concrete state of the environment (Gerloff et al., 1991) and centers around existing knowledge and specific state of the technology and market. For entrepreneurs and investors that are applying new technologies, the lack of data and experience makes it impossible to anticipate how environmental changes will impact the market and create new opportunities or influence outcomes of previous business decisions (Alvarez & Barney, 2005; Brettel et al., 2012) Therefore state uncertainty cannot reduce the perceived uncertainty for entrepreneurs.

Effect uncertainty can be characterized by the perceived unpredictability of the effects of an environmental chance on the organization itself, or to put in in other words, the lack of understanding for the outcome of a specific action by the venture. This makes it, for example, very difficult to anticipate the effects of certain strategies, such as ecofriendly strategies, where the new venture decides to prioritize sustainability over cost without the ability to predict the effect on sales. Response uncertainty is the inability to evaluate the consequences of a response choice (Milliken, 1987). For the previous example, this could mean the effect on market share of competitors to the sustainability prioritization.

All forms of uncertainty may be subjectively perceived differently (Reymen et al., 2015), which is why this dissertation does not focus more deeply on distinguishing types of uncertainty and accepts—in line with Knight (1921a)—that it is a defining characteristic of entrepreneurs' decision-making environment and therefore a dominant characteristic of a new ventures market, in which the information needed to anticipate possible outcomes of an individual decision will often be unavailable (Alvarez & Barney, 2007).

As individual as the perceived type or level of uncertainty is the response to it. Scholars so far have not been able to pin down the exact function of uncertainty in entrepreneurial decision making, making it an area of research that is open for debate (Zayadin et al., 2022). To make it even more complex, research has found that objective and measurable uncertainty has no systematic relation to the choice of strategic decision-making logic (McKelvie et al., 2011). It is therefore advisable—as is being done in this dissertation—to measure the perceived uncertainty to investigate the effect on the decision making and ultimately performance of the new venture. While the link between perceived uncertainty and behavioral logic or action is established in the literature, it still needs further investigation as to how exactly they are connected (Jiang & Tornikoski, 2019).

Furthermore, the level and type of perceived uncertainty and individual response may change over time and be of critical importance. Time in this context is not only the particular moment

connected with elements such as the degree of sophistication or stage of the new venture, but the perceived uncertainty about the urgency to act, that is, the time the entrepreneur has to react to a new information or change that subjective feeling of uncertainty in the first place. (Mc Mullen & Dimov, 2013; Shipp & Jansen, 2021). While uncertainty is complex, it is not an unsolvable obstacle for entrepreneurs, it can be actively managed by i.a. evaluation, forecasting, or the development of special resources (Thanh et al., 2021).

In the context of this dissertation, we address uncertainty in the context of innovation management and entrepreneurial action. We investigate the role of perceived uncertainty by the entrepreneur and how it related to the orientation towards technology as well as effectuation and causation, two opposing behavior logics for decision making under uncertainty. The two logics will be presented in more detail in part 1.5 of this dissertation.

2.3. Innovation

It is believed that the central driver for sustainable growth in companies, economies, and entire nations is innovation (Chen et al., 2018). The ability to stay innovate, for example through an innovative product, new technology, service or business model can be the decisive factor for sustaining a competitive advantage (Baregheh et al., 2009).

The field of innovation is wide and different research focuses advance the topic academically. However, just like the barriers innovators themselves face when trying to innovate (Mohnen & Rosa, 2002; Sandberg & Aarikka-Stenroos, 2014), innovation research itself faces challenges as it seeks to incorporate modern topics such as sustainable innovation or artificial intelligence (AI) (Martin, 2016; Pieroni et al., 2019). Furthermore, for our research focus—new ventures—many do not achieve the degree of innovation needed to succeed. Nine out of ten new ventures fail (Aminova & Marchi, 2021). Hence, on the one hand, the stakes for entrepreneurs are massive. On the other hand, the resources and funds these companies have are limited, leaving the entrepreneurs with the task of getting creative and achieving the best innovation based on the use of resources at hand.

In line with the focus on resource allocation for innovation, in this dissertation, we follow Schumpeter's (1934) definition of *innovation* as "new combinations of new or existing knowledge, resources, equipment, and other factor" and by this, focus on two different fields of innovation research: innovation orientation (Manuscript 2) and business model (BM) innovation (Manuscript 3).

Innovation orientation is rooted in the literature on innovation and is considered to form a multidimensional structure (Varadarajan, 2017). Innovation orientation is often theoretically positioned with innovation capabilities as well as the resource-based perspective and dynamic capabilities (Barney, 1991; Hadjimanolis, 2000; Teece et al., 1997), explaining a lasting competitive advantage of owning a non-substitutable resource. In the most comprehensive conceptualization of the term, Siguaw et al. (2006) consider innovation orientation i.a. as a learning philosophy or deliberate strategic direction that influences organizational activities.

For entrepreneurs this translates into the positive confrontation and intentional allocation of resources towards new opportunities, such as the identification and implementation of new technologies into the new venture.

Looking at the early publications of Manu (1992) and Manu & Sriram (1996) innovation orientation is understood as an active and dynamic concept that combines all innovation related activities in an organization. It is then conceptualized through a three-component construct, including new products, R&D expenditures for products and service processes, and entry into markets. Manu's argument that a combination of different elements provides a more realistic view of innovation capabilities is in line with our understanding of the positive effects of ambidexterity in new ventures (Manuscript 3), where for our research objective of new ventures, we employ the definition taken from Worren et al. (2002) and understand innovation orientation as the "organization's core built-in strategic intent to provide an organizational commitment toward innovations." In addition to the innovation orientation within the new venture, the conscious orientation towards collaboration is another way, through which entrepreneurs can mirror their orientation towards increasing innovation. This is because innovation often demands new information that cannot be sourced from within the venture, therefore collaboration can support the identification of opportunities and new ideas to increase new venture performance (Farzaneh et al., 2022).

Business model (BM) innovation, as so many terms in the innovation literature, has no single definition, yet since 2004 it has seen an increase in publication, i.a. due to its practical implications. Comparing the definitions found in the literature, it is revealed that business model innovation is content related and consists of many different components (Wirtz et al., 2015), mirroring the complexity.

One way of looking at it, the focus on novelty and change that has caused an improvement in performance can, more specifically, look at what is "designed, novel, and nontrivial changes to the key elements of a firm's BM and/or the architecture linking these elements" (Foss & Saebi, 2016, p. 17). For this dissertation and in line with Anwar (2018), business model innovation is understood as a key competitive advantage, especially for new ventures. For entrepreneurs in new ventures with no customer base and often very limited resources, introducing an innovative business model to the market attracts interest from customers, investors, and other market players and with this creates value (Breier et al., 2021).

Especially for ventures trying to commercialize their innovations (Chesbrough, 2010; Teece, 2019), business model innovations are important, since commercialized products or services are the proof of an idea and serve as figureheads for entrepreneurs. If the new venture can show, the idea works on a larger scale, this will attract supporters to invest and scale the new venture and ensure operations, and by this the survival of the new venture in the market (Chesbrough, 2010).

Since Manuscript 3 focuses on decision making logics under uncertainty, we focus on the business model innovation in the area of managerial practices and Furthermore, consider

literature relating to digital technologies, which are often present in innovative new ventures (Centobelli et al., 2020; Ranta et al., 2021; Rosa et al., 2020).

2.4. Technology

With scarce resources and low levels of market sophistication, entrepreneurs have to find ways to provide a unique product that opens new markets and/or provides a unique comparative advantage for costumer and users in existing market environments. One strategic decision to achieve superior performance in a business and specifically new venture context, is the orientation towards technology, academically rooted in the literature around technology orientation (Chen et al., 2014; Gatignon & Xuereb, 1997). While this may seem like an obvious and somewhat easy choice, the development and integration of technology is complex and has multiple layers.

Bringing clarity into this complex matter, Zahra (1996) established a six-facet strategy environment that centers around the strategic choices when including technology in the new venture context. First comes the general decision as to whether or not the venture should become a pioneer by introducing a new technology to an established or new market. Secondly, the intended number of products to be introduced to that market is determined, followed third by the allocation of internal and external R&D resources to execute on the previous decisions. Fourthly, entering an explorative area of R&D, the entrepreneurs have to also decide on the momentary investment or allocated R&D spending going into the development of technological product trades. Fifth is the decision around the mix of simple and more sophisticated research science, leading to the sixth and final decision of pursuing the patenting of the result(s) to protect innovation from market competitors.

The impacts of technology on performance, especially in new venture context is dynamic and changes depending on multiple factors, such as the internal and external context of the venture or the saturation of a market with that technology. New markets itself are moreover by nature disrupted frequently, leaving the entrepreneurs in a constant state of having to improve technological aspects as part of ensuring innovativeness and market combability. Avoiding the use of outdated technology is even more difficult for mature firms (Øyna et al., 2018). Therefore, entrepreneurs with a technology intensive strategy are forced to constantly re-focus strategy, often engaging in a mix of exploration and exploitation behavior, requiring different logics of thinking and allocation of resources (Freeman et al., 2023).

While the complex and dynamic demands of a technology-oriented new venture have been presented, a new form of technology integration has gained mass readiness and is disrupting markets and sectors all over the world. Artificial intelligence (AI) in the private and entrepreneurial sector, it is suggested, will be the “engine of future development” and have positive impacts on performance (Li et al., 2023), but the empirical academic evidence—particularly regarding the entrepreneurship-AI intersection (Chalmers et al., 2021) — on the effect of AI towards new venture performance is limited.

With the ability to process large amounts of unstructured data in a short time, AI technology is actively taking over complex tasks, that previously had to be carried out by humans. Still with a mix of reluctance and excitement scholars are slowly catching up to investigations into the applications of AI for businesses and, more specifically, in the new venture context. The benefits of including AI into the new venture seem limitless. Still, Chalmers et al. (2021 points out that possible social and economic impacts when incorporating AI have to be considered in positive and negative directions. For Taddy (2018) the structuring of domains or understanding the problems and rules, data generation, and purposeful machine learning to uncover patterns and make predictions are three areas where AI could benefit new ventures.

2.5. Effectuation and Causation

Zooming in on the individual entrepreneur, we investigate individuals on the firm level that, according to Schumpeter (1934), introduce something new in the market, either a product, a new quality of a product, a service or a method, often by the(re) combination of existing elements. The recombination of existing elements asks for actions and concrete decisions to change. Two decision-making logics have been proven to increase performance in the new venture context: effectuation and causation (Sarasvathy, 2001). While they are different, they are not strictly isolated "Both causation and effectuation are integral parts of human reasoning that can occur at the same time and intertwining over different contexts of decisions and actions" (Sarasvathy, 2001, p. 245). Causation and its positive effect on venture performance has been established in neoclassical economics (Mthanti & Urban, 2014). The causation logic is a more traditional business approach and executed by engaging in planning activities, including extensive environmental analysis and opportunity screening before exploiting an opportunity (Laskovaia et al., 2019). In causation, the goal and expected returns are very specific and clearly preset to the opportunity engagement.

Opposing this logic is the effectuation logic, which is not driven by a pre-defined goal. The goal emerges along the opportunity exploration. Effectuation is expressed by experimentation and achieves a high degree of flexibility that allows the entrepreneur to engage in an opportunity without extensive planning and delay. The effectuation logic accepts the uncertainty and does not try to reduce it through research and information gathering, requiring the entrepreneur to keep an open mind, and requires the entrepreneur to actively react to changes by adapting strategies rapidly. Table 1 illustrates the differences of causation and effectuation, providing a practical and process-oriented description. Taking this into a real business decision, a new venture could, for example, analyze international market conditions, competitors and current available resources to create a plan for internationalization with concrete countries, possibly even with pre-commitments from stakeholders (Harms & Schiele, 2012) and time frames (causation). Alternatively, a new venture could enter a country based on a perceived opportunity and rapidly decide to stay with that decision, possibly adapting the product or time frame or moving to a different country more quickly than intended when the success rate for the ventures performance is estimated favorably by the entrepreneur (effectuation).

An entrepreneur that is only applying causation logic may not be able to pursue opportunities that offer very limited data with high uncertainty but possibly high reward.

While scholars until recently investigated the two logics separately and in an either-or logic (Ruiz-Jiménez et al., 2020; Vanderstraeten et al., 2020), the academic discussion has moved on to investigating them together, resulting in proof that applying both effectuation and causation logics favors venture performance (Braun & Sieger, 2020).

While studies investigating the interplay of both are numerous (Matalamäki, 2017), the two logics are still rarely investigated as combined effect and predominantly separated in time or by task (Galkina et al., 2022). Reymen et al. (2015) for example conducted research on the simultaneous use of effectuation and causation during decision making, but still sees them as independent processes with one having a dominant application depending on the perceived level of uncertainty or development stage of the venture. Investigating the task-related parallel application of causation and effectuation, Yang and Gabrielsson (2017) find that certain marketing decisions, such as costumer care, require more effectuation, while other decisions around technology or product require more causation (Nummela et al., 2014). This knowledge is of practical value to entrepreneurs but does not advance the academic investigation into the combined effects of effectuation and causation on new venture performance. This gap is addressed in Manuscript 3 that investigates effects combining effectuation and causation in different support environments.

CATEGORY	CAUSATION PROCESS	EFFECTUATION PROCESS
BEGINNING	Set clear goals	Set means and values
LOGIC	Predictive forecasting	Situational controlling
MARKET POSITION	Competitor	Partner
STRATEGIC PERSPECTIVE	Exploiting existing information	Exploring contingencies
ACTING ON OPPORTUNITY	Once clear business plan exists	Instantly if matches core values
RESOURCE ALLOCATION	Pre-set and calculated	Set by availability and urgency

Table 2: Contrasting Causation and Effectuation

3. Research overview

3.1. Overview of the research manuscripts

The following section has two parts. The first part summarizes the manuscripts for the dissertation considered and provides insights on the individual methods and contents. Table 3 summarizes key elements of the manuscripts and contrasts the different works in terms of research question, considered sample, research methods and main finding. Besides that, the theoretical basis and findings are provided as well. Manuscript 1 quantitatively tests the effect of innovation in relation to new venture performance and finds a positive relation between innovation orientation and market performance. The underlying samples are individual survey inputs from 1595 entrepreneurs in c-level positions of European new ventures. The data was collected with the support of the European Commission and by using an online survey, which was distributed of a wide network in the European Innovation ecosystem, consisting i.a. of private associations of the European Startup Network, academic institutions and public European departments and initiatives. These public initiatives include the European SME Envoy, which is a network of the European Commission, SMEs, and their representative organizations with one representative for national representation of SMEs and startups appointed by each member state of the European Union. The paper draws on literature around the resource-based theory and the resource-based view, as well as dynamic capabilities theory.

Manuscript 2 moves from the individual micro perspective of the entrepreneurs to the macro perspective of the entrepreneurial ecosystem investigation and qualitatively tests for key attributes and mechanisms of an entrepreneurial ecosystem in relation to their successful performance in four countries (Denmark, Sweden, Finland and Latvia). Based on an extensive literature review on the key attributes to positively influence innovation ecosystems, different types of stakeholders within the ecosystem (entrepreneurs, public actors and private regional experts) rank the attributes in order of their perceived importance for a successful entrepreneurial ecosystem. The findings include the discovery of the multi-factor process of “talent transformation” and the creation and introduction of a three-phase talent transformation model (Figure 2), which is intended for interested stakeholders and a practical tool to support the developing of successful entrepreneurial ecosystems. The paper draws on cluster theory, regional innovation systems, and literature around entrepreneurial ecosystems, focusing on the Nordic region.

Manuscript 3 combines the individual and broader ecosystem view and, using linear and interacting variable analyses, tests the individual entrepreneur’s strategic application of two decision-making logics: effectuation and causation in dependance to the external ecosystem support. The findings suggest that the appropriate application of effectuation or causation is dependent on the level of ecosystem support. Furthermore, the paper finds that the positive interacting effect of effectuation and causation on entrepreneurial new venture performance exceeds the positive effect of the individual application of causation as decision-making logic.

	MANUSCRIPT 1	MANUSCRIPT 2	MANUSCRIPT 3
TITLE	Embracing Uncertainty; How startups are outperforming markets through technology and innovation	Investigating the success factors of entrepreneurial ecosystems in the Nordics - talent transformation as key mechanism	Non-linear and joint effects of effectuation and causation on new venture performance: The role of ecosystem support
OUTLET	Journal of Business Research	International Journal of Entrepreneurship and Innovation	European Journal of Innovation Management
RSEARCH QUETIONS	-What role does innovation play in a startups' market performance? -How does technology and innovation orientation influence the startups' market performance? -How does uncertainty influence the startups' market performance?	- What are the key drivers for entrepreneurial ecosystems? - Which role does the context have in entrepreneurial ecosystems? -What importance do specific factors have? - which mechanisms are connected to these factors?	- What is the effects of combined decision-making logics on new venture performance? -Which effect do context and support structures have for the tested relation?
SAMPLE	1595 startups from 21 countries	9 experts: government, private sector, and NGO	861 new ventures
METHOD	Quantitative survey multiple regression analysis, confirmatory factor analysis	Qualitative interviews purposeful sampling three-step method by Gioia et al., (2013).	Quantitative survey hierarchal regression analysis
MAIN THEORIES	Resource-based view dynamic capabilities	Cluster theory regional innovation systems, entrepreneurial ecosystems	Effectuation causation

Table 3: Overview of considered manuscripts

3.2. Publication status of research manuscripts

All three research manuscripts included in this dissertation have been submitted to reputable academic journals and have successfully taken part in the academic review process. The detailed status of the application for publication of each manuscript is outlined in table five. The ESCP Europe has in the with the VHC ranking has set clear scores and requirements for the choice of academic outlet to be considered for cumulative dissertations. Specifically, the 2016 requirements, which was the year the dissertation process started, mandate that the overall sum of points accumulated through publications must meet or exceed a minimum threshold of 2.0 points.

The point calculation methodology is based on the ranking of the journal—categorized as A, B, or C—corresponding to 4.0, 2.5, or 1.5 points, respectively. These points are then divided by the number of authors contributing to the manuscript. In the present dissertation, one B-ranked journal and two C-ranked journals were selected for submission. Given the author distribution—two authors for the first and second manuscripts, and three authors for the third manuscript—the calculated points are 1.25, 0.75, and 0.5, respectively. The total score of 2.5 points therefore fulfills the requirement, ensuring compliance with academic standards.

An additional requirement for cumulative dissertations is that all included manuscripts must receive formal approval from the supervising professor. In this case, the manuscripts have been thoroughly reviewed and endorsed by Prof. Dr. René Mauer, who has confirmed their acceptance as integral components of the dissertation. Consequently, the dissertation is now eligible for presentation to the academic board to initiate the formal doctorate procedure.

The first manuscript, titled *Embracing Uncertainty; How startups are outperforming markets through technology and innovation*, was submitted to the Journal of Business Research in June 2019. After undergoing an initial screening process, it successfully passed a desk rejection and proceeded to peer review. Unfortunately, despite this progress, the manuscript was ultimately rejected in July 2019 and not invited for resubmission. However, the detailed feedback and constructive comments provided by the reviewers offered significant insights and served as a valuable foundation for improving subsequent manuscripts and refining the research approach for future research of in this dissertation.

The second manuscript entitled *Investigating the success factors of entrepreneurial ecosystems in the Nordics - talent transformation as key mechanism,* was submitted to the International Journal of Entrepreneurship and Innovation in June 2021. Following an initial review and one round of revisions, the manuscript was resubmitted and formally accepted for publication in September 2021. Subsequently, it was published online in November 2021 and included in the journal's February 2023 issue, appearing in Volume 24. Citation details have been included in Table 4. The third manuscript was submitted to the European Journal of Innovation Management in September 2024. After undergoing a comprehensive peer-review process, it was revised and resubmitted in February 2025. The review feedback was addressed to meet the journal's standards, and the revised manuscript is currently under consideration for final acceptance.

	MANUSCRIPT 1	MANUSCRIPT 2	MANUSCRIPT 3
TITLE	Embracing Uncertainty; How startups are outperforming markets through technology and innovation	Investigating the success factors of entrepreneurial ecosystems in the Nordics - talent transformation as key mechanism	Non-linear effects of effectuation and causation on entrepreneurial ventures' performance: The role of ecosystem support
OUTLET	Journal of Business Research	International Journal of Entrepreneurship and Innovation	European Journal of Innovation Management
VHB 2014	B	C	C
STATUS	Passed desk reject (06/2019), Rejected (07/2019)	Submitted (06/2021) Accepted (09/2021)	Invitation to Revise and resubmit (12/2024)
	- In review-		- Resubmitted-
CITATION		Steigertahl, L., & Mauer, R. (2023). Investigating the success factors of the Nordic entrepreneurial ecosystem–talent transformation as a key process. *The International Journal of Entrepreneurship and Innovation, 24*(1), 718. doi.org/10.1177/1465750321105121	
POINTS	1.25	0.75	0.5

Table 4: Publication status of presented manuscripts

3.3. Summaries of manuscripts

3.3.1. Summary of manuscript 1

Today's fast-evolving markets create an environment of uncertainty in which ad hoc business decision must be made, without having the full set of information. These agile and uncertain market conditions are an environment in which new ventures have been proven to achieve high performance (Sarasvathy, 2001). Market performance is directly linked to competitive advantage (Kaleka & Morgan, 2017). This advantage can be achieved in different ways and through different business decisions. For startups competitive advantage is commonly created through innovation orientation (Vardarajan, 2017). Innovation orientation is an ongoing "learning philosophy" (Siguaw et al., 2006) or strategic core decision (Worren, Moore & Cardona, 2002) for supporting the entrepreneur's open mind and willingness to take risks to achieve an exceptional product or service for their venture.

One way to overcome uncertainty and deliver innovation is the orientation towards technology (Hurley & Hult, 1998). This is based on the idea that consumers prefer products or services that are technologically superior to others (Gatignon & Xuereb, 1997). The research environment of new ventures is perfectly suited to investigate the effect of technology in performance, since just like innovation orientation is it said to have the highest effects under highly uncertain environments (Ali et al., 2016).

Based on a 74-item online questionnaire and with the support of the European Commission, from a total sample of 2402 European startup entrepreneurs, 2004 units were selected and 1594 inputs were considered for the manuscript in summary. The reduction of considered cases was due to the high-quality screening of inputs and over proportional representation from one country (Italy), which were only considered for the research project with a random sample of 1/3 of the inputs.

Based on multiple tests, such as model fit, reliability, biases, and robustness of data and chosen scales, including control variables, we conducted multiple regression and confirmatory factor analyses. The results demonstrated that—in line with our literature-based expectations—both innovation and technology orientation had a highly significant and positive effect on market performance, while uncertainty had a highly significant negative effect on market performance. Generally, with our research we therefore proved that the negative effect of uncertainty on performance can be reduced with an orientation towards innovation and technology. Our control variables further showed that the positive effect is even greater for new ventures in a more mature stage (growth or later stage).

3.3.2. Summary of manuscript 2

Despite its renowned universities, engineers, and artisans, Europe is falling behind in the area of technological innovations (Word Economic Forum, 2019). As a result, many promising new ventures relocate at some point to the U.S. or China to benefit from the local entrepreneurial benefits and support. In seeking to discover how Europe can create sustainable ecosystems, the academic research firstly acknowledges that Europe in itself has such unique attributes that is would be careless to just go ahead and try to create a second Silicon Valley (Isenberg, 2010). Focusing on entrepreneurial ecosystems, in line with the academic discussion, we broaden the research level from the individual entrepreneur (in our case referred to as talents) in an individual new venture toward a complex interdependent structure of social, cultural and generally external venture contexts in a given territory (Stam & Spigel 2016; Dodd & Anderson, 2007).

Based on an extensive literature discussion, 15 individual factors—sometimes called attributes—to positively influence entrepreneurial ecosystems are identified, acknowledging that the interpretation of each individual factor and evaluation of their importance may differ. This is why we chose to follow a qualitative approach, conducting interviews in highly ranked entrepreneurial ecosystems in the Nordic region of Europe. The interview partners included high-ranking governmental officials, opinion leaders, entrepreneurs, and important stakeholders from key incubators and events based in Denmark, Sweden, Finland, and Latvia. Applying the three-step method by Gioia et al. (2013), the data was dynamically clustered from individual quotes to identify underlying major components and overall dimensions.

Diving into the core of our results, we found individual people—or better yet, talent—to be the most important factor for entrepreneurial ecosystems. The interviewees acknowledged that the individuals undergo a transformation process from talent to entrepreneur that we extracted as result of our research by introducing the three-phase talent transformation model.

The talent transformation process starts with an onboarding phase, which successful ecosystems manage to create openly and without barriers for all interested talents. Formal networks, individual entrepreneurs, and professional create spaces for like-minded talents to meet and interact. Once the individual talents have found their spaces — which can for example be separated by sector, forms of finance or use of technology — the growth phase follows. The talents move away from a passive to a more active role, engaging with other individuals to benefit from peer learning. This is done through groups or individual mentoring and very much differs from individual to individual. Serial entrepreneurs share experience and sometime give advice to support less experienced entrepreneurs in scaling the ventures without making the same mistakes. While some talents may find it easy to create individual advantages from the ecosystems, other may take longer time frames or, depending on the product or service, may not instantly find the right mentor or group, leading to new subsegments.

Once the talents and ventures have benefited from active engagement, they enter the implementation phase, which often broadens the personal network with a specific business environment and new stakeholders from private to public investors.

While the three-phase approach may imply that the phases come one after the other, it is a very dynamic structure, where new talents enter with new ideas and “old”, more established entrepreneurs enter with new ideas as well. While serial entrepreneurs, depending on their individual capacity, take on multiple roles in flourishing ecosystems and increase the level of knowledge through experience, new talent plays a very important role in opportunity creation and opening of new and innovative markets

While eternal business environments are illustrated only by two boxes in the implementation phase, from the interviews, we also learned that the cultural context can make or break an entrepreneurial ecosystem. One unique and important aspect of the success of Nordic ecosystems is the positive attitude and willingness from all stakeholders to make it work. This willingness is measurably reflected in many ways, such as the number of new patents applied for, businesses created, or entrepreneurial programs offered by governmental bodies, universities, and the private sector. These initiatives are paired with internationally compatible financial resources and a minimum of red tape in migration polices for talent attraction, as well as entrepreneurship-friendly taxation regulations. The mutual appreciation and respect between the private and public sector create a warm environment for innovation to flourish, new businesses to grow, and talents to develop.

3.3.3. Summary of manuscript 3

Entrepreneurs operate in uncertain environments and under varying support from the entrepreneurial ecosystem (Sarasvathy, 2001; Guo, 2019). While for many this sounds like a fascinating and exciting role to have, it pressures the individual to make decisions that lead to superior performance of new ventures without having the full picture regarding resources, market conditions, or regulatory developments.

Supporting the decision-making processes, effectuation and causation have been proven to be performance-increasing logics in uncertain environments (Alzamora-Ruiz et al., 2021). The logics offer a structured way to engage in long-term planning and in-depth analysis (causation) before entering an opportunity, or to dive right in and adjust the strategy and resource allocation in a somewhat experimental manner in the process (effectuation). With recent research indicating that a hybrid, more dynamic approach increases performance and resilience (Broun & Sieger, 2020; Peng et al., 2020), we investigate the individual entrepreneur as part of an entrepreneurial ecosystem. In line with Yu et al. (2018) we split our sample into high and low levels of perceived entrepreneurial ecosystem support to build on prior evidence, that contextual factors and particularly support structures benefit new ventures in uncertain environments (Saxena & Siddharth (2021); Laskovaia et al., 2019).

Following the extant literature in the field of effectuation and causation research, we chose to investigate with a large sample and used primary data from an extensive quantitative data collection from the European Startup Monitor (Steigertahl & Mauer, 2018). After data cleaning by excluding missing values or invalid cases, our final sample comprised 861 entrepreneurial ventures in different development stages from 35 countries. Segmented into 28 EU member

states (Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Ireland) and 7 non-EU states (Iceland, Macedonia, Moldova, Norway, Switzerland, the United Kingdom, and Ukraine).

The sample was tested for common method variance and relevant statistical criteria (such as Cronbach Alpha). An exploratory factor analysis (EFA) was conducted to confirm the measurement reliability and convergent and discriminant validity. Following Yu et al. (2018), we tested the effects of the single and squared variable in both support environments (high and low) in all cases. Our findings suggest that effectuation and causation have a statistically significant positive interaction effect on market performance, especially in environments with low ecosystem support. Our results furthermore show that causation for our sample has a significantly positive performance effect in established entrepreneurial ventures in environments with low ecosystem support but no statistically significant performance effects for effectuation alone. Practically speaking, this suggests that founds should evaluate the external support environment before choosing to engage in causation or effectuation. Combining strategies and thinking ambidextrously may be boosting new venture performance, especially in low support environments and under high uncertainty.

4. Manuscripts

4.1. Manuscript 1: Embracing Uncertainty; How startups are outperforming markets

Research manuscript 1	
TITLE:	Embracing Uncertainty; How startups are outperforming markets through technology and innovation
AUTHORS:	Lisa Steigertahl and Prof. Dr. René Mauer
STATUS:	Passed desk reject, under revision
JOURNAL RANKING:	B
AVAILABILITY:	From the thesis' author upon request

Abstract

Startups are the digital natives in today's race for competitive performance, as they disrupt established industries and garner the attention of researchers, executives and politicians. Through their application of technology and orientation toward innovation, this type of small and medium-sized enterprise (SMEs) has become a role model for its ability to achieve great performance. Though interest in the relation between innovation and performance is evident in the literature, little research has been conducted in this area of SMEs. Supported by the European Commission, this paper presents 1594 survey inputs of entrepreneurs from 21 countries. The article develops and tests a framework that considers innovation, technology orientation and uncertainty in relation to market performance. The results prove the proposed positive relation between innovation orientation, technology orientation and market performance. The findings contribute to literature on innovation and organizational strategy, open discussion around distinguishing startups from SMEs and offer business action points.

4.2. Manuscript 2: Success factors of entrepreneurial ecosystems in the Nordics

Research manuscript 2	
TITLE:	Investigating the success factors of entrepreneurial ecosystems in the Nordics - talent transformation as key mechanism
AUTHORS:	Lisa Steigertahl and Prof. Dr. René Mauer
STATUS:	Published
JOURNAL RANKING:	C
AVAILABILITY:	Steigertahl, L., & Mauer, R. (2023). Investigating the success factors of the Nordic entrepreneurial ecosystem–talent transformation as a key process. *The International Journal of Entrepreneurship and Innovation*, *24*(1), 7-18. https://doi.org/10.1177/14657503211051217

Abstract

This paper explores talent transformation from entrepreneurial talents to successful entrepreneurs as a central characteristic of a successful entrepreneurial ecosystem. To this end, we link related literature streams around cluster theory and regional innovation systems and expand them by drawing on the literature of entrepreneurial ecosystems. As a starting point we review literature for the factors that drive the success of entrepreneurial ecosystems and employ qualitative expert interviews in order to uncover nuances of ecosystem performance. Based on qualitative expert interviews and by interlinking the factors identified in literature to have a positive influence on entrepreneurial ecosystems, we suggest that talent transformation is the key factor for the flourishing of entrepreneurial ecosystems and find the social context and external business environment to be the main independent co-factors for talent transformation. By investigating the European best-practice example of the Nordic countries, we develop a three-phased talent transformation process and make concrete recommendations for entrepreneurial ecosystem development that can be applied in any geographic context.

4.3. Manuscript 3: Non-linear and joint effects of effectuation and causation

Research manuscript 3	
TITLE:	Non-linear and joint effects of effectuation and causation on new venture performance: The role of ecosystem support
AUTHORS:	Lisa Steigertahl, Pro. Simon Hensellek and Prof. Dr. René Mauer
STATUS:	Passed desk reject, revised and resubmitted
JOURNAL RANKING:	C
AVAILABILITY:	From the thesis's author upon request

Abstract

This paper investigates non-linear and interaction effects of effectuation and causation on entrepreneurial ventures' performance considering different levels of ecosystem support. Drawing on an ambidexterity perspective and recent research on effectuation and causation, we theorize curvilinear and interaction effects of effectuation and causation on venture performance that depend on the level of ecosystem support (i.e., from the government, business associations, and accelerators/incubators). We empirically test our hypothesized model with a cross-country dataset of 861 European entrepreneurial ventures using multivariate regression analysis. We find that causation has a J-shaped relationship with venture performance. Furthermore, the interaction of effectuation and causation has a positive effect on performance. Both effects are stronger in environments with low ecosystem support.

5. Implications

The underlying thesis provides novel contributions to multiple research streams. The manuscripts offer various perspectives into the complex but fascinating world of new venture performance and by viewing this area on an individual and ecosystem level opens new ways to investigate the creation, identification, and exploitation of opportunities as forms of competitive advantage.

5.1. Contributions

The three underlying manuscripts complement one another and offer a variety of contributions to stakeholders from the academic, as well as the private and policy sectors, giving the dissertation both a theoretical and managerial importance. With the choice to build on established scales and the exceptionally extensive sample sizes for the quantitative Manuscripts 1 and 3, the dissertation contributes robust findings and contributes to the literature streams around performance and entrepreneurship research with a supranational sample in a new venture context.

Manuscript 2 adds a layer of quality to the academic discussion around new ventures by zooming out from the individual venture to the entrepreneurial ecosystem. Basing our research on cluster theory and the literature around regional innovation systems, we advance the academic discussion in the fields. By extracting suggested attributes for successful entrepreneurial ecosystems from other scholars, we are contributing to the literature around entrepreneurial ecosystem and a more weighted and therefore better understanding of individual attributes to benefit their creation and sustainability. The resulting talent transformation model sheds light onto the variety of stakeholders present in entrepreneurial ecosystems and creates a sophisticated process to advance the streams intersecting the entrepreneurship literature with a closer, internal research focus around the individual entrepreneur in an individual venture and a more open and external focus as part of the entrepreneurial ecosystem.

Manuscript 1 contributes to the differentiation of business-related literature around SMEs and activates scholars to start a discussion around differentiating traditional non-innovative SMEs from startups or new ventures to achieve greater clarity of the research unit and therefore a more concrete contribution to the literature stream around business performance. Grounding our studies on the resource-based view and literature of dynamic capabilities we contribute to the literature streams and open a new connection of research on new ventures within the field.

Strongly conjoining the literature streams of effectuation and causation by undertaking research on the combined variables in Manuscript 3, we advance the literature streams around effectuation and causation in the new venture context and answer a current call to expand the academic focus around ambidexterity in new ventures. By replicating the sample split for high and low ecosystem support, we confirm recent work in the field. Combining the two decision-making logics of effectuation and causation, we furthermore contribute

knowledge to the academic discussion on the most likely intended application of effectuation and causation similarly and not separately in uncertain decision-making environments.

The dissertation holds valuable practical implications for traditional businesses, policymakers and entrepreneurs. In terms of practical implications, traditional business can adopt a more startup-style approach and engage in dynamic and agile strategies — including constant evaluation and rapid change of strategy — to cope with uncertainty. Concretely, traditional business leaders should appropriately replicate from new ventures and, for instance, not base all decisions on pre-defined, purely numerical measures but on perceived opportunity to ensure faster exploitation of spontaneous market opportunities and, with this, long-term competitive advantage.

The clear commitment towards innovation in mission statements or company visions can help to constantly remind employees and leaders alike to work towards that common value. Internal flat structures, as practiced in many new venture environments, can furthermore help to establish more openness for innovative ideas or feedback. Including individual employees in strategic processes, for example, is common practice to learn from new ventures, leading to a more innovative and open way of participative internal communication, often leading to a feeling of belonging as part of a team.

Looking outside the company for innovative ideas and seeking interactions with the entrepreneurial ecosystem are important take aways of Manuscript 2 for all traditional businesses, policymakers, and entrepreneurs alike. Acknowledging and respecting entrepreneurial ecosystems as a two-way street—both contributing and gaining—is important too, and should make traditional companies move away from a top-down approach to ecosystem support towards a circular understanding of stakeholder interaction in entrepreneurial ecosystems.

As one learning, policy makers can also benefit from the more dynamic internal organization and decision-making styles of new ventures and lighten their routines. Manuscript 2 in particular contributes to this with concrete and actionable implications on how to set up an open and enriching entrepreneurial ecosystems for a variety of stakeholders from individual new or serial entrepreneurs to universities and private stakeholders. The three-phase talent transformation process contributes to the literature around talent transformation and advances the practical understanding of stakeholder amalgamation. We consider the framework suitable for all regions and therefore to be of high practical relevance to national and international policy makers.

Based on our research, entrepreneurs can gain self-confidence to simultaneously engage in different decision-making styles. Generally, our research suggests that an orientation towards innovations and technology will benefit a new venture’s performance, especially in uncertain environments. In addition, our dissertation-related research implies that in order to be able to tap into unexpected opportunities quickly, entrepreneurs can increase performance with effectual techniques, even though available data to base these decisions on is limited. The

individual entrepreneurial ability to act with a conscious mix of planning, pre-setting goals and playing it safe, while engaging in an experimental and dynamic approach depending on the specific external conditions will make or break great entrepreneurs in the future. The dissertation emphasizes the interplay of the individual with the ecosystem and may contribute to activating entrepreneurs to consider the space outside of the new venture just as valuable for opportunity development and identification.

Overall, the dissertation contributes to a more holistic understand of causes and effects in uncertain decision-making environments, leading to the idea of interconnecting literature streams and research units that may have been investigated individually.

5.2. Limitations and avenue for future research

While the underlying sample for Manuscripts 1 and 3 was very large, the sample diversity was not ideal by academic standards. For example, not all countries, sectors, and development stages were represented equally. This shortcoming could be addressed by conducting sector-specific, country-specific, or stage-specific research in the future. Since the definitions of the terms “startups” or “new ventures” are not commonly agreed upon and there is no common international register for them, an additional limitation is that the representativeness of our research based on the total population of new ventures could not be calculated.

The data considered was collected at one point in time, and even though appropriate tests were conducted, it would be advisable for future researchers to replicate our studies with longitudinal data. This approach would allow for a more dynamic examination of the interactions tested. From a methodological perspective, we considered all variables under regression as exogenous, while they might be non-measurable or latent in reality. To address this limitation, we suggest that scholars may simplify the model and reduce the number of variables. By adding objective data to our perceptual measures, scholars could additionally address the issue around perceptive inputs.

For our ecosystem research, we acknowledge that qualitative approaches in general, and in our case qualitative research with a limited number of considered cases, do not allow for generalizations. Therefore, future research should strive to increase the number of interview partners or include additional types of ecosystem stakeholders to enhance the generalizability of results. Another way of overcoming this limitation could potentially be to adopt a mixed-method approach, incorporating quantitative research into the study to broaden the generalizability of results.

Expanding the geographical region beyond the Nordic countries or replicating the study in other European regions, such as Central or Southern Europe, as well as adopting different clustering methods, such as on the level of sophistication of the entrepreneurial ecosystem, would also be suggested for further academic research. In terms of future research on the combined effects of effectuation and causation, we only considered a few moderators to increase the significance of the interaction. Future research could broaden the range of moderating variables to discover further important factors for the effectuation-causation

relationship and simultaneously provide even more actionable results for policymakers and entrepreneurs.

To put ecosystem support in more quantitatively measurable terms, it may also be advisable for future researchers to investigate concrete policy actions that have been taken to increase the number of entrepreneurs and the quality of the entrepreneurial ecosystem in a specific country or region. Possible research focuses could include the number of entrepreneurial education programs, financial support programs, mentoring programs, or triple helix offerings from partnerships between universities, industry, and government.

5.3. Concluding Remarks

The dissertation firstly highlights the importance of establishing adaptive structures within businesses that enable both leaders and employees to embrace uncertainty and leverage innovation and technology when opportunities present themselves. It demonstrates how mindful but spontaneous situational decision-making can boost performance, especially when compared to the traditional approaches of more static managerial practices. This distinction between entrepreneurial decision-making logics and those of conventional managers deepens our understanding of how today's leadership roles have changed and what they can do to better navigate uncertainty and unforeseen changes in markets and business environments. It emphasizes that the type of leader and the leadership style — whether grounded in detailed prior planning or more flexible resource reallocation — can significantly influence a business's ability to increase performance or ideally outperform. These insights are broadly applicable, transcending sectors and organizational contexts, making them vital for both new ventures and established businesses seeking competitive advantage.

Besides the internal structures and individual leadership style, the dissertation shifts the focus outward, examining the interconnections between businesses and the ecosystems in which they operate. By doing so, the research unpacks the diverse factors and different roles contributing to the success of entrepreneurial ecosystems and their degree of innovativeness. These ecosystems are presented as both interdependent structures organized on the one hand, i.e. by the new and established entrepreneurs, academic institutions, or private financing structures, and on the other hand, governmental instruments, funding schemes, and regulations framing the capabilities needed to nurture—or suffocate—innovative ideas. By uncovering the "talent transformation process," the dissertation advances the understanding of the role of support to help promising often young talents to grow into successful and recognized entrepreneurs. The dissertation furthermore emphasizes the roles of regional support contexts and stakeholder alignment in creating sustainable entrepreneurial ecosystems, since factors such as public health support, social benefits or education are support structures that reduce stress for the individual and create a sense of community and belonging, something that is also important for entrepreneurial well-being and happiness.

Acknowledging the rising importance of ambidextrous leadership in current fast paced and unexpectedly changing markets, the dissertation integrates effectuation and causation — long

perceived to be opposing decision-making logics — and offers academic and practical insights into how the combination or simultaneous application of these approaches can enhance innovation. It highlights the adaptability required of entrepreneurs and modern leaders to succeed in low-support and/or high-uncertainty environments. The research enriches the discourse on ambidexterity, positioning it as a critical mindset for future-proof leadership. The findings encourage leaders across sectors to step beyond their comfort zones, adopting a balanced approach that integrates forward planning with the flexibility to respond dynamically to emerging challenges, while zooming out to see what support can be received from the external environment. This approach underscores the importance of fostering a leadership ethos capable of navigating personal and external resources effectively.

The dissertation's relevance is further amplified by its timeliness in the context of technological momentum, especially for the areas of AI and machine learning. The unimaginable pace of technological advancement in these fields is transforming industries, markets and governments as you read. While AI fosters automation, efficiency, and innovation, this research emphasizes that no algorithm, plan, or machine can fully replace human interaction. Successful entrepreneurial ecosystems need humans in the loop. The sharing of ideas, emotional experiences, and collective learning remains integral to innovation, as humans inherently seek validation and inspiration from one another, not from machines. Collaborative ecosystems continue to remain indispensable for ensuring responsible and ethical leadership and human-centered innovation that allows for connections and trust.

By investigating innovation as a driver for performance in connection with entrepreneurial ecosystems and external support, the dissertation additionally confirms the enduring importance of human-centric elements — such as trust, mentorship, and shared values — as essential components for translating technology-driven opportunities into sustainable market innovation. This work serves as a reminder that, even in an era dominated by technological breakthroughs, such as AI the human spirit, ingenuity, and collaboration will remain at the heart of common achievement and success.

In conclusion, the dissertation provides a comprehensive analysis of the interplay between technological innovation and human-centric values. It emphasizes that while technology such as AI and machine learning offer unprecedented opportunities for growth and efficiency, the human element remains indispensable. The insights gained from this research are invaluable for policymakers, business leaders, and educators seeking to harness the power of entrepreneurial thinking and technology while preserving the core values that drive human progress. This work ultimately champions a future where technology and humanity coexist harmoniously, driving sustainable innovation and collective success in entrepreneurial human-machine ecosystems.

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