

Student venture creation: developing social networks within entrepreneurial ecosystems in the transition from student to entrepreneur

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ABSTRACT

Purpose

The purpose of the paper is to provide insight into how students navigate entrepreneurial ecosystems and make use of social networks as they create their own ventures. Such ecosystems for students are an understudied phenomenon and there is a need for more profound insights into the issue in order to build better support systems for student entrepreneurs. The study aims to increase understanding on the elements that are important in students' entrepreneurial ecosystems and how these impact on students' venture creation processes, with emphasize on the role social networks play. Student entrepreneurs account for a substantial number of the startups that come into being at universities. Understanding more about how the surroundings affects this process is important for facilitating student entrepreneurship in higher education.

Methodology

The study is qualitative and makes use of in-depth interviews with student entrepreneurs, educators and support actors in the ecosystems. Multiple actors were interviewed in order to capture different perspectives on the matter, with a total of 15 interviews conducted.

Findings

Two main findings arose from the study. First, it provides insight into elements that are perceived as important for student venture creation by the student entrepreneurs themselves, by educators and by support actors in the ecosystems. Second, it describes how the elements make up the entrepreneurial ecosystems surrounding the students, which serve as platforms from which students can develop their social networks. Therefore, the study highlights how

such ecosystems can serve as sources from which students can gain access to ideas, resources and identity processes.

Research limitations/implications

A limitation of the study is that the interviews took place in one country. Consequently, further investigation is necessary to establish whether the findings are valid in other contexts. The research has implications for higher educational institutions, policymakers and researchers concerned with student entrepreneurship and student venture creation.

Originality

The study contributes empirical findings on a topic that is currently not well understood and on which there are few empirical studies. While student ventures represent a substantial proportion of university spin-offs, the topic has received little attention compared to research on academic entrepreneurship. The study represents a step towards enhancing understanding of students' entrepreneurial ecosystems and how students gain access to resources through social network ties within these systems.

KEYWORDS:

Student entrepreneurship, student venture creation, social networks, student entrepreneurial ecosystem, entrepreneurship education, higher education.

INTRODUCTION

In recent years, there has been growing recognition of the importance of entrepreneurship for economic development (Audretsch *et al.*, 2006; Baumol and Strom, 2007). Student entrepreneurship has been identified as one potential source of new venture creation and is receiving increasing attention from universities, policymakers and scholars. The focus in policies and research on entrepreneurship in universities has traditionally been on faculties' academic entrepreneurship, but there is a growing realization that students are also an entrepreneurial force to be reckoned with (Åstebro *et al.*, 2012; Siegel and Wright, 2015). For instance, a study by Lange *et al.* (2014) shows that out of 3,775 alumni from Babson College, US, 913 were entrepreneurs. In total, these had started more than 1,300 full-time businesses and created over 25,000 jobs. Moreover, Roberts and Eesley (2011) reported that graduates from Massachusetts Institute of Technology (MIT) had created over one million jobs and generated revenues of more than US\$164 billion worldwide. In the European context, empirical studies have found that in both France and the UK the number of startups created by students and recent alumni is approximately 20 times greater than those generated by staff (Wright and Mustar, 2016). Hence, graduates who create ventures after graduation can be engines for economic growth. It is accordingly important to understand what stimulates student entrepreneurship, i.e., the process of initiation and development of a business while studying at university (Bergmann *et al.*, 2016; Nielsen and Gartner, 2017).

There have been important contributions addressing various aspects of student entrepreneurship, such as entrepreneurship education (Elert *et al.*, 2015; Morris *et al.*, 2017), co-curricular entrepreneurship activities (Morris *et al.*, 2017; Pittaway *et al.*, 2015), networking, team formation and incubators (Haneberg and Aabo, 2020; Jansen *et al.*, 2015), and university financial support (Morris *et al.*, 2017). Nevertheless, there is a need for a broader perspective to understand the complexity of the phenomenon of student entrepreneurship. The entrepreneurial ecosystem literature could provide such a lens through which one can view student entrepreneurship from a system perspective. An entrepreneurial ecosystem refers to “*the interdependent actors and factors that enable and constrain entrepreneurship within a particular territory*” (Stam and van de Ven, 2019, p. 1). The literature is relatively new within entrepreneurship research, but is rapidly expanding (Alvedalen and Boschma, 2017). However, to date entrepreneurial ecosystems have received little attention in the research on student entrepreneurship. One exception is the work of Wright *et al.* (2017), who made an important contribution by suggesting a framework for student startups ecosystems, but few empirical

studies exist on the subject. This study aims to contribute the field by providing new empirical insight into this important topic.

Within the entrepreneurial ecosystem literature, there has been a call for the integration of social network theory. Alvedalen and Boschma (2017) claim that “*little to no reference has been made to network theory*” (p. 895) and critique the entrepreneurial ecosystem literature for mostly producing lists on what an entrepreneurial ecosystem is instead of providing explanations for how it works. Social network theory has been important for theory development in entrepreneurship research (e.g. Elfring and Hulsink, 2003; Jack and Anderson, 2002; Stuart and Sorenson, 2005) and has been suggested as a theoretical perspective that could offer valuable insights into how relational connections develop in entrepreneurial ecosystems and how entrepreneurs navigate within such systems (Alvedalen and Boschma, 2017; Stam, 2015; Wurth *et al.*, 2021). This study aims to address this call by combining an ecosystem perspective with social network theory. In the examination of elements within entrepreneurial ecosystems that support student entrepreneurship, the impact of students’ social networks is emphasized. The purpose of the paper is to provide insight into how students navigate entrepreneurial ecosystems and make use of social networks as they create their own ventures; therefore, the research question is; *How do entrepreneurial ecosystems impact students’ venture creation process?*

To address the research question, a qualitative study was conducted. An explorative qualitative approach was chosen as there are few empirical studies on students’ entrepreneurial ecosystems and this is a topic that needs to be understood in depth. Since the paper takes an ecosystem perspective, actors who play different roles within the ecosystems were interviewed, i.e., student entrepreneurs, educators and ecosystem actors from incubators, public support systems and entrepreneurship programs. In the literature, student entrepreneurs are defined as individuals who explore venture creation activities alongside their university studies (Bergmann *et al.*, 2016; Nielsen and Gartner, 2017). In this study, entrepreneurs who had, initiated venture creation during their studies were interviewed. Hence, given the retrospective nature of the research design, student entrepreneurs are defined as entrepreneurs who have initiated venture creation activities while at university and who have continued to develop the venture after graduation.

The study thereby aims to provide insight into the important factors for student venture creation and into the significance of entrepreneurial ecosystems in this process. The integration of entrepreneurial ecosystem literature with social network theory in the context of student venture creation, contributes to expanding the theoretical foundations of student

entrepreneurship. This enables enhanced understanding of the structures and mechanisms that are in play when students learn to navigate the entrepreneurial ecosystem in order to gain access to important information and resources.

The paper proceeds as follows. The following section develops the theoretical framework for the study by integrating literature on student entrepreneurship, social networks and students' entrepreneurial ecosystems. Subsequently, the methodological approach is presented, before the findings from the interviews are summarized and discussed. The paper concludes by providing insights into the implications of the findings for theory, practice and further research.

CONCEPTUAL FRAMEWORK

Student entrepreneurship

With the growing recognition of the role entrepreneurship plays in economic development and prosperity, there have been many policy initiatives to stimulate it. Higher education institutions have been challenged over their role in this and the need for entrepreneurial universities has been emphasized (Etzkowitz *et al.*, 2000). The main rationale for promoting entrepreneurial universities is the belief that academic entrepreneurship could be an important driver of knowledge transfer and research commercialization (Shane, 2004; Wright, 2014). However, the evidence in terms of the effectiveness and wealth creation of academic entrepreneurship has been questioned by many (Miranda *et al.*, 2018; Siegel and Wright, 2015). In fact, several studies indicate that students outnumber faculty members when it comes to startup rates. A case study of MIT spinoffs by Hayter *et al.* (2017) found that students, not faculty members, played the leading role in the initial establishment of all the spinoffs in the sample and played a critical role in their subsequent commercialization. In addition, Åstebro *et al.* (2012) made similar findings in their study on US university spin-offs; that graduate students were twice as likely to start ventures than faculty members. Åstebro *et al.* (2012) conclude that policymakers may need to reconsider the most effective way to stimulate entrepreneurship by universities when designing entrepreneurship policies. They argue that what faculty members do in the classroom to stimulate entrepreneurship among students may matter more than faculty members' outputs in terms of university spinoffs, a topic which has received insufficient attention both in research and policy. Hence, there have been several calls for more research on students' contribution to entrepreneurial activity after graduation, since studies on university spinoffs and entrepreneurship have tended to neglect the role of students in these processes (Boh *et al.*, 2016; Grimaldu *et al.*, 2011; Hayter *et al.*, 2017).

To date, the role of universities in student entrepreneurship has been mainly focused on entrepreneurship education, while the more complex relations within the university context have been overlooked. Much of the research has concentrated on the effectiveness of entrepreneurship education, with particular focus on entrepreneurial intentions (e.g. Bae *et al.*, 2014; Martin *et al.*, 2013). The findings, however, remain inconclusive and often conflicting, as experimental studies show both positive and negative impacts (Longva & Foss, 2018). Moreover, intention research offers minimal insight on actual entrepreneurial behavior after graduation. There is evidence which suggests that entrepreneurship education makes a difference with regards to starting a venture after graduation. A study by Elert *et al.* (2015) used register data from Sweden to investigate the long-term impact of entrepreneurship education in high school. They found that participation in the Junior Achievement Company Program increased the long-term probability of starting a firm and increased expected entrepreneurial income, when compared to cohorts who did not take part in entrepreneurship education. A meta-analysis by Martin *et al.* (2013) made similar findings, but also called attention to the fact that few studies had investigated the impact of entrepreneurship education on actual entrepreneurial outcomes such as entry, performance, and survival. Apart from the work of Elert *et al.* (2015) described above, very little rigorous research design appropriate for addressing causal relationships has been applied. In terms of the value of entrepreneurship education, Jones *et al.* (2017) evaluated the career impact of such education in a quantitative study of UK alumni. They found that those who entered self-employment after graduation reported entrepreneurship education to be of significant value for their startups and gave particular importance to entrepreneurship education content, such as entrepreneurial opportunity recognition, networking, coaching, leadership, effectuation/bricolage and entrepreneurial growth

Considering students' share of entrepreneurship emerging from universities, it is important to understand which factors apart from entrepreneurship education have supported them in their pursuits. The research on this is limited, with a few exceptions. In terms of individual factors, previous studies have considered examples such as effectual and causal cognitive reasoning (Laskovaia *et al.*, 2017; Politis & Dahlstrand, 2012); prior business experience (Zapkau *et al.*, 2017); and family support and entrepreneurial family members (Bergmann *et al.*, 2016; Edelman *et al.*, 2016), all of which are positively related to new venture creation. With regards to important contextual factors, less is known. However, entrepreneurship is a social practice in which context is of the essence (Welter, 2011; Zahra *et*

al., 2014) and it is important to gain a better understanding of which contextual elements in universities are vital for student entrepreneurship and why they are so.

The importance of social networks in entrepreneurship

Within entrepreneurship research in general, it has been established that social networks are critical for the entrepreneurial process and outcomes (Jack and Anderson, 2002). During the 1980s, related research turned from focusing on individual factors to recognizing that entrepreneurship was embedded in social networks (Aldrich and Zimmer, 1986; Johannisson, 1988), and has since drawn upon seminal work within social network theory about the strength of social ties (Granovetter, 1973), structural holes (Burt, 1992) and cohesive networks (Coleman, 1988). The research stream has focused both on how networks impact the entrepreneurial process, but also on how this process impacts the development of networks (Hoang and Antoncic, 2003). Networks have been shown to provide access to resources and competitive advantage in the formation of ventures without the need for capital investment (Slotte-Kock and Coviello, 2010) and the position of entrepreneurs within a social network has implications both for the opportunities and the constraints that they face (Stuart and Sorenson, 2005). In terms of opportunities, social network ties can have impact on the discovery of opportunities, the mobilization of resources and on obtaining legitimacy (Elfring and Hulsink, 2003). More specifically, social networks can benefit entrepreneurs in the form of, for example, gaining access to information, new knowledge and advice, competencies, financial support, arenas for recruiting talent, legitimacy, self-confidence and identity development (Alvedalen and Boschma, 2017; Elfring and Hulsink, 2003; Johannisson, 2000; Klyver *et al.*, 2008; Leyden *et al.*, 2014). Moreover, social networks will be useful in different ways, depending on the stage in the venture formation process. According to Casson and Della Giusta (2007), the exploration phase mainly concerns gathering information; the resource acquisition phase deals with mobilizing labour and capital resources; while in the exploitation phase there is a need for more formalized relations and the establishment of trust with critical actors.

Facing resource constraints is a familiar situation for many entrepreneurs, while student entrepreneurs, it will be more the rule than the exception. Student entrepreneurs are in most cases novices who lack the developmental experience within entrepreneurship that entrepreneurs with expert mindsets have (Krueger, 2007). Students will in most cases not have previous work experience, industry insight or an established industry network, upon which more experienced entrepreneurs can rely. Hence, students will have less access to human, social and financial capital. These are types of capital that have all been proven to be important

predictors of nascent entrepreneurship, as well as for advancing through the venture formation process (Davidsson and Honing, 2003; Mosey and Wright, 2007). Bergmann *et al.* (2016) suggest that the regional context could play a role in the establishment of new firms by student entrepreneurs, as the ability to establish network ties will depend on this context. The notion of entrepreneurial ecosystems provides one such regional setting through which these networks can be developed.

Recent work on social networks in entrepreneurship has drawn attention to the dynamic nature of networks (Fayolle *et al.*, 2016; Hallen *et al.*, 2020, Soetanto *et al.*, 2018). According to Slotte-Kock and Coviello (2010), networks are sometimes treated as static and the literature has only recently begun exploring how network relationships are developed and transformed. The dynamic nature of social networks in entrepreneurship is particularly relevant for student entrepreneurs, who in most cases must establish and develop their network ties from scratch as the work with their startup progresses.

Students' entrepreneurial ecosystems

Having established that entrepreneurship can be viewed as being embedded in networks of continuing social relations (Aldrich and Zimmer, 1986), entrepreneurial ecosystems provide a context in which such relations are established and developed. An entrepreneurial ecosystem could be defined as the set of actors and factors that either enable or constrain entrepreneurship within a particular territory (Stam and van de Ven, 2019), while Isenberg (2014) describes it as a dynamic, self-regulating network of different types of actors. Isenberg argues that where entrepreneurial activity is taking place, there will also be important connectors and influencers who may not be entrepreneurs themselves, but rather stakeholders involved in policy, markets, capital, human skills, culture and support (Isenberg 2010, 2014). Empirical evidence suggests that the quality of entrepreneurial ecosystems is strongly related to the prevalence and performance of startup and high-growth firms in a region (Stam and van de Ven, 2019). However, the research literature has also been criticized for not being clear on how exactly entrepreneurial ecosystems can explain differences in entrepreneurship rates across regions (Alvedalen and Boschma, 2017). Hence, such ecosystems can take place at national, regional and community levels and have different shapes and content. A case study by Spigel (2017) shows that although the entrepreneurial ecosystems in the Canadian cases studied have quite different configurations, they all confer significant benefits to new ventures.

Ecosystems can also be said to exist at the university level (Morris *et al.*, 2017). Students who engage in start-ups while studying at higher education institutions are a part of a

student entrepreneurial ecosystem for students (Wright *et al.*, 2017). According to Wright *et al.*, the elements of this framework can be viewed as involving a continuum of university mechanisms aimed at facilitating student entrepreneurship from entrepreneurial awareness to students' venture creation. The research, strategy, discipline and courses of the university itself, along with the affiliated entrepreneurs, policies, support systems, incubators, accelerators, science parks and regional entrepreneurial ecosystems, all constitute important elements of the ecosystem for student startups. While Wright *et al.* sees the student entrepreneurial ecosystem as a continuum, Brush (2014) introduces the notion of layers in such ecosystems. She sees the core of such ecosystems as the internal entrepreneurship education ecosystem consisting of curriculum, co-curricular and research. This is surrounded by the school stakeholders, resources, infrastructure, and culture, as well as the local community. Despite their importance for student entrepreneurship, such ecosystems are understudied and not well understood (Miller and Acs, 2017; Wright *et al.*, 2017). Consequently, there have been several calls for empirical research that explores their drivers and effectiveness (Hv and Pillai, 2020; Miller and Acs, 2017; Wright *et al.*, 2017). There is also a need to track the experience and destinations of graduate students who have pursued entrepreneurship in order to understand more about what has impacted their journey (Jones *et al.*, 2017).

There are some studies, however, which have investigated the impact of parts of the entrepreneurial ecosystem on students' venture creation. The previously mentioned study by Elert *et al.* (2015), addresses the importance of access to entrepreneurship education in such an ecosystem. This was also found by Morris *et al.* (2017), who analyzed the GUESSS database from 25 countries and demonstrated that students' involvement in entrepreneurship-related curricular programs was positive related to their start-up activities. Moreover, Morris *et al.* (2017) found that co-curricular activities within entrepreneurship had the same positive relation, a finding supported by Pittaway *et al.* (2015) and Lerner and Malmendier (2013), with the latter emphasizing the value of learning from classmates in and outside class and the impact this has on critical evaluation of business ideas. Moreover, an entrepreneurial ecosystem that supports, either through curricular or co-curricular activities, team formation and the recruitment of students, networking with peers and industry, incubation or office space has been identified as being important for the development of student ventures (Eesley and Wang, 2017; Haneberg and Aaboen, 2020; Jansen *et al.*, 2015).

Hence, some aspects of the students' entrepreneurial ecosystem have been partly addressed; however, much remains that is not understood. Within entrepreneurship research, there has been a call for a connecting the evolving entrepreneurial ecosystem literature with

the established network theory (Acs *et al.*, 2017; Alvedalen and Boschma, 2017). For student entrepreneurs this is particularly relevant, as they need to gain access to information and resources by drawing upon and continuously developing their social networks. The context in which they do this is the entrepreneurial ecosystem surrounding them. Consequently, this study sets out to integrate the two streams of literature, entrepreneurial ecosystem and social network theory, by exploring which elements of students' entrepreneurial ecosystems are important for student entrepreneurship and how these have developed and provided access to information and resources for the students that they do not possess themselves.

METHODOLOGY

The focus of the study is students' entrepreneurial ecosystems, which is a topic where the existing conceptual and empirical literature is limited. Hence, a qualitative approach was necessary to elaborate on existing theory by drawing on the findings from the cases in the study (Eisenhardt and Graebner, 2007). In line with Yin (2009), several sources of information were used for each university location, with in-depth interviews with several key actors at each location and cross-referencing with available secondary data. The role of entrepreneurial ecosystem in the transition from student to entrepreneur is not well understood, so an exploratory approach is taken in order to better understand the mechanisms at play between students' venture creation, the ecosystem surrounding it, and how the social networks created within them play an important role. In order to cover both the student entrepreneur as well as the ecosystem perspective, a multi-actor approach was taken when collecting the data. Student entrepreneurs were interviewed about their experiences and to achieve a broader perspective that included both the university and the surrounding entrepreneurial ecosystem, educators and ecosystem support actors were also included as informants.

Data collection

Data were collected from three different regions in Norway. Student entrepreneurship has been a priority area for Norwegian higher education for several years; Norway was amongst the first countries to have a dedicated entrepreneurship education policy, established in 2004 (KD, 2004), which was followed by an action plan for entrepreneurship education in 2009 (KD, 2009). There have also been several policy efforts to stimulate student entrepreneurship, for example through the funding scheme from the Norwegian Research Council (RCN, 2019). Consequently, Norway is an interesting case to explore in terms of student entrepreneurship, considering the resources that have been used to stimulate it.

The sample included student entrepreneurs, educators and ecosystem actors. The informants were selected by contacting entrepreneurship educators at four different universities in three regions in Norway. These provided contact to both entrepreneurship educators and student entrepreneurs. In this study, a student entrepreneur is defined as one who has initiated venture creation during their studies and who has continued to work on developing the venture after graduating. Hence, the student entrepreneurs interviewed are today entrepreneurs. Since the study focuses on the transition from student to entrepreneur, for the sake of clarity the students are referred to as student entrepreneurs throughout the text. The ecosystem actors were informants who played different roles in the entrepreneurial ecosystem in which they had been in contact with several student entrepreneurs, either in an incubator, in the public support system for startups, in the university support system or in an external entrepreneurship program aimed at competence building for young entrepreneurs. These were selected based on insights from the interviews with the student entrepreneurs and entrepreneurship educators, in which important external actors emerged as a topic. In total, eight student entrepreneurs from eight different student start-ups, four educators and four ecosystem actors were interviewed. Data collection continued until data saturation was reached and additional informants did not provide additional data in line with Fusch and Ness (2015). One of the ecosystem actors was also involved in teaching and thus provided perspectives from both roles. 15 interviews¹ were conducted, each lasting between 25 and 55 minutes. More information about the sample can be found in Table 1 in relation to the student entrepreneurs and Table 2 with regard to the educators and ecosystem actors.

¹ Informant no. 8 from the student entrepreneurs and informant no. 8 from the educators and ecosystem actor is the same. A two-part interview was held, the first concerning the experience as a student entrepreneur in one city, and then the current role as an ecosystem actor in a different city.

Table 1: Sample overview of student entrepreneurs

Informant no.	Name	Region	Entrepreneurship education	Age of startup	Market
1	Alex	A	Yes. Degree.	1 year	B2B
2	Chris	A	Yes. Degree.	1 year	Consumer
3	Taylor	A	No.	1 year	B2B
4	Jamie	B	Yes. Degree.	2 years	B2B
5	Kyle	B	Yes. Degree.	3 years	B2B
6	Sam	B	Yes. Course.	1 year	B2B
7	Robin	C	Yes. Degree.	0,5 years	Consumer
8	Max	C	Yes. Course.	3 years	Consumer

Table 2: Sample overview of educators and ecosystem actors.

Informant no.	Name	Region	Role	Years of experience
1	Charlie	B	Educator	10+
2	Joe	C	Educator	10+
3	Billie	C	Educator	5+
4	Bobby	C	Educator	2+
5	Daryl	A	Educator/ecosystem actor	2+
6	Finn	B	Ecosystem actor	5+
7	Francis	B	Ecosystem actor	5+
8	Max	C	Ecosystem actor	2+

In the interviews, a semi-structured interview guide with open-ended questions was applied. In this, questions were centered around the facilitators and drivers for student entrepreneurship, important experiences and critical events (for the student entrepreneurs), and observations of experiences and critical events (for the educators and ecosystem actors). The interviews were recorded and transcribed. Due to technical difficulties, an interview with one of the educators was not recorded, but interview notes were used as the basis for the analysis.

Data analysis

The data analysis was conducted using NVivo, with the application of first and second cycle analysis, following Saldaña (2012) and Miles *et al.* (2014). For the first cycle analysis, initial

descriptive codes were employed in order to understand the factors that had been important for students in their transition from student to entrepreneur. The initial descriptive codes related to the university education were for example, business planning skills, customer insight, team members, sense of community, faculty support and role models. From these, the ecosystem perspective emerged, resulting in six main categories identifying the central elements of the students' entrepreneurial ecosystems. The coding from the first cycle analysis regarding the importance of the entrepreneurial ecosystem provided the direction for the second cycle analysis, which concentrated on the significance of social network ties based on insights from the literature. The second cycle analysis was conducted through a focused coding process outlined by Saldaña (2012), which resulted in eight social network mechanisms that were all indicated as being important to varying degrees by the study informants of the study. In the findings section below, insights into the ecosystem factors and the underlying social network outputs are outlined before being visualized and discussed together in the discussion section.

FINDINGS

The coding of the data led to six main elements, amongst which student entrepreneurs, educators and ecosystem actors were considered to be particularly important for student venture creation. Three were internal and three were external ecosystem elements. From a social network perspective, these provided access to different resources that were important in different phases of the entrepreneurial process. The findings related to the six main elements and the associated social network mechanisms are further elaborated below.

Internal ecosystem elements

The three elements shown in Figure 1 were identified as being particularly important by the informants, namely curricular activities related to entrepreneurship; co-curricular activities related to entrepreneurship; and university infrastructure for student entrepreneurship. While all were identified to be essential, it was the interplay between them that was emphasized as critical by both the informants who saw this as a facilitator of student entrepreneurship, and by those who considered the lack of an internal entrepreneurial ecosystem as something that had hindered the progress of entrepreneurial projects.

Internal ecosystem elements

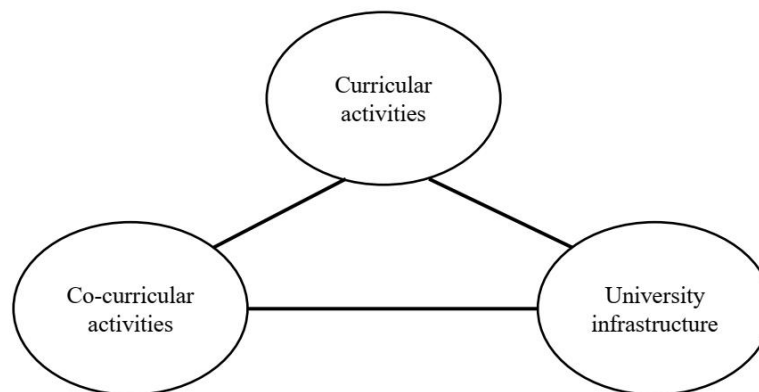


Figure 1: Overview of internal elements in the ecosystem for student entrepreneurship

Curricular activities related to entrepreneurship

Entrepreneurship education had been the starting point for seven out of eight of the student entrepreneurs interviewed. The ability to work on a project over time and receive continuous feedback had been decisive for many in terms of developing their idea and gaining confidence as entrepreneurs. One student entrepreneur described how an original idea was only used in order to have an idea to work on during courses. But through constant polishing and pivoting throughout their studies, the idea had become a venture by the end of their master's program. Alex explains: *"One of my fellow students had this idea before he started the master's. He shared it, well, actually just to learn as much as possible, I guess. So he brought the idea to class. So that is just what we did. We developed the idea in order to learn, and that is sort of what we are still doing. The more we learned, the more real it became, and suddenly we actually had a finished product."* Both students and entrepreneurs emphasized the importance of hands-on work with authentic ideas. As educator Daryl put it: *"I think it is important that students work with their own ideas and take ownership. Courses should not just be about learning about entrepreneurship, but about learning entrepreneurship through working with your own business idea. It is not a guarantee for success, but it helps both with learning and venture creation."* The aspect of authentic, hands-on ideas was also reflected in comments from the ecosystem actors, but also as a criticism that entrepreneurship education could at times be too theoretical. Finn, an ecosystem actor at an incubator explained that: *"Some of the students that we meet have done really well in courses and school competitions. They have been good at solving academic tasks. But they might not be ready for entrepreneurship. At times they have built visionary ideas that check all the boxes academically, but they are years*

away from getting the first sale. It is actually more a research project than a commercialization project.” Hence, the dynamics with external partners was emphasized as important for the orientation of students’ ideas with reality in relation to whether the ideas were viable or not.

While being important for the idea development process, entrepreneurship education was also highlighted as important for starting to build social networks as a nascent entrepreneur. The faculty gave access to *professional knowledge* and *advice*, both through courses and through informal meeting points outside of class. Moreover, meeting student peers was considered to be a fundamental part of committing to student entrepreneurship. Along with the faculty, student peers provided *social support* and a sense of belonging, with feedback given on ideas and process. Several referred to this as an *identity building* experience, in the form of finding a community of like-minded students and discovering more about oneself. Curricular activities were also important in terms of team formation and *recruitment*, i.e., meeting student peers with whom one could work together. Student entrepreneur Chris explained that *“Having a good team is essential. And students have an advantage there. We were taking classes together and found each other there and were able to work on ideas without a salary. It would be more challenging to recruit someone who is already in a full position into a student startup”*.

Co-curricular activities related to entrepreneurship

The co-curricular activities surrounding the students at campus were perceived as an important supplement to curricular activities, both by students and educators. There were different ways of organizing this at the different universities and the co-curricular activities could be centered around student organizations, student labs or class initiatives outside courses. An aspect that was mentioned by several was the role these arenas played in *social support* and *building identity*, by meeting student peers who were equally enthusiastic about entrepreneurship. The co-curricular activities were centered around events and often also a physical location. Educator Bobby reflected that *“At our university the students have a student-run makerspace. That has been really important for building a culture for entrepreneurship and innovation among students. We as teachers have limited time outside class, so students’ taking ownership of the lab has accelerated the participation in student entrepreneurship”*. At one campus, there was a student mentor service, which several participants pointed to as essential for their idea development process. It served as a low-threshold service for *advice* at the initial stages of idea development. Co-curricular activities were also important for *recruitment*. Several stated that they had recruited fellow students for short- and long-term engagements through such

activities; for example, Join-a-Startup events. One of the student entrepreneurs was not part of the original startup team, but had himself been recruited into a summer job through such activities.

Those who had not been a part of such activities stated that this was something they missed. Student entrepreneur Robin reflected that *“It is important to be in contact with people who are in the same situation. In the larger cities, there are well-established environments for startups. But from my perspective, there are fewer such environments in the more rural areas. So it is difficult to find students and entrepreneurs who have been in the same situation as you. But when I have been in contact with students or previous students who have similar experiences as me, I have gotten really valuable advice.”*

University infrastructure for student entrepreneurship

The interviews with the student entrepreneurs and the educators gave insight into the substantial differences that exist between campuses in terms of university infrastructure for student entrepreneurship. For some, the only university input into entrepreneurship was the courses offered. Student entrepreneur Max explained that *“I tried to take what I could find of entrepreneurship courses. But there were not many offered, and they were very theory focused. When we started our company it almost felt as anti-learning because none of the theories worked and we had to learn everything ourselves. There was no environment on campus that could help us either. We ended up travelling abroad for an entrepreneurship program during the summer holiday.”* The student since moved to a different city after graduation, where the startup found an environment in which its development could be continued.

One of the campuses had a substantial university infrastructure which had matured over several years in close connection with a master’s program. Student entrepreneurs from this environment referred to the student incubators, alumni incubators and advice for financial support applications as critical for their transition to entrepreneurship. During their studies, some had access to student incubators, which allowed them to share experiences with other student startups, which was considered important for *social support* and *identity building*. Several also had experiences with alumni incubators, through which graduates are allowed to stay on campus for 12 months after graduation free of charge. This gave access to university resources, faculty members who could give subject-specific *advice*, and access to *recruitment* of other students for specific tasks or part-time positions. Student entrepreneur Chris explained that *“For us, it is amazing to be here right now. Hopefully we are at a different place next year,*

where there will be other things that we need. But at the moment it is great because we can recruit students really easily. And it is easier for the student who work for us to juggle their studies and startup work. Later on, we might be able to pay more for competence and it will be more important to be close to investors. But now it is perfect. It is the hybrid incubator which makes something that is really difficult a bit less difficult.” As the quote suggests, the alumni incubator was seen as an important steppingstone in the transition from student entrepreneurship to an industry incubator, which some of them had not felt ready for immediately after graduation.

The importance of an integrated internal ecosystem for student entrepreneurship

While the separate parts of the internal ecosystem are all independently important for student entrepreneurship, it is the integration between them that lays the foundation for a dynamic ecosystem. The interviews reveal that students made use of all of the elements and established social networks within them, which give access to resources that they did not possess themselves. Some resources were reached through the formal connections with faculty and classmates on courses, while others were reached through more informal meeting places within co-curricular activities and university infrastructure on campus. To sum up, it can be said that the internal ecosystem elements allow student entrepreneurs to start building a social network that gives access to professional knowledge, advice, identity building, social support and recruitment.

External ecosystem elements

Ecosystems for student entrepreneurship do not only exist within universities, but are also, to varying degrees, connected to external elements. Figure 2 shows the elements identified as particularly important by the study informants, namely industry, incubators and the public support system.

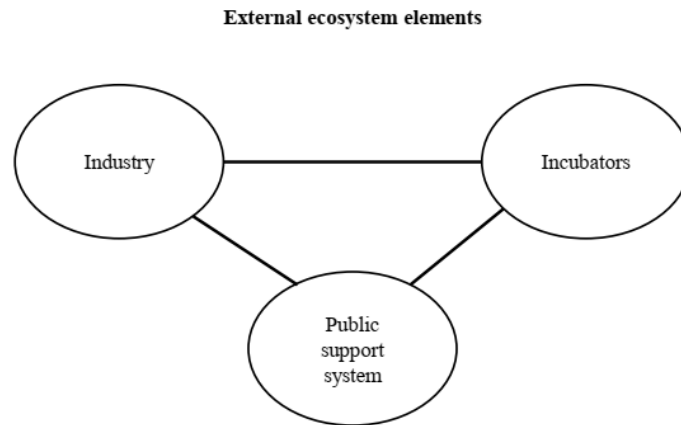


Figure 2: Overview of internal elements in the ecosystem for student entrepreneurship

Industry contact during studies

Both student entrepreneurs and educators, as well as the ecosystem support actors, highlighted the importance of close contact with industry when developing students' business ideas. In the idea development phase, industry contact was deemed to be essential, both for identifying problems based on *industry knowledge*, and *obtaining advice* that pivoted ideas. Student entrepreneur Alex recounted that *"It actually started with this case presentation, which was about something totally different. It was about using drones and radar for finding people in avalanches and we were working with that. Then there was this industry guy during the presentation, who asked if this could be used in a completely different context. We thought, well probably not, we do not know. But that awoke this idea and after a while that became the main idea which led to the company"*.

Industry contact was also highlighted by several participants as critical when evaluating ideas. Some of the student entrepreneurs recalled that it was when entrepreneurship education, mentors or competitions had forced them to make contact with potential partners and customers that they had obtained *validation* of their idea and decided to continue after graduation. The lack of industry contact during their studies was also stressed as a reason for unsuccessful exploitation of business ideas. Francis, an ecosystem actor in the public support system who had been guiding students who started ventures after graduation reflected on this: *"Well, the reasons for failing are complex, but many have perhaps made some choices based on little experience, which have turned out to be... well, actually fatal. And that is difficult to get back from. They get major adversity and it gets difficult to start all over again. For example, when signing a contract, some of them have actually been tricked. And whether that is due to lack of*

contract understanding, unclarified roles and responsibility, or not having a big enough network to look for other opportunities, there is something that leads to them to making the wrong decisions.”

Incubator access

Some of the students had moved into industry incubators after graduation, while others were in alumni incubators or co-working spaces. Two student entrepreneurs had mixed feelings about incubators. While the experience had been valuable, they did not feel that they had benefited as much as they could have done because their idea was not yet mature enough. But there were also several student entrepreneurs who expressed the opinion that incubators had been of major importance in their transition from student to entrepreneur. Taylor elaborated that *“It was fantastic that we could move right into the incubator when we graduated. We got access to a startup environment and an open office space where there were so many people with different competencies. And often competence and experience that we did not have ourselves. As a student startup you do not have resources to employ people. But in this community, knowledge and advice was free over a coffee and we used that to our advantage.”* The quote above is from a student located at a campus where the industry incubator was in close collaboration with the university’s entrepreneurship activities. According to the student, this made the transition smooth after graduation.

In addition to the *industry knowledge and advice* as described above, incubators provided access to *financial support* for some of the entrepreneurs, both directly and indirectly. But according to Finn, an ecosystem actor at an incubator, the key benefit was that: *“... it makes them more disciplined and focused. When they start here, they become a part of an environment that expects something of them and take them seriously. Here, we focus on sales and reaching the customer, and those who succeed become important role models for the others.”* Hence, the transition was referred to as tough by the ecosystem actor, as well as by some of the student entrepreneurs and educators. At the same time, it was perceived as a *validation* of the idea to be taken seriously and that someone had high expectations and did not treat them as “just students”.

Public support system

Financing of new ventures is critical for all entrepreneurs, but especially for student ones who might not have private savings or investor networks to rely upon. Educator Joe highlighted this as the main reason for students giving up on their ventures: *“When they are finished with their*

education some get family and other financial obligations. So to live on a couch and eat oatmeal is hard for many. The challenge is to have time to work with the idea, while at the same time having a secondary source of income”.

Several of the students highlighted the public support system as critical for their continued existence as entrepreneurs. Student entrepreneur Alex explained that *“We would not have been able to make it without [public support organization] and [public support fund]. Companies need money to survive and when you are finished studying you need to have a salary. You do not necessarily need that much, but you need something to live by. It is always possible to work part time somewhere, but it gets sort of half-way and you do not get the full focus that you need. If you are going to excel with a startup, you need to be dedicated and focused.”* The student entrepreneurs were all quite dependent on support from the public system and few had investors or other sources of capital. Passing through the eye of the needle in the public support system also functioned as a *validation* of the business idea and spurred renewed enthusiasm.

Reliance on the public support system also caused major frustration for those who did not qualify for it. At the same time, both students and educators reflected upon the importance of not being too generous with funding options. Student entrepreneur Jamie stated that *“Public funding is very helpful, but it is also important that it does not become a crutch. The most important thing is to get investors on board and that should be the main focus instead of writing applications.”* Educator Daryl shared his thoughts on the issue: *“Well, it might be good if the public funding options for students were extended, but at the same time they might have only supported ideas that are not entitled to life. Some of the ideas that students want to continue with are not advanced enough and it might be better to quit and start something new later.”*

The importance of external relations for student entrepreneurship

The description of the external ecosystem elements above shows that is not enough that industry, incubators and public support system are in place when students graduate, but that it is also important to include these in the ecosystem for student entrepreneurship while future entrepreneurs are still at university. Students need to encounter external ecosystem actors from early on in their idea processes. The data indicate that this will aid both idea development at university, but also ease the transition from being a student to an entrepreneur after graduation. Meeting ecosystem actors is important in establishing a social network outside the university context and giving students access to industry knowledge, advice, validation of their ideas and financial support.

Towards a model for student entrepreneurial ecosystems

Student entrepreneur Kyle attempted to describe what had been the most important aspect during the transition from the student venture to a real-life startup, saying that “*Creating a good network, that is alpha and omega*”. The findings of the study show that this was important for all student entrepreneurs and was also a recurring topic in the interviews with educators and ecosystem actors. The social networks of the student entrepreneurs are created both within the internal university ecosystem elements, as well as through connections with external ecosystem actors. The students benefit from the networks in different ways. While the internal elements are important for gaining professional knowledge, advice from faculty and peers, building identity, experiencing social support and for recruiting other students, the external elements are essential in order to gain access to industry knowledge and advice from experienced professionals and ecosystem actors, and to obtain financial support and validation of ideas when someone outside the protected university context believes in you. Figure 3 summarizes the findings in a model portraying the different ecosystem elements for student entrepreneurship, along with the associated outputs that are a result of students’ emerging social networks. The figure illustrates how students are a part of an internal ecosystem at campus through both curricular and co-curricular activities, as well as through the university infrastructure for entrepreneurship. The internal ecosystem is in varying degrees linked to the external ecosystem elements. Students can be offered opportunities to engage with the external ecosystem through activities in the internal one, or to gain awareness of opportunities for contact through information provided within the internal ecosystem.

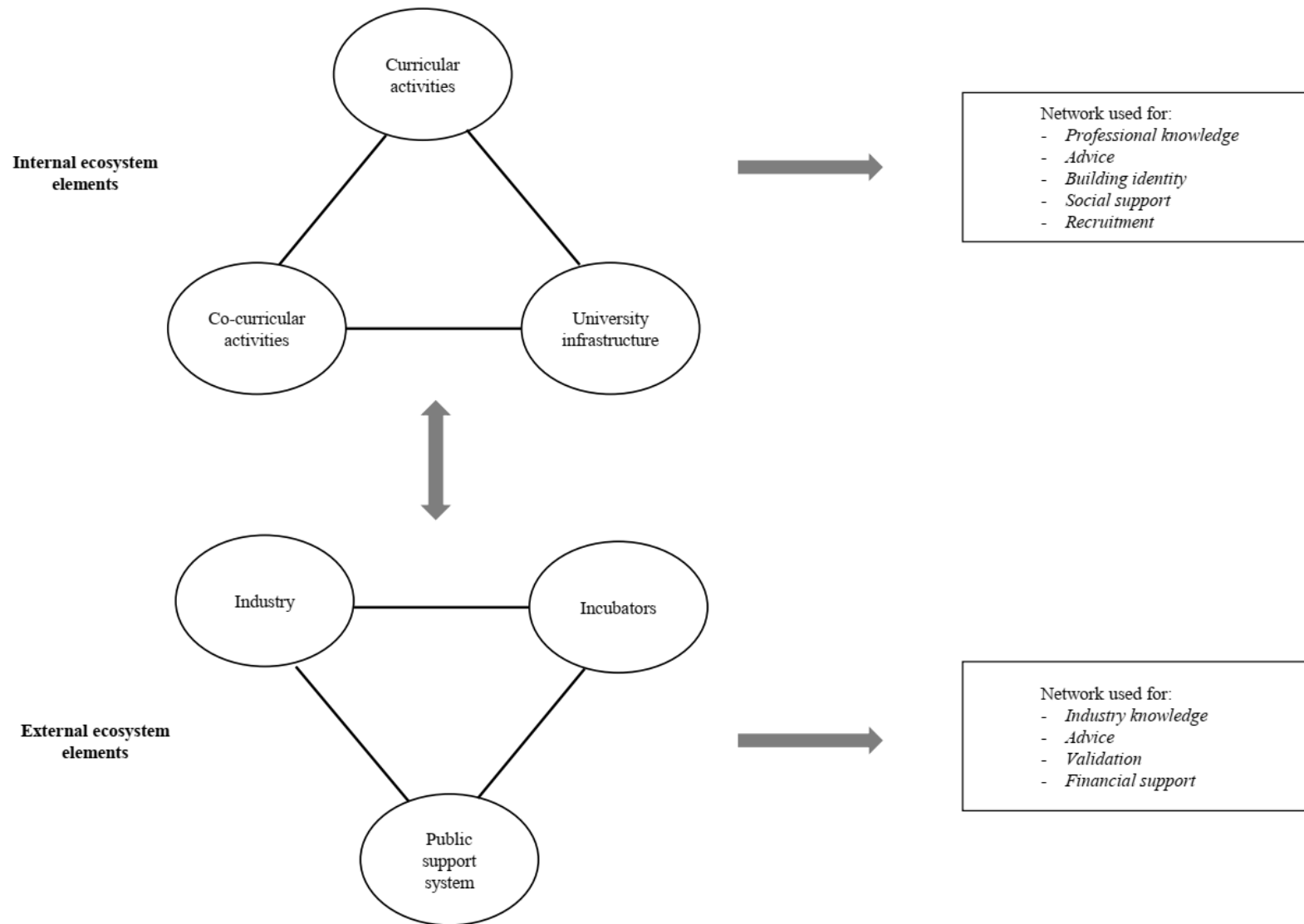


Figure 3: Overview of the ecosystem for student entrepreneurship with associated network outputs

DISCUSSION

The starting point for this paper was the research question: *How do entrepreneurial ecosystems impact students' venture creation process?* The qualitative study found three internal elements and three external ones, which were perceived to be important for students' venture creation by the study informants. These elements are shown on the left-hand side in Figure 3. The figure illustrates how entrepreneurial ecosystems provide both important activities, and meeting places where students can commence building their social networks for their entrepreneurship endeavors. The boxes on the right-hand side of the figure lists the network outputs for which the networks are used.

It has been established within entrepreneurship research that social networks are critical for the entrepreneurial process and outcomes (Anderson and Jack, 2002). Social network ties have been found to have an impact on the discovery of opportunities, mobilization of resources and on obtaining legitimacy (Elfring and Hulsink, 2003). There is limited empirical research on the importance of social networks among student entrepreneurs. However, considering that students have both limited work experience and financial resources, it can be assumed that such networks are even more important in this regard. This study shows that the ecosystem for student entrepreneurship can serve as an arena through which students develop their social networks. By utilizing the opportunities that lie within the social network ties, whether consciously or unconsciously, students can gain access to resources that they do not have themselves, thus complementing their own limited resources.

The internal ecosystem on campus

In line with Elert *et al.* (2015), Middleton *et al.* (2020) and Morris *et al.* (2017), the interviews revealed that entrepreneurship education is an essential part of the students' entrepreneurial ecosystem. Co-curricular entrepreneurship activities were also perceived to play an important role. This has received little attention in the literature, but contributions from, amongst others, Pittaway *et al.* (2015), Preedy and Jones (2017) and Morris *et al.* (2017) have given indications that this might be an important aspect. The curricular activities within entrepreneurship, the co-curricular activities and the university infrastructure for student entrepreneurship together make up the three main elements of the internal ecosystem for student entrepreneurship, similar to the structure suggested by Brush (2014). Students develop their social network ties within this ecosystem during their time at university. The data show that the social network ties support their access to professional knowledge and advice both from the faculty and student peers. This is in line with entrepreneurship research on social network ties, which shows that

access to information is an important benefit of a well-developed social network (Elfring and Hulsink, 2003; Jenssen and Koenig, 2002). Moreover, this study found that student ecosystems provide an arena for building identity, which is in accordance with Johannisson (2000), who states that entrepreneurs need personal networks in order to confirm their identities and to build self-confidence. In terms of building self-confidence, the social support of faculty and peers is also essential. Finally, students are able to gain access to human capital through the ecosystem by recruiting other students. The importance of social networks for recruitment processes has been well established since Granovetter's (1973) seminal paper on the strength of weak ties.

The external ecosystem off campus

The study shows that it is not only the internal elements within a university that are important. Strongly integrated internal elements of an ecosystem need to be closely linked to external elements, such as industry, incubators and the public support system. With regards to industry, some differences were observed in the sample. Student entrepreneurs within ecosystems less integrated with industry tended to focus on student-centric ideas within the consumer market. On the other hand, those with close links to industry were more focused on solving industry problems within the B2B market. Since this was a qualitative study of eight student entrepreneurs, no claims concerning cause and effect can be made, although the insights are in line with research highlighting the importance of industry-university collaboration for university entrepreneurship (Perkmann *et al.*, 2013). However, it was emphasized by the informants that it is important to stay close to industry in the process from idea exploration to idea exploitation in order to both validate ideas and be orientated to reality, as well as to gain industry knowledge for students' entrepreneurship projects.

A finding whose context is perhaps specific to Norway, where the study was conducted, was the heavy reliance on the public support system. Few participants mentioned venture capital as a relevant source of financing for student entrepreneurs. While specific to the Norwegian context, the reliance on university funding and public support is also to some degree seen internationally (Morris *et al.*, 2017). In this study, the public funding system was seen to be generous by those who qualified for it, but disappointing for those who did not. In terms of the students' entrepreneurial ecosystem, the importance of having an infrastructure for information and application support was highlighted. Receiving public funding was considered by many of the students as validation of their project and opened new opportunities in terms of scale and speed.

Furthermore, access to incubators was also considered important, for the physical location, community and competence they provided. In some cases, they also gave access to funding, while in others they provided valuable advice for navigating the public support system. Incubators facilitated industry knowledge and advice, both directly and through the related social networks that gave access to them. The changeover to an industry incubator when transitioning from being a student to an entrepreneur was perceived as demanding by some. However, for the student entrepreneurs who had managed the transition, it was perceived as external validation of their entrepreneurship project.

Paths through the entrepreneurial ecosystems

The overview of the ecosystem elements for student entrepreneurship is based on interviews with students, educators, and ecosystem actors. Upon closer examination of the students' entrepreneurial paths, it appears that all elements have been important for each path, but to varying degrees. A common thread in all eight students' entrepreneurial paths is the fact that during the first stages of venture creation they relied mainly on the social network within the internal ecosystem. As the venture creation progresses, it becomes apparent that there are different paths to venture creation and, more specifically, how student entrepreneurs develop and make use of their social networks in the process. For example, student entrepreneurs from region A studied at a campus with a well-developed and mature internal ecosystem. One of the student entrepreneurs from this region was working towards the consumer market, while the two others had research-intensive startups with one or few industry partners. All were still located at an alumni incubator on campus one year after graduation and were receiving public support that financed their activities. The startups were not connected to industry incubators. On the other hand, student entrepreneurs from region B were from a campus with a less developed internal ecosystem. They had different paths compared to those from region A, as they had more developed social networks within the industry and regional incubators. They were all working towards the B2B market with industry partners with whom they had established contact during their studies. However, they had faced challenges in navigating the public support system, which was perceived by some as being due to the underdeveloped university infrastructure on campus. The students from region C also perceived the internal ecosystem on their campuses to be underdeveloped. They further considered the regional external ecosystem to be immature, but had developed relations with external ecosystems at other locations during their university studies. After graduation, they had moved to these locations to continue developing their ventures.

The different entrepreneurial paths taken by the student entrepreneurs support the notion of entrepreneurship as context-dependent and socially embedded. The student entrepreneurs all developed their own particular social networks to gain access to information and resources. The context might, however, have been decisive for where the social networks developed and how they were made use of, which is in line with previous findings on network evolution (Hallen *et al.*, 2020). The development of social networks is an inherently dynamic process (Fayolle *et al.*, 2016; Soetanto *et al.*, 2018); this can clearly be observed among the student entrepreneurs, who had to construct their social networks more or less from scratch because of their limited work experience and industry insights. Consequently, the entrepreneurial ecosystems surrounding them became the context in which they constructed these networks.

Moreover, the dynamic and interrelated nature of social networks and its link to entrepreneurial ecosystems is underlined by the fact that students, by developing their own social networks, contribute to the development of the entrepreneurial ecosystem for other students. Particularly in the well-developed internal ecosystem on the campus in region A, students were following paths which previous ones had laid the foundation for. By making use of the connections that others had established before them, both within the internal ecosystem and towards the external elements, they were able to stand on the shoulders of others when starting the development of their own social networks and ventures.

CONCLUSION

This study contributes with empirical research on a phenomenon that is not well understood in the entrepreneurship literature, namely the role that students' entrepreneurial ecosystems plays in their venture creation process. Insights are also provided into six elements that are perceived to be central to student venture creation by the student entrepreneurs themselves, educators, and support actors in the ecosystem. Moreover, the study describes how the entrepreneurial ecosystem surrounding the students can contribute to building and expanding the social networks of the student entrepreneurs, which also enables them to gain access to resources they do not have themselves. Hence, the contribution of the study is that it both points towards important elements and processes in students' entrepreneurial ecosystems, but also highlights how an ecosystem is an interdependent system in which parts interact and need to be integrated in order for an ecosystem to function optimally. In nature, ecosystems are communities of organisms that interact together, with all parts being important. Hence, a damaged or

imbalanced ecosystem will not function optimally. In students' entrepreneurial ecosystems, curricular activities need to support co-curricular ones, and vice versa, and also be linked to the university infrastructure for entrepreneurship. Moreover, students' entrepreneurial ecosystems need to be connected to the surrounding entrepreneurial ecosystem and in particular to industry, incubators and the public support system. This gives rise to important implications for policymakers, who must adapt policies and support systems carefully to fit existing entrepreneurial ecosystems. It further has important implications for universities and educators, who must consider the connection between internal ecosystem elements and the regional entrepreneurial ecosystem. Moreover, it shows how important it is for students to engage with the entrepreneurial ecosystem in order to expand their social networks and thereby have input, support and resources to progress with their student ventures.

The research is not without limitations, which also indicate areas for future study. For instance, since this is a qualitative study, the findings will always be context dependent, and the objective of the study is not to generalize findings. Instead, qualitative research seeks transferability (Lincoln and Guba, 1985), and rich descriptions of the research context and findings are accordingly provided for the readers to judge the fit. This also leaves opportunities for future research; for example, to examine whether the findings are replicable in other research settings, or to examine generalizability through quantitative studies. A further limitation is the retrospective research design of the study. Narratives that are provided in interviews tend to change as time passes. Situations, relationships and the chronology of events in the past might be different to how informants remember them. Hence, further research through longitudinal qualitative studies could help overcome this challenge. Finally, the student entrepreneurs who were interviewed had all moved on to startup ventures after graduation. The interviews with educators and support actors in the ecosystem also provided several observations about students who had decided not to start ventures. Hence, an interesting avenue for further research could be to study those who had started venture creation activities as students, but decided not to continue. This could provide important insight into the barriers and challenges to continuing with student ventures after graduation.

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