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THE CO-DEVELOPMENT PROCESS OF NEW VENTURE IDEAS AND ENTREPRENEURS' LEARNING

Tadeu F. Nogueira and Gry A. Alsos

1. INTRODUCTION

Entrepreneurship research seeks to explain the generation of new economic activity through new venture creation or through the renewal of established organizations (Wiklund et al., 2011). Such processes are directed by the agency of entrepreneurs, as well as they are situated in a broader context which has in itself characteristics that influence the scope of entrepreneurs' action. Interested in this dual-development process, we examine the interplays between opportunity development and the learning processes of entrepreneurs. In this effort, we build on and extend the literature on entrepreneurial learning, which is concerned with the process by which entrepreneurs, teams, and organizations develop knowledge and skills to perform entrepreneurial actions (Rae and Wang, 2015). Concurrently, we partake in the discussion about entrepreneurial opportunities, following a recent conceptualization by Davidsson (2015) which distinguishes new venture ideas from external enablers and opportunity beliefs, all parts of the opportunity concept. Hence, with the intent to develop theorizing on the nexus between entrepreneurs and the artifacts they act upon, we conceptualize entrepreneurial learning as a key part of the opportunity development process.

Entrepreneurial experience can be treated as a *stock*, i.e. a quality of the entrepreneur based on their cumulative experiences, or as a *flow*, i.e. events that occur over time which the entrepreneur learns from (Reuber and Fischer, 1999). Entrepreneurial Learning (EL) literature has particularly dealt with the role of entrepreneurs' stock of pre-entry experiences and knowledge in a number of different outcomes. For instance, in regard to opportunity-level outcomes, Gruber et al. (2008) found that teams with prior entrepreneurial experience identify more market opportunities than teams lacking this experience. In regard to individual-level outcomes, Lee and Jones (2008) concluded that human and social capital facilitate learning in the post-startup process. In regard to firm-level outcomes, Dencker et al. (2009) found that founders' pre-entry knowledge and management experience increase new firm survival. Consequently, there is widespread support for the important role that pre-entry experiences and knowledge play in entrepreneurship.

To a lesser extent, EL literature has considered the experiences of entrepreneurs as a flow of events involving learning. Treating experiences as a flow means being closer to the learning phenomenon, as learning is better described as a process rather than an outcome (Kolb, 2014). Even though Experiential Learning Theory (ELT) depicts individuals' learning as a dynamic and continuous process, this perspective has scarcely been used in the scholarly discussion of entrepreneurial learning. In this chapter,

we address this gap by giving more emphasis to learning as a process/flow, taking place over time during the NVI development.

Research on the connection between entrepreneurial learning and opportunity development has been limited so far. While acknowledging the important role of learning in entrepreneurial activities in general, extant research has focused more on the role of entrepreneurs' pre-entry experiences and knowledge in the discovery of opportunities (e.g. Shane, 2000, Gruber et al., 2013). Taking a process perspective to entrepreneurial learning, we ask: *how does the development of a new venture idea interplay with the entrepreneur's learning processes?*

In addressing this question, we see new venture ideas as developed over time, from starting in a rough form as a vague idea and undergoing changes and refinement during the process before they can be commercially exploited. Learning plays a crucial role in this process, given the high levels of uncertainty and ambiguity involved. However, the mechanisms of how entrepreneurs learn in interaction with the idea development are still unclear.

Addressing these issues, we aim to contribute to the literature in three ways. First, we conceptualize NVI development as a learning process, thereby adding to the vivid discussions on entrepreneurial opportunities. Second, through case studies of technology entrepreneurs, we show how the process of developing NVIs triggers entrepreneurs' learning, as well as how the resulting learning influences its further development. Third, we contribute to the literature on entrepreneurial learning by emphasizing the learning related to NVI development, attempting to distinguish entrepreneurial learning from other types of learning of entrepreneurs.

2. THEORETICAL FRAMEWORK

Entrepreneurial learning (EL)

Entrepreneurial learning (EL) has received increased attention in the past decades, fueled by the synergies between the fields of individual/organizational learning and entrepreneurship (Wang and Chugh, 2014). The study of entrepreneurial learning was inspired by human capital research, which, among others, explores the role of entrepreneurs' stock of pre-entry experiences in firms' performance (Lamont, 1972, Box et al., 1993, Cooper et al., 1994). However, by recognizing that a direct relationship between entrepreneurs' pre-entry experiences and firm performance is problematic (Politis, 2005), EL research has focused on the relationship between entrepreneurs' stock of pre-entry experiences and outcomes at the individual level, as well as on the underlying transformation process of experiences into knowledge.

For instance, entrepreneurs' stock of pre-entry experiences has been linked with the generation of new business ideas by entrepreneurs (Gabrielsson and Politis, 2012), entrepreneurs' amount of learning (Sardana and Scott-Kemmis, 2010), entrepreneurs' attitudes towards failure (Politis and Gabrielsson,

2009), the ability to manage several firms simultaneously (Huovinen and Tihula, 2008), skills for coping with the liabilities of newness and preference for effectual reasoning (Politis, 2008), and entrepreneurs' performance and aspirations (Westhead et al., 2005). Overall, EL research has sought to explain how differences in entrepreneurs' stock of pre-entry experiences result in different levels of entrepreneurial knowledge and skills. One common proposition in EL literature is that experienced entrepreneurs are more knowledgeable and skilled than novice entrepreneurs and thus, are better able to capitalize on such knowledge and skills (Politis and Gabrielsson, 2009). In turn, this is argued to contribute to superior performance at the firm-level (Delmar and Shane, 2006).

The literature on EL has largely relied on Kolb's experiential learning theory (Kolb, 2014). Even though Kolb's experiential learning theory focuses on the transformation process of experiences into knowledge, the learning of entrepreneurs has still been depicted in a quite static way by EL literature, largely seen as the result of differences in stocks of pre-entry experiences. Further, research has included examinations of individuals' learning styles, which are seen as stable states. The issue that arises from this static view of learning is that it focuses on the results of learning or its the antecedents, and does not reflect the phenomenon of learning in itself (Corbett, 2005). Despite the overall static orientation of EL research, there are also examples of studies that treat entrepreneurs' experiences as a flow. For instance, Rae and Carswell (2001) conducted life-story interviews with people who had shown a disposition to become an entrepreneur, highlighting learning as a life-long process. Such studies show the value of looking more closely into the process of learning in entrepreneurial activities.

Learning can be explored from many different perspectives, including behaviorism, cognitivism, constructivism, and social learning (Merriam and Bierema, 2013)—the behaviorist approach stresses individuals' actions and stimulus-responses mechanisms; the cognitivist approach highlights the internal mental processes in individuals' cognitive structures; the constructivist approach places the locus of learning in the construction of meaning by the individual; and the social learning perspective advances that learning has its locus in socialization/interaction activities. While particular perspectives may have gained momentum for a period of time, none of them has come to full prominence. Each approach has distinct contributions to provide, given the complex and multi-faceted nature of learning. As such, learning has been approached from a plurality of perspectives in entrepreneurship literature.

Following this plurality of perspectives to learning, the concept of entrepreneurial learning (EL) has been defined as: (1) learning how to recognize and act on opportunities (e.g. Franco and Haase, 2009); (2) learning how to initiate, organize and manage ventures (e.g. Cope, 2005, Rae, 2005, Rae, 2006, Berglund et al., 2007, Huovinen and Tihula, 2008, Voudouris et al., 2011, Miller, 2012, McCann and Vroom, 2015); (3) learning how to work in entrepreneurial ways (e.g. Rae, 2000); (4) learning how to accumulate and update knowledge (e.g. Minniti and Bygrave, 2001, Ravasi and Turati, 2005); (5) the construction of meaning in the process of entrepreneurship (e.g. Rae and Carswell, 2001, Thorpe et al.,

2006, Kauppinen and Juho, 2012); (6) a process where entrepreneurs transform direct and indirect experiences into knowledge in disparate ways (e.g. Young and Sexton, 2003, Politis, 2005, Holcomb et al., 2009, Sardana and Scott-Kemmis, 2010, Westhead and Wright, 2011); (7) a cognitive and social process through which knowledge is generated, articulated and distributed (e.g. Fang et al., 2010, Cope, 2011); (8) the development of entrepreneurial skills and entrepreneurship-specific behaviors (e.g. Matlay et al., 2012); (9) and the development of attitudinal competencies such as resilience and self-efficacy (e.g. Becot et al., 2015).

On the one side, EL is seen as the learning of the entrepreneur during creation and organizing a new firm. Emphasis is thus given to new firm creation. On the other side, EL refers to the learning processes in the recognition, evaluation, exploitation and/or creation of opportunities. Emphasis is thus given to entrepreneurial opportunities, regardless of whether they involve the creation of a new firm. In line with the latter, this chapter advances that learning associated with the pursuit of opportunities is what defines the boundaries of entrepreneurial learning.

Experiential learning theory (ELT)

Despite EL literature has borrowed from several theoretical perspectives, experiential learning theory is frequently used as the theoretical foundation in this field of research (Wang and Chugh, 2014). ELT consists of a comprehensive, holistic and appealing set of explanations about how individuals learn. The theory posits that the acquisition and transformation of experiences into knowledge are central to the learning process, and defines learning as “*the process whereby knowledge is created through the transformation of experience*” (Kolb, 2014: 49). ELT stresses learning as a continuous process; it emphasizes individuals’ experiences from where knowledge is derived and tested out in; it highlights two opposed modes of adaptation to the world, namely by observing and acting; it acknowledges the transactions between the individual and the environment; it acknowledges that learning encompasses multiple interactions between the subject and object; and it distinguishes between different kinds of knowledge, namely personal and social knowledge. ELT is thus a holistic cognitive learning theory that assimilates the external environment in its explanation, suiting the entrepreneurship context well.

ELT emphasizes that individuals develop knowledge from a continuous flow of experiences. Knowledge is developed both by integrating new experiences into existing systems of beliefs and ideas, as well as by substituting old beliefs and ideas by new ones, when faced with confusing, disruptive situations. As ELT portrays learning as a process and not as an outcome, the knowledge that is developed in the process is constantly shaped and reshaped, never achieving an ultimate state.

Aligned with this dynamic view, the experiential learning cycle illustrates two dialectic ways through which individuals grasp experiences (through abstract conceptualizations or concrete experiences), and transform experiences (through reflection or action) (Kolb, 2014). In regard to the first dialectic (abstract/concrete), individuals grasp experiences by relying on mentalistic/symbolic representations i.e.

comprehension, or by relying on the tangibility of the immediate experience i.e. *apprehension*. In regard to the second dialectic (reflection/action), individuals transform experiences through internal reflection i.e. *intention*, or through experimentation with the external world i.e. *extension*.

ELT acknowledges the importance of the environment for the learning of individuals. However, it still focuses more on the individual at the expense of contextual conditions. While ELT does not advance that types and forms represent the ultimate reality, it still advances that individuals learn in preferred ways (learning styles)—this is so because the learner cannot process all the information from the environment, only a portion of the received information.

While behavioral theories of learning bring in the environment more emphatically, they see learning as a one-sided activity—the environment triggers responses from the individual, but the individual does not have any influence on the environment (Merriam and Bierema, 2013). The feedback from the individual to the environment is thus largely ignored by behavioral theories of learning. ELT addresses this issue by placing emphasis on experiences, which represent one important transaction between the individual and the environment.

In this study, we emphasize the interaction between the entrepreneur and the environment in the learning process. In the process of developing a NVI, the entrepreneur interacts with the environment (Dimov, 2007) in a process which is likely to trigger learning. However, importantly, the entrepreneur also actively take part in the process of developing the opportunity (Dimov, 2011, Snihur et al., 2017) and, hence, influence the environment.

Entrepreneurial opportunities

Entrepreneurial opportunities have become a key concept in entrepreneurship research. Shane and Venkataraman (2000) emphasized the importance of the concept by arguing that the field should move beyond the study of individual characteristics that supposedly differentiate entrepreneurs from non-entrepreneurs, to the study of the nexus between individuals and entrepreneurial opportunities. The introduction of this concept reconnected entrepreneurship research with economics, and had the intention of establishing theoretical boundaries for the field. Since Shane and Venkataraman (2000), much effort has been given to defining opportunities, and to discussing whether or not they are objective and independent of the perception and actions of entrepreneurs (e.g. Alvarez and Barney, 2007, Sarasvathy et al., 2010, Shane, 2012).

The discovery and creation views are the most prevalent approaches to opportunities in entrepreneurship literature. One key distinction between them is whether or not opportunities exist objectively without the action of entrepreneurs, as the definitions below clearly illustrate:

“Entrepreneurial opportunities are those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their cost of production”. (Shane and Venkataraman, 2000: 220).

“Opportunities are created, endogenously, by the actions, reactions, and enactment of entrepreneurs exploring ways to produce new products or services”. (Alvarez and Barney, 2007: 15).

More recently, the dichotomy between discovered and created opportunities has started to lose traction, given the realization that opportunities reflect the interaction between entrepreneurs’ action and structural conditions that can be conducive for entrepreneurship. Among the researchers that support this view, Garud and Giuliani (2013) argue that both agency and entrepreneurial opportunities are distributed and emergent, and thus discovery and creation interact dynamically during the entrepreneurial process. That is, entrepreneurial opportunities can be both made and found (Venkataraman et al., 2012).

Moreover, opportunities, seen as means-ends relationships (Eckhardt and Shane, 2003), can involve elements of both the discovery and creation views, depending on conditions of uncertainty (Sarasvathy et al., 2010: 82): (1) opportunities are discovered when there is the *“possibility of correcting errors in the system and creating new ways of achieving given ends”*, which assumes that only supply or demand is known, given information asymmetries among individuals; and (2) opportunities are created when there is the *“possibility of creating new means as well as new ends”*, which assumes that neither supply nor demand exists. Applying this means-ends perspective to technology-related opportunities, two situations are derived: (1) the source of the opportunity can either be the technology itself, or, alternatively, a market demand. This resembles Sarasvathy et al.’s (2010) ‘discovery’ view in that only one side of the means-ends relationship is known; and (2) both the technology and the market are unknown and consequently, developed simultaneously. This resembles Sarasvathy et al.’s (2010) ‘creative’ view.

Another issue in the opportunity discussion is the lack of construct clarity. Despite the acknowledgement of the difference between business ideas and opportunities (Shane and Venkataraman, 2000, Eckhardt and Shane, 2013), current depictions of how opportunities come into existence rarely take this into account. One of the exceptions is Vogel (2016), who defines a venture idea as a preliminary and mostly incomplete mental representation of the concept for a potential future venture, whereas a venture opportunity is a favorable combination of endogenously shaped and exogenously given circumstances. Vogel suggests a chronological order to these constructs, advancing that a venture idea is followed by a venture concept, which is finally followed by the venture opportunity.

Despite this important step in further delineating the differences between a venture idea and an opportunity, Vogel’s conceptualization does not acknowledge that a venture idea is not just the preliminary and mostly incomplete mental representation of the concept for a new venture, but it is

something that entrepreneurs work with throughout the process of creating a new venture. Entrepreneurs constantly make mental representations of anything that is pertinent to their ventures, and the venture idea is one of the most important artifacts entrepreneurs act upon during their entrepreneurial journeys. Moreover, current depictions of how opportunities come into existence often suggest linearity. Either the opportunity is the starting point for entrepreneurial efforts or it is the final destination. This does not seem to apply to real-life situations where venture ideas are constantly tried out, refined, discarded and replaced by new ones in interaction with changing structural conditions, in a co-evolution process. As such, the acknowledgement that the opportunity construct encompasses both external factors and venture ideas allows the accommodation of the apparently contrasting views between discovered and created opportunities, as it recognizes that there are situations that may be conducive for entrepreneurship, as well as it grants that the creative work of entrepreneurs plays a role in transforming environmental conditions.

This is aligned with a recent call for more clarity for the opportunity construct. Davidsson (2015) argues that, as too many different concepts have been discussed under the label ‘opportunities’, such construct is surrounded by problems. Especially problematic, in Davidsson’s view, is the application of this construct at the micro level in a prospective context, as it does not represent very well the non-actor nexus component i.e. the entity acted upon by entrepreneurs. Consequently, he has suggested for the opportunity construct to be divided into three sub-constructs: (1) *external enablers* to represent aggregate-level conditions, such as changes in regulation and demography; (2) *opportunity confidence* to represent entrepreneurs’ subjective evaluation of the desirability of a situation; and (3) *new venture ideas* to represent the non-actor nexus component.

Entrepreneurial learning and opportunities

Extant research provides different theoretical frameworks with regard to the relationships between learning and entrepreneurial opportunities. For instance, Corbett (2005), following experiential learning theory, suggested a creativity-based model for the opportunity recognition process; Dutta and Crossan (2005) proposed a reconciliation between the discovery and creation view on entrepreneurial opportunities by applying the 4I organizational learning framework; Lumpkin and Lichtenstein (2005) advanced that the opportunity recognition process is comprised of two phases (discovery and formation), and each phase requires the engagement in different learning activities (cognitive, behavioral, action learning) by entrepreneurial firms; Politis (2005) offered a conceptual framework depicting entrepreneurial learning as an experiential learning process, which plays an important role in the recognition of entrepreneurial opportunities; and Dimov (2007), building on insights from creativity research, proposed that, instead of being the result of a single insight from a single entrepreneur, opportunities emerge through continuous shaping and development of an initial idea, through social learning processes.

Empirical research on the relationship between learning and entrepreneurial opportunities has been scarce. Existing studies focus mostly on the link between different types of pre-entry experiences and the recognition of entrepreneurial opportunities. Examples include Gruber et al. (2008), who examined the connection between prior entrepreneurial experience among teams of entrepreneurs and the number of market opportunities identified; Gruber et al. (2013), who found that industry experience and external knowledge sourcing contributes to a higher number and variety of opportunities identified; Hajizadeh and Zali (2016), who investigated the role of prior knowledge, entrepreneurial alertness, and entrepreneurial learning in opportunity recognition; and Mueller and Shepherd (2016), who examined how entrepreneurs' business failures influence the identification of entrepreneurial opportunities.

From a cognitive learning perspective, extant literature has focused on the role individuals' cognitive processes play in opportunity recognition. For instance, Gaglio (2004) explored how mental simulations (e.g. rehearsing a sales pitch) and counterfactual thinking (thinking in a way that is contrary to facts) influence opportunity identification; Bingham et al. (2007) discussed the role of experience and heuristics in the capturing of opportunities; and Corbett (2007), building upon ELT, found that individuals with preference for acquiring new information through comprehension identify more opportunities than individuals with preference for acquiring new information through apprehension. While such studies have increased our understanding of opportunities under the discovery view, the mutual interactions between actor and non-actor components, i.e. the individual-opportunity nexus, have been largely overlooked, partly because of the lack of clarity for the opportunity construct, as previously discussed.

Given the overemphasis on a static representation of entrepreneurial learning, the uneven weight given to the individual entrepreneur at the expense of the individual-opportunity nexus, and the focus on opportunities as discovered, we need more theorizing on the nexus between actors and non-actors components taking a dynamic perspective, i.e. seeing opportunities as developed and individuals as changing their knowledge in relation to the opportunity over time. In particular, this chapter explores the interplays between the entrepreneurial learning processes (as an actor component) and the new venture idea development (as a non-actor component).

3. METHOD

As there is limited theory on the interplays between the NVI development process and the learning of the entrepreneur, we conducted a multiple-case study with the aim to develop theoretical understanding about such relationships, with an overall inductive approach (Eisenhardt, 1989). Even though our research process was characterized by constant interactions between theory and data (Dubois and Gadde, 2002), we focused more on the development of theory from empirical data. The research setting was entrepreneurs in Norway involved with a technology-related new venture idea. These entrepreneurs are

embedded in situations where their learning is heightened by the higher degree of newness, ambiguity and uncertainty associated with technology-related ideas.

Case selection

The cases were sampled using the following criteria: (1) entrepreneurs had to be working with a technology-related new venture idea; (2) they had to be the founders of the firm or among the founding team; (3) they had to be the lead entrepreneur in the new firm; (4) and the firms had to be located in Norway. Additionally, the 6 cases were selected in such a way that firms were diverse in relation their industry and the entrepreneurs diverse in relation to their pre-entry start-up experiences. Lastly, we also sought variation in relation to the presence of a founding team. Figure 1 summarizes the cases in this study. This is followed by a brief presentation of each case, with background information of the firm, the new venture idea, and the entrepreneurs.

Figure 1. Characteristics of cases

Cases	Firm		Entrepreneur		Team of founders
	Founded in	Industry	Habitual or novice	Role	
PharmaX	2008	Bio-technology	Novice	Co-founder and CEO	Yes
LaKs	2009	Bio-technology	Habitual	Founders	Yes
iTech	2012	IT; Programming services	Habitual	Founder and CEO	No
LibrT	2013	IT; Programming services	Novice	Co-founder	Yes
Msport	2013	Sports, Physical training	Habitual	Co-founder and CEO	Yes
SolEn	2016	Leasing of solar panel systems	Novice	Founder and CEO	No

PharmaX

This case consists of a biotechnology firm. The firm has very close relations to a Norwegian university, where basic research on how to synthesize proteins from bacteria started in the early 1990s. The firm was started to explore this technology, after it was found to be useful for industrial application.

The entrepreneur joined the research team in 2003, when the commercial potential of the technology had already been realized. He then engaged in several industry-university collaboration projects, which helped verify that the technology worked and could be applied commercially. The entrepreneur then started leading the venture.

LaKs

This case consists of a biotechnology firm. The firm has close connections with different universities in Norway. The new venture idea combines research from different academic fields, and it is aimed at the fish farming industry in Norway.

The firm has two co-founders, who are the key people ahead of its development. Each is responsible for different aspects of the business. One is a researcher in biotechnology and in charge of the technological aspect of the business, and the other is an experienced entrepreneur within the fish farming industry,

responsible for the administrative and financial aspects of the business. The entrepreneurial team started therefore with a high level of pre-entry knowledge and experience.

iTech

This case consists of a software firm. The new venture idea consists of the development of a software for improved Customer Relationship Management (CRM), an idea heavily based upon the entrepreneur's pre-entry knowledge and experiences. After the realization that the processes of management were slow and complex, the entrepreneur decided to start the firm to make a better use of the vast amount of data available to companies, and transform it into inputs for good decision making.

He is a portfolio entrepreneur with substantive experience as a manager within CRM. One of his other enterprises consists of a consultancy-based firm that invests in technology-based companies. As a general manager, he had worked with the development of applications for management systems, such as Enterprise Resource Planning and Customer Information Systems.

LibrT

This is a software firm, with close connections with a Norwegian university. The firm, through this university, has access to valuable resources such as collaboration partners. The new venture idea consists of a digital library software based on an open-source software for management of digital, electronic resources. This technology (digital library software) can be applied in different industries.

The entrepreneur, without pre-entry start-up experiences, relied more on his educational background, which combined engineering and business studies. During the startup of the firm, the entrepreneur was following a master program in entrepreneurship in the same university. This program gives incentives for students to start a new firm, and provides guidance throughout the startup process.

Msport

The firm was started with the intent to help solve the problem of widespread physical inactivity. It has close links to one university in Norway, through which the firm has access to research, potential customers and new team members. Despite having more than one new venture idea, the main idea consists of a web application that provides research-based physical training programs and innovative health indicators, such as the user's biological age.

The firm explores knowledge from three main areas: medical research, market research, and software development. The entrepreneur, through pre-entry start-up experiences, is skilled in the second knowledge area (market research). He follows a master program in entrepreneurship, in the same university with which the firm has close links (this program gives incentives for students to start a new firm – same as LibrT).

This firm works with the leasing of solar panel systems to international organizations. The firm started with the intent to solve the problem of unreliable electrical grids in Africa, where diesel generators are the main alternative to such problem. The new venture idea consists of providing solar power technology to such organizations, offering a leasing model so that they can pay per month and avoid upfront costs.

The entrepreneur relied on his educational background in economics and political economy, as well as on his previous work experiences in international organizations. His background contributed to a great extent to the formation of this new venture idea.

Data collection

Interviews were the main source of data for this study. Prior to the conduction of the interviews, we developed a case study protocol, an interview guide, and carried out a pilot study with one entrepreneur (Yin, 2013). Once we tested the interview guide, we refined our questions in such a way that it was relatable to respondents, while still appropriate for our topics of interest.

All interviews were conducted in the English language and lasted, in average, 1 hour. Following a semi-structured format, informants were asked, for instance, about their prior work experiences and educational background, about the emergence of their venture ideas, and whether their ideas had changed over time, and how. They were also asked about challenging situations during the development of their ideas, and how they dealt with these. The interviews provided us with rich accounts of how their venture ideas emerged and changed over time, as well as it allowed us to identify the learning situations throughout this process.

The interview data was combined with registry data on firms, the new ventures' websites, and LinkedIn information on entrepreneurs. Such alternative sources of data served the purpose of validating the interviews. The interviews were subsequently transcribed in Nvivo v.11 software, which was used for the analysis of the data, in combination with Excel 2013.

Data analysis

The cases have been analyzed by the coding of data into categories—each individual case was analyzed separately, and this was followed by a cross-case analysis. The data was organized in a '*case-ordered descriptive meta-matrix*' (Miles et al., 2013), which consists of the ordering of cases according to selected criteria to compare common variables. The analytical focus was on the interplays between the learning of the entrepreneurs and the NVI development. This analysis sought to unravel the mutual interactions between the learning of entrepreneurs (actor components) and the new venture ideas (non-actor component). While this analytical focus steamed from entrepreneurial learning literature, as well as from recent theorizing on entrepreneurial opportunities, the relationships between *learning->NVI*

development->learning->NVI development were achieved by an inductive approach to the data (Eisenhardt, 1989).

For building the data matrix, we identified, from the interview data, the events with relevance to both the learning of the entrepreneur and the NVI development. Thereafter, we coded the type of learning involved in these instances, as well as the implication for the NVI as a means-ends relationship. After carrying this out for each individual case, we proceeded to a cross-case analysis. At this point, we could identify significant characteristics of the NVI development as well as of the learning processes of the entrepreneurs. Having identified such characteristics, interplays between them were explored.

4. RESULTS AND DISCUSSIONS

New venture ideas

The NVIs in our sample were different in relation to how specified they were at the beginning of their development. There was a difference between the NVIs with initially well-specified means from the ones with well-specified ends. Some cases had an initial NVI that was well-formulated on the supply-side (or means-side), but largely unspecified on the demand-side (or ends-side), whereas other cases had an initial NVI that was well-formulated on the demand-side, but unspecified on the supply-side.

The NVIs for PharmaX, LaKs, and LibrT contained a high-level of specialized knowledge about their respective technologies. As such, they were specified on the means-side to a large extent, from the very beginning. As an example, the technology being explored by PharmaX consisted of a method for producing proteins from bacteria. This technology, originally developed as a research tool, was found to have potential commercial application. Hence, the initial NVI consisted of an existing, well-established technology with promising yet vague market applications. The following quotation illustrates this:

“It started out as basic research with no intention of getting commercialization or generating anything of commercial value. It started as pure basic research to understand how bacteria synthesize proteins. To aid this research, this technology was developed, not to be used commercially but just as a research tool and it turned out that this technology could also be used at industrial levels and hence it had a commercial value, but that was completely unintentional, but when it was discovered that this tool could also be used commercially, the research became more applied.” (VT., PharmaX).

The other NVIs with well-specified means also contained high-level of specialized knowledge about existing technologies. Additionally, they were shared by different actors, and this knowledge was codified to a larger extent. In PharmaX example, other researchers working with the same technology could have conceived of similar or even the same NVI. These NVIs were therefore already largely independent from the entrepreneurs from the very beginning of the process.

Contrastingly, the NVIs for iTech, Msport, and SolEn contained extensive knowledge about customer problems. As such, they were specified on the ends-side to a large extent, from the start. As an example, the customer problem being addressed by SolEn steamed from the entrepreneur's work experiences in international organizations such as the United Nations. Through such experiences, the entrepreneur realized that these organizations could benefit from alternative sources of electricity, given the lack of reliable electrical grids in the places where they operated. The initial NVI was therefore largely shaped by the entrepreneur's pre-entry experiences. Hence, it consisted of a well-specified customer problem with a vague solution to such problem:

“After I worked for the Norwegian ministry of foreign affairs, I started working for the UN first in Sudan and later on in New York at their headquarter there. That brought me to September when I started (the firm) with a colleague from the World Bank. The idea around (the firm) was something that evolved over the years, it was something that I had thought of when I was in Sudan in 2013, where diesel generators were widely used, so organizations that require electricity, they use diesel generators to compensate for the lack of reliable electrical grids. These generators require a lot of resources from the organization both because they require constant diesel, but also because they require maintenance and service, so with the development of solar systems or solar technology, our idea is that it is a cheaper and more reliable option compared to diesel... (KE., SolEn).

The other NVIs with well-specified ends were also more intertwined with the pre-entry knowledge and experiences of the entrepreneurs in the beginning of their development. In SolEn example, as the knowledge involved in the NVI was for the most part tacit and difficult to share with others, it was more dependent on the entrepreneur at the beginning of the process. However, even for these NVIs, other individuals with similar work experiences could have conceived of similar ideas.

Despite of how they started, it was possible to see a distinction between the entrepreneurs' learning [actor component] and the NVIs [non-actor component] in all six cases. Moreover, the NVIs were not contingent on the outcome of the entrepreneurial process. The ideas were still under development, and the outcome of such process was unknown. Theorizing on the interplays between the entrepreneurs and NVIs was thus possible. This would not have been possible with the opportunity construct, as it requires success. As such, we argue that it is much preferable to adopt the sub-construct of NVI, in prospective studies, to represent one important artifact acted upon by entrepreneurs, instead of the opportunity construct, as the latter inherently carries the notion of favorability.

Consequently, the cases provide support for a recent view of the 'opportunity' construct, as advanced by Davidsson (2015). In this view, the 'opportunity' construct is divided into three sub-constructs: external enablers, the new venture idea, and opportunity confidence. The cases explored in this chapter illustrated the nexus between one actor and one non-actor components, namely the interplays between entrepreneurs' learning and the new venture ideas. The NVI refers to an imagined future venture, cognized by the individual entrepreneur and/or by the entrepreneurial team (Davidsson, 2015). Even though NVIs are for the most part in the realm of cognition, all the NVIs being developed by the

entrepreneurs in our sample had been tested out in practice. Therefore, these NVIs represented the actual development of the idea over time, in interaction with stakeholders.

NVI development process

The six NVIs were developed from a rudimentary means-ends relationship to a more specified one. In line with Dimov (2007) and Sarason et al. (2006), results showed that the NVIs, instead of being the result of a single insight from the entrepreneurs, they actually emerged over time through the continuous shaping of a rudimentary initial idea into a more developed one. In this process, the NVIs were also shaped from contextual influences, where entrepreneurs interacted with different stakeholders and had to deal with contingencies.

The initial specification of either the means or ends-side of the NVIs divided their development process into two distinctive paths: (1) the search for potential market applications, for the NVIs building upon existing technology; or (2) the development of solutions to customers' problems, for the NVIs building upon entrepreneurs' pre-entry knowledge and experiences. For PharmaX, LaKs, and LibrT, the development started with creation processes [technology], and this was followed by discovery processes [searching for market applications]. For iTech, Msport, and SolEn, the development started with discovery processes [customers' problems], and this was followed by creation processes [development of solutions].

Consequently, the cases provide support for the view of opportunities as both discovered and created (Garud and Giuliani, 2013, Venkataraman et al., 2012), and help dissolve the dichotomy between the two predominant views on entrepreneurial opportunities. Rather than being opposites, the discovery and the creation views, having very different definitions over the opportunity concept, engage in different discussions. While the discovery view defines opportunities as objective external conditions, the creation view defines them as the process or result of entrepreneurs' action. These two definitions, however, do not exclude each other. They are complementary in that individual action and external conditions are always present in the entrepreneurship process.

At the same time, there were instances when both sides of the NVIs underwent changes as a result of new knowledge being acquired during their development process. Taking LaKs as an example, the NVI was also changed on the means-side due to the need of co-development of the technology [despite its NVI started with well-defined means]. LaKs operates within the salmon farming industry, and its NVI consists of a platform that can run different types of tests with salmon fish. As the platform had not been applied in this industry before, the NVI required not only the identification of specific customers' problems, but also the co-development of the technology. Technical complexity increased as entrepreneurs aimed to achieve higher commercial value. At the same time, however, they needed to ensure technical feasibility, which required further work with the technology. Both sides of this NVI, as a means-ends relationship, were therefore developed, at times.

NVI development as a learning process

The six NVIs were poorly-defined and in a rough form in the beginning of the process. Similarly, entrepreneurs' initial knowledge-base and set of experiences, while important for triggering the start of the entrepreneurial process, were not sufficient for dealing with all the events that unfolded thereafter. This dual development process was noticeable for all cases. The NVIs were modified, changed, and refined during such process. Likewise, the entrepreneurs' knowledge base was improved upon, refined, combined with complementary knowledge and skills, and replaced by newly created knowledge.

Entrepreneurs frequently described the development of their NVIs as a learning process: *"every step you take gets you into a new area of knowledge"* (DG., iTech). They often described the different stages or events in the development process as triggers for learning. As such, the progress of the NVI development required learning from the entrepreneur, and this learning fed back into the NVI development, pushing the process forward. Both the NVI and the knowledge-base of the entrepreneur were developed over time and in interaction with each other. The NVIs triggered the learning of the entrepreneurs at several occasions, and the learning of the entrepreneurs contributed to their further development.

The entrepreneurs learned continuously throughout the NVI development. Entrepreneurs' knowledge was both derived from their pre-entry experiences, as well as they were tested and reshaped in post-entry experiences. At the same time that entrepreneurs' pre-entry experiences facilitated learning, they were not reliable, at times. This is because many new events unfolded during the new venture creation process—some of these events fell within entrepreneurs' initial pool of experiences and knowledge, while others fell close to the borderline, and others completely outside of this pool. Therefore, entrepreneurs' learning was not always a linear, neat, cohesive, cumulative process where they ended up with more usable knowledge and better prepared for subsequent challenges. This is aligned with experiential learning theory, which advances that learning occurs precisely at the intersection between expectation and experience. That is, individuals always carry pre-formed knowledge and expectations to new situations, which means that all adult learning is essentially re-learning in the form of validation, refinement, or replacement of old beliefs (Kolb, 2014).

This chapter, by acknowledging that learning is non-cumulative at times, calls attention to the problem of adopting a static view to entrepreneurs' learning. Experiential learning theory has been applied in entrepreneurship literature mainly in a static way. The problem with this is the underlying assumption that learning is cumulative, i.e. the more knowledge and experiences accumulated, the better the performance of the entrepreneur in a number of different activities. In contrast, the process view allows the possibility for learning to result in non-usable knowledge, as well as it acknowledges that experiences can be confusing and ambiguous. As such, we argue for a more nuanced application of ELT in entrepreneurship—one that recognizes the importance of on-going experiences in the new venture creation process, and the possibility of experiences leading to non-useful knowledge.

The social context in NVI development

The social context within which the NVI development took place influenced the learning processes of the entrepreneurs to a large extent. Not only the entrepreneurs engaged in individual learning, transforming experiences into knowledge throughout the process (Kolb, 2014), but they also learned in interaction with others.

One predominant social context for PharmaX and LaKs was the academic research community. In the former case, the entrepreneur started to develop the NVI while undertaking a PhD in biotechnology. In the latter case, the firm had 2 lead entrepreneurs. One of them was a researcher within biosciences and aquaculture, and the other had extensive work experience in the salmon farming industry. In both cases, such an environment contributed to a dynamic and interactive learning process. Looking at this environment from a community of practice perspective (Klein et al., 2005), the academia environment is generally characterized by a high degree of knowledge-sharing activities and an egalitarian distribution of power among its members. As such, the learning processes of the entrepreneur were characterized by multiple, dynamic interactions with the members of this community. At the same time, both cases interacted with other people outside academia e.g. potential customers, investors, and other stakeholders. PharmaX had loose ties to several potential customers, whereas LaKs had strong ties with one trusted customer. For PharmaX, however, these other interactions were not as important in the NVI development process as the interactions within academia. In contrast, for LaKs, the interactions with the one trusted customer were very important too.

Similarly, the NVI development process for LibrT and Msport was embedded in an educational setting. In both cases, the entrepreneurs were part of an entrepreneurship master program, in which students are encouraged to start new firms. This master program is also characterized by a high-level of knowledge-sharing activities. However, the distribution of power within such context was slightly different than that of the last two cases. As students, these entrepreneurs experienced a higher level of power imbalance. Surely, knowledge was exchanged in many directions (students-professors; professors-students; students-students, etc.). Still, the distribution of power in this setting was not perfectly egalitarian. In that respect, the learning process of these two entrepreneurs was interactive, but more rigid than the first two cases. Through the university, LibrT had access to one important partner, which was the developer of the technology being explored by the firm. Similarly, Msport had access to valuable research-based knowledge—for instance, access to the university's research on the habits of Norwegians in regard to physical activity, as well as research on particular physical exercises and their health benefits.

Differently, for iTech and SolEn, the development of the NVI was not strongly embedded in any particular social context. Despite multiple interactions with potential customers and technology

stakeholders, these NVIs were, to a large extent, developed internally in these ventures. This contributed to a more individualistic learning process for these two entrepreneurs.

Social learning was more often than not a pervasive process for the entrepreneurs. Not only this helped them cope with ambiguity, but it also helped them develop their entrepreneurial identities [especially the novice]. When entrepreneurs interacted with others, their learning shifted away from their minds into the arena of social relations, where conflicts take place and power relations matter (Blackler and McDonald, 2000). Consequently, their learning not only consisted of acquiring/processing knowledge, but it also consisted of becoming part of a social system (Cook and Brown, 1999). As such, their knowledge was often distributed and negotiated with others in the larger environment.

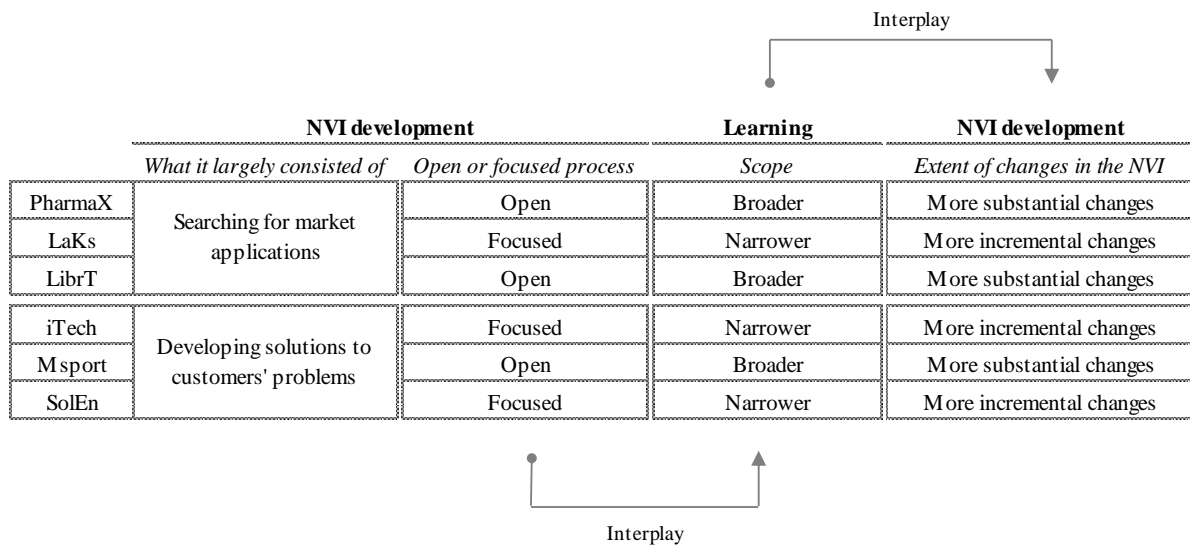
By recognizing the importance of social learning activities for entrepreneurs, this chapter contributes to the discussion about the locus of learning. Entrepreneurial learning literature usually works under the assumption that the locus of learning lies either on individuals or on organizations. When borrowing from individual learning theories, EL literature emphasizes changes in behavior and/or entrepreneurs' cognitive processes (e.g. Matlay et al., 2012, Holcomb et al., 2009). In contrast, when borrowing from organizational learning theories, EL literature highlights that individuals do not learn in a vacuum. Rather, they learn within organizational contexts, in which the individual learns from the organization and the organization learns from the individual (e.g. March, 1991).

This chapter, by illustrating the presence of both individual and social learning activities within the new venture creation process, shows that learning can be both an individual as well as a supra-individual activity taking place in a social context. This is compatible with experiential learning theory, as the incorporation of social, cultural, historical, and political factors in its discourse about how individuals learn actually enhance the understanding of experiential learning (Kolb, 2014). As such, we argue that the field of entrepreneurial learning would benefit from a stronger combination of individual and social learning theories.

Interplays between the NVI development and learning

A noticeable characteristic of the NVI development was how the missing side of the NVI was developed. This process was either an open or focused one. It was open both when the search for market applications, as well as the development of solutions to customers' problems were carried out in an exploratory way. Figure 2 illustrates such interplays:

Figure 2 - Interplays between the NVI development and learning



PharmaX and LibrT, with NVIs well-specified on the means-side, were very open in relation to which industries (and customers within a given industry) could become the target for their offerings:

"...so we started the company but were not sure exactly what was our target market because there was so many [...] so the big question then was which segments to target, should we target pharmaceutical sector? Or production of drugs? Or should we target the production of enzymes industry? and this is something that we really weren't really sure, and I think we went out pretty broad at the beginning, in the sense that okay let's see where we could get some traction and then we can narrow down the focus." (VT., PharmaX).

Likewise, Msport, with a NVI well-specified on the ends-side, was quite open in how to address customers' problems:

"...we gave them a task, it was 137 students gathered from the middle of Norway and Sweden to work in 24 hours, and it was to solve the inactivity problem for 16 year-old Norwegians because they are 2nd place in the world in sitting still, they are almost world leader in inactivity so the trend is like this, so we ask them, find a solution for this and they came up with a lot of ideas [...] so they presented 37 different commercial solutions and three of the ideas were so good that we think we want to take them and put them in our concept, and this is an example of how we work..." (MW., Msport).

On the other hand, this process was focused when market applications as well as solutions to customer problems were sought in a directed way. LaKs, with a NVI well-specified on the means-side, was very focused in relation to their targeted industry and customers, and one important reason for this was the work experiences of one of the entrepreneurs within the targeted industry:

"I have worked in the salmon farming industry and my business partner has been a lecturer for 18 years now, and a lot of his students are now in leadership positions. It is easier to get out to them if you know them in advance. That is how we have our first customer, it is a company I used to work for before I was a student, so they are really helping us but it is because they know us from before." (BV., LaKs).

iTech and SolEn, with a NVI well-specified on the ends-side, were also focused in developing solutions to their customers' problems. What influenced their focused efforts was the presence of pre-entry knowledge and experiences on a preferred solution. The following quotation illustrates this:

"... so in my case it's a lot about the combination of my background having 25-30 years as a manager, being a process control engineer [...] I had the technological knowledge as I was educated in engineering and process control [...] and also having worked with analytic tools and making those kind of tools, and then you combine things from different areas..." (DG., iTech).

In turn, this characteristic of the NVI development (open or focused process) influenced the scope of learning of the entrepreneurs. When the process was open, the scope of their learning was broader. Taking LibrT as an example, by searching broadly for market applications, the entrepreneur's learning involved testing the technology in different industries. By interacting with potential customers in different industries, the entrepreneur developed knowledge about customers' problems on a broader level:

"..it is hard to learn from your... on the sales side, I think we have done quite good, it took much more time to get the first customers than we believed and now it is much faster, and the customer did not necessarily come from where we thought it would come from..." (TD., LibrT).

On the other hand, when the process was focused, the scope of entrepreneurs' learning was narrower. Taking LaKs as an example, by searching narrowly for market applications, the entrepreneurs' learning involved testing the technology with one trusted customer in one single industry, where one the entrepreneurs had previously worked. By doing so, the entrepreneurs developed knowledge about customers' problems on a specific level:

"...we had just one trusted customer and we have a signed agreement with him [...] we have done a project testing if this could actually be done. We made a system and tested it in a farm, very simple system, and we have access to the lab in the salmon farm and we put some cheap equipment [...] we put it there and run tests in the lab there." (BV., LaKs).

Consequently, this characteristic of the learning of the entrepreneurs (scope) fed back to the development process of their NVIs, influencing the extent of changes in their ideas (magnitude). A broader scope of learning resulted in more substantial changes in the NVI. For instance, PharmaX had a major change to the NVI, when the ends-side of the idea was specified:

"The original idea was to build the company to out license this technology. The aspect that has changed is who we are targeting, we started out with this broad... going out and targeting all companies and seeing where we could get deals and then focusing on those, and now we have become a very targeted pharmaceutical supplier..." (VT., PharmaX).

On the other hand, a narrower scope of learning resulted in more incremental changes to the NVI. As an example, SolEn modified the ends-side of the NVI slightly (choice to focus on international organizations with less bureaucratic procedures), and refined how the solution would be delivered to

customers (by opting for a collaboration with a technical partner to procure and design the solar panel systems, instead of doing this internally):

"I think it became much more nuanced overtime, so our initial idea was fairly vague [...] so what we've done is we focus on the clients that have less bureaucratic procurement procedures [...] we have adjusted our business plan a little bit in terms of how much of the responsibility we take on as a company and how much we partner with other organizations, so initially we thought we would do all the procurement and design of the systems ourselves and do all these installations or be responsible for the installations and where we have moved into is that we want to have local partners that do the installation for us..." (KE., SolEn).

In sum, the NVIs, being initially well-specified either on the means- or on the ends-side, triggered the search for market applications or the development of solutions to customers' problems, respectively. This process was either an open or focused one, which determined the scope of learning for the entrepreneurs (broader or narrower). By learning broadly, the entrepreneurs implemented more substantial changes to the NVIs [as a means-ends relationship]. In contrast, when they learned in a narrower way, entrepreneurs implemented more incremental changes to the NVIs.

These interplays between the NVI development and entrepreneurs' learning is, admittedly, a simplification of such process. The authors acknowledge that the linearity implied in Figure 2 is likely to be more complex and intertwined, in reality. Moreover, the causal direction between *NVI development*->*learning*->*NVI development* needs testing and further refinement. Further, the authors acknowledge that other factors may influence the scope of learning for entrepreneurs, as well as the extent of changes in the NVI. In regard to the former, entrepreneurs' individual preference for a generalist vs. specialist learning style may have played a role in their scope of learning, for instance. In regard to the latter, regulatory changes, for example, may have influenced the triggering of more substantial changes to the NVIs. Lastly, the temporal boundaries of the NVIs have been assumed as quite open. Different from existing conceptualizations that treat them as the most incomplete mental representation of a new venture, our interpretation is that NVI includes well-developed business ideas, as well as ideas that have been tested out in practice.

5. CONCLUSION

This chapter has worked with a more precise definition for entrepreneurial learning, as extant literature usually defines the concept too broadly and inconsistently. We propose that 'entrepreneurial learning' should be conceptualized as the learning of entrepreneurs in relation to an opportunity development process. Concurrently, we have adopted a definition for the opportunity construct that recognizes its objective and subjective sides—while the objective side consists of non-actor components e.g. external situations and new venture ideas, the subjective side refers to actor components e.g. entrepreneurs' actions (Davidsson, 2015). In particular, we have highlighted the interplays between one non-actor component (the new venture idea) and one actor-component (entrepreneurs' learning).

We have looked at such interplays in an exploratory way. As such, they are to be seen as potential relationships to be further developed in future studies. Despite the entangled nature of entrepreneurs' learning and the NVI development process, we argue that it is still possible to conceptually separate them, and to theorize on how they are co-developed over time. Moreover, we encourage theorizing on the interplays between other actor and non-actor components e.g. between external situations (such as technological changes) and the decision-making processes of entrepreneurs.

This study is not without limitations. As a first step into analyzing the mutual interplays between the opportunity development and the learning of the entrepreneur, this chapter has built on retrospective data and one informant per case. Future studies should validate these findings using longitudinal approaches and more detailed case studies. Particularly, as a large share of new technology based ventures are started by entrepreneurial teams, it will be particularly interesting to examine how the learning of several team members in interaction influence on and is influenced by the opportunity development process. An entrepreneurial team does not only represent a social context of the individual members for learning, but as they jointly work on the development of an NVI, there is likely to be learning also at the team level. Extending the concept of entrepreneurial learning to account for how entrepreneurial teams learn, seems to be a potentially fruitful direction of future research. This raises questions such as: What is the relationship between individual learning and team learning? How is team learning triggered in the process of NVI development? How is the NVI influenced by individual as well as team learning during the development process?

This study has shown that entrepreneurs learn in interaction with the development of a new venture idea. This interaction process does not take place in a vacuum. It is influenced by the social context in which the entrepreneur(s) are embedded. Our findings indicate that learning can be both an individual as well as a supra-individual activity taking place in a social context. Hence, we call for integration of individual and social learning theories. Relevant questions for future research are such as: When does the NVI development process facilitate entrepreneurial learning, and when is learning hampered? Are there some ways of approaching NVI development that better facilitate learning of the entrepreneur? When is the learning of the entrepreneur taken in and contributing substantially to NVI development, and when is the transfer of learning into a changed NVI hampered? We encourage further research on the mechanisms of learning and idea development.

To conclude, this chapter contributes to entrepreneurial learning literature and to the discussion about opportunities, by exploring the mutual relationships between entrepreneurs' learning and one important artifact they act upon (new venture ideas). The authors advocate for a closer connection between the learning of entrepreneurial individuals and the artifacts they act upon, as well as the larger environment.

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