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Insights

Welcome to the March issue of the *Technology Innovation Management Review*. We welcome your comments on the articles in this issue as well as suggestions for future article topics and issue themes.

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Overview

The *Technology Innovation Management Review* (TIM Review) provides insights about the issues and emerging trends relevant to launching and growing technology businesses. The TIM Review focuses on the theories, strategies, and tools that help small and large technology companies succeed.

Our readers are looking for practical ideas they can apply within their own organizations. The TIM Review brings together diverse viewpoints – from academics, entrepreneurs, companies of all sizes, the public sector, the community sector, and others – to bridge the gap between theory and practice. In particular, we focus on the topics of technology and global entrepreneurship in small and large companies.

We welcome input from readers into upcoming themes. Please visit timreview.ca to suggest themes and nominate authors and guest editors.

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Contribute to the TIM Review in the following ways:

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About TIM



The TIM Review has international contributors and readers, and it is published in association with the Technology Innovation Management program (TIM; timprogram.ca), an international graduate program at Carleton University in Ottawa, Canada.



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Editorial: Insights

Chris McPhee, Editor-in-Chief

Welcome to the March 2017 issue of the *Technology Innovation Management Review*. The authors in this issue share insights on organizational ambidexterity, innovation ecosystems, R&D outsourcing, and hybrid entrepreneurship.

In the first article, **John Fiset** from Memorial University of Newfoundland in Canada and **Isabelle Dostaler** from Concordia University in Canada examine how organizational ambidexterity manifests itself in the new product development process. In applying a typology of ambidextrous behaviours to three product development stories, the authors show how certain behaviours exhibited by project teams in response to organizational challenges promote a beneficial balance of relying on proven approaches (exploitation) while simultaneously introducing new ones (exploration).

Next, **Katri Valkokari** and **Maria Mäntylä** from VTT Technical Research Centre of Finland, **Marko Seppänen** from Tampere University of Technology, Finland, and **Simo Jylhä-Ollila** from the Elisa Corporation explore how firms can orchestrate innovation ecosystems to enhance collaboration for innovation among different actors. Through a qualitative case study of 35 startups and established firms in the metal and engineering industries, the authors identified an essential ecosystem competence needed by all actors in an ecosystem: the ability to manage dynamic strategic interactions related to innovation.

Then, **Iivari Kunttu** from the University of Vaasa in Finland presents a tool to help R&D managers decide which tasks and projects are best performed in-house and which should be outsourced to external suppliers. The tool was developed through a qualitative multiple case study based on R&D supplier relationships and has been empirically tested in an R&D organization. It provides a practical but theoretically grounded way to rapidly evaluate and compare internal R&D capabilities with those available externally.

Finally, **Marina Z. Solesvik** from Nord University Business School in Norway examines the motivations and policy implications of hybrid entrepreneurs – individuals who combine employment with entrepreneurship. Based on a longitudinal case study in which Solesvik followed two entrepreneurs over nearly a 10-year period, she proposes a future research agenda emphasizing that hybrid entrepreneurship may be a valuable stepping stone to full-time entrepreneurship or it can also be a desired outcome in its own right.

In April, our editorial theme is **Cybersecurity**, and I am pleased to welcome guest editor **Michael Weiss** from the Technology Innovation Management (TIM; timprogram.ca) program at Carleton University in Ottawa, Canada.

For future issues, we are accepting general submissions of articles on technology entrepreneurship, innovation management, and other topics relevant to launching and growing technology companies and solving practical problems in emerging domains. Please contact us (timreview.ca/contact) with potential article topics and submissions.

Chris McPhee
Editor-in-Chief

About the Editor

Chris McPhee is Editor-in-Chief of the *Technology Innovation Management Review*. He holds an MASc degree in Technology Innovation Management from Carleton University in Ottawa, Canada, and BScH and MSc degrees in Biology from Queen's University in Kingston, Canada. Chris has nearly 20 years of management, design, and content-development experience in Canada and Scotland, primarily in the science, health, and education sectors. As an advisor and editor, he helps entrepreneurs, executives, and researchers develop and express their ideas.

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Opening the Black Box of Ambidexterity: Three Product Development Stories

John Fiset and Isabelle Dostaler

“*In an apparent defiance of logic or of physical possibility, the creative person consciously formulates the simultaneous operation of antithetical elements and develops those into integrated entities and creations. It is a leap that transcends ordinary logic. What emerges is no mere combination or blending of elements: the conception does not only contain different elements, it contains opposing and antagonistic elements, which are understood as coexistent.*”

Albert Rothenberg
In *The Emerging Goddess*

Organizational ambidexterity, which can be roughly defined as the ability for organizations to combine old and new ways of doing things to meet organizational objectives, has drawn considerable attention in the management literature in recent years. Authors distinguish clearly between structural ambidexterity, which implies that ambidextrous organizations are firms in which groups of people concentrate on traditional business or ways of doing things while others explore new avenues, and contextual ambidexterity, which characterizes companies where any individual can be ambidextrous. Our research is positioned in the contextual ambidexterity perspective. In this article, we apply the typology of four ambidextrous behaviours developed by Birkinshaw and Gibson (2004) to increase our understanding of the process whereby organizational actors are able to build on existing capabilities or business processes while developing new ones. Our results indicate that at least three of the ambidextrous behaviours proposed by Birkinshaw and Gibson (2004) (initiator, broker, and multitasker) are helpful to understand how new product development team members rely on proven approaches while simultaneously introducing new ones to successfully overcome daily challenges. Practitioners should be encouraged to become familiar with the concept of ambidexterity, to recognize when and how the successful combination of old and new ways of doing happens, and to promote these occurrences.

Introduction

Although the tensions between exploitation and exploration (and between adaptability and alignment) have been discussed at length in the classic management literature (March & Simon, 1958), Duncan (1976) was the first author to employ the term ambidexterity. He used it to refer specifically to the structure of organizations that are able to find a proper balance between the conflicting objectives of remaining aligned (i.e., maintaining coherence among the patterns of current activities) and adaptable (i.e., being able to quickly reconfigure activities to meet changing environmental demands). Duncan's (1976) solution for finding a balance between

alignment and adaptability objectives relied on creating dual structures within the same organization. This partitioning of the organizational groups for the purpose of focusing on separate objectives has been termed structural ambidexterity (Benner & Tushman, 2003; Duncan, 1976; Tushman & O'Reilly, 1996). More recently, Wang and Rafik (2014) have identified structural ambidexterity, cyclical ambidexterity, and reciprocal ambidexterity as the three different types of a “bi-polar construct”.

There has been some debate regarding the difficulty of having two separate groups present within the same firm (Lewis, 2000), and a number of studies have docu-

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mented that firms may resolve this difficulty by combining divergent features (Adler et al., 1999; Jansen et al., 2005). Gibson and Birkinshaw (2004) argued that contextual ambidexterity enables individuals within various business units to make their own judgments about the best way to resolve the conflicting demands they face on a daily basis. Unlike structural ambidexterity, contextual ambidexterity does not rely on separated groups to manage competing goals. Rather, alignment and adaptability goals are managed concurrently by each employee. The fact that this distinction between structural and contextual ambidexterity is clearly mentioned in the definition of ambidexterity available on Wikipedia (2016) suggests that it is well established.

Gibson and Birkinshaw (2004) use four constructs to describe the context that will allow organizational actors to combine alignment and adaptability: stretch, trust, support, and discipline. Stretch challenges individuals to strive to accomplish more. Support takes into account the accessibility of tools and information as well as the willingness of group members to collaborate. Discipline focuses on how members commit to objectives that they have set for themselves. Finally, trust is the ability to rely on others to meet agreed-upon commitments.

When reporting in the *MIT Sloan Management Review* on the three-year ambidexterity research project that they had conducted across ten multinational companies, Birkinshaw and Gibson (2004) were particularly explicit about what it means to be ambidextrous. Writing for a practitioner audience (the same year as their seminal *Academy of Management Journal* paper on contextual ambidexterity was published) seemed to have forced the researchers to be more precise (or less abstract). Hence, they proposed a typology of four ambidextrous behaviours, stating that ambidextrous individuals: i) take the initiative and easily identify opportunities, or ii) are willing to cooperate with others, or iii) act as brokers always looking to build linkages, or iv) are multitaskers (Birkinshaw & Gibson, 2004) (Table 1). The authors clearly indicate that these behaviours should be observable in organizations that are contextually ambidextrous, namely characterized by a context with proper levels of stretch, trust, support, and discipline. Although their article has been referenced over 600 times, only a handful of authors, including Mom, Fourné, and Jansen (2015), have built on the four ambidextrous behaviours introduced by Birkinshaw and Gibson.

Table 1. Ambidextrous behaviours (adapted from Birkinshaw & Gibson, 2004)

Behaviour	Description
Initiator	Ambidextrous individuals take the initiative and are alert to opportunities beyond the confines of their own jobs.
Cooperator	Ambidextrous individuals are cooperative and seek out opportunities to combine their efforts with others.
Broker	Ambidextrous individuals are brokers, always looking to build internal linkages.
Multitasker	Ambidextrous individuals are multitaskers who are comfortable wearing more than one hat.

Building on the above typology, the research we report on in this article aimed to answer the following question: how does ambidexterity manifest itself in the new product development process? Although a considerable amount of ambidexterity research has focused on the antecedents and impacts of ambidexterity, there is still a need to understand how ambidexterity manifests itself in day-to-day organizational life. In other words, we argue that the ambidexterity “black box” has not been completely opened, and our research goal is to contribute to further opening it. We therefore examine several “episodes” of three product development “stories” to find out if and how organizational actors were able to combine alignment and adaptability activities. Each episode starts with a triggering event (Schmitt et al., 2010) that gives product development team members the opportunity to demonstrate an ambidextrous behaviour (Birkinshaw & Gibson, 2004). In the next section, we will describe the methodology that we used to answer our research question.

Methods

The product development stories reported here are based on empirical material that was collected during interviews with project team members. We omit the names and locations of participating companies and their industries to ensure anonymity. We conducted 24 interviews with actors at various hierarchical levels of new product development teams, including some team members who were in charge of coordinating the design work subcontracted to various suppliers. We

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asked each senior interviewee to provide the names of up to three direct reports for subsequent interviews. This snowball method of data collection continued until we had interviewed actors from all hierarchical levels of the three new product development teams.

In each interview, we asked respondents to describe a particularly important change or challenge (i.e., triggering event) they had faced within the past six months as well as how they reacted to it. We focused on a six-month period prior to the interview in an effort to collect rich material without having to dig too far back in the respondents' memory. We recorded and transcribed all the interviews and analyzed the transcriptions to isolate the triggering events and determine whether the actor's reaction to it demonstrated an ability to combine adaptability and alignment behaviours. In the sections that follow, the results are presented as three product development stories.

Story 1: All or Nothing

This first product development story took place in a manufacturing company that was in a challenging competitive situation. The sales of its main product line were stagnant and the organization was losing ground to its key competitor. The only way that the company could succeed was to create an innovative design that integrated the latest technological advances in order to offer the most efficient product on the market. The new product was intended to have a strong symbolic value with the goal of it eventually becoming the flagship product of the organization. Furthermore, this project was the largest endeavour taken on by this organization thus far, both in terms of cost and scope; it was a financial gamble as it could either be a successful venture ensuring the survival of the company, or a failure that could cause the downfall of the organization.

This new venture also represented an opportunity to implement cross-functional product development teams in which supplier representatives, customer service team members, and designers were co-located. In the new product development literature, such teams are recognized as efficient integration mechanisms (Adler, 1995; Oliver et al., 2004). One manager described the structural change as follows: "What we are trying to do is essentially change the way the whole company behaves."

For the new project to be successful, the organization had to create a highly innovative product that suited

customer needs and would be delivered to them in a timely manner. Individuals involved in this project experienced significant deadline stress because top management insisted that each team must not "fail to deliver."

Next, we now consider four discrete episodes of this first product development story, during which organizational actors demonstrated ambidextrous behaviour.

Organizational actors as brokers

We identified two episodes during which organizational actors played brokering roles. In this first episode, the triggering event was the interruption of the project's concept definition phase because top managers were not convinced that the specifications of the product were meeting market requirements. The specifications had to be optimized before developers could start the detailed definition, which forced managers to reduce the number of employees working on the project to only conceptual design team members. In reaction to this trigger, some managers acted as brokers and used their contacts within the organization to re-allocate employees not involved in conceptual design and assign them to other projects or functions. Along with this allocation to other projects was an assurance that, once the concept design was fully optimized, these relocated employees would be able to work again on the new project.

Once potential clients and top managers became satisfied with the optimized concept design, a ramp up was initiated and internal transfers as well as external hiring began in earnest. The project managers kept their promise and offered a position to all employees displaced during the optimization process. This ingrained trust attained from management upholding their word contributed to a much smoother ramp up of employees, given that many had previously worked on the project and could help train new employees.

We see this episode as a good example of a process through which organizational brokers manage not to lose the project-specific knowledge embedded in the team members who were relocated and eventually came back to the project team. As a result, creative work could be undertaken to optimize the design of the project while existing tacit product development knowledge acquired in the initial stages of the project was retained within the organization through project re-allocation. Thus, exploration and exploitation were therefore combined simultaneously to ensure consistent deliverable attainment during the project ramp up.

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The second episode during which an organizational actor acted as a broker was triggered when a phase of the design project was almost completed and the structure of the organization started to change in preparation for the beginning of another phase of the project. Because this restructuring exercise took place at the same time as the transition phase, a number of communication problems arose: employees were unclear of their responsibilities and the rationale behind the changes. In response to this triggering event, one team leader helped employees recently transferred under his supervision to complete their initial projects so that they could all focus on the next phase of the project together. Playing a broker role, this team leader helped his team to carry out the ongoing work while adapting to the structural change made necessary by the beginning of a new phase of the design project.

Organizational actors as initiators

We identified two episodes during which organizational actors played initiator roles allowing exploitation and exploration to be combined. A first episode took place when the detailed design phase resumed and the size of the design team grew considerably. We interviewed a section chief who had recently joined the company. This individual had years of experience working in another firm where he always knew where to go for assistance on a particular problem. He realized that he felt rather isolated after joining an organization where he did not know anyone. During a continuous improvement brainstorming session with the project director, the new section chief discussed his difficulty finding experts within the firm to help him with his work and asked how other recent hires overcame similar hurdles. From this triggering event, he was tasked by the director to produce a contact list that each new project team employee would receive as part of their welcome package. This initiative proved to be an efficient method to make veteran personnel more accessible to new team members in need of advice and mentorship.

The second episode in which an organizational actor played an initiator role took place during a team meeting held early in the project. One of the managers that we interviewed explained that project team members seemed to have the bad habit of wanting to “change and improve just for the sake of change.” This mindset stood in stark contrast to the notion of ambidexterity, given that past knowledge was being discredited without consideration instead of being incorporated into new thinking. This excessive emphasis on change reached a breaking point at a project team meeting

when one employee interrupted the group and said, “Wait a second. Do you realize what you are doing and how you are mixing up everybody? We must go back to basics. Before we decide that we want to change something, let’s ask ourselves why.” This triggering event led to the implementation of a formalized change process. Improvement suggestions were discussed in groups and captured in a list of the top ideas. Volunteers would then provide their own timeline for implementing one of the listed improvements. This formalized approach included a vetting process where existing capabilities were examined to decide whether a completely new way of doing things was necessary or whether minor changes could bring about a solution instead. As with the previous episode, the response to this challenge illustrated a dialectic process through which organizational actors managed to exploit existing capabilities while exploring new ones.

Story 2: Time to Modernize Our Product

The new project development team featured in this story was working on a new, modernized version of an existing product in response to a competitor’s product that had outperformed theirs. The company realized that they needed to respond quickly to this new design, or they would lose valuable market share.

Organizational actors as initiators

We identified two episodes of this second new product development story during which organizational actors played initiator roles allowing exploitation and exploration to be combined. The first episode started when one director that we interviewed formed the opinion that organizational members tended to focus on meeting short-term goals to the detriment of long-term objectives. This director initiated a number of changes that resulted, according to him, in a different managerial approach: “[the company] has moved towards a much more holistic view of management and a much stronger long-term focus.” We noted that, during the interview, the director seemed careful not to be too judgmental of past management approaches, given that they were very successful. Rather, he stated that, “You can have a strong long-term vision and it can have a real effect on the plans of the company in the coming years, yet still have a focus on what is happening today, without undermining the strength of the organization and the ability to achieve stakeholder goals.” These comments point toward an ambidextrous process through which organizational actors were making an effort to learn from the past and use this knowledge to deal effectively with new challenges.

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Revamping the product involved considerable redesign effort. However, the inevitable pressure to control costs forced the group to consider the optimal use of all the resources including various specialists within the organization. A second episode during which organizational actors played initiator roles was triggered by the fluctuating demand for key specialists within the organization. Organizational actors initiated the creation of a centre of excellence in which all expertise in a specific domain was centralized. Bringing all the resources together served to smooth out the variance in demand because the specialists could be allocated to teams as they were needed. Through this process, the organization managed to adapt to the cost pressure from the competitive environment by hiring fewer contractors. At the same time, this initiative favoured the leveraging of internal expertise as well as its improvement.

Story 3: Let down by a Key Supplier

In this third story about the new project development project, the company studied had decided to design a product using a completely new material in the hope of gaining a significant competitive advantage. The relatively recent introduction of this material in the industry made it difficult to find a sufficient number of employees comfortable with its use. Some of the design and production work had therefore been subcontracted to an overseas supplier. Unfortunately, the supplier filed for bankruptcy protection and the focal company needed to decide whether or not to develop the competencies in-house or shutter the project completely. The decision to continue with the project created significant upheaval in the organization because it required hiring new designers, bringing together expertise, and learning new techniques – all in very short order. The organization needed to be particularly cost-sensitive at this time because they were developing new expertise during a period where their cash flow position was particularly weak. As a result, organizational members were asked to delay spending as much as possible and to optimize what was being purchased. Surprisingly, this vigilant eye on spending seemed to be taken more as an opportunity to display the team's professional skill than a negative constraint on their ability to successfully run the project.

Organizational actors as initiators

We identified three episodes during which organizational actors played initiator roles allowing adaptability and alignment to be combined. The first episode started shortly after the company learned that its supplier filed for bankruptcy. This news came as a major sur-

prise to all, and there were no contingencies planned for this eventuality. Senior managers looked around the industry to see if there was another supplier capable of taking on the work and eventually decided that “the best choice was to go ahead and consolidate our own internal resources and augment those by hiring new people,” as mentioned by one manager that we interviewed. This approach proved to be a significant challenge because the supplier's host nation had strict bankruptcy laws that prevented the company from hiring employees from the bankrupt company. Organizational actors were nonetheless able to combine exploitation (i.e., consolidating existing internal resources) with exploration (i.e., hiring new people).

The second episode started when the organization wanted to improve how they met commitments. A new director was brought in, and his mandate was to change the culture from one that was, in his words, “official and stuck to one that is more entrepreneurial and innovative.” He explained that he tried to be very inclusive and asked for input on how to efficiently meet buyer commitments. From these discussions, he produced a list of cultural changes that he believed needed to be implemented immediately. He referred to this list as a collectively developed “charter” and added: “as far as the path that we would take for change, I think [the development of the path] was 30% mine and 70% my team's.” The production of this charter represented a process through which existing and new ideas for improvement were combined and helped to demonstrate the importance of supportive leaders in the development of cohesive and ambidextrous teams.

The third episode took place when a manager was put in charge of the product testing, which provided essential data to many other organizational actors. Given the level of novelty of the product, this manager took the following initiative: “We went through all the lessons learned and saw if they were still applicable or not. Also, we made sure that we were addressing them so we would not repeat some of the mistakes that we have done in the past.” Through the examination of the past lessons learned, organizational actors became open to new ideas while continuing to believe that a strong sense of the past is a source of competitive advantage.

Organizational actors as brokers

We identified two episodes during which organizational actors played the role of brokers. The decision to carry out the design in-house with a previously unused material resulted in a radical change in the composition of the work force, from small groups of engineers

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playing a liaison role with the supplier to much larger groups of designers. During this first episode, the organization was able to meet this challenge by including actors from upper and lower levels in frequent discussions, resulting in quick and efficient decisions, thus easing the process of combining existing capabilities with new ones.

The second episode was triggered during a meeting when a major problem was found in the product design. The manager's reaction to this triggering event was to challenge all the team members involved to find alternatives that would satisfy all stakeholders. After long debates, a consensus eventually emerged, as the manager explained to us: "We started working with the stakeholders, we built a mockup, we ran through it, and everybody ended up being happy." The broker role played by this manager led organizational actors to put a new spin on an existing idea and still manage to clear the design with all stakeholders.

Organizational actors as multitaskers

Despite the efforts that were made to cope with the numerous challenges inherent in their industry, the company continued to suffer from a critical shortage of highly trained personnel. One organizational actor that we interviewed mentioned that he was responsible for three separate sub-assemblies of the product and had to make sure that they fit together perfectly during the manufacturing process: "each of these three sub-assemblies had their own demands that I had to fulfil, and sometimes you have to neglect one to work on the other." During our discussion with him, this actor said that he was really doing the work of two employees, due to a lack of personnel. He even added that "there are others in the group who are doing the work of three or four." The fact that various actors take on multiple roles suggests an apparent lack of organizational slack. This episode also indicates that the organizational resources are used as much as possible in a context where the organization was also forced to develop new capabilities.

The lack of trained personnel prevented one manager, who was responsible for two different groups of designers, from providing adequate support to his subordinates. His dual role also led him to take care of both administrative and technical issues at the same time. To solve his problem, he created for himself a new role that encompassed all the administrative and strategic work related to the two design groups, while the supervision of the technical work was delegated to another individual. The process by which this manager took on a new strategic role while ensuring continuity by promoting someone below him to manage technical issues and provide support to the two design teams illustrates a combination of adaptability and alignment.

Discussion

In the various episodes detailed above, we have seen organizational actors enacting various ambidextrous roles in response to triggering events, allowing them to build on what their organization excelled at while designing new ways of doing things. The stories provided rich answers to our research question by showing how contextual ambidexterity manifests itself in the new product development process. As summarized in Table 2, our findings include observations of 13 instances where individuals demonstrated ambidextrous behaviours: seven acted as initiators, five as brokers, and one as multitasker. When coding the data, we soon realized that the cooperator role suggested by Birkinshaw and Gibson's (2004) was too similar to the broker role and we therefore only used the latter. It is puzzling that we only had one episode to report where an organizational actor engaged in multitasking to combine exploitation and exploration, given that, from a conceptual standpoint, it is easy to understand how engaging in multiple roles can help combine exploitation and exploration.

The competitive environments and the organizations studied in this research are shaping each other, and this process generates very concrete triggering events, such

Table 2. Summary of observed ambidextrous behaviours

Behaviour	Story 1: All or Nothing	Story 2: Time to Modernize Our Product	Story 3: Let down by a Key Supplier
Initiator (7)	2	2	3
Broker (5)	2		3
Multitasker (1)			1

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as the interruption of the concept definition phase resulting in job cuts or the change in the composition of the work force in the aftermath of a key supplier bankruptcy. Triggering events are interpreted by actors as situations needing to be acted upon; some actors seem to be very good at responding in a way that builds on what the organization is already good at (alignment; exploitation) while favouring the development of new and creative ways of doing things (adaptability; exploration). Finding alternative positions for designers elsewhere in the organization following the interruption of a project and offering them the possibility of rejoining the team when the design project resumes is an example of ambidextrous behaviour. When organizational actors are not able to combine adaptability and alignment, they tend to resolve the dilemma by choosing one or the other. We posit that choosing adaptability over alignment could result, for example, in creating products that would be perceived as “too novel” by the market to which they are destined, or in creating organizational processes, structures, or strategies that would not be perceived as legitimate by the institutional environment. Conversely, organizational actors that would systematically favour alignment behaviours over adaptive ones could contribute to decisional and institutional inertia. We believe that ambidexterity acts as a “muscle” that needs to be developed and nurtured – a muscle that may contribute to the long-term survival of the organization. Such a nurturing process is even more prevalent in contextually ambidextrous organizations in which any actor can learn to combine alignment and adaptability.

The three new product development stories depicted in this article allowed us to open up the black box of ambidexterity. Our research results suggest that ambidexterity hinges on the effective development and exchange of knowledge. The ambidextrous roles played by the various organizational actors that we interviewed allowed them to engender both the preservation of existing knowledge and the development of new knowledge. This was clearly demonstrated by the efforts that were made to smooth the transition from one design phase to another, the addition of a contact list to the welcome package for new hires, the development of new expertise within the organization, or the creation of a centre of excellence. This serves to prove the relevance of at least three of the Birkinshaw and Gibson’s ambidextrous roles: initiator, broker, and multitasker.

Although some authors have stated that organizational capacity for change is closely linked to ambidexterity (Judge & Blocker, 2008; Moreno-Luzon et al., 2014), our

study suggests that the combination of alignment and adaptability amounts to a form of “disciplined change”. This disciplined change was visible in the episodes where organizational actors attempted to implement a more structured change process in order to avoid the tendency to “change just for the sake of changing”, and where the lessons learned from previous projects were carefully reviewed. This disciplined approach to change was also represented by an organizationally-defined charter for change, which is consistent with emergent research on implementing an ambidextrous mindset (Zimmermann et al., 2015). Contained within this charter were core ideas for improvement as well as a strategy for how these ideas should be implemented.

Conclusion

In this article, although we have attempted to provide rich descriptions of organizational challenges and the behaviours exhibited by project teams in response to those challenges, the small number of observations does not allow us to generalize our research findings. We nevertheless believe that an important message has emerged from our research. Building on the growing literature that has established a link between ambidexterity and firm performance, we posit that the typology of ambidextrous behaviours proposed by Birkinshaw and Gibson (2004) is an effective and simple tool to generate a concrete understanding of a concept that is undeniably challenging. The initiators, brokers, and multitaskers featured in the new product development stories presented above were indeed able to build on existing capabilities while simultaneously developing new ones. Management scholars should therefore encourage practitioners to become familiar with the notion of ambidextrous behaviour, to recognize when and how the combination of exploitation and exploration happens, and to even promote these instances in their organizations. Even if we do not know how future chapters of the three stories featured in this article will unfold, we have nevertheless presented episodes that took place in challenging competitive environments and during which some organizational actors had simple but clever ideas to limit the waste of past efforts while simultaneously embracing change. In this way, the stories create an important link back to the literature on change. Studying the emergence and impact of such ideas and promoting ambidextrous thinking could favour the success and long-term survival of organizations. Further research is also needed to see if the typology of ambidextrous behaviours used in the research reported here could be further developed and enriched.

Opening the Black Box of Ambidexterity: Three Product Development Stories

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Orchestrating Innovation Ecosystems: A Qualitative Analysis of Ecosystem Positioning Strategies

Katri Valkokari, Marko Seppänen, Maria Mäntylä, and Simo Jylhä-Ollila

*“Nothing is more difficult than the art of
maneuvering for advantageous positions.”*

Sun Tzu (544 BC – 496 BC)

Military general, strategist, and philosopher

This article explores how firms can orchestrate innovation ecosystems to enhance collaboration for innovation among different actors. Most previous research on ecosystems has focused on firm-level strategies to operate in an ecosystem rather than the composition or orchestration of an ecosystem as a whole. However, finding the balance between the self-interests of involved actors is critical in order to create collaborative settings that induce different parties to jointly develop and put their best efforts into a joint endeavour. Thus, we undertook a qualitative study with 35 case companies from the metal and engineering industries, each of whom was interested in developing their position in ecosystems and improving their relational business practices. The findings suggest that there is an essential ecosystem competence that is needed by all actors in an ecosystem, regardless of their position, and that is the ability to manage dynamic strategic interactions related to innovation. This competence enables them to ensure the future vitality of the ecosystem and their own business. These results highlight the need for managers to profile their own company's role in an ecosystem in relation to the type of ecosystems, while simultaneously evaluating the ecosystem's ability and potential to survive.

Introduction

The importance of inter-organizational relationships and networks to innovation is widely acknowledged. And now, there is active discussion on the topic of value co-creation within boundary-spanning activities and various concepts related to collaborative innovation (Lee et al., 2012). Recent studies of such innovation practices underline a variety of different forms, such as inter-organizational alliances and collaborations with and within communities, crowds, or networks of individuals – including users, citizens, scientists, etc. However, although these perspectives deliver unique insights into specific distributed innovation processes, there are only limited connections across them (Bogers et al., 2016).

The notion of “ecosystems” offers an attractive metaphor to explore a variety of interactions and inter-

linkages between multiple organizations in innovation (Autio & Thomas, 2014). The metaphor emphasizes that the relationships are constantly co-evolving through actions and interactions of involved actors (Moore, 1996). In other words, inter-organizational relationships in ecosystems evolve through repetitive sequences of cooperation, conflict, and compromise, thereby altering positionings of actors and generating new roles (Pellikka & Ali-Vehmas, 2016). Although ecosystems are a usual context for doing business in some industries, such as software and communication technologies (Muegge, 2013), research on ecosystems is underdeveloped and undertheorized (Spigel, 2017).

Ecosystems include broad sets of actors and, even in business ecosystems, the relationships and interactions are not always governed with contracts. This lack of formal structure increases the role of relational governance mechanisms (Poppo & Zenger, 2002). As an

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example, consider entrepreneurial or innovation ecosystems, which lack a clear power hierarchy or formalized enforcement methods that could impede informal interaction between firms (Bell et al., 2016; Pitelis, 2012). Thus, the key management issue in an ecosystem is setting the right balance between a shared vision and the self-interests of involved actors to influence, facilitate, and motivate their actions (Adner, 2006; Valkokari & Valkokari, 2014). However, an ecosystem (as well as a network) is a multi-level phenomenon, which makes its orchestration challenging for a firm as a single entity. Still, the current research has focused more on firm-level strategies to operate in existing business ecosystems rather than their composing or orchestrating innovation ecosystems as a whole.

This article aims to bridge the gap by exploring *how firms can orchestrate innovation ecosystems to enhance collaboration between different actors*. Therefore, our research questions are:

1. What are the main roles of companies in their innovation ecosystems?
2. How should the actors collaborate by adopting particular roles?

We sought to answer these questions using a qualitative study of 35 companies and their ecosystem positioning strategies, with particular attention paid to the differences between well-established companies and startups. The context of our research is the mechanical engineering sector in Finland, which represents a quite traditional sector from the viewpoint of ecosystem thinking.

This article is organized as follows. First, we review the literature and then create a framework for ecosystem strategies in the innovation ecosystem context. Next, we present our research design and our results. Finally, we discuss our academic and managerial contributions.

Background

Innovation and entrepreneurial ecosystems

There has been and still is an enormous amount of scholarly attention paid to ecosystem typologies – and their differences and similarities. The innovation ecosystem approach has emphasized fostering the creation of growth, interaction, and innovative startups around so-called knowledge hubs (Engel & Del-Palacio, 2011). Thus, a defining characteristic of innovation ecosystems is their ability to adapt and evolve (Basole, 2009).

For instance, Silicon Valley is often put forth as an example of a successful (local) innovation ecosystem where there are plenty of interactions and inter-linkages between multiple organizations. The innovation ecosystem concept is often utilized to highlight innovation emerging from the interaction between different actors or to differentiate them from national innovation systems and policies (Suominen et al., 2016). Similarly, entrepreneurial ecosystems have become a popular tool in the study of the geography of high-growth entrepreneurship (Spigel, 2017). From the company perspective, such innovation or entrepreneurial ecosystems may offer different learning possibilities according to their structure and participants. Companies in the same industry or supply chain that serve the same larger customers learn from each other's production and service processes (Priore & Sabel, 1984), whereas technology firms that have the same core technology share knowledge and networks related to new business opportunities (Spigel, 2017). Thus, in addition to growth-oriented SMEs and startups, regional innovation ecosystems need larger anchor companies close to the core in order to ensure connection to the global competition in business (Viitanen, 2016).

To sum up, in an innovation or entrepreneurial ecosystem, the focus is on creating new business opportunities or new knowledge, whereas a business ecosystem operates within the present business context and uses existing resources. In addition to companies, an innovation or entrepreneurial ecosystem may include many different actors, such as entrepreneurs, innovators, venture capitalists, accelerators, vendors, and academic institutions. For instance, in an innovation (or knowledge) ecosystem, the financial network that supports the actors (both companies and research institutes and other technology developers) has recently been identified as one of the key success factors (Clarysse et al., 2014). Regardless, established companies typically have their main focus on their current business ecosystems – even when building new solutions such as platforms (Evans & Gawer, 2016).

For many companies, the attempt at ecosystem innovation has been a costly failure. This is because, along with new opportunities, innovation ecosystems also present a new set of risks (Adner, 2006). After all, firms are still interested in their own survival even if their ecosystem strategies should also consider how to increase the resilience of the whole ecosystem (Seppänen et al., 2015). Consequently, the concept of ecosystem resilience or health is “fuzzy”, and it should be noted that ecosystem health (defined in natural ecosystems as a

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state of ecosystem equilibrium) is not necessarily beneficial from the viewpoint of all involved actors (Valkokari, 2015). Thus, the previous literature has typically highlighted how the ecosystem leaders (i.e., organizations in central leadership positions) should take care of ecosystem health (Iansiti & Levien, 2004).

Ecosystem borders

In present-day business, ecosystems are global and setting an ecosystem's borders is complicated – or even impossible (Iansiti & Levien, 2004). Still, studies of innovation ecosystems as well as entrepreneurial ecosystems have often neglected this global dimension and focused on actors that are regional or geographically proximate (Valkokari, 2015) or have examined national innovation systems (Suominen et al., 2016). Thus, the borders of innovation ecosystem are even fuzzier than the borders of business ecosystem given that they are more dynamic, with actors, roles, and interlinkages changing constantly (Valkokari et al., 2016). Hence, the most recent innovation studies point out that discussions about closed national innovation systems are rather factitious: new innovations are actually generated in global settings (Viitanen, 2016; Oksanen & Hautamäki, 2015). If an innovation ecosystem is to be defined more extensively – by more than business relationships or national borders – one of the key challenges is determine how it can be formed through shared sense-making and by the cognitive construction of the ecosystem participants, (in line with the cognitive model of strategic groups introduced by Reger and Huff (1993). However, it should be noted that companies' strategies related to collaboration within innovation often are more typically emergent than deliberate (Mintzberg & Waters, 1985).

Since Chesbrough's (2003) seminal work on open innovation, the need for openness and collaboration in innovation has been highlighted through numerous concepts such as “collaborative innovation”, “democratized innovation”, “open innovation”, “networked innovation”, and “co-innovation”, as summarized by Lee and colleagues (2012). Although open innovation has received broad acceptance since its initial launch over a decade ago, there is undoubtedly more work to be done. Open innovation was initially understood and implemented as a series of collaborations between two organizations to open up the internal innovation process. Today, however, we may see multiple cases in which the concept is being used to orchestrate many players across manifold roles in the innovation process. Put simply, designing and managing innovation communities will become more and more important to the

future of open innovation (Chesbrough, 2012). According to this new model of open innovation, company boundaries are becoming more permeable, enabling resources to increasingly flow into and out of the firm at various stages of the innovation funnel (Lee et al., 2012; Bogers et al., 2016; Zobel, 2016). Recent studies present inconsistent results regarding the outcomes of open innovation, suggesting positive, curvilinear, and even negative associations between openness and innovation performance measures at the company level. These heterogeneous empirical findings call for an explanation of the interfirm differences in benefiting from external sources of innovation and how organizations implement open innovation in ecosystems in which all participants are depending on each other in co-evolving their capabilities and innovation outcomes (Bogers et al., 2016). Nevertheless, there is a gap in understanding of how companies are able to translate their openness into innovation outcomes and whether – and if so, how – companies can create a competitive edge in product innovation by utilizing these external sources (Zobel, 2016).

In addition to changing in space, ecosystems borders also change in time, and the innovation ecosystem lifecycle spans the time from the discovery of a new technology until the first successful commercialization of that technology (Dedehayir & Seppänen, 2015). Similarly, Moore (1993) has identified four lifecycle phases in an ecosystem: birth, expansion, leadership, and self-renewal (or death). And Adner (2012) suggests that there are five levers of reconfiguration: relocation (of actors); separation (of tasks to be undertaken by different actors); combination (of separate tasks); addition (of new actors to undertake tasks that would benefit the ecosystem); and subtraction (of existing actors and their tasks to benefit the ecosystem). To summarize, ecosystem management can be divided into composing and orchestration tasks (Valkokari & Valkokari, 2014). Thus, the composing phase – how ecosystems come into existence in the first place – has received scarce attention (Dedehayir & Seppänen, 2015), and discussion of ecosystem management has focused on orchestrating business ecosystems. Furthermore, orchestration has been conceived as a function performed by one actor, designated for instance as a keystone (Iansiti & Levien, 2004), an ecosystem leader (Adner, 2012), or an ecosystem coordinator (Jansen & Cusumano, 2013). Still, perspectives on innovation-ecosystem strategy, such as co-creation, networking, and interaction with innovation ecosystem partners, play a crucial role in an individual company's success given that companies are increasingly dependent on their collaborators (Pellikka & Ali-Vehmas, 2016).

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Ecosystem strategies

The choice of ecosystem strategy is affected both by a firm's intentions, strategic thinking, and current position in an ecosystem. Iansiti and Levien (2004) have identified three (business) ecosystem strategies that a firm can choose: keystone, dominator, or niche. These strategies are strongly linked with the actors' positions within the network structure, which can be central or peripheral. According to network scholars, a central position in a network has a positive influence on an actors' own innovativeness, for instance through access to different knowledge sources (Zaheer & Bell, 2005). However, the three roles of "feeder", "breeder", and "niche", as identified by Zahra and Nambisan (2011), highlight that the attitudes of actors lean more towards ecosystem co-evolution than their own strategic positioning. These authors also acknowledged that the roles are typical manifestations and hybrids of those that exist in a wide variety of companies. Furthermore, Muegge (2011) has identified different innovation ecosystem roles of technology-intensive business organizations as adopters and patrons of open platforms, and stewards and promoters of innovation communities. In addition to the key roles played by financiers and sponsors, the discussion of entrepreneurial ecosystems also highlights the important role of mentors (Ozgen & Baron, 2007; Lafuente et al., 2007) and dealmakers (Feldman & Zoller, 2012).

Most of the above-mentioned roles and also their contingent strategies can be linked to the network position of the company. The keystone, dominators, patrons, promoters, feeders, as well as breeders act as a hub, whereas niche firms, stewards, and adopters are typically in the position of spokes. Consequently, other kinds of organizations, in addition to companies, operate in some of the roles, for example as financiers, sponsors, mentors, and dealmakers, and their network positions are less clear. A hub often provides a single face for the customer and operates as an ecosystem orchestrator whereas the spokes represent complementary actors that provide the services, technological solutions, and other assets distributed across various settings. Thus, the actor's network position and role are dependent on other actors' strategies and actions, and they are therefore constantly changing (Pellikka & Ali-Vehmas, 2016). In other words, the ecosystem is co-evolving all the time and a niche player may eventually become a keystone in a new emerging ecosystem. Furthermore, a given actor may play different roles in the different ecosystems to which they belong (Iansiti & Levien, 2004).

Preliminary research framework

In line with strategy in general, the ecosystem strategy should answer the questions of where to compete, when to compete, and how to compete (Adner, 2006). On the other hand, success in an ecosystem requires a new kind of strategic thinking – concurrent collaboration and competition (Zahra & Nambisan, 2011). Furthermore, through an ecosystem strategy, companies should consider interdependency and complementary resources in their business as well as their own capabilities to integrate these external resources and knowledge (Iansiti & Levien, 2004).

Based on the above-mentioned characteristics of ecosystem strategies and in order to highlight the need for collaborative innovation in the ecosystem, we have built our preliminary research framework prior to data collection. The framework has two dimensions answering the questions of how and where to collaborate (Figure 1). The first dimension (the x-axis) explores the "where" question (i.e., where to set the borders for an ecosystem) and the second dimension (the y-axis) considers the "how" question (i.e., how the actors should collaborate by adopting particular roles). The question of where to set the ecosystem borders represents a continuum from local to global ecosystems. The question of how to collaborate represents a continuum of ecosystem roles extending from the hub (i.e., owner, keystone, promoter) out to the spokes (i.e., adopters, niche firms, stewards). Most studies consider a snapshot of ecosystem strategies of one firm at one point in time, rather

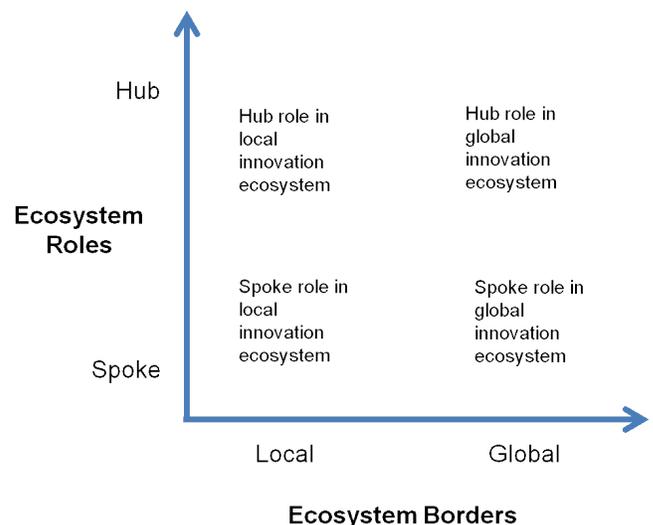


Figure 1. A preliminary research framework on ecosystem strategies

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than exploring the interdependency of evolving strategic choices in their context, in other words, within the ecosystem (West & Wood, 2008). Although the co-evolution of an ecosystem is an important characteristic and is strongly linked with the “when to compete” question (Adner, 2006), this perspective is quite case-specific, and therefore we focused on the two viewpoints of “where” and “how”.

In practice, ecosystem strategies or even memberships in ecosystems are not necessarily obvious to firms; their ecosystem positioning strategies are more emerging than intentional (Mintzberg & Waters, 1985). Instead, firms typically see their networks and other inter-organizational relationships from their own perspectives rather than emphasizing ecosystem-level viewpoints (Valkokari, 2014). Moreover, ecosystems as well as networks are multi-level phenomena, which makes it difficult to manage them as a single entity. Furthermore, companies’ ecosystem roles and congruent strategies are often hybrids.

Research Design

In this study, the choice of method was motivated by our desire to deepen and enrich our understanding of innovation ecosystems in supporting the strategic choices of companies. The research was conducted as a qualitative analysis, as it was seen best to fit in line with the research questions. In qualitative research, the chosen sample needs to be purposeful (Eisenhardt, 1989; Miles & Huberman, 1994) and therefore we integrated a data total of 35 case companies from the metal and engineering industries. The selected companies were all interested in developing their ecosystem roles and relational business practices. By selecting a rather traditional industry sector such as the Finnish mechanical engineering sector, we also aimed to look beyond the “hype” of the ecosystem concept. With this dataset, we compared ecosystem strategies between startups (21 cases, I–21) and well-established large companies (14 cases, A–N). In order to ensure richness of data, we selected a dataset that represented these two groups, which are, according to Viitanen (2016), the main groups of private actors that operate in innovation ecosystems.

Data collection and analysis

The practical challenge of innovation ecosystem orchestration and the identification of theoretical typologies of ecosystem strategies and their characteristics were the starting points of the research. Tables 1 and 2 summarize the case data sources of ecosystem views in

the startups (Table 1) and in the established companies (Table 2). In subclassifying both the startups and established companies by size, we used the definition provided by the European Commission, (2015):

1. Micro- or small companies employ fewer than 50 persons and their annual turnover or annual balance sheet total does not exceed EUR 10 million
2. Medium-sized companies employ fewer than 250 persons and either have an annual turnover that does not exceed EUR 50 million or they have an annual balance sheet not exceeding EUR 43 million

The majority of the startups were micro-companies with less than EUR 2 million in annual turnover and balance sheet total and less than 10 employees, except two of them that were classified as small companies. The established companies were mostly medium-sized or large companies and only one of them was a small company with less than 250 employees.

The empirical material was collected by a group of 6 researchers (including the authors of this article), who interviewed a total of 65 managers from 21 startups and 14 established companies. Each interview lasted between 1 and 1.5 hours. Semi-structured themed interviews were chosen as the main source of empirical material because the study was partly explorative in nature and the meanings of concepts needed to be negotiated with the interviewees. The interview themes follow the dimensions of the preliminary research framework and included questions about innovation ecosystem and networks, their borders (global versus local), and the company’s roles and strategies within ecosystems. All of the interviews were conducted in Finnish. The interviewees in the established companies occupied senior corporate, R&D and business unit, or customer and supplier relationship management positions, whereas the interviewees with the startups were typically founders or CEOs. The interview material was complemented by secondary data such as company presentations.

Analysis of the empirical material proceeded by applying the grounded theory approach. Open coding, “the process of breaking down, examining, comparing, conceptualising and categorising data” (Strauss & Corbin, 1990), was applied to the empirical material. The coding process created concepts that were later grouped and categorized, which enabled comparisons between the datasets from established companies and startups. Based on the coding, quotations characterizing the companies’ ecosystem perspectives were collected and

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Table 1. Summary of cases from startups

Company	Role	Size	Representatives
1	Equipment manufacturer	Micro	• Founder and CEO
2	Equipment manufacturer	Small	• Founder and CEO
3	Equipment manufacturer	Micro	• Founder and CEO
4	Equipment manufacturer	Micro	• Founder and CEO
5	Equipment manufacturer	Micro	• Founder and CEO
6	Equipment manufacturer	Micro	• Founder, sales, marketing • Product developer
7	Equipment manufacturer	Micro	• Founder and CEO
8	Equipment manufacturer	Micro	• Founder and CEO
9	Equipment manufacturer	Micro	• Founder
10	Equipment manufacturer	Micro	• Founder and CEO
11	Equipment manufacturer	Small	• Founder and CEO • Production manager
12	Equipment manufacturer	Micro	• Founder and CEO
13	Equipment manufacturer	Small	• Founder and CEO
14	Equipment manufacturer	Micro	• Founder and CEO
15	Equipment manufacturer	Micro	• Founder and CEO
16	Equipment manufacturer	Micro	• Founders (2)
17	Equipment manufacturer	Micro	• Founder and CEO
18	Equipment manufacturer	Micro	• Founder and CEO • Salesman
19	Equipment manufacturer	Micro	• Founder and CEO
20	Equipment manufacturer	Micro	• Founder and CEO
21	Equipment manufacturer	Micro	• Founder and CEO

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Table 2. Summary of cases from established companies

Company	Role	Size	Representatives
A	Brand owner	Medium	<ul style="list-style-type: none"> • Top management • Middle management
B	Service provider	Large	<ul style="list-style-type: none"> • Middle management
C	Manufacturer (material supplier)	Large	<ul style="list-style-type: none"> • Top management
D	Solution provider	Large	<ul style="list-style-type: none"> • Middle management and experts (6)
E	Brand owner	Large	<ul style="list-style-type: none"> • Middle management and experts (4)
F	Service provider	Small	<ul style="list-style-type: none"> • Middle management
G	Solution provider	Medium	<ul style="list-style-type: none"> • Top management
H	Solution provider	Large	<ul style="list-style-type: none"> • Middle management
I	Solution provider	Large	<ul style="list-style-type: none"> • Middle management and experts (6)
J	Brand owner	Medium	<ul style="list-style-type: none"> • Top management & middle management (3)
K	Subcontractor	Medium	<ul style="list-style-type: none"> • Middle management
L	Solution provider	Large	<ul style="list-style-type: none"> • Middle management (3)
M	Brand owner	Medium	<ul style="list-style-type: none"> • Middle management (6)
N	Brand owner	Medium	<ul style="list-style-type: none"> • Top & middle management (5)

the most relevant ones were chosen to be presented in this article. Then, the researchers who had conducted the interviews positioned the companies in the preliminary research framework (Figure 1). The positioning was based on shared guidelines. Along the x-axis, the share of global revenue and geographical position of markets and customers guided the positioning. Along the y-axis, network role (i.e., the business model) of the companies directed the mapping.

Next, we highlight typical perspectives on ecosystems through various quotations, then the positionings of startup and established companies are presented and discussed.

Case Findings

The interviews revealed that companies' views about ecosystems differ significantly, and thereby both their resources and capabilities to orchestrate ecosystems were different. Even so, all 35 of the case companies reported engaging in having collaborative relationships

to develop new innovations and look for new sources of competitive advantage.

Making sense of ecosystems

Although most of the interviewees were familiar with the concept of ecosystems, only a few of the established companies (B, C, D, H, and I) reported that they had actively considered their own a strategy or approach. In other words, the ecosystem strategies of the interviewed companies were more emergent than deliberate. The firms – especially the well-established companies – were typically thinking more about the business than innovation activities. Furthermore, attempts to intentionally influence other actors (i.e., through ecosystem orchestration) were uncommon. Still, deviating examples could be found, as represented by the following quotation from the sourcing manager of company D: *“Operating in ecosystems means that your role is dynamically changing from customer to technology provider and that you have to concurrently collaborate and compete. So, we have to think about our strategic position all the time.”*

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The startups in particular perceived themselves as independent actors, as emphasized by the founder of company 16: *“We are more of an independent actor. Well, we’re actually producing very little – we’re more like creating our own ecosystem network for the world.”* Also, the importance of social networks was highlighted by the startups, who highlighted that key actors consist mostly of the entrepreneur’s own personal relations, including family (case 3), neighbours (case 8), friends from school (case 5), colleagues from a previous firm (case 9), industry connections (case 17), or contacts related to a research project (case 10).

In the well-established companies, there was typically a long history of different relationships and, in addition to business actors, the representatives mentioned a broad list of other ecosystem actors, from regulators and politicians to members of local communities. The following quotation from company H provides a good example of the complexity of connections needed: *“We are in a field in which it is not enough to collaborate with a paying customer, but to come into contact with legislators and authorities, when developing new solutions. Customers often need funding and we have to participate in such discussion with the World Bank etc. Finally, at the project site, communication with the local community is needed to understand their expectations and needs. There is a sacred tree that needed to be appreciated, and the social dimensions are important.”*

Few representatives of the startup companies acknowledge the larger business environment – or even the innovation ecosystem – around them, as this example from company 13 shows: *“But it [the ecosystem] can change, or it is living. Let’s say it [the company] is not firmly there in its own place – we have to [be part of an ecosystem], we do not have money to produce everything ourselves.”* The large well-established companies typically recognized the broader business (or innovation) ecosystem around them.

Still, hardly any of the large companies had an explicitly intentional approach in their development related to an innovation ecosystem. One diverging example was a representative of company C, who highlighted their role as a network promoter: *“We have been building a Western Finland business cluster and contacted some other manufacturing companies (interviewee mentions companies in other industrial sectors...) to make the change on-going.”* Another example of intentional building of new ecosystem partnerships was mentioned by the representative of company B: *“We are*

negotiating our role as a system integrator in a triad aiming to provide solutions to big global players.”

Additionally, within the startup companies, there were some examples of an intentional approach to the utilization of ecosystems as a source of external knowledge, as noted by the interviewee from company 5: *“We were looking at what we do not have and what we need more of. We were looking at who we have in the social circle.”* On the other hand, related to the possibility of utilizing external knowledge, the established companies highlighted the need to understand the company and customers’ specific needs, as illustrated by a representative from company E: *“External actors in the innovation ecosystem must be able to understand our solution from the viewpoint of our customers, and even the customer’s customers’ needs. The product must be suitable for our world – it must be anchored into a certain way of life, maintenance, etc..”*

To sum up, when discussing key network dimensions, a small number of startups identified their supplier networks (cases 8 and 9), their startup network (case 1), and their industry forums or intermediaries (case 12). In the established companies, the interviewees typically mentioned all these networking dimensions, although the interviewee’s own role might have focused on one of the relationship types. Regarding the collaboration between startups and the large established companies, the representative of company B stated how their mindsets differ and how the management of intellectual property is therefore a key challenge: *“Startups want to work with us, but they also say openly that they give the same rights to all possible partners in order to access to the new markets.”*

Summary of cases

As described above, the case companies differed in their ecosystem activities and especially in the extent to which they intentionally operate in different ecosystems. Still, we were able to locate all the cases in our framework according to the main focus of their ecosystem strategies at the time of study. Figure 2a locates the startups, Figure 2b locates the well-established companies, and Figure 3 locates all 35 case companies together.

According to the interview material, 17 startups out of 21 are seen as global actors who clearly have an objective of operating in global markets and increasing worldwide sales, therefore not only focusing on the domestic market. In a few cases, the volume of exports was even

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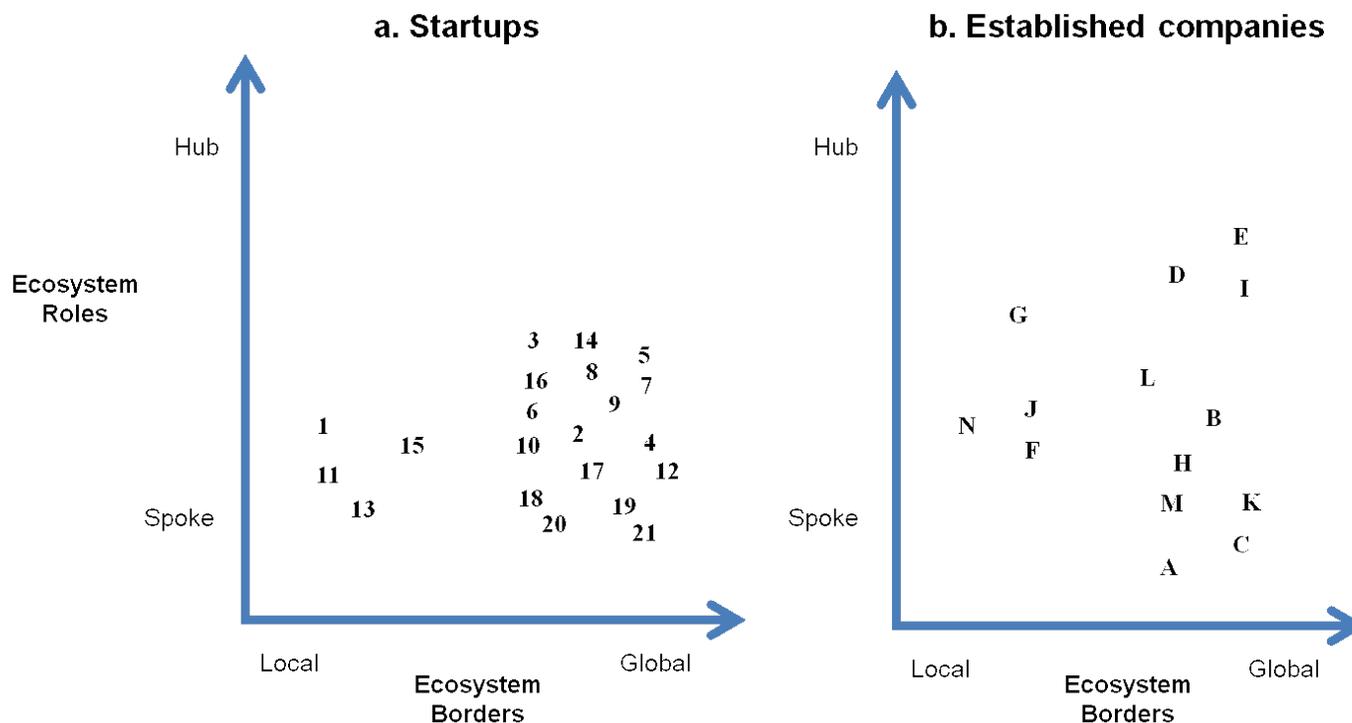


Figure 2. The 21 startup case companies (a) and the 14 established case companies (b) located in the ecosystem strategies research framework

larger than that of domestic trading. Due to scarce resources, startups typically operated in one or two international markets and therefore the “global” dimension differs from the global ecosystem activities of the established companies. Only four startups are located in the local part of the framework depicted in Figure 2a. Their business activities and collaboration between other stakeholders took place mainly at the local level and there was no solid intention to broaden the innovation activities globally. All companies had quite a restricted impression of the ecosystem surrounding the company. Instead of being an owner/promoter and having an established position in the ecosystem, many startups are seen in steward/adopter/niche roles, focusing on their own needs and operations. Given that all the companies located in this framework are fairly young startups, they may not have fully established their positions in their innovation ecosystems.

Only a few of the globally operating established companies (E, D, and I) have a central role in their innovation ecosystems at the global level (Figure 2b). Six of the established companies (A, C, D, H, I, and K) belong to a large, globally operating corporation and therefore their innovation activities also have global perspectives. Thus, their activities are often based on internal R&D

cooperation between business units in different countries. Typically, these companies were operating as technology providers. Within the small and medium-sized companies (F, J, and N), the network roles were similar and the local dimension was even stronger.

Discussion and comparison between the companies

Both the descriptive quotations and the qualitative analysis of the companies’ positioning advance our understanding of ecosystem strategies in startups and well-established companies, along with their perspectives of innovation ecosystem orchestration in different roles. Figure 3 summarizes the positions of all 35 case companies.

There were some differences between startups and well-established companies, although most of them are positioned at the bottom-right corner of the framework, or the “spoke role in global innovation ecosystem” as depicted in Figure 1. The well-established companies typically highlighted their operations in different network dimensions; the startups typically did not see that they would be part of any existing ecosystem and instead envision themselves as players in emerging new ecosystems. In summary, the qualitative analysis of the ecosystem strategies in the 35 case companies provides

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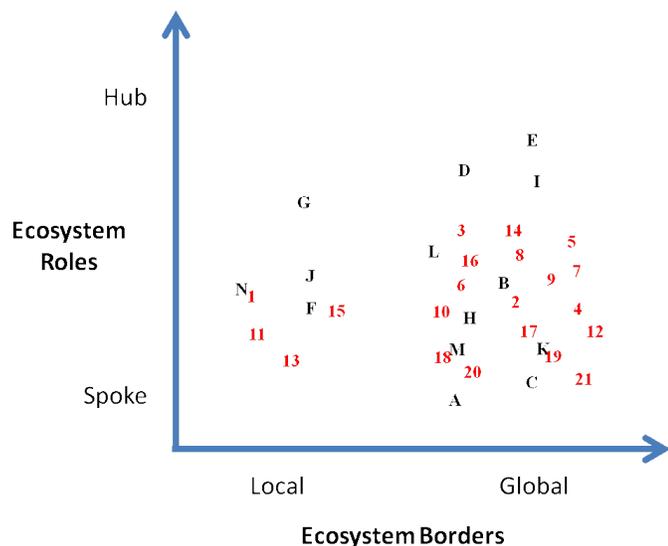


Figure 3. All 35 case companies located in the ecosystem strategies research framework

answers to the research questions as follows. First, with regards to the main roles companies play in their innovation ecosystems, we found that spoke roles (i.e., adopters, niche firms, stewards) are typical among companies in the Finnish mechanical engineering sector and that these companies were generally operating on a global scene related to their innovation ecosystems. This finding highlights the global dimension and is in line with the most recent discussions on innovation ecosystems (Viitanen, 2016), but challenges the former literature on innovation or entrepreneurial ecosystems. Second, regarding orchestration, we found that the established companies focused more on orchestration in existing business ecosystems but that the startups more typically saw their role in composing future ecosystems. Furthermore, the roles were often seen as hybrids, and most of the companies consider that their actions may influence the future development paths of an ecosystem and its health, which complements the previous literature.

Conclusions and Practical Implications

The aim of this article was to explore how firms can orchestrate innovation ecosystems to enhance different actors' collaboration for innovation. Based on the empirical data, the ecosystem strategies of the Finnish mechanical engineering sector companies seem to be rather traditional and technology-oriented. In the present-day global business environment, most of the companies considered their innovation ecosystem global, although setting the ecosystem borders was judged to a complica-

ated issue. Until now, studies of innovation as well as entrepreneurial (eco)systems have typically omitted this global dimension and focused on regional – and geographically proximate – actors (Suominen et al., 2016; Valkokari, 2015; Viitanen, 2016). Therefore, our findings are in line with recent research of inter-organizational innovation highlighting crowdsourcing and digital platforms as means to identify novel and distant sources for knowledge inflows by broadcasting particular tasks to a larger undefined network of potential external problem solvers (i.e., the “crowd”). When operating on such large geographical scales, for instance when exclusively using digital platforms, the levels of interaction and collaboration between the ecosystem actors may remain low, and further research on new ways to integrate global and local playgrounds – as well as physical and virtual innovation settings – is required.

Firm-centric strategies too often end in “winner-takes-all” settings in ecosystems. Therefore, our findings highlight that a new kind of thinking by all involved actors is needed in order to share the value for all members in an ecosystem and thereby ensure the health of the ecosystem. To a certain extent, this view challenges the previous literature (Iansiti & Levien, 2004), which has pointed out that the ecosystem leader should take care of ecosystem health. Furthermore, within their strategic thinking, companies should consider how they are perceived by other actors. One way to survive and succeed in the innovation ecosystem is to be an attractive collaboration partner. And, based on our empirical findings, that perception should be a main concern in most of the Finnish mechanical engineering companies, as they were more often positioned in “spoke” rather than “hub” roles.

The results of collaborative innovation in ecosystems appear from the dynamics of strategic maneuvering among actors. Therefore, the key success factor, and *an ecosystem competence*, is a company's ability to manage dynamic strategic interactions related to innovation. Furthermore, these strategic intentions are not often explicitly pointed out and the orchestration then requires interaction and constant follow-up in order to get a clear picture of these actions. This understanding provides managerial implications in the utilization of innovation ecosystems and profiling of both the company's own role and the type of ecosystem, while simultaneously assisting them in evaluating the ecosystems' ability and potential to survive. To sum up, this view could help managers to better understand how (in which role) and where (with local and global settings) to collaborate for innovation.

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As with any research effort, this one also has its limitations, some of which offer possible avenues for future research. First, due to the qualitative design with 35 cases and the innovation ecosystem being the main unit of analysis, it was not possible to give deeper consideration to entrepreneurship and strategic management at the company level. Still, the case examples demonstrate that the role of managers and entrepreneurs in the orchestration of innovation is challenging.

Therefore, one important subject for future studies would be to research entrepreneurship and to undertake a longitudinal study of an ecosystem from composition to orchestration through to the strategic choices of all involved actors. Second, all of the case companies operated in the same industry sector (mechanical engineering). Further research on other contexts could either validate the study results or provide interesting complementary views on the topic.

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Keywords: ecosystems, innovation, orchestration, positioning, actors, roles, strategy, collaboration

A Managerial Decision Tool for R&D Outsourcing and Partner Selection in High-Technology Industries

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“ Our own R&D relies quite heavily on long-term relationships with competent R&D suppliers. However, we have noticed that we tend to continue our outsourcing activities without regular reconsideration even if it would perhaps be more feasible to carry out some outsourced tasks internally. In a similar manner, performing some tasks that we have always done internally might be more efficient if we outsourced them. Therefore, we have realized it is important to consider our R&D outsourcing and insourcing practices based on rational reasoning.”

R&D Manager (Interviewee in this study)

Deciding which tasks and projects are best performed in-house and which should be outsourced to external suppliers are, alongside the supplier selection process, among the key challenges for R&D managers operating in high-technology firms. This study presents a decision tool for evaluating whether to pursue R&D tasks in-house or to outsource them. The tool also helps R&D managers to evaluate which of the supplier candidates would be best suited to undertake the task to be outsourced. The tool is based on four views of evaluation that have both managerial and theoretical roots: identity, dependence, efficiency, and competence. The tool has been developed in a qualitative multiple case study based on R&D supplier relationships and has been empirically tested in an R&D organization.

Introduction

High-technology firms now recognize that strategic investments in collaborations with external R&D partners are critical to developing successful product innovations. However, the challenges of this approach require companies to enhance and reorganize their R&D capabilities to access competencies and resources from external R&D suppliers through outsourcing (Geringer, 1991). Accordingly, suppliers of R&D functionality have an increasingly important role in product development and innovation (Johnsen, 2009; Quinn, 2000; Wagner & Hoegl, 2006). For this reason, it is essential for companies to understand which kinds of external partners are best suited to R&D alliances (Paananen, 2012) and how the tasks and projects suitable for outsourcing should be selected (Geringer, 1991). Similarly, it is important for the effective imple-

mentation of R&D in the dynamic environment of high-technology industries that managers understand which resources are necessary in their organization and which resources can be outsourced to complement internal resources, improve R&D performance, or to split costs and risk (Eisenhardt & Schoonhoven, 1996; Verona, 1999).

R&D managers must regularly decide how best to utilize an external supplier's resources and simultaneously deploy and develop their firm's own internal R&D resources. To serve this end, there are several approaches to facilitate the decision making concerning outsourcing decisions. Literature on organizational boundaries (Santos & Eisenhardt, 2005) presents four conceptions – efficiency, competence, dependence, and organizational identity – all of which have a solid theoretical background and are applied in industry.

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The *efficiency* conception considers the governance costs that the collaboration with external suppliers creates for the customer organization. According to this conception, an activity should be outsourced if the external supplier's production costs and the relationship governance costs together are less than the customer's internal production costs (Dyer, 1996; Rindfleisch & Heide, 1997). This kind of decision making has been a popular choice, especially in those industries characterized by intense price competition and a stable structure (Santos & Eisenhardt, 2005). However, in the dynamic environments of high-technology industries, market requirements, competition, and speed of technology renewal (Heide & Weiss, 1995) create a constant need for developing and sustaining product innovation capabilities, and therefore, capabilities provided by external partnerships steer the outsourcing decision more than the direct and indirect costs of the partnerships.

The *competence* conception emphasizes the value of knowledge resources, special competences (Lambe et al., 2002; Wittmann et al., 2009), and dynamic capabilities (Teece et al., 1997) provided by external R&D suppliers. Therefore, under this conception, outsourcing and partner selection decisions are based on valuable and unique competences provided by suppliers. However, when making decisions concerning outsourcing, managers also have to consider how dependent the customer will become on the supplier's specialist competences and capabilities that may be difficult to substitute or imitate (Gulati & Sytch, 2007).

According to the *dependence* conception, the risk of high dependence on external partners in strategically important technology areas may make the customer vulnerable to a supplier's opportunistic behaviour: a vulnerability that may cause the customer to favour performing those activities in-house (Mayer & Nickerson, 2005). Therefore, power-based decisions aim to control the dependence on external supplier partners by retaining crucial projects in-house and outsourcing activities that will not cause dependence on single suppliers.

The fourth conception, *organizational identity* (Weick et al., 2005), is based on managerial experience, personal views and attitudes, as well as organizational traditions (Santos & Eisenhardt, 2005). Identity-based decisions are usually based on prior experience of supplier collaboration, and therefore, identity-based outsourcing decisions often favour continuation of outsourcing practices with trusted, familiar suppliers. Thus, identity-based decision making often lacks a systematic process to support rational reasoning (Bäck & Kohtamäki, 2015).

A recent study on R&D outsourcing decision making (Bäck & Kohtamäki, 2015) reveals a central problem: R&D managers may either make decisions based on experience- and identity-based reasoning, or alternatively, they may focus solely on one rational viewpoint such as governance cost or supplier competences. Therefore, Bäck and Kohtamäki (2015) suggest that managers should consider a wider range of factors, including the dependence, efficiency, and competence viewpoints, to facilitate rational and systematic decision making when evaluating outsourcing and insourcing activities. Accordingly, the present study presents a practical decision-making tool based on the four above-mentioned conceptions of R&D measurement to support outsourcing decisions. The tool is designed primarily for two purposes: i) to help managers decide whether or not a particular piece of development work (task) is suitable to be outsourced to an external technology partner (supplier) and ii) to help them decide which of the known supplier candidates is best suited to perform the task. Therefore, the tool is primarily designed to support decisions concerning supplier involvement in the R&D function, not research or innovation collaboration that usually emphasizes joint knowledge creation and learning with research partners (Bäck & Kohtamäki, 2016; Laursen & Salter, 2006).

Background

From organizational identity to strategy-based decision making

As described in the introduction, the view of organizational identity is based on the observation that managerial cognition and managers' personal experiences, views, and attitudes, alongside an organization's traditions, tend to dominate other rationally grounded reasons when technology firms make decisions on R&D outsourcing or insourcing. The combination tends to promote those decisions that are aligned with the current, tradition-based identity (Brown & Starkey, 2000; Santos & Eisenhardt, 2005). Therefore, when a firm has a strong organizational identity, it can dominate to the extent that the firm will only act in a way consistent with its existing identity, and it can mean that its decision making is not always entirely rational (Brown & Starkey, 2000; Santos & Eisenhardt, 2005). Accordingly, identity often affects decisions on R&D outsourcing because any decision that might challenge the traditional way of working is not easily accepted in an organization, even if there is clear evidence of improved performance, efficiency, or better technological capabilities, for example (Santos & Eisenhardt, 2005). One way to overcome this limitation would be to en-

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courage a clear R&D strategy that could steer identity-based decisions by defining the core competence areas and core business in which the internal R&D function wants to be involved (Bäck & Kohtamäki, 2015). Thus, an organization should devote effort to determining the valuable competence areas it wants to own and develop, and also to deciding upon the areas that can be outsourced. Doing so would permit such an organization to define its identity through a consensual strategy that facilitates systematic and rational decision making.

Dependence on suppliers

In networked, knowledge-intensive technologies, firms may be dependent on the special competences, resources, and skills provided by their suppliers. This is because these resources are typically difficult to substitute or imitate (Gulati & Sytch, 2007) and, consequently, it is expensive and difficult to switch partners (Heide & Weiss, 1995). Accordingly, firms must decide how much dependence on external suppliers they can tolerate to improve their R&D performance (Gulati & Sytch, 2007), or alternatively, they must ensure that their strategically crucial R&D projects are carried out in-house to avoid dependence. Internalizing these projects may, in turn, limit the customer firms' access to the unique competences and skills possessed by their partners (Mayer & Nickerson, 2005). Therefore, when making decisions on outsourcing an R&D project or task, R&D managers must usually consider the extent to which outsourcing would make the customer firm dependent on the supplier. The key factors would relate to the time and cost of switching a partner or bringing the task in-house. The cost of switching partners can be significant if the partnership requires investment or competence development by both parties. In addition, subsequent partner switching would be complicated if the competences of the supplier are very rare and difficult to imitate. For this reason, companies may decide to maintain internal competences in their critical technology areas even as they employ suppliers on tasks in those areas, or they may decide to employ several sources in each technology area. Previous research has shown that customers tend to tolerate dependence on those suppliers with whom they have a long-term and close relationship (Bäck & Kohtamäki, 2015). This is because previous positive experience and familiarity with a supplier serves to increase mutual trust, which in turn tends to increase the tolerance of dependence.

Governance efficiency

When product development projects are outsourced to external partners, the customer firm must take care of the governance of the project and also the relationship

with the supplier. R&D project governance costs are transaction costs that arise from the mechanisms related to agreements, project management, information sharing, as well as negotiation, monitoring, and meeting practices with the external partner. These costs can have a significant effect on decisions on whether to outsource R&D work or retain it in-house (Eng & Wong, 2006; Rindfleisch & Heide, 1997). The efficiency of governance can be measured on the basis of the efforts required of R&D managers to manage, control, and steer projects. In this context, successfully adhering to schedules is obviously important, because extending a planned project time also increases the project governance cost. Research has shown that there are several key factors that affect project governance costs. First, previous experience and knowledge accumulated in earlier similar projects are important because experienced teams do not need as much steering and control as teams that are still acquiring competences in the relevant technology. Second, the R&D team's ability to adapt to the established processes of the lead company is also important, because having that ability reduces the need for project monitoring and meetings, and because an R&D supplier must adapt to its customer's internal processes and tools (Gulati & Sytch, 2007; Rindfleisch & Heide, 1997). A willingness and ability to adapt also supports interaction and creates entrance barriers for competing firms (Brennan & Turnbull, 1999; Walter, 2003). Third, the cost of negotiating and drafting contracts is an important factor affecting project governance costs, because long-term relationships with trusted partners typically have less need of written agreements than relationships with new partners would. These are important reasons for organizational decisions affecting make-or-buy decisions in dynamic high-technology environments (Bäck & Kohtamäki, 2015).

Competence

The competence conception is based on the view that competitive advantage flows from processes that enable value creation from resources and competences (Eisenhardt & Schoonhoven, 1996). This value creation has a significant strategic meaning in R&D, where joint learning and the development of technological capabilities and skills facilitate the creation of valuable knowledge in internal R&D and in any collaboration with external suppliers. Having access to the best possible skills and resources to perform each project or task is most important in managerial and organizational decisions, because technological capabilities are usually regarded as primary drivers of R&D outcomes (Verona, 1999; Wagner & Hoegl, 2006). The competences and capabilities of prospective partners are usually the key factors in de-

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cisions on whether to outsource R&D and in any subsequent partner selection process. Other factors in the decision might be the networking performance and networking capabilities of the supplier, because the resources provided by the R&D supplier network can boost the lead firm's competitiveness (Gulati, 1998; Ritter & Gemünden, 2003). In the interactions between the customer firm and its supplier network, joint learning is particularly important because it involves the exchange of tacit, experience-based knowledge that is difficult to transfer (Bäck & Kohtamäki, 2016; Selnes & Sallis, 2003) and because this kind of joint learning has a positive effect on a firm's innovative performance (Duysters & Lokshin, 2011; Lin et al., 2012).

Tool Development

Bäck and Kohtamäki (2015) present example cases of collaborative supplier–customer relationships that were initiated largely on the basis of identity-based decision making, but which over the years of collaboration developed and grew into a form in which they were examined and analyzed in terms of identity, dependence, competence, and efficiency. The primary motivation for developing the R&D outsourcing tool presented in this article is a key conclusion of the work of Bäck and Kohtamäki (2015), which stated that managers' personal views and organizational traditions tend to dominate R&D outsourcing decisions, or alternatively the decisions are made based on a single criterion such as governance cost or competence instead of a broader range of criteria. This conclusion supports the use of objective analysis methods based on rational reasoning in organizational decision making that could challenge accepted practices and conventions.

To develop this tool, the author utilized the interview data obtained in a multiple-case study that examined six key R&D supplier relationships of a leading multinational corporation operating in the area of electrical and electronic devices and systems (Bäck & Kohtamäki, 2015). The empirical data collection for the research involved meetings and discussions with senior corporate executives responsible for product development, product management, and research to collect general information on the corporation's R&D activities and supplier involvement strategy. To identify the key factors that affect the outsourcing decisions in the R&D organizations, data on outsourcing decision making were collected in interviews with R&D managers who were each responsible for one of the six collaborative relationships with R&D suppliers. Based on these key factors, which were all related to one of the four concep-

tions presented earlier in this article, a set of questions concerning the R&D project outsourcing was formulated. These key questions were then reviewed and analyzed with the group of R&D managers participating in the interviews.

The R&D outsourcing decision tool supports make-or-buy decisions in the R&D area. The purpose of the tool is to analyze outsourcing decisions relating to an R&D project or task by using a template comprising two phases as presented in Figure 1. The template presented in Table 1 requires R&D managers to respond to each question related to each conception using a 5-point scale anchored with *strongly agree* (1) and *strongly disagree* (5), and to record their reasons for the decision in a description field. In Phase 1, the effect of an outsourcing decision is analyzed based on questions concerning *strategy* and *dependency*. Questions related to strategy help managers to consider how much the potential outsourcing of the selected task aligns with their firm's R&D strategy. Empirical observations in R&D organizations (Bäck & Kohtamäki, 2015) suggest that, in many cases, managers must first define the strategic goals of their organization before they can be made available to guide strategy-based decisions. At the end of Phase 1, the tool calculates a summary score for both strategy and dependency viewpoints. These scores provide an indication of whether outsourcing would be an appropriate course of action. Phase 2 involves assessing the expected *efficiency* and *competence* of the external supplier candidates against those of the internal R&D function. Again, the tool calculates a summary score for both efficiency and competence, but in this case, the scores are calculated for all supplier candidates and for an internal R&D operation separately. Thus, the user can compare the scores of internal R&D and supplier candidates and use that information as a basis for the outsourcing or insourcing decision.

Conclusion

Managers in high-technology industries decide whether to outsource R&D work based on their previous experience or interpretations of the environment. These interpretations can be influenced by personal, subjective views or by tangible factors. Instead of concentrating only on previous experience or personal opinions, or solely on a prospective partner's efficiency or competence, it would be beneficial for managers responsible for R&D supplier relations to adopt a range of viewpoints to support their decisions. This study presents four theoretically and empirically grounded conceptions – effectiveness, efficiency, competence, and

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dependence – available for use when evaluating the benefits of R&D collaboration with external suppliers. Previous research identified several factors related to those conceptions that affect how firms select their R&D suppliers and how the decisions on outsourcing R&D tasks are being made. Those factors provide the foundation of the practical decision template presented in this study.

The main contribution of this study is to present a tool capable of facilitating the decision-making process related to R&D outsourcing and partner selection. It provides a practical but theoretically grounded way to rapidly evaluate and compare internal R&D capabilities with those available externally. When adopting and using the tool, customer R&D organizations may also need to define and elaborate their R&D strategy by considering their core capabilities and defining general guidelines for outsourcing activities. These activities in

turn facilitate the change from identity-based decision making to decision making based on a broadly accepted organizational strategy. Given that the tool has primarily been developed to assist decisions concerning the potential outsourcing of R&D tasks, it is not a primary choice for decisions on innovation or research collaboration aiming for joint learning and knowledge creation. The development of a tool for facilitating partner selection in those cases is a natural subject for further research in this field.

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Phase 1:

Can we outsource this task?

Is outsourcing aligned with our strategy?

Can we tolerate dependency on suppliers in this task?

Phase 2:

Who can best perform this task?

Who has the best competences and efficiency to perform this task?

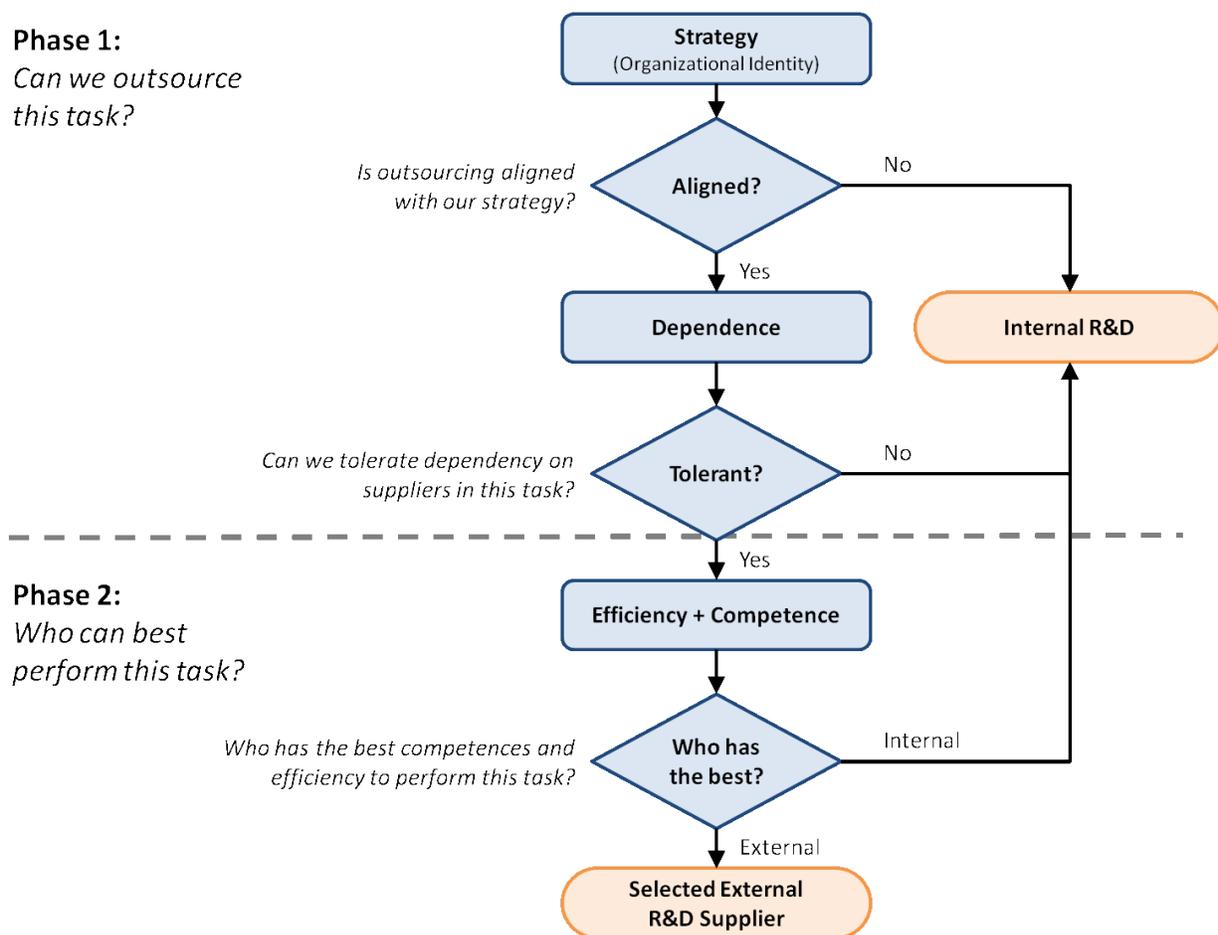


Figure 1. Outline of the R&D outsourcing decision tool

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Table 1. Template of the R&D outsourcing and partner selection decision tool

Phase 1	Question / Statement	Evaluation (1...5) (1=strongly agree, 5=strongly disagree)	Comments/Reasons		
Identity and Strategy	The task belongs to our core business / core competence area.				
	Carrying out this task by ourselves is in line with our R&D strategy.				
	Carrying out this task by ourselves is the best decision from the viewpoint of our organization's operation, competence, and identity.				
	SUMMARY (Average number)				1 suggests outsourcing, 5 suggests insourcing
Dependence	Outsourcing the task will probably lead to strong dependence on the selected partner.				
	It would be particularly difficult to change the partner afterwards.				
	It would be particularly difficult to insource the task afterwards.				
	We will not maintain replacement partnerships (second sources) or internal competences to limit dependence on the selected partner.				
	SUMMARY (Average number)				1 suggests outsourcing, 5 suggests insourcing
Phase 2	Question / Statement	Internal R&D (1...5)	Supplier 1 (1...5)	Supplier 2 (1...5)	Supplier 3 (1...5)
Efficiency	The total cost of the project/task will probably be reasonable when compared to common cost level.				
	Governance and steering costs of the project/task will probably be small (i.e., we do not need to commit much of our own time and resources to project management).				
	Collaboration between project/task stakeholders and communication will probably be easy.				
	It is expected that time schedules and agreements will be adhered to.				
	The need to control the deliverables is minor.				
	SUMMARY (Average number for each column) (1 suggests low efficiency, 5 suggests high efficiency)				
Competences and Resources	This party has the best possible competence and resources to carry out the task.				
	This party will commit to developing its competences and capabilities relating to this task.				
	This party has sufficient capacity to carry out the task.				
	Having this party carry out the task provides opportunities for new learning and to deliver innovations.				
	SUMMARY (Average number for each column) (1 suggests low competences, 5 suggests high competences)				

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Keywords: research and development, supplier involvement, outsourcing, partner selection, decision tool

Hybrid Entrepreneurship: How and Why Entrepreneurs Combine Employment with Self-Employment

Marina Z. Solesvik

“ I never had it in mind that I would start a company one day and it would really be successful. I have just been motivated by working on interesting technology. ”

Pierre Omidyar
Entrepreneur who founded eBay
while in full-time employment

Changes in the labour market and growth in the diversity of non-standard working arrangements have heightened the interest of policy makers and entrepreneurship researchers in “hybrid entrepreneurship”, which is a combination of employment and entrepreneurship. This form of entrepreneurship is particularly popular among highly educated professionals in the high-technology and R&D sectors. With the goal of improving our understanding and defining a research agenda for this phenomenon, I examined the relevant literature to clarify definitions and I undertook a research study to examine first-hand, through a longitudinal case study, the experiences of two hybrid entrepreneurs, one who intended to become a full-time entrepreneur and one who wish to be hybrid entrepreneur. The key result of the study emphasizes that hybrid entrepreneurs should not be considered as a homogeneous group: some hybrid entrepreneurs may always stay at their waged jobs and others may tend to become full-time entrepreneurs. The results have implications for policy makers wishing to encourage hybrid entrepreneurship and for researchers wishing to undertake further research into this phenomenon.

Introduction

The constantly falling rates of self-employment in developed countries concern policy makers. Individuals are steadily more reluctant to take risks and start their own firms if they have secure jobs with high salaries and good social benefits (Schmitt & Lane, 2009). Previous research demonstrates that there is a significant part of the population in different countries who have an entrepreneurial spirit and wish to start an own business one day (Kelly et al., 2016). The share of latent entrepreneurs – those individuals who are otherwise employed but wish to start their own business – is estimated from 27% in Norway to 80% in Poland (Blanchflower et al., 2001). In 2012, 37% per cent of Europeans and 46% of US citizens wished to be their own bosses (European Commission, 2013). In emerging economies, the share of people willing to be self-employed is even higher: 56% in China and 82% in Turkey (European Commission, 2013).

For many people, dropping their waged work and starting their own firm is a difficult decision. However, by undertaking both types of work simultaneously, hybrid entrepreneurship could provide an attractive bridge from employment to self-employment. Though the notion of part-time or hybrid entrepreneurship is not new (Smallbone & Welter, 2001), only recently have hybrid entrepreneurs started to attract the attention of policy makers and scholars (Folta et al., 2010; Petrova, 2005; Schulz et al., 2016). This growing interest of scholars and policy makers can be explained by recent changes in the employment market, where there has been a dramatic shift towards temporary or part-time jobs (Kalleberg, 1999).

Relative to full-time entrepreneurs, hybrid entrepreneurs show higher levels of education (Folta et al., 2010) and human capital (Petrova, 2012). Thus, the role of hybrid entrepreneurship is expected to be greater in

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knowledge-intensive and innovative industries. The share of hybrid entrepreneurs in R&D high-technology startups is estimated to be 42% in Germany (Bretz et al., 2015) and 58% in Sweden (Folta et al., 2010). Moreover, high-technology industries have yielded some well-known examples of billion-dollar businesses that were created by their founders while they were employed elsewhere. For example, Steve Wozniak founded Apple while he was an engineer at Hewlett-Packard, and while Pierre Omidyar was working for a software development firm, he launched the firm that would eventually become eBay (Livingston, 2007).

But, do all hybrid entrepreneurs intend to become full-time entrepreneurs? In describing a pathway to full-time entrepreneurship, Thorngren and colleagues (2016) distinguished between first-step and second-step entrepreneurial decisions. The first-step entrepreneurial decision is made when a person chooses to become a hybrid entrepreneur. The second-step decision is associated with the switching from hybrid to full-time self-employment. However, their study of hybrid entrepreneurs in Sweden also highlighted that not all hybrid entrepreneurs intend to become full-time entrepreneurs (Thorngren et al., 2016). Similarly, Schulz, Urbig, and Procher (2016) concluded that hybrid entrepreneurs are not a homogeneous group. They found that more highly educated hybrid entrepreneurs act differently than their less educated counterparts, and they call for more research exploring different types of hybrid entrepreneurship. So far, research into hybrid entrepreneurship has mainly been quantitative (Burke et al., 2008; Folta et al., 2010; Petrova, 2012; Raffiee & Feng, 2014; Schulz et al., 2016; Thorngren et al., 2016) and, therefore, our understanding of the motives, behaviours, and intentions of hybrid entrepreneurs is limited.

This article describes a study that is both qualitative and longitudinal, which can hopefully shed light on these important aspects of hybrid entrepreneurship. In addition to deeply exploring the motives, behaviours, and intentions of different types of hybrid entrepreneurs, I also aim to clarify the definition of the terms “hybrid entrepreneur” and “hybrid entrepreneurship” to better distinguish these terms from related concepts.

A qualitative study is appropriate when a researcher wants to gain deep insight into a phenomenon. Furthermore, qualitative studies are suitable when asking “How?” and “Why?” research questions. The two research questions that guided this study are:

1. *Why do individuals select a hybrid career path?*

2. *Why do some individuals prefer to remain hybrid entrepreneurs and why do others aim to become full-time entrepreneurs?*

In this article, I first introduce and analyze existing definitions of hybrid entrepreneurship and review the current state of research on the topic. Next, I present and analyze two longitudinal cases of hybrid entrepreneurs observed from 2006 to 2015. Finally, I offer conclusions and present a future research agenda.

Theoretical Background

Definitions

The relevant literature reveals some inconsistency in the definitions related to hybrid entrepreneurship (Table 1). On one hand, some scholars define hybrid entrepreneurs as “individuals who mix their time in both self-employment and wage work” (e.g., Folta et al., 2010), while others would call these same individuals “part-time entrepreneurs” (e.g., Petrova, 2012). In contrast, Schulz, Urbig, and Procher (2016) use the term “part-time entrepreneur” without implying that these individuals have other paid employment, and they use “hybrid entrepreneurship” to refer specifically to a combination of paid employment and self-employment. On the other hand, some scholars refer to hybrid entrepreneurs quite differently, as individuals who start firms combining non-profit and for-profit activities (Battilana et al., 2012; Dees, 1998; Fowler, 2000; Nicholls, 2008). This last usage is quite different and is beyond the scope of the current discussion. In this article, I am specifically interested in individuals who combine entrepreneurial activities with wage work, which is in line with the definition proposed by Folta and colleagues (2010).

State of research on hybrid entrepreneurship

In countries with strong social security systems, high salaries, and other benefits for employees (i.e., a short working day, generous social security and health insurance plans available from employers, long and paid maternity and paternity leave), some individuals may be reluctant to become self-employed. For example, only 27% of Norwegians report wanting to be self-employed (European Commission, 2013). And this indicator has not changed since 1997, when Blanchflower and associates (2001) carried out their study of self-employment preferences. A similar situation has been observed in other countries with high wages and social security, such as Lichtenstein, Switzerland, Denmark, and Finland (OECD, 2016). So, we know that about a quarter of the population in such countries is attracted

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Table 1. Summary of existing research on hybrid entrepreneurship

Authors	Aim of Study	Method and Sample	Key Findings
Petrova (2005, 2012)	To explore the reasons why some people choose to be part-time entrepreneurs.	Quantitative. 721 nascent entrepreneurs in the US.	<ul style="list-style-type: none"> Part-time entrepreneurs are not limited by financial limitations. Risk-averse individuals are more likely to become hybrid entrepreneurs. Human capital is very important for hybrid entrepreneurs.
Burke et al. (2008)	To “move beyond dichotomous depiction of entrepreneurship and wage work and begin to explore the implications of entrepreneurial persistence”.	Quantitative. 11,361 individuals from National Child Development Study. Probit analysis.	<ul style="list-style-type: none"> They distinguish between “die-hard” and part-time entrepreneurs. Having children does not influence selection of hybrid or full-time entrepreneurship among males. However, it negatively influences female entrepreneurship. Motivation to “be one’s own boss” drives females to hybrid entrepreneurship but not full-time entrepreneurship. For males, this motive drives them to full-time entrepreneurship.
Folta et al. (2010)	To explore why individuals prefer a hybrid entry to entrepreneurship compared to full-time entrepreneurship and whether hybrid entrepreneurs are more likely to become full-time entrepreneurs than waged workers.	Quantitative. 329,624 observations of 45,000 male waged workers, self-employed and hybrid entrepreneurs in Sweden. Multivariate analysis.	<ul style="list-style-type: none"> High-wage earners are more likely to become hybrid entrepreneurs. Individuals with high switching costs are also more likely to become hybrid entrepreneurs. Hybrid entrepreneurs are more likely to become full-time entrepreneurs than waged workers.
Burmeister-Lamp et al. (2012)	To explore the time allocation between a waged job and a new entrepreneurial firm.	Quantitative. 25 nascent entrepreneurs and 29 undergraduate students. Computer-based experiment.	<ul style="list-style-type: none"> More risk-averse hybrid entrepreneurs allocate fewer hours to a new firm than less risk-averse individuals.
Thorgen et al. (2014)	To explore motives of hybrid entrepreneurs with a focus on passion as a driving force of entrepreneurship.	Quantitative. 262 Swedish hybrid entrepreneurs. Logistic regression analysis.	<ul style="list-style-type: none"> Passion is the main motive for hybrid entrepreneurs. Older individuals report more passion towards their hybrid businesses. Those who work longer hours in their side business report less passion as the main motive.
Raffiee & Feng (2014)	To explore whether risk-averse and less confident individuals are more likely to become hybrid entrepreneurs than full-time entrepreneurs.	Quantitative. Analysis of National Longitudinal Survey of Youth, 1979 cohort in the US. Continuous survival analysis.	<ul style="list-style-type: none"> Individuals who are risk-averse and report low core self-evaluation are more likely to enter hybrid entrepreneurship compared to full-time self-employment. Hybrid entrepreneurs who successively move into full-time self-employment have much higher survival rates relative to individuals who enter full-time self-employment straight from a waged job.
Schulz et al. (2016)	To explore responses of full-time versus hybrid entrepreneurs to institutional changes.	Quantitative. 212,523 individuals in Mexico. Multinomial logit analysis.	<ul style="list-style-type: none"> Researchers distinguish between part-time, full-time, and hybrid entrepreneurs. Part-time entrepreneurs were less educated than hybrid entrepreneurs in the sample of Mexican entrepreneurs. More highly educated hybrid entrepreneurs use ventures to test ideas and explore business opportunities, and they respond quicker to institutional changes than less educated hybrid entrepreneurs and full-time entrepreneurs.
Thorgen et al. (2016)	To examine how age relates to the transition from hybrid to full-time entrepreneur.	Quantitative. 256 hybrid entrepreneurs in Sweden. Logistic regression analysis.	<ul style="list-style-type: none"> Younger and older hybrid entrepreneurs are more likely to become full-time entrepreneurs than those in between.

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to self-employment; however, the actual proportion of a population that is self-employed varies between 10–15% in different countries (Blanchflower et al., 2001). In other words, there is a substantial gap between those who only have intentions to be self-employed and the actual number of self-employed. And within this gap lies potential for some forms of hybrid entrepreneurship. Indeed, some people may be forced into hybrid entrepreneurship, for example, individuals who are experiencing difficulty obtaining full-time and permanent employment but use self-employment to supplement their earnings. Others may use hybrid entrepreneurship to explore opportunities without given up their main source of income.

There are different reasons why some individuals never realize their entrepreneurial intentions. First, because of a risk of losing monetary and nonmonetary benefits from wage jobs, individuals are not eager to bear opportunity costs. Thus, hybrid entrepreneurship can be an option to earn supplementary income in addition to the income from conventional jobs or to try a new business idea (Schulz et al., 2016). In case of business success and sufficient income from entrepreneurial activity, individuals can switch from hybrid entrepreneurship to full-time self-employment. Second, some people lack resources that can be used as start-up capital. Salary from employment can support novice entrepreneurs and help to overcome the liabilities of newness and smallness. Hybrid entrepreneurs are more likely to operate their businesses using the resources in hand, thereby acting as bricoleurs (Baker & Nelson, 2005) or effectuators (Sarasvathy, 2001) rather than full-time entrepreneurs. Apparently, hybrid entrepreneurs may be motivated by a drive to “be their own boss” but can also work under the management of other people if necessary. However, so far, hybrid entrepreneurship has not been investigated from the theoretical perspectives of bricolage or effectuation. Effectuators are good network players (Sarasvathy, 2001), and hybrid entrepreneurs use their time to build their networks while they combine waged and entrepreneurial activities. A key question is how this approach affects the likelihood of entrepreneurial success. So far, there is at least some evidence that the survival rate of firms started by hybrid entrepreneurs is higher than that of firms started by full-time entrepreneurs (Raffiee & Feng, 2014).

In some contexts, individuals have greater opportunities to become hybrid entrepreneurs. For example, in some countries such as the countries of the former Soviet Union and China, people were forced to be wage workers by law. Entrepreneurship was legally prohib-

ited in these countries; all people (with the exception of females with three or more children) were required to be employed by state-owned or collective enterprises (Parsyak & Zhuravlyova, 2001; Peng, 2001). Able individuals who did not work or study could be found guilty of “parasitism” (Porket, 1989). In such situations, some entrepreneurially oriented individuals participated in the grey economy in addition to earning wages – and acquired quite important skills in combining both types of work (Peng, 2001). Another factor that influences opportunities for hybrid entrepreneurship is an individual’s wage in part-time employment. If they cannot earn enough money to support themselves on a part-time wage in the early stages of entrepreneurship, they may be reluctant to “take the leap”. Indeed, people occupied in certain well-paying industries, such as academia, medicine, and policing, are well-represented among hybrid entrepreneurs (Folta et al., 2010). From the monetary point of view, the reason for such trend is the difficulty for individuals with fixed wages to increase their working hours and income from their main jobs (Folta et al., 2010).

Thorgren and colleagues (2016) have shown that younger and older adults are more likely to become full-time entrepreneurs than those in between. The former are less risk-averse because they have not accumulated significant material resources (i.e., they have less to lose) and their opportunity costs (i.e., the wages that they might earn as employees) are not high. As people become older, the probability of becoming self-employed increases (Blanchflower et al., 2001). This phenomenon can be explained by several factors. On one hand, people obtain human and social capital through employment (Burke et al., 2008), both of which contribute to successful entrepreneurship (Solesvik, 2016). On the other hand, older individuals may have accumulated savings and are more likely to have paid back their mortgages. In addition, with their children fully grown, they may have more free time and can take risks in trying a self-employment career path. Notably, the salary level of individuals entering hybrid entrepreneurship is higher than wages of individuals who become full-time entrepreneurs (Raffiee & Feng, 2014).

Thus, generally speaking, hybrid entrepreneurship is a good way to realize entrepreneurial intentions for risk-averse individuals. Females are more risk-averse compared to their male counterparts (Solesvik et al., 2013). Thus, trying to become a hybrid entrepreneur may be an especially attractive approach for females (Westhead & Solesvik, 2016), but this topic is under-researched at present. In their comprehensive study of

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hybrid entrepreneurs, Folta and colleagues (2010) omitted females from their long-term study of hybrid and full-time entrepreneurs.

Another aspect of hybrid entrepreneurship that will require further study is the employer's perspective, which is only briefly mentioned in the literature (Folta et al., 2010). Some employers are very strict and do not allow employees to engage into competing businesses. According to prior research, such restrictions are barriers to entrepreneurship (Stuart & Sorenson, 2003). However, some employers encourage the entrepreneurial spirit of employees and support them to develop innovative products (Chesbrough, 2002). Successful innovative ideas and developments might give birth to successful spin-offs where employers and inventors might have stakes. This avenue is a promising avenue of research given that hybrid entrepreneurship is likely to become more important in the future.

Based on gaps identified in the literature on hybrid entrepreneurship, I wished to understand why individuals selected a hybrid entrepreneurship career path. I also wanted further our understanding of why some individuals prefer to remain hybrid entrepreneurs while others go on to become full-time entrepreneurs.

Research Method

As a qualitative approach, I chose a long-term comparative case study method to answer the research questions. I selected two hybrid entrepreneurs who had different levels of human capital, were of different ages, who operated in different industries, and who had different growth motivations. The two case entrepreneurs were also different in their full-time entrepreneurial intentions: the first one wished to keep his hybrid status, and the second one intended to operate his own company on full-time basis. I selected these two cases to contrast them to one other and show the difference between two types of hybrid entrepreneurs.

I interviewed the two hybrid entrepreneurs six times each in the period between 2006 and 2015 so that I could follow the development of their businesses. All interviews were face-to-face and semi-structured, and they were transcribed the day afterwards. I asked some general demographic questions, questions related to current and previous "day jobs" of the entrepreneurs, and questions related to the firms they created through hybrid entrepreneurship. To ensure the confidentiality of the informants, their names have been changed.

In addition to the interview data, I collected secondary information about the informants' companies from the Internet, newspapers, and accounting reports. I also visited their offices in Norway and Germany and observed how they work. I selected entrepreneurs from these two countries because they are among the countries with the lowest rates of self-employment in the world and the level of self-employment is decreasing (World Atlas, 2016). In these countries, increasing support to hybrid entrepreneurs might be a solution for policy makers to increase the level of self-employment.

I analyzed the data following three principles: constant comparison, analytic induction, and theoretical sensibility (Boeije, 2010). I coded the information received from the interviews and secondary sources. The unit of analysis was an entrepreneur. First, I made a within-case analysis of each case. Then, I compared two cases and made a cross-case analysis. I analyzed the data with the help of existing theories and research on hybrid entrepreneurship.

Case 1: The Inventor

Mr. Müller is a hybrid entrepreneur. He combines his single business with his academic work as the chair of a university computer science department. Mr. Müller used to work as the R&D director for a branch of a world-leading ICT company in Europe. One of his inventions brought millions of dollars in revenue to his employer. However, Mr. Müller only received a modest bonus of DM3000 for his invention. He decided to quit the ICT company and became a university professor. Mr. Müller felt that he had reached his peak at the ICT company and that further promotion would be difficult. On the side, he had been working on an invention that scared away birds from eating crops in gardens and fields. One day, his neighbour suggested that he should start selling his invention. The neighbour helped Mr. Müller to promote the product by sending letters to potential customers, both businesses and private individuals. The sales of the product went well, and Mr. Müller started to sell the product around the world. His initial manufacturing efforts were modest: he even taught his children and other family members how to assemble the devices. But, Mr. Müller later invented a more professional version of the device that was used by airports around the world to keep birds away from planes. As of the latest interview, the business is doing well. Mr. Müller is close to retirement now, but he does not want to quit his secure employment as a university professor. Furthermore, he never

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did intend to become a full-time entrepreneur when he started this journey back in 2006. The income from his business gives Mr. Müller (and his family) additional income that supplements his income from his full-time job. He has accumulated significant personal savings, and he owns two houses and a collection of luxury cars. Interestingly, Mr. Müller is careful not to reveal the extent of his wealth to his employer. For example, despite owning several luxury cars, he uses a tiny, cheap car to drive to the university. He was also concerned about needing to disclose financial information related to his revenue and assets to the university. He plans to transfer his assets to a trust if the university decides he must disclose this information.

Case 2: The Shift Worker

Mr. Jensen lived in a rural area of Western Norway and worked as a sailor and electrician on a fishing vessel. He would work four weeks at sea per shift, then he would stay for four weeks at home. Building on his experience and professional education in electrical services, Mr. Jensen started a private electrical company in his 30s. When not at sea, he installed air conditioning and heat pumps in households in the countryside where he lived. Although Mr. Jensen initially did the electrical work alone, he eventually employed his cousin to perform the installations when he was at sea. The company gradually grew, and Mr. Jensen built premises for the business next to his home. Mr. Jensen had been operating as a hybrid entrepreneur but then applied for one-year leave of absence from his duties on the fishing vessel in order to become a full-time entrepreneur. Mr. Jensen's employer did not grant him leave of absence. There was no conflict of interest, given that Mr. Jensen's duties on board were different than the services provided through his private business. But, for the employer, it likely would have been difficult to find a reliable and experienced person who will agree to work only for one year on the fishing vessel. Mr. Jensen then quit his fishing vessel employment position and became a full-time entrepreneur. However, the income from his private electrical company was not sufficient. He decided to go back to paid employment as a sailor for another shipping company but he continued to run his own private electrical company. Mr. Jensen acquired a license to install complete electrical solutions in new houses. This opened a new market and brought many new customers. When the income from the electrical company was stable and secure, Mr. Jensen stopped working as a sailor and became fully self-employed and self-sufficient. He expanded his private electrical company and started a shop in a countryside

selling electrical appliances for households and firms. In 2014, Mr. Jensen's private electrical company was one of six gazelle firms in the county. Mr. Jensen recently bought a new office for his firm, which now employs six electricians. His family members (a wife and a daughter) also work in his business by assisting in the shop. Mr. Jensen now derives wealth from income from several businesses, including the electrical services company, the electrical appliances shop, and a property management shop.

Analysis and Discussion

These two case entrepreneurs have some similarities and differences. In each case, the entrepreneur was male. They each had a well-paying "day job" before they added entrepreneurship. The social security benefits were quite good in both cases. Importantly, in both cases, the hybrid entrepreneurs also had enough spare time in their "day jobs" to devote to their businesses. Also, they each could use income generated from their employment as start-up capital for their firms. However, investments into the new ventures were moderate. In Case 1 (Mr. Müller, the inventor), investments covered the cost of postage and supplies to inform customers by direct mail about the invention and the cost of ordering electronic components for the bird-scaring devices. In the Case 2 (Mr. Jensen, the shift worker), the entrepreneur acquired a used pickup truck and some instruments for the electrical installations. Neither entrepreneur had previous experience in business ownership. Both businesses made quite good progress and were profitable for their owners, but neither was particularly growth-oriented.

The differences between the cases were also notable. The entrepreneur in Case 1 is older. He started his business in his late 40s. He had a PhD degree before he switched from his industrial career to his academic career. The entrepreneur in Case 2 was younger, but still not very young, when he started his business. He was about 30 years old when the Norwegian government launched a subsidy programme to households that equipped their houses with heat pumps. The entrepreneur in Case 2 saw an opportunity to earn some extra money during the four weeks when he was at home between shifts at sea. His shift work as a sailor and his high salary provided him time and resources to starting a business alongside his main occupation. He had no higher education but had accumulated specific human capital through 10 years of employment as an electrician. He is quite sociable with many friends who were his first customers. The entrepreneurs were also

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different in terms of their social statuses and work conditions. In Case 1, the entrepreneur had a high social status as professor and the leader of an institute at the university, where he enjoyed comfortable working conditions. In Case 2, the entrepreneur's "day job" was performed in quite a harsh and dangerous environment in the North Sea and other polar waters. In Case 1, the entrepreneur did not have intentions to be a full-time entrepreneur. In Case 2, the entrepreneur had a clear goal to become a full-time entrepreneur and to quit his waged job. He succeeded on his second attempt. Notably, if he had decided from the beginning to drop his full-time job and become a full-time entrepreneur right away instead of first becoming a hybrid entrepreneur, he probably would have failed. It took him about 10 years to build his business and gain enough customers to secure sustainable revenue for the business and family.

Conclusion

The two cases examined here show that hybrid entrepreneurship is a viable path for people willing to realize their entrepreneurial ambitions in a lower-risk and organic way. In line with prior research (Folta et al., 2010), the hybrid entrepreneurs in this study have enough free time to do business alongside their "day jobs". Previous research argues that hybrid entrepreneurs are more risk-averse than individuals switching straight from waged jobs to full self-employment (Folta et al., 2010). The case evidence here suggests that the two entrepreneurs are not more risk-averse than full-time entrepreneurs but may be more realistic and know the pros and cons of entrepreneurship. Pursuing the hybrid entrepreneurship path allows entrepreneurs to test their business ideas (Giones et al., 2013) and grow in an evolutionary way. The information from the cases presented here shows that one hybrid entrepreneur aims to become a full-time entrepreneur and use the time when he combines both wage job and self-employment to overcome the liability of newness and liability of smallness by taking time to build his customer base and a reputation. He also learned a lot on the way. A key finding is that, without the secure incomes from the waged jobs, it would be more difficult (or even impossible) for the new ventures to survive.

Not all entrepreneurs aim to become full-time entrepreneurs. Some enjoy a dual status of having a high-paid, secure, and prestigious job while also deriving some extra income from entrepreneurial activity that can further improve their lifestyle. It is neither good nor bad that some hybrid entrepreneurs do not have growth intentions and do not intend to switch from the hybrid

entrepreneurship to full-time entrepreneurship. However, policy makers who are interested in growing the number of successful full-time entrepreneurs might wish to develop tailor-made programs to support hybrid entrepreneurs and encourage them to become full-time entrepreneurs. Such programs might be even more successful in producing full-time entrepreneurship than entrepreneurship education programs that focus on full-time entrepreneurship as the dominant model.

Hybrid entrepreneurship is a promising topic for policy development and academic research. In particular, several research avenues may be of interest to policy makers and scholars. First, research is needed regarding hybrid entrepreneurship among females. Previous research has not focused specifically on gender issues of hybrid entrepreneurship. This is an important avenue for hybrid entrepreneurship research given that female and male hybrid entrepreneurs have different motives to start a venture (Burke et al., 2008). Additionally, females still bear a greater responsibility for child care. Women have reported that child care has a negative influence on their entrepreneurial persistence (Burke et al., 2008). Better understanding of patterns that lie behind female and male hybrid entrepreneurship might give information for policy makers on how to increase the involvement of females in hybrid and full-time entrepreneurship.

Further research is required to understand the timing and decision-making processes of the switch to full-time entrepreneurship or decisions to maintain a hybrid status. Such future research might apply different theories to investigate various aspects of hybrid entrepreneurship, such as entrepreneurial bricolage theory (Baker & Nelson, 2005), effectuation theory (Sarasvathy, 2001), the theory of trying (Bagozzi et al., 1992), and gender theories. For example, using a lens of bricolage theory can help scholars to understand whether there is a difference between full-time self-employment and hybrid entrepreneurship in terms of using scarce resources. The effectuation perspective would allow investigation of the difference between full-time and hybrid entrepreneurs in utilization of causation and effectuation approaches.

Despite its limitations and exploratory nature, and the potential for future research in this area, the current study has implications for policy makers and education managers. The hybrid entrepreneurs studied here were not a focus of policy makers who develop and realize different support programmes for novice full-time entrepreneurs. The author's analyses of entrepreneurship

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support programmes in Norway, such as those offered at the Skape.no Centre of Entrepreneurship in Rogaland (skape.no/om-oss/english-info), show that such programmes are aimed at developing entrepreneurial skills primarily among those with limited education and among those who have experienced difficulties finding jobs. I propose that policy makers should develop measures to support hybrid entrepreneurship programmes, especially among people with high levels of human capital but who are still under-represented among entrepreneurs, such as women and young people. Policy makers might also consider involving people from certain industries that are expected to decline in the future to acquire entrepreneurial skills in order to secure future smooth transitions from the declining industries into new spheres. In particular, this can be interesting approach for policy makers in oil-dependent economies (e.g., Norway, Russia, and Brazil). In Norway, offshore workers have generous free time schemes between the shifts in the sea. The recent downturn in the oil industry and related industries serving the oil rigs (e.g., offshore shipping) lead to job losses among highly educated engineers and other professionals. Those individuals who are hybrid entrepreneurs may prove to be more resilient and flexible during turbulent economic times should their “day jobs” disappear.

Educators from higher education institutions might consider adding hybrid entrepreneurship their enterprise education curriculums. Many academic programs focus on teaching people either to become entrepreneurs or to become professional managers. Insertion of issues related to honing of effectuation and bricolage skills as well as creativity might help future generations of entrepreneurs to combine “day jobs” with self-employment. Given recent and predicted future instability in the labour market, such approaches may become all the more important in the future. Different possibilities and opportunities related to the swift development of Internet technologies and virtual business platforms would only favour involvement of more and more people in hybrid entrepreneurship.

The study has also implications for owners and managers of firms where hybrid entrepreneurs are employed. It seems that nonstandard employment relations will play a more important role in the future. The employer perspective is scarcely researched in prior studies on hybrid entrepreneurship (Folta et al., 2010). Managers might consider developing a company policy related to employees doing business in addition to their main occupation, not as a way of discouraging the behaviour but as a way of encouraging openness

and possibly as a means of retaining valued employees. The employer’s perspective and degree of involvement – in terms of spin-offs or forms or corporate entrepreneurship, or even entrepreneurial behaviours within full-time employment that may not be financially motivated – warrants study within the context of hybrid entrepreneurship as a stepping stone to full entrepreneurship.

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Keywords: hybrid entrepreneurship, hybrid entrepreneurs, self-employment, definitions, risk taking

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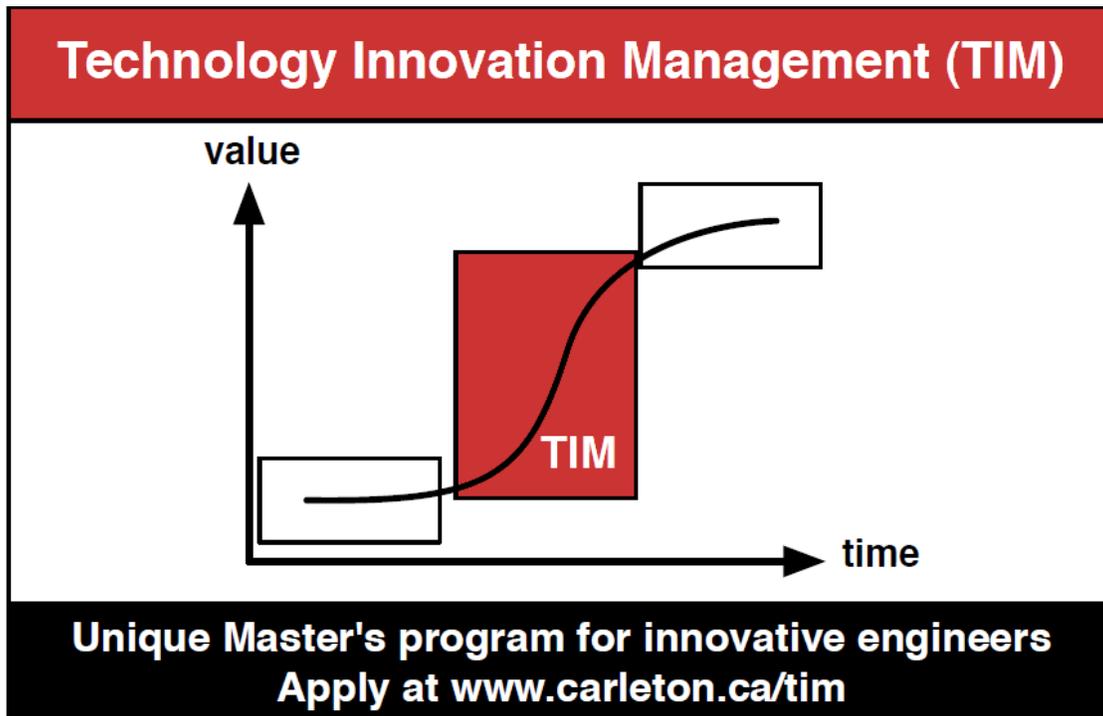
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