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JUKKA MOILANEN

**CONSTRUCTING A
TENSIONED SENSE
OF ACADEMIC
ENTREPRENEURSHIP**

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Constructing a tensioned sense of academic entrepreneurship

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ABSTRACT

Due to increasing recognition of the impacts of universities within society, academic entrepreneurship (AE) in all its diverse forms has become a highly relevant field of research. The exploitation of scientific knowledge for commercial purposes often occurs through university spin-off firms. Scientists and their inventions play a key role in the development of these firms, sometimes even years before they are founded. This study addresses the pre-founding phase of these firms by focusing on the university spin-off teams (USTs) that are formed by scientists who work in universities and wish to establish science-based firms to commercialise the outcomes of their academic research.

This study draws on and contributes to the research concerning AE as a social process. Most prior studies in this field have explored discourses, narratives and sensemaking related to the emergence of AE within and outside universities. Such studies have also investigated the identity construction of different groups of more or less engaged academics in relation to various forms of AE. Scientists who work in USTs and therefore, interact with academic and commercial stakeholders represent an important but under-researched group of actors with regards to the social process approach to AE.

Many AE scholars have highlighted the key differences between the academic and commercial worlds. However, questions concerning how such

differences are socially constructed and how specific tensions emerge in social interactions between USTs and their stakeholders have only rarely been addressed in prior studies. The present study generates new knowledge to address this research gap by answering the following three research questions regarding the social interaction among USTs and their stakeholders: How does the sense of tensioned AE unfold? How are the differences between the academic and commercial worlds constructed? How are tensions associated with AE negotiated and resolved?

The data used in this study consist of interviews and audio recordings of meetings between UST members and their stakeholders during the course of four research commercialisation projects. The study participants were interviewed multiple times throughout the commercialisation projects to gain insights into their sensemaking processes. The interviews were conducted in an open-ended manner, with the aim being to provide the participants the opportunity to narrate their experiences and perspectives as openly as possible. Utilising the sensemaking and critical sensemaking frameworks as theoretical lenses, the data were analysed so as to understand the meaning making of the interacting parties.

The analysis suggests that a tensioned sense of AE emerges as the members of USTs evaluate the differences they experience between the academic and commercial worlds, especially in terms of their identity reflections, ethical considerations and competence judgments. When involved in research commercialisation projects, the members of USTs engage in a process of negotiating resolutions to such tensions by conforming to, resisting, or rejecting the commercial world. The findings of this study extend the understanding of how tensions concerning identity reflections, ethical considerations and competence judgments are made sense of as well as how resolutions are negotiated in social interaction. For scientists and their stakeholders, this study provides new knowledge to help them understand how the differences between the academic and commercial worlds are socially constructed. It also demonstrates how the various tensions experienced can be negotiated and resolved with different outcomes. Moreover, the study highlights the importance of identifying and addressing the tensioned sense of AE in the various support systems both within and outside universities.

Keywords: academic entrepreneurship, social process, sensemaking, university spin-off team, scientists, stakeholders, commercialisation, tensions, entrepreneurship, universities and colleges, stakeholder groups, scientists

Moilanen, Jukka

Akateemisen yrittäjyyden jännitteinen merkityksenrakentaminen

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TIIVISTELMÄ

Yliopistojen yhteiskunnallisen vaikuttavuuden merkityksen kasvun myötä monimuotoisesta akateemisesta yrittäjyydestä on tullut entistä olennaisempi tutkimuksen kohde. Tieteellisen tutkimuksen tulosten kaupallistaminen tapahtuu usein yliopistolähtöisten yritysten kautta. Tutkijat ja heidän löydöksensä ovat keskeisessä roolissa näiden yritysten kehittymisessä jopa vuosia ennen niiden perustamista. Tämä väitöskirja tutkii yliopistolähtöisten yritysten perustamista edeltäviä vaiheita keskittymällä yliopistossa työskentelevien tutkijoiden muodostamiin tiimeihin, joiden tarkoituksena on perustaa yritys tutkimuksen kaupallistamista varten.

Tämä tutkimus sijoittuu tutkimuskentälle, jossa akateemista yrittäjyyttä tutkitaan sosiaalisena prosessina. Merkittävä osa tämän tutkimuskentän aiemmasta kirjallisuudesta on tutkinut akateemiseen yrittäjyyteen liittyviä diskursseja, narratiiveja ja merkityksenrakentamista sekä yliopistojen sisällä että ulkopuolella. Lisäksi tutkimuksen kohteena on ollut erilaisten akateemisen yrittäjyyden muotojen kanssa toimivien tutkijoiden identiteetin rakentuminen. Yliopistolähtöisten yritysten perustamista tavoittelevissa tiimeissä työskentelevät tutkijat ja heidän vuorovaikutuksensa akateemisten ja kaupallistamiseen liittyvien sidosryhmien kanssa on tärkeä, mutta huomattavasti vähemmän tutkittu aihe akateemista yrittäjyyttä sosiaalisena prosessina tarkastelevissa tutkimuksissa.

Monet akateemisen yrittäjyyden tutkijat ovat kiinnittäneet huomiota akateemisen ja kaupallisen maailman eroavaisuuksiin. Näiden eroavaisuuksien sosiaalinen rakentuminen sekä jännitteiden ilmeneminen sosiaalisessa vuorovaikutuksessa yliopistolähtöisten yritystiimien ja heidän sidosryhmiensä kanssa on kuitenkin saanut vain vähän huomiota aiemmassa tutkimuksessa. Tämä tutkimus tuottaa uutta tietoa kyseiseen tutkimusaukkoon vastaamalla seuraaviin kolmeen yliopistolähtöisten yritystiimien ja heidän sidosryhmiensä väliseen vuorovaikutukseen liittyvään tutkimuskysymykseen: Kuinka jännitteisen akateemisen yrittäjyyden merkitys kehittyy? Kuinka erot akateemisen ja kaupallisen maailman välillä rakentuvat? Kuinka akateemisen yrittäjyyden jännitteet neuvotellaan ja ratkaistaan?

Tutkimuksen aineisto koostuu neljän yliopistolähtöisen yritystiimin ja heidän sidosryhmiensä kanssa käydyistä haastatteluista ja tapaamisista. Tutkimukseen osallistuneita henkilöitä haastateltiin useaan kertaan kaupallistamishankkeiden aikana, jotta aineisto tuottaisi ymmärrystä heidän merkityksenrakentamisen prosesseistaan. Haastattelut toteutettiin avoimina haastatteluina, millä pyrittiin tarjoamaan tutkimukseen osallistuneille henkilöille mahdollisuus kuvailla kokemuksiaan ja näkemyksiään mahdollisimman avoimesti. Aineiston analyysin teoreettisena linssinä käytettiin merkityksenrakentamisen ja kriittisen merkityksenrakentamisen viitekehyksiä, joiden avulla aineistosta voitiin tehdä tulkintoja henkilöiden merkityksenrakentamisesta.

Analyysin mukaan akateemisen yrittäjyyden jännitteinen merkitys ilmenee yliopistolähtöisten yritystiimien arvioidessa heidän kokemiaan eroavaisuuksia akateemisen ja kaupallisen maailman välillä. Erojen arvioinnissa korostuvat etenkin identiteettipohdinnat, eettiset seikat sekä kyvykkyyksien arviointi. Tutkimuksen kaupallistamiseen tähtäävässä projektissa yliopistolähtöisten yritystiimien jäsenet osallistuvat prosessiin, jossa näihin kysymyksiin liittyvät jännitteet ratkaistaan mukautumalla kaupalliseen maailmaan, vastustamalla kaupallista maailmaa tai hylkäämällä kaupallinen maailma. Tutkimuksen löydökset edistävät akateemisen yrittäjyyden tutkimusta tuottamalla ymmärrystä tutkimuksen kaupallistamiseen liittyvien identiteettipohdintojen, eettisten seikkojen ja kyvykkyyksien arvioinnin tuottamien jännitteiden merkityksenrakentamisesta. Lisäksi tutkimus tuottaa ymmärrystä näiden jännitteiden ratkaisemisesta sosiaalisessa vuorovaikutuksessa. Tutkijoille sekä heidän

sidosryhmilleen tämä tutkimus tuottaa uutta tietoa akateemisen ja kaupallisen maailman välisten erojen rakentumisesta sekä niihin liittyvien jännitteiden neuvottelemisesta ja ratkaisemisesta erilaisin lopputuloksin. Tutkimus korostaa myös akateemisen yrittäjyyden jännitteisyyden tunnistamisen ja huomioimisen tärkeyttä yliopistojen sisällä ja ulkopuolella toimivissa tukirakenteissa.

Avainsanat: akateeminen yrittäjyys, sosiaalinen prosessi, merkityksenrakentaminen, yliopistolähtöiset yritykset, tutkijat, sidosryhmät, kaupallistaminen, jännitteet, yrittäjyys, yritykset, yliopistot, korkeakoulut

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“We choose to go to the Moon... We choose to go to the Moon in this decade and do the other things, not because they are easy, but because they are hard”

John F. Kennedy, 1962

The process of writing this dissertation has, as expected, been a long and at times an arduous one. In addition to the pages that make up this final product there have been hundreds more that have been written only to be swallowed by the sea that is the development of ideas and understanding of the world. In the face of adversity and occasional frustration, I have come to draw strength and inspiration from John F. Kennedy’s 1962 speech about the urgency of landing a human on the Moon. We must strive to do difficult things because they are often the ones which can teach us the most about the world and ourselves. And yet, they provide us just a glimpse of what we can achieve and what there is to learn. This dissertation has been my mission to the Moon. May many a new frontier beckon beyond it.

This dissertation has been made possible by a variety of people who have supported and guided me on my way. First and foremost, I must thank my supervisors Associate Professor Tero Montonen and Professor Päivi Eriksson for both encouraging me to start my doctoral studies as well as guiding me along the way. Without their efforts, none of this would have been possible. During times when the end goal has been out of sight, they have been able to help me to find the right direction. As a junior researcher their guidance and encouragement were vital in enabling me to start finding my own voice as a researcher.

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Helsinki, 11 August 2022

Jukka Moilanen

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1 INTRODUCTION

1.1 Aim and objectives

This study aims to generate new knowledge concerning the social aspects of academic entrepreneurship (AE), especially in relation to university spin-off companies. To achieve this, the study investigates the pre-founding phase of university spin-off firms, focusing on the teams of scientists who wish to establish firms with the aim of commercialising the outcomes of their research. The objectives of this dissertation are to study the social interaction of university spin-off teams (UST) and their stakeholders during the early stages of the spin-off process, and to investigate how USTs and their stakeholders make sense of academic entrepreneurship.

The popularity of AE as a research field has increased significantly over the last few decades due to societies, especially in the Western economies, seeking to increase their competitiveness through the commercialisation of the outcomes of academic research (Grimaldi et al., 2011; Perkmann et al., 2013; Van Langenhove & Eriksson, 2021). While the principal tasks of universities remain research and education, the so-called third mission of universities, the task of making societal contributions through social and commercial contributions, has become the subject of increasing interest among reserachers as well among society more generally.

Research-based university spin-off firms represent an important vehicle for the commercial exploitation of scientific knowledge. The trend towards spin-off development has manifested over the decades in the founding of technology transfer offices, accelerator programmes, incubators and other initiatives by institutions and governments with the aim of supporting the founding of spin-offs (Mustar et al., 2008). University spin-offs are formed by scientists who work in universities and aim to establish science-based firms in order to commercialise their research (Shane, 2004). To differentiate between the pre-founding and post-founding phases of spin-off teams, I use the term university spin-off team (UST) to refer exclusively to the teams of

scientists working in universities with the aim of founding spin-off firms. In contrast, the term spin-off team is used when referring to post-founding teams, or in instances when referring to prior studies in which the status of the team is not known.

While the importance of the spin-off team has been recognised in prior studies, such works have mainly focused on the post-founding phase spin-off teams, with studies concerning the pre-founding USTs are rare. As spin-offs are formed by scientists who typically have only limited entrepreneurial experience, they are said to lack the commercial competence necessary to establish and grow successful businesses (Miozzo & DiVito, 2016; Nikiforou et al., 2018; Vanaelst et al., 2006). To mitigate this shortcoming, USTs can seek help from university technology transfer offices, incubators, or accelerator programmes. It is also common for the spin-off to be supplemented by a more experienced surrogate entrepreneur, who is tasked with leading the firm's commercial efforts (Clarysse & Moray, 2004; Lockett et al., 2003, Rasmussen et al., 2011). Spin-off teams operate and interact with a variety of stakeholders, such as faculty, university commercialisation staff, investors, industry partners and business advisors, who all influence the spin-off teams' internal processes (Clauss et al., 2018; Miller et al., 2014; Simeone et al., 2017). As these teams aim to bridge the gap between university and business, they need to overcome distinct challenges associated with the variety of interests that influence the processes through which AE unfolds.

This study contributes to the examination of AE as a social process. Prior studies concerning AE as a social process have investigated the variety of discourses and narratives associated with entrepreneurial universities (Eriksson et al., 2021), such as entrepreneurial ecosystems (MacNeil et al., 2021) and gender (Elkina, 2021; Suopajarvi et al., 2021). In such works, identity has been recognised as a salient topic when it comes to academic entrepreneurs. Indeed, studies suggest that academic entrepreneurs may have to identify an identity position that enables them to maintain aspects of their scientist identity while adapting to the identity pressures associated with entrepreneurship (Jain et al., 2009; Montonen et al., 2021a; Peura et al., 2021). Recent studies have also investigated the sensemaking of USTs, examining

how the understanding of AE is socially constructed in the spin-off process (Montonen et al., 2016; Palo-oja et al., 2017; Palo-oja & Eriksson, 2019).

Due to the desire to increase AE, new tensions have emerged inside universities. The commercial interests related to AE may be seen to conflict with the traditional Mertonian norms of academia as well as the values of scientific pursuit (Owen-Smith & Powell, 2001; Samsom & Gurdon, 1993). Given the different and sometimes even conflicting natures of the academic and commercial worlds, AE has been suggested to be a tensioned subject for individual scientists, USTs, research groups and faculties alike (D'Este & Perkmann, 2011; Philpott et al., 2011; Tuunainen & Knuuttila, 2009). The ways in which the tensions associated with AE emerge during the social interactions among USTs and their stakeholders have not, however, been investigated in prior studies.

This study contributes to the AE literature by examining how AE unfolds as a social process between USTs and stakeholders of university spin-offs. During my research, I have utilised both sensemaking (Weick, 1995) and critical sensemaking (CSM) (Helms Mills & Mills, 2000/2017; Helms Mills et al., 2010) as theoretical lenses with which to examine how USTs and their stakeholders interact and make sense of AE during the early stages of the spin-off process.

1.2 Investigating academic entrepreneurship from the social process perspective

In the present dissertation, I study the concept of AE by examining the creation of university spin-offs. In this context, spin-offs are new ventures created with the aim of commercialising research inventions. They are usually founded by a team of scientists, whose expertise may be supplemented by a so-called surrogate entrepreneur who has more experience of commercialisation or entrepreneurship (Clarysse & Moray, 2004; Miozzo & DiVito, 2016; Vanaelst et al., 2006). University spin-offs are considered to be important venues for the direct commercialisation of new technologies, creators of knowledge-based employment, and sources of higher revenues for universities when

compared with licensing (Fini et al., 2018; Shane, 2004). As the creation and development of spin-offs require active involvement from university scientists, the process provides an avenue for examining the concept of AE based on the experiences of the scientists involved in it, which has previously been under-represented in the research field (Montonen et al., 2021a; Palo-oja & Kivijärvi, 2015; Palo-oja et al., 2017).

University spin-off firms are typically founded by entrepreneurial teams formed by university researchers. As these spin-off teams are formed by scientists, they are suggested to be more homogeneous and to lack commercial or entrepreneurial experience when compared with the founding teams behind other new ventures (Clarysse & Moray, 2004; Ensley & Hmieleski, 2005; Rasmussen, 2011). While prior studies have established the centrality of the team with regard to the performance of university spin-offs, the majority of team-level studies of AE have focused on the characteristics and human capital of such spin-offs. Although studies have recognised the importance of the interaction of the entrepreneurial team, only a few have explored the internal processes of these teams. (Hayter et al., 2018; Mathisen & Rasmussen, 2019; Nikiforou et al., 2018)

Prior studies suggest that spin-off team members are usually scientists with limited entrepreneurial experience and industry contacts. Therefore, it is common for spin-off teams to be supplemented by surrogate entrepreneurs with commercial or entrepreneurial backgrounds (Lockett et al., 2003; Vohora et al., 2004). These surrogate entrepreneurs can help to improve the performance of spin-offs and render them more viable targets for investors (Clarysse & Moray, 2004; Franklin et al., 2001; Lundqvist, 2014). In addition, spin-off teams often seek assistance in relation to their commercialisation efforts from a variety of stakeholders, including university technology transfer offices, accelerator programmes and incubators. These support systems can provide them with both advice and mentorship, and they can also help with developing their entrepreneurial skills and gaining access to investors and industry partners (Clarysse et al., 2015; Hochberg, 2016).

Aside from commercialisation-oriented support systems, spin-off teams operate among multiple research-related interests. Universities, faculties, research groups, funding bodies and other research contacts can all vary in

terms of their approach to and approval of AE (Davey et al., 2015; Samsom & Gurdon, 1993; Tuunainen, 2004). Having such an array of stakeholders representing both commercial and research interests is a unique characteristic of spin-off teams, who have to make sense of a variety of interests and sometimes conflicting expectations to navigate the challenges associated with bringing their research to market.

Many studies suggest AE to be tensioned. The tensions associated with AE have been argued to be related to a perceived conflict between traditional academic objectives and the objectives of commercialisation (Holloway, 2015; Siegel & Wright, 2015; Zheng, 2010). AE has also been suggested to be a source of tensions for individual scientists and spin-off teams operating in the boundary of research and commercialisation (D'Este & Perkmann, 2011; Philpott et al., 2011).

The perception of AE is said to be entangled with the social contexts of spin-offs. In addition to the social interactions that occur between team members and stakeholders, the national and local contexts influence how AE is perceived. Moreover, AE is also influenced by the societal discourses concerning entrepreneurship, the role of universities, and aspects such as gender (Karhunen et al., 2017; Sengupta, 2021; Suopajarvi et al., 2021). The research and commercialisation discourses can provide academic entrepreneurs with resources for strengthening their preferred identity and agency, although they also represent a source of tension for scientists who aim to continue their academic careers while acting as entrepreneurs (Jain et al., 2009; Montonen, 2014; Montonen et al., 2021a; Peura et al., 2021).

While AE has not yet been extensively studied from the social process perspective, there is a growing body of research exploring the subject. Such studies have approached the issue of AE from various theoretical perspectives. For instance, recent research has studied the processing of societal expectations by university social systems (Tuunainen et al., 2021), the identity work and identity construction of academic entrepreneurs (Jain et al., 2009; Karhunen et al., 2017; Montonen, 2014; Montonen et al., 2021a; Peura et al., 2021), the so-called third mission of universities as a boundary object (Montonen et al., 2021b; Sataøen, 2018), the antenarratives of entrepreneurial ecosystems (MacNeil et al., 2021), the gendered discourses of AE (Elkina,

2021; Fältholm et al., 2010; Suopajärvi et al. 2021), and the sensemaking of academic entrepreneurs (Montonen et al., 2016; Palo-oja, 2018; Palo-oja & Eriksson, 2019; Palo-oja & Kivijärvi, 2015; Palo-oja et al., 2017).

To extend the recent literature, I aim to highlight how the tensioned sense of AE is constructed in social interaction among UST members and their stakeholders. Originally conceptualised during the 1970s, sensemaking is a way of understanding how meaning is extracted from a flow of events. Sensemaking was most famously applied to organisational circumstances by Karl E. Weick (1995), who proposed it as a means of understanding organising by focusing on the social psychological processes involved instead of the outcomes of organising. Weick's (1995) sensemaking is based on seven interrelated properties that define how individuals and organisations make sense of novel situations. It is a social psychological process, whereby people develop a plausible, albeit not necessarily accurate, sense of events through social interaction, retrospection, and enactment. Sensemaking is an ongoing process that is heightened during organisational shocks, such as crises or other situations which disrupt the routine processes of organisations. (Weick, 1995, 2001; Weick et al. 2005)

The sensemaking perspective has been used to study AE in a few prior studies. For example, Montonen et al. (2016) found that scientists take clues from their research experiences when making sense of entrepreneurship, while business advisors draw on their entrepreneurial background to challenge and guide the scientists' interpretations. The sensemaking seen in relation to commercialisation projects has been found to promote ambiguous understandings of AE and the primacy of the research perspective (Palo-oja & Kivijärvi, 2015; Palo-oja et al., 2017).

Although the sensemaking perspective has been used in a variety of organisational contexts since the 1990s, it has also been subject to criticism, with potential improvements having been proposed (Sandberg & Tsoukas, 2014). One important development derived from Weick's (1995) sensemaking approach is CSM, which aims to address some of the shortcomings of traditional sensemaking by considering sense to be situated in its contextual factors. This is achieved by recognising discourses, formative contexts, organisational rules, and power as key influences of sensemaking (Aromaa et

al., 2018; Helms Mills, 2003). Discourses are embedded within language, and they are composed of the ideas, beliefs, social norms and values of a society or social group. They influence the construction of the world and also serve to induct the norms and values of the social order into its subjects (Foucault, 1969/2002; Thurlow & Helms Mills, 2009). In the AE context, these social discourses can include the role of academics in society, as evidenced by the discourse concerning universities' third mission (Sataøen, 2018), or gender, which can restrict or empower female scientists to pursue entrepreneurial career paths (Fältholm et al., 2010; Suopajarvi et al., 2021).

Formative contexts form the structures of social life, which establish the expectations of society and the organisations within it. They are a set of arrangements taken for granted in social situations, which means that they are difficult to challenge or change. (Hilde & Mills, 2017; Unger, 1987) In the case of academic entrepreneurs, the university seems to be the obvious formative context, including its long-standing traditions of teaching and producing knowledge within society. These traditions are also embedded in the larger context of society, where entrepreneurship is valued as a producer of goods, services, and employment opportunities. Moreover, AE can be incentivised and emphasised on a governmental level (Etzkowitz et al., 2000; Laredo, 2007; Perren & Jennings, 2005). Closely linked to formative contexts are organisational rules, which represent the formal or informal rules of organisations that define the structure of an organisation and set out the ways things should be done within it (Mills & Murgatroyd, 1991). Modern universities often house technology transfer offices or entrepreneurship services, which are tasked with formally defining the processes related to AE within a university. Faculties and research groups can also have their own informal rules, which influence individuals and teams seeking entrepreneurial opportunities (Lockett et al., 2014; Owen-Smith & Powell, 2001).

Power can exert a restrictive or constructive influence on the agency of actors. It can enable actors to influence what is considered accepted in sensemaking, although resistance to power can also have an empowering impact through sensemaking (Aromaa, 2020; Mills & Helms Mills, 2017; Weick et al., 2005). A few prior studies have examined the power relationships associated with AE and their impacts on social processes. For example,

Montonen et al. (2016) suggest that the mentors of university spin-offs can utilise their power position, which is derived from their business expertise, to influence both the sensemaking and the actions of scientists, who often lack experience of commercialisation. The power distance between the academic and the non-academic members of spin-off teams has also been argued to hinder communication between team members. Moreover, the existing power dynamics of the university influence how scientists navigate the boundary between their academic work and the commercialisation of their research outputs (Djokovic & Souitaris, 2008; Tuunainen, 2005; Tuunainen & Knuuttila, 2009; Palo-oja, 2018).

1.3 Epistemological considerations

The main epistemological considerations with regard to this study stem from the concepts of sensemaking (Weick, 1995) and CSM (Helms Mills et al., 2010), which I use as theoretical lenses with which to examine AE from the perspectives of the individual and the team.

Weick (1979) defines sensemaking as a cognitive process that forms the basis of organising and social interaction. As Weick (1979) proposes, sensemaking builds on the epistemological foundations of the interpretivist paradigm. More specifically, sensemaking draws on both phenomenology and ethnomethodology. The phenomenological perspective considers reality to be created through actors' interpretations of phenomena. Phenomenological research also represents an interpretive process whereby the researcher aims to interpret the experiences of actors in order to generate an understanding of the phenomenon of interest (Creswell, 2007). This is central to the sensemaking perspective, according to which the social world is examined as constructed and ordered from the perspective of the actors within it. Furthermore, ethnomethodology involves the study of everyday life, with a focus on the construction of reality by people who seek to make sense of activities by making them rationally accountable within their contexts (Burrell & Morgan, 1979). These perspectives are central to organising when it comes to the sensemaking approach. In addition, Weick (1979) proposes

that sensemaking is a process that is both action-oriented and cognitive, as people act and make sense by looking back at their actions. In his later work, Weick (1995) also acknowledges the socially constructed nature of sensemaking, although he continues to focus on sensemaking as it occurs through individual cognitive actions.

Weick's (1995) sensemaking framework has been later developed into the CSM framework, which emphasises the social-constructionist nature of sensemaking. In the prior CSM research, the construction of sense is examined as situated in the surrounding contexts of the actors. CSM draws on what Helms Mills et al. (2010, p. 188) describe as the 'triangulation of methodologies' of interpretivism, poststructuralism, and critical theory, which form the epistemological basis of CSM. This approach aims to challenge the scientific character of Weick's (1995) sensemaking properties and provide different ontological frames of reference for CSM. It also offers researchers a multitude of epistemological approaches for the study of organising (Aromaa, 2020).

Structuralist research tends to focus on understanding reality as a set of structures. Structuralism is, therefore, concerned with the relationships between actors as well as how those underlying structures produce the ideas and behaviours of the actors. The aspect of power is deeply ingrained within structuralism. The main structural influences seen in the prior CSM research are Mills and Murgatroyd's (1991) organisational rules and Unger's (1987) formative contexts. Here, organisational rules are formal or informal rules that control, guide, and constrain social action within an organisation. In the context of AE, these organisational rules can be, for example, formal policies defining how the commercialisation of research is allowed in the university or informal rules prioritising research over commercialisation. These rules are structures that define and restrict sensemaking by affecting which interpretations are considered plausible and which cues are selected for sensemaking purposes. (Thurlow & Helms Mills, 2009) Formative contexts are assumptions and shared ideas that define social life within a given society. They are structures that restrict what is considered to be plausible in a society. In terms of CSM, formative contexts are considered to link the organisational

rules and individual activities with the dominant social values of society (Mills et al., 2010).

Post-structuralism seeks to break down the structural, isolated, and deterministic elements of knowing and understanding the world. Instead of expecting unequivocal answers, post-structuralist thought is built on the notion that there can be multiple interpretations of reality. Thus, post-structuralism both builds on and stems from the critique of structuralism. It also rejects the notion of underlying established structures and the study of the hierarchical binary pairs that are common in structuralist thought. In light of this, post-structuralists argue that objects, such as language, are not themselves a direct source of truth; rather, they must be examined as situated within the systems of knowledge that produced them. (Alvesson & Sköldbberg, 2018; Harcourt, 2007; Olssen, 2003) The post-structuralist influence of the CSM approach is based on Michel Foucault's (1962/2002) work on discourse. Foucault (1962/2002) argues that discourses are dominant social practices that define and restrict what is allowed to be spoken in the society, and by whom. Knowledge is the source of power in society, and this power involves discourses exercised in the discourses that construct and maintain truth and impose order in society. (Alvesson & Sköldbberg, 2018; Foucault, 1969/2002) In the context of CSM, powerful discourses define what senses are considered possible. They also affect what will be accepted as plausible sensemaking outcomes and restrict the identity options available to actors. Discourses change temporally, meaning that sensemaking must also be considered a product of its time (Helms Mills et al., 2010). In terms of AE, discourses can, for example, define what kind of entrepreneurial activity is considered permissible for scientists or, considering general discourses on gender, what options and identities are considered plausible for female scientists in particular (Suopajarvi et al., 2021). In general, entrepreneurship discourses are perceived to be heavily gendered (Elkina, 2021; Maclean et al., 2021), with women often being represented as a special group in entrepreneurship texts and imagery, whereas male entrepreneurs are simply presented as entrepreneurs (Fältholm et al., 2010).

In this study, I apply the heuristic approach to CSM proposed by Helms Mills et al. (2010). Offering a variety of onto-epistemological frames, the

CSM approach does not require researchers to restrict themselves to a strict research paradigm when setting out to conduct research. This approach shares similarities with Alvesson and Sköldbberg's (2018) reflexive methodology, according to which the researcher reflects upon the research process, aiming to make justified choices and interpretations concerning the aims and findings of the research and to explain those choices to the reader (Aromaa, 2020; Montonen, 2014).

In the present study, I consider the concept of AE itself to be socially constructed. Indeed, the reality of what AE means develops over time through the process of social interaction that occurs between academic entrepreneurs and the people situated close to them, including faculty members, advisors, and mentors. I propose that this social interaction cannot be separated from the societal context in which it is embedded. Societal and organisational rules, discourses, and power relationships define what scientists are allowed and expected to do when it comes to AE, which affects how they interact. Moreover, the availability of funding mechanisms, university commercialization initiatives, the prominence of academic research as a source of commercial innovation and the statement of the third mission of the university are all elements that shape how AE is understood and considered as an option for scientists. In addition, as people interact, they share and enact these discourses, rules, and power relationships using both language and action.

1.4 Research questions and scope

My research extends the literature concerning AE by examining USTs from a social process perspective. By investigating the social interaction of university scientists in a UST that operates among stakeholders representing varied interests, this dissertation aims to provide new insights into the under-researched subjects of the individual and collective experiences of AE (Hayter et al., 2018; Mathisen & Rasmussen, 2019; Nikiforou et al., 2018). Several prior studies have suggested that scientists face tensions when transitioning to and operating at the boundary of research and commercialisation (Brennan & McGowan, 2006; D'Este & Perkmann, 2011; Philpott et al., 2011), although

the emergence of tension through social interaction has not previously been subjected to further study. The main research question that this dissertation seeks to answer is as follows:

How does the sense of tensioned academic entrepreneurship unfold in social interaction?

To answer my main research question, I address the following two sub-questions, which provide insights into two specific aspects of how the tensioned sense of AE is constructed. First, I examine how scientists and stakeholders construct the differences between the academic and commercial worlds with the following sub-question:

How are the differences between the academic and commercial worlds constructed in social interaction among the university spin-off team and its stakeholders?

To construct a plausible sense of AE between these two worlds, scientists and stakeholders must resolve the identified differences through the process of social interaction. To explore how the differences between the two worlds are negotiated in social interaction, I address the following sub-question:

How are the tensions associated with academic entrepreneurship negotiated and resolved in social interaction between the university spin-off team and its stakeholders?

1.5 Structure of the dissertation

In the following chapter, I discuss the prior literature concerning AE as a social process, sensemaking and CSM. I also provide a brief overview of the different topics that have previously been researched in the AE literature, after which I examine the concept of university spin-offs and the study of AE as a social process in further detail.

In chapter three, I present the data I used for the research as well as the methods used to collect those data. I also explain the methodological approach and choices made for the three articles included in this dissertation. In chapter four, I present the findings of this dissertation and the three articles, while in chapter five, I discuss the various contributions of this research. Moreover, I suggest some possible avenues for further study.

2 SCIENTISTS, STAKEHOLDERS, AND ACADEMIC ENTREPRENEURSHIP

2.1 Prior research on academic entrepreneurship

The role of universities within the society has expanded over the last few decades. Aside from the traditional tasks of research and teaching, since the 1970s governments have emphasised the need to bring research-based inventions to industry in order to remain competitive in the international markets (Grimaldi et al., 2011). The importance of academic research as a source of economic competitiveness has been highlighted in several higher education policy initiatives on the part of the European Union (Van Langenhove & Eriksson, 2021). The promulgation of the Bayh-Dole Act, which gave universities the ability to gain ownership of patented breakthroughs in government-funded research, in the United States (US) in 1980 is often cited as a major factor influencing the increase of university-industry technology transfer. (Rothaermel et al., 2007) However, the rise of research commercialisation through patenting in the US has also been attributed to institutional changes in both universities and the government during the decades preceding the influential legislation (Popp Berman, 2008). Policies similar to the Bayh-Dole Act have also been adopted internationally. For instance, in Finland, the so-called 'professor's privilege' was abolished as part of a legislative reform in 2007, which gave universities the right to claim patent rights to their employees' inventions. Such legislative efforts have been argued to incentivise universities to increase their technology transfer activities, although studies have questioned the effectiveness of the reforms (Ejermo & Toivanen, 2018; Mowery & Sampat, 2004).

Early studies concerning AE mainly focused on the commercialisation of academic research as a source of revenue for universities, especially when it came to supplementing the dwindling supply of public funding. These studies generally focused on university-industry collaboration and the commercialisation of research inventions through both patenting and

licensing (Perkmann et al., 2013; Rothaermel et al., 2007). However, these subjects provide only a partial picture of the phenomenon. In more recent studies, the term 'AE' has been used to refer to a wide range of interrelated topics. In fact, prior AE research has provided insights into topics such as university-industry collaboration, the consulting work done by scientists (Etzkowitz, 2004; Haeussler & Colyvas, 2011), entrepreneurial behaviour within universities (Obschonka et al., 2019), student entrepreneurship (Hayter et al., 2017; Komulainen et al., 2019; Oponng et al., 2019; Ripa & Secundo, 2019), and the societal impacts of AE (Fini et al., 2018; Mathisen & Rasmussen, 2019; Rothaermel et al., 2007; Siegel & Wright, 2015).

In this dissertation, I investigate the topic of AE by focusing on university spin-off firms, especially the USTs formed by scientists for the purposes of commercialising research inventions. Such companies can seek to achieve the commercial exploitation of research inventions through the 'spinning off' of either technology, personnel, or both from the university (Nicolaou & Birley, 2003; Shane, 2004). Spin-offs are considered an important mechanism for the direct commercialisation of new technology, as they can provide a means of commercialising technologies that would otherwise be left undeveloped, create knowledge-based employment, and generate higher revenues for universities when compared with the licensing of technology (Fini et al., 2018; Shane, 2004).

While spin-offs share certain similarities with other new ventures, particularly technology-based firms, prior studies suggest that they have meaningful differences. For instance, university spin-offs are suggested to commonly require external managerial expertise, be more closely oriented towards the patenting of new technologies, maintain strong links to universities, and require more time to develop their business. (Clarysse & Moray, 2004; Mathisen & Rasmussen, 2019)

One of the most well-researched aspects of university spin-off firms concerns the determinants and antecedents of the development, growth and performance of such companies (Mathisen & Rasmussen, 2019). This perspective has also long dominated the study of the individual and team levels of AE, with the majority of individual-level studies focusing on the determinants of entrepreneurial activity and the personal characteristics

of academic entrepreneurs (Miranda et al., 2017; Montonen, 2014; Neves & Brito, 2020). These studies suggest that academic entrepreneurs are not a homogenous group of individuals. Indeed, the motivations, demographic factors and other individual determinants of commercialisation activity have been studied extensively and found to be varied (Hayter et al., 2018; Krabel & Mueller, 2009; Perkmann et al., 2013). Scientists generally attribute their commercial engagement to economic incentives, reputation- or career-related rewards and the satisfaction of its puzzle-solving nature. It is not, therefore, only personal financial gain that drives researchers towards AE. For some, its appeal lies in the ability to gain funding for further research, while for others, the interest lies in bringing the fruits of their research labours to the public's attention (Lam, 2011). Fini et al. (2009) suggest that a major incentive for scientists to found spin-off companies is actually the enhancement of their academic status, for example, through the expectation of gaining new opportunities or funding for their research activities as well as recognition as leading academics in their fields.

Just as there are differences in the motivations of academic entrepreneurs, so there are differences in the personal attributes of scientists who engage in different commercial activities. In their study of scientists' founding and advising activities, D'Íng and Choi (2011) find that junior scientists are more likely to found companies, whereas experienced scientists are more likely to fulfil advisory roles. Other studies, however, suggest that younger academic entrepreneurs face greater risks to their careers as scientists. More experienced scientists have better job security and, especially if they have prior business experience, are more likely to be able to leverage their extensive network as resources when growing their ventures (Haeussler & Colyvas, 2011; O'Shea et al., 2007; Shane & Khurana, 2003). Gender has also been found to impact the likelihood of scientists engaging in founding activities. More specifically, female scientists are less likely to found companies than their male colleagues, although this difference may be at least partially explained by female scientists' tendency to focus on research areas that are less conducive to commercialisation as well as their less senior status within universities (Abreu & Grinevich, 2017). Interestingly, the differences between male and female scientists are, however, less pronounced in relation to

consulting and advising activities (Ding & Choi, 2011; Haeussler & Colyvas, 2011). Psychological aspects have also been argued to have strong links to the entrepreneurial intentions of scientists. In fact, studies suggest that scientists' passion with regard to entrepreneurship and science is associated with their likelihood of founding a company (Huyghe et al., 2016; Obschonka et al., 2019).

2.2 The teams and stakeholders of university spin-offs

University spin-offs are typically founded by teams of scientists, and the composition of the entrepreneurial team is recognised as an important determinant of a given spin-off's commercial viability (Miozzo & DiVito, 2016; Vanaelst et al., 2006). While spin-off teams have been the focus of several studies, team-level studies focusing specifically on USTs before the founding of firms remains quite rare. Thus, the studies referred to in this section have mainly examined the entrepreneurial teams of already established spin-off firms.

The majority of studies concerning spin-off teams have focused on the aspects of team characteristics and human capital (Hayter et al., 2018; Mathisen & Rasmussen, 2019; Nikiforou et al., 2018). Spin-offs are generally formed by the key researchers involved in the development of the technology in question, with a specific researcher often acting as the team 'champion' tasked with leading the spin-off's development (Clarysse & Moray, 2004). While academic entrepreneurs are seen to provide highly valuable technical experience and expertise to spin-offs, they are often said to lack the commercial and managerial experience necessary to develop and grow the business as well as to secure much needed early-stage funding. (Miozzo & DiVito, 2016; Nikiforou et al., 2018; Vanaelst et al., 2006). To overcome this lack of entrepreneurial experience, spin-off teams may turn to various support systems, including university technology transfer offices, incubators, or accelerator programmes, to develop their entrepreneurial capabilities (Ensley & Hmieleski, 2005; Siegel & Wright, 2015).

Aside from team members learning the required competences during the development of the spin-off, prior studies suggest that a common way of supplementing the knowledge and experience of the spin-off team is to recruit a surrogate entrepreneur. These surrogate entrepreneurs are usually recruited from outside the university and have business experience that the research team might lack (Clarysse & Moray, 2004; Franklin et al., 2001; Lockett et al., 2003; Rasmussen et al., 2011). The diversity of spin-off teams has been suggested to increase their effectiveness, especially in cases where the spin-off company board includes outside members to mediate any problem solving (Björnali et al., 2016). Diversity can, however, also result in challenges when it comes to cooperation among spin-off teams. During their early stages, such teams are often fairly homogeneous, which has been found to improve communication inside the team (Clarysse & Moray, 2004). By contrast, diverse teams, especially when it comes to disparities in academic status, can struggle to achieve coordination between the technical and business aspects of the spin-off (Visintin & Pittino, 2014). Vanaelst et al. (2006) suggest that the spin-off teams often change drastically during their early stages because the team members aim to find a good fit for the team's interpersonal relations.

Spin-off teams are also defined by their social capital (Nikiforou et al., 2018). Academic entrepreneurs often rely on interactions with actors close to their academic environment, which has been indicated to limit their choices of initial investment and access to diverse information that could help them recognise business opportunities (Scholten et al., 2015), while teams with prior experience in industrial engagement are known to be more likely to commercialise their research (Hayter, 2016). Spin-off teams can, however, overcome the lack of existing external networks by recruiting non-academic team members or implementing clear role divisions between team members to facilitate relations with external contacts (Grandi & Grimaldi, 2003). Academic entrepreneurs' social networks evolve over time alongside their changing business development requirements (Rasmussen et al., 2015). Teams that include academic entrepreneurs are suggested to be better able to access non-redundant networks when compared with spin-offs in which the technology is spun out from the university without any substantive

participation by the scientists in the new venture (Nicolaou & Birley, 2003). According to Rasmussen et al. (2011), spin-off teams face diverse challenges in terms of opportunity refinement, leveraging competency and championing competency, which they can overcome through leveraging networks with both industrial partners and actors inside the university. Incubators and accelerator programmes have also been recognised as important sources of networking opportunities for academic entrepreneurs (Pauwels et al., 2016).

While the importance of spin-off teams has been noted in prior studies, the team level still offers several avenues for further study (Hayter et al., 2018; Mathisen & Rasmussen, 2019; Nikiforou et al., 2018). In their review of the AE literature, Hayter et al. (2018) find that the team level has been the focus of only a minority of studies, which have tended to focus on the human capital aspect of AE. Mathisen and Rasmussen (2019) call for more qualitative, process-oriented studies of entrepreneurial teams in order to elucidate the micro-processes of such teams. Only a few studies have examined the functioning of spin-off teams. As Nikiforou et al. (2018) note, understanding the internal processes of these teams is critical to generating knowledge of how spin-off team members interact in the face of the challenges they must overcome when bridging the university and business worlds.

University spin-offs involve a variety of stakeholders with vested interest in the development of the enterprise in question. These networks of stakeholders are considered to play a key role in the commercialisation of academic research (Miller et al., 2014), and they also influence the creation and success of research spin-off firms at the university level (Clauss et al., 2018). Industry partners, government agencies, technology transfer offices, funding programmes and investors all play a role in the spin-off process and influence how, as well as with who, the entrepreneurial team interacts (Simeone et al., 2017). Interestingly, the importance of specific stakeholders varies throughout the spin-off process. During the early stages, the key stakeholders include the university faculty and technology transfer office, while later in the spin-off process, the importance of industry partners and investors increases as the team seeks to bring the company to market (Wood, 2011).

As USTs are formed by university scientists, they tend to work alongside many academic stakeholders. Universities, faculties, research groups, funding bodies and other research contacts vary in terms of their approach to and approval of AE, as the commercialisation of research may be considered to conflict with the other activities of universities (Samsom & Gurdon, 1993; Tuunainen, 2004). While the commercialisation of research is considered to be a contentious topic within universities (Holloway, 2015), Thomas et al. (2020) suggest that experienced academic entrepreneurs can provide important mentorship for UST members through the development of an entrepreneurial mindset and related practices during the pre-founding phases of spin-offs.

One of the key stakeholders involved in any spin-off is the university technology transfer office. This specialised office focuses on the promotion of the commercialisation of university research through a variety of processes, including technology evaluation, management of intellectual property, business development and partner recruitment (Macho-Stadler et al., 2007; Shane, 2004). Gübeli and Doloreux (2005) posit that the role of the support systems provided by parent universities is especially pivotal during the pre-founding phase of spin-offs, as they can provide mentorship and the required infrastructure to the spin-off team. Technology professionals or other university-hired actors can also be actively involved in the process of setting up the spin-off, providing advice to the founding team as a so-called 'privileged witness' (Vanaelst et al., 2006) and potentially joining the company board once the spin-off has been founded (Siegel & Wright, 2014). The role of technology transfer offices in supporting AE has been questioned. Some studies suggest that technology transfer offices focus on intellectual property protection and the formalisation of contractual relations rather than on supporting the entrepreneurial activities of scientists, which can be detrimental to the creation and performance of spin-off firms (Clarysse et al., 2011; Lockett & Wright, 2005). More recently, the importance of technology transfer offices as support systems for spin-offs has diminished somewhat due to the rise of accelerators and incubators (Siegel & Wright, 2015). To date, AE studies have mostly focused on the macro-level aspect of technology transfer offices, meaning that knowledge concerning the micro-level aspect,

such as interaction between technology transfer office professionals and AE, remains lacking (Cunningham & Menter, 2020).

The business advisors involved in spin-offs are particularly influential during the process of spin-off development. They can be actors hired by the university, for example, technology transfer office professionals, to support the spin-off process (Wright et al., 2007). Moreover, in some instances, they can be considered part of the extended spin-off team, although their participation may vary from strategic decision-making to coaching the spin-off team members (Vanaelst et al., 2006). In addition to receiving business advice from university-appointed actors, spin-offs can receive mentoring from experienced business professionals or entrepreneurs as part of an accelerator programme (Hochberg, 2016; Pauwels et al., 2016).

The micro-level interactions that occur between spin-off teams and their key advisors and stakeholders have not yet been thoroughly studied (Balven et al., 2018; Cunningham & Menter, 2020). However, the limited research available on this subject suggests that business advisors and mentors have considerable influence over the ways spin-off teams operate and interact with each other. Advisors can guide spin-off teams' sensemaking and activities by conveying preferred meanings and designing clear structures, concrete roles, and tasks for entrepreneurs (Montonen et al., 2016). Montonen et al. (2017) consider that the inherent power imbalance between academic entrepreneurs and their stakeholders shapes the social processes within spin-offs, in terms of both the scientist-university relationship and the scientist-advisor relationship. The structure and guidelines provided by accelerator programmes have also been suggested to influence the development of the role dynamic between mentors and spin-off team members (Palo-oja et al., 2019). Additional insights into the micro-level processes that unfold between spin-off teams and their stakeholders could provide useful knowledge concerning the development of support systems for AE (Balven et al., 2018).

2.3 Process perspective on academic entrepreneurship

The term 'process' has been assigned several meanings within the prior organisation research literature. Langley (2007) offers a definition of a process that considers 'phenomena dynamically – in terms of movement, activity, events, change and temporal evolution' (p. 271). In his taxonomy, Van de Ven (1992) suggests that the term 'process' has been used to refer to three different concepts: '(1) a logic that explains a causal relationship between independent and dependent variables, (2) a category of concepts or variables that refers to actions of individuals or organizations, and (3) a sequence of events that describes how things change over time.' (p. 169)

Ontologically, process studies provide two different perspectives on what the social world consists of. Processes can be viewed as changes in entities within the world, while the world can be viewed as consisting of processes that are manifested by temporally existing entities (Langley et al., 2013). Within the field of organisation research, process studies often view processes as social interactions between individuals and organisations. However, Langley et al. (2013) note that process studies often focus on organisational- and institutional-level processes and, therefore, call for more individual-level analyses of processes.

Studies concerning AE often refer to the commercialisation of research as a process (e.g. Carayannis et al., 1998; Ding & Choi, 2011; Siegel & Wright, 2015; Vanaelst et al., 2006). Although the notion of AE as a process seems to be prevalent in the field, the concept itself has yet to be clearly established (Fini et al., 2018). Accordingly, calls have been made for more in-depth studies into the process of AE (Mathisen & Rasmussen, 2019; Miranda et al., 2017).

Those studies that have explicitly studied AE as a process have mainly focused on applying either linear or iterative process models of new venture creation in relation to the creation of university spin-offs. Roberts and Malone (1996) recognise the roles of individual actors in their spin-off phase model, as they suggest that the related process is structured around the roles of key parties within the process: the researcher, the entrepreneur (or the entrepreneurial team), the research organisation, and the venture capital investor. Carayannis et al. (1998) define the spin-off process from

a resource transfer perspective, wherein the entrepreneur, technology, or other resources are spun off from the university so as to create a firm that can exploit the commercial opportunity.

Several studies have suggested phase- or stage-based process models of AE, which have mainly focused on the founding phases of spin-offs (Clarysse & Moray, 2004; Vohora et al., 2004; Wood, 2011). Such models share the notion of AE as a linear process that progresses from research through to opportunity recognition and the founding and maturing of the spin-off. While Clarysse & Moray (2004) and Vohora et al. (2004) consider the key actors involved in the spin-off process to be the entrepreneurial team, as championed by either researchers or business managers depending on the stage, Wood's (2011) process model situates the technology transfer office as the spin-off's key stakeholder.

Some criticism has been offered regarding the stage-based process models of AE. Rasmussen (2011) finds that the spin-off process, despite displaying certain aspects of discrete stages, does not follow a structured development approach, especially during the early development of the spin-off. Stage models are also lacking in terms of their ability to account for the agency of the human actors involved in the spin-off process. Rasmussen (2011), therefore, suggests a teleological process for spin-off development, whereby the individuals or organisations purposefully act to achieve a set goal and adapt their actions and behaviour as they accumulate knowledge. This process is impacted by the contextual aspects, culture and power relations of both the university and the business contexts. This organisational context has been posited to play an important role within the entrepreneurial behaviour within the spin-off. The university context and its principles of exploration and restrictive compensation when it comes to technology exploitation have been suggested to restrict entrepreneurial activity, whereas the start-up context encourages entrepreneurial activity due to its focus on venture capital funding (Nelson, 2014).

Furthermore, the process of spin-off development is influenced by the academic and industrial networks available to the teams. Established university links and collaborations enable the development of the resources and competences required early in the spin-off process, whereas weaker

industry links can facilitate the recognition of market opportunities. Academic contacts can also prove important in terms of providing motivation and support for the initial establishment of a spin-off. (Grandi & Grimaldi, 2003; Wood, 2011) As the spin-off matures, opportunity refinement relies more on stronger industry ties that enable the transfer of more complex knowledge. While university technology transfer offices are an important stakeholder in the development of spin-offs, external industry networks can prove better at providing access to the resources and connections required for the development of spin-offs (Hayter, 2016; Rasmussen et al., 2015). Technology transfer offices are, however, important when it comes to providing spin-offs with assistance in developing the managerial competences of the entrepreneurial team (Miozzo & DiVito, 2016).

The spin-off team is recognised as a focal aspect of the AE process. Yet, most process studies have focused on examining firm- or institutional-level processes when studying the development of university spin-offs. Several calls have been made for further research into the teams and individuals involved in spin-offs so as to develop a better understanding of how AE unfolds in micro-level processes (Cunningham & Menter, 2020; Mathisen & Rasmussen, 2019; Wright & Phan, 2018). Balven et al. (2018) recognise multiple levels of micro-processes that could offer further avenues for understanding the human aspect of AE. These processes can be internal to the individual, relational between entrepreneurs and other stakeholders within the university, or associated with the influence of organisational factors on individual scientists. Moreover, they can deal with identity, motivation, leadership, technology transfer office communication and education, work-life balance, and organisational justice. The unique characteristics of university spin-offs have been suggested to be an interesting avenue for further study due to, for example, the scientists non-commercial backgrounds, potential surrogate entrepreneurs' business backgrounds, and the difficulties of striking a balance between the academic and business worlds. A better understanding of these social processes could prove helpful in understanding new venture creation in areas outside of AE too (Fini et al., 2019; Nikiforou et al., 2018).

2.4 Academic entrepreneurship as a social process

In this section, I will present the social process perspective adopted in prior AE studies. Social processes have been assigned different definitions and categorisations in the sociological literature, but in this study, I consider social processes to be patterns of social interaction that can unfold intrapersonally or between either people or groups of people (Bardis, 1979; Ginsberg, 1933). This study, therefore, investigates the micro-level (Djokovic & Souitaris, 2008) social construction of AE that emerges from social interaction among individuals and groups.

Prior studies concerning AE as a social process have utilised a variety of theoretical approaches when investigating this subject. For instance, several studies have explored the discourses and narratives associated with AE, both inside and outside of universities. Such studies have investigated AE from a post-structural perspective, examining how the discourses and narratives related to aspects such as entrepreneurial ecosystems (MacNeil et al., 2021) and gender (Elkina, 2021; Suopajarvi et al., 2021) contribute to the social construction of AE as a concept.

Identity is considered a salient issue in AE studies, and many studies have applied identity-related theoretical perspectives to examine the subject of AE. (e.g. Karhunen et al., 2017; Peura et al., 2021; Montonen et al., 2021a). These studies examine the identity work (i.e. the development of role identities) that scientists spanning the boundary of research and commercialization engage in in an effort to accommodate the expectations of the roles related to AE. The epistemological foundations of these identity-focused approaches vary. For instance, Jain et al. (2009) examine identity work as a social psychological process, whereas Montonen (2014) and Karhunen et al. (2017) approach the concept of identity as being socially constructed through a discursive approach.

The theoretical approaches of sensemaking and CSM have been used in a few studies to examine how academic entrepreneurs make sense of commercialisation. For example, Montonen et al. (2016) examine how the sensegiving of a business advisor influences the sensemaking of scientists in a university spin-off. The sensemaking framework has also been used to

study how scientists come to understand the commercialisation of research (Palo-oja & Kivijärvi, 2015; Palo-oja et al., 2017). The CSM approach has been applied to AE research by Palo-oja (2018) and Palo-oja & Eriksson (2019) when studying the contextual aspects of sensemaking in relation to AE.

A common empirical finding of studies concerning the social aspect of AE concerns the relationship between the academic and business worlds. Several studies have posited that the relationship between these two worlds is a source of conflict and tension for academic entrepreneurs and other actors within the university, who may struggle with balancing their academic pursuits against their commercialisation activities (Billot, 2010; Brennan & McGowan, 2006; Philpott et al., 2011). For scientists who are considering AE, or their colleagues, entrepreneurship can seem to threaten the values of scientific pursuit and academic freedom, since the traditional focus of business is on gaining economic benefit by exploiting an opportunity. This conflict may lead to dissent among faculty members as well as between scientists and universities (Owen-Smith & Powell, 2001; Samsom & Gurdon, 1993). One potential source of discord that has been recognised in prior studies concerns the ethical differences between the academic and business worlds, although it has not yet been extensively explored with regard to spin-off teams (Shore & MacLauchlan, 2012; Ylijoki & Ursin, 2013).

While commercialisation has been recognised as a cause of tension within universities, Holloway (2015) argues that the commercialisation of research has nevertheless become a hegemony that has been normalised in the literature, while scientists' agency has been neglected. The tensions that exist between commercialisation and research have been suggested to stem from academic entrepreneurs' identities as scientists, the transitioning into a new commercially oriented identity, and the pressures related to the modifying one's priorities and abilities to suit a new role (Jain et al., 2009). Yet, these often-contrasted discourses can also provide scientists with resources for identity development in a positive manner and allow them to establish their agency by drawing on either discourse. The challenges associated with combining academic work and entrepreneurship are well recognised, although it has been suggested that AE can offer scientists a variety of ways to strengthen their agency, to maintain a preferred identity as scientists or

entrepreneurs, or to draw from both worlds (Jain et al., 2009; Montonen, 2014; Palo-oja & Kivijärvi, 2015).

The social context that contributes to the understanding of AE is a complex field of actors and discourses. Spin-off teams must negotiate the relationship between research interests and commercialisation requirements, which can lead to struggles with communication and power discrepancies among team members (Clarysse & Moray, 2004; Visintin & Pittino, 2014). Academic entrepreneurs generally belong to faculties, research groups and universities, which can all have local cultures and different understandings of the relationship between research and commercialisation (Pilegaard et al., 2010; Tuunainen, 2004). Spin-off teams can be advised by business advisors who draw on their own business experience to provide guidance on the processes, roles and activities expected of a spin-off firm (Montonen et al., 2016). Commercialisation projects and accelerator programmes can form a distinct context that shapes how scientists come to understand AE (Palo-oja, 2018; Palo-oja et al., 2019). The discourses regarding the role of universities, the commercialisation of science and aspects such as gender provide academic entrepreneurs with cues as to what is expected of them and which options are available to them (Fältholm, 2010; Suopajarvi et al., 2021; Tomlinson et al., 2021).

2.5 Critical sensemaking as a lens with which to examine academic entrepreneurship

In this dissertation, I utilise sensemaking and CSM as the theoretical frameworks with which to study AE as a social process. These frameworks can be used to understand the sensemaking of individuals from the social-psychological, social constructionist, and post-structuralist perspectives. Together, they provide a means of exploring both the individual and the collective sensemaking processes associated with organising as well as the contextual aspects of CSM (Helms Mills, 2003; Maitlis & Christianson, 2014; Weick, 1995, 2005). In this study, I draw on Maitlis' (2005) definition of organisational sensemaking as a social process: 'organization members

interpret their environment in and through interactions with others, constructing accounts that allow them to comprehend the world and act collectively' (p. 21). Sensemaking, therefore, provides a lens through which to understand how the sense of AE unfolds as a social process in social interaction among USTs and their stakeholders.

The origins of sensemaking can be traced back to research streams that emerged during the 1960s, although the concept did not become prominent until the publication Weick's (1995) book 'Sensemaking in Organizations'. In it, Weick (1995) proposes the sensemaking framework as a way of understanding how individuals and organisations rationalise novel, unambiguous or otherwise expectation-breaking situations, whether they stem from unplanned organisational crises, planned changes, or threats to one's identity. (Maitlis & Christianson, 2014; Weick, 1995) In this study, the creation of spin-offs serves as the context that requires scientists to make sense of unfamiliar expectations as they enter the new world of AE from the familiar world of the university.

The concept of sensemaking does not have a specific or commonly accepted definition, since a variety of sensemaking approaches have been suggested in prior organisational studies (Maitlis & Christianson, 2014). Scholars describe sensemaking as both a cognitive process and a socially constructive one. According to Starbuck and Milliken (1988), 'sensemaking has many distinct aspects, comprehending, understanding, explaining, attributing, extrapolating, and predicting, at least' (p. 48). Gioia and Chittipeddi (1991) regard sensemaking as the redefining of an organisation through the development of a sense of the organisation's internal and external environments. Weick (1995) defines sensemaking as a process based on seven properties, describing it as being grounded in identity construction, centred on retrospection, enactive of sensible environments, social, ongoing, focused on and by extracted cues, and driven by plausibility rather than accuracy. In a later work, Weick et al., (2005) emphasise the social nature of sensemaking, claiming that 'sensemaking is, importantly, an issue of language, talk, and communication' (p. 409).

Interaction with others is central to sensemaking. Sense is socially constructed through both communication and action involving others. Talk

and action feed into the iterative loop whereby shared understanding is developed. This socially constructed sense is accepted or rejected not due to its accuracy, but rather due its plausibility. Of course, what is plausible to one group of individuals, might not be plausible to others. (Helms Mills, 2003; Weick, 2005) The influence of others, whether actual or imaginary, affects the outcomes of sensemaking. Individuals can be encouraged to select cues that conform to the perceived expectations of others as well as to suppress the cues that do not support this perception of the situation (Mills & Helms Mills, 2017; Weick, 2001). Thus, the study of sensemaking is the study of the social processes that lead to specific cues being chosen and a specific sense being accepted as plausible (while others are rejected).

Enactment represents a major part of how sensemaking is performed and how the senses are manifested in reality. Acting, in addition to and making sense of action, fosters a new understanding of the ongoing situation. Enactment also provides an opportunity to challenge the outcomes of sensemaking and, therefore, to create a new sense to be projected onto the surroundings of the actors. Thus, enactment reflects the sense of the situation to the environment and feeds into further sensemaking. (Weick, 1995; Mills & Helms Mills, 2017) Weick (2005) links the activities of noticing and bracketing cues to enactment too. The ability to notice such cues, as well as to make sense of them, is retrospective, being informed by earlier experiences, training, and education.

Originally, Weick (1995) suggested sensemaking to be a purely retrospective process. According to this perspective, sensemaking occurs when people reflect upon what has happened so as to synthesise the many meanings available to them into a plausible understanding (Weick, 1995). The dismissal of prospective sensemaking (i.e. the act of making sense of things before they emerge) is one of the main criticisms that has been raised in the sensemaking literature (Sandberg & Tsoukas, 2014).

Sensemaking is considered to be a core activity in relation to the process of organising. Weick et al. (2005) argue that through sensemaking, people organise the flow of activity within their environment, drawing cues from such activities and enacting a plausible sense, which feeds back into the selection of cues from the world around them. Chia (2000) suggests that organisational

discourse defines and limits the scope of exploration of the sense of the world around actors within organisations. When the perception of the world does not match the expectation, the collective action within organisations is broken. A plausible sense of the situation provides the organisation with the ability to continue operating. This focus on plausibility positions sensemaking in conflict with the theories of managerial decision-making, where the assumption is that the accuracy of managers' perceptions of the situation is a determinant of the decision-making outcomes. (Weick et al., 2005) There is no specific definition of what makes for a plausible sense, although plausibility can hinge on the availability (or lack thereof) of alternative explanations, the perspectives of other individuals or organisations, or the alignment of explanations with one's own identity (Thurlow, 2010).

While widely applied in organisational contexts, the Weickian approach to sensemaking has been the subject of criticism. Some of this criticism stems from the wide field of literature, as scholars have proposed a multitude of variations on what actually constitutes sensemaking (Aromaa et al., 2018; Maitlis & Christianson, 2014). Sandberg and Tsoukas (2014) note that the sensemaking framework has been criticised due to its lack of prospectiveness, the vagueness of the process of sensemaking as well as issues concerning the concept of sense itself. Weick's (1995) approach to sensemaking treats the social-psychological properties as being grounded in positivistic scientific knowledge, while simultaneously arguing that sense is constructed in part through individuals' interpretations of their situation (Hilde & Mills, 2017; Nord & Fox, 1996). At times, Weick (1995) seems to offer the sensemaking framework as a recipe for understanding organising and at others as a concrete, well-defined process. Another shortcoming of the sensemaking framework is its lack of attention regarding the contexts, power imbalances and discourses as aspects of sensemaking. (Helms Mills, 2003; Helms Mills et al., 2010)

Building on Weick's (1995) sensemaking framework, Helms Mills et al. (2000/2017, 2010) aim to address its shortcomings with the CSM perspective. CSM aims to address many of the criticisms raised with regard to sensemaking by drawing upon interpretivism, poststructuralism, and critical theory. Helms Mills et al. (2000/2017, 2010) criticise the epistemological grounding

of sensemaking by arguing that the nature of the social-psychological properties of sensemaking should be considered as a heuristic rather than being treated as grounded in positivistic knowledge. The CSM approach also extends the sensemaking framework by introducing the concepts of organisational rules (Mills & Murgatroyd, 1991) and formative contexts (Unger, 1987), as well as the theory of discourse (Foucault, 1979), as ingredients of sensemaking. These elements all address the context of the larger social environment that is said to influence the sensemaking of both individuals and organisations. Within this social context, identity construction is a key component of CSM. Indeed, in social environments, certain identities are privileged over others, which influences how individuals enact their identity, for example, in their workplaces (Tomkins & Eatough, 2014).

Intrinsic to the CSM approach is the examination of power and any imbalances of power within organisations. The power relationships inside organisations result in certain individuals being privileged over others in the sensemaking processes of organisations. In other words, power positions enable certain individuals to have more sway in terms of how situations are made sense of within organisations. In sensemaking processes, power is manifested in, for example, the ability to highlight or suppress cues, define accepted actions, prefer identities, or choose the criteria for plausibility (Weick et al., 2005). Yet, power relationships are not purely straightforward when it comes to CSM. According to the CSM approach, power can both restrict and construct agency (Aromaa, 2020). Resistance to power imbalances can also provide less powerful individuals with the ability to empower themselves through sensemaking (Mills & Helms Mills, 2017). In the context of AE, the asymmetry of power that exists between academic entrepreneurs and their stakeholders influences the actions, sensemaking and identity development that take place during the spin-off process. University systems and established career paths set rules and expectations for scientists, while business advisors and other advocates of commercialisation call for specific business development activities. (Montonen et al., 2016; Montonen et al., 2017) University spin-offs also exhibit internal power imbalances that shape the way AE unfolds as a social process. As spin-off teams often recruit non-academic team members (or so-called surrogate entrepreneurs) during the

spin-off development, the evolution of the team's composition can be a source of tension between team members (Nikiforou et al., 2018).

CSM draws on the work of Foucault (1979) to highlight the discourses that affect the sensemaking process. Discourses are interlinked with power, as they enforce and induct members of society and social groups into norms and values. There are domain-specific discourses, such as the discourse of history or medicine, although there are often competing discourses within these domains as well (Foucault, 1979; Hilde & Mills, 2017; Linstead, 2010). Discourses are embedded into the use of spoken and written language as well as other communication and social practices (Thurlow & Helms Mills, 2009). While discourses hold power over individual actors, they can also be used or resisted to suit one's own ends. In fact, individuals may prefer specific discourses to hold on to their agencies or identities (Laine & Vaara, 2007).

In the context of AE, there are several discourses that normalise certain expectations for individuals. The academic discourse based on the Mertonian norms of science holds, for example, that scientists should have common ownership of scientific knowledge, that claims should be exposed to critical scrutiny and that scientific institutions should act for the common benefit of science rather than for individual gain (Davey et al., 2015; Etzkowitz, 1998; Krabel & Mueller, 2009). By contrast, academic entrepreneurs operate in an environment in which the commercialisation discourse normalises specific talk, identities, and activities for them as entrepreneurs. These discourses can act as a resource for the academic entrepreneurs, who can utilise them to position themselves in such a way that strengthens their preferred identity or agency as actors. The boundary between these discourses creates tension on the part of academic entrepreneurs, who might seek to both maintain their academic careers and pursue further opportunities in entrepreneurship (Brennan & McGowan, 2006; Montonen, 2014). Guo et al. (2019) suggest that entrepreneurial narratives can help scientists to develop an entrepreneurial identity, which has a positive impact on the performance of AE. They also find that close social ties to academics restrict the performance of university spin-offs, which suggests that the academic context can limit scientists' transition to entrepreneurial roles. Tomlinson et al. (2021) find that the emphasis on entrepreneurial capability development is also present in English higher

education policy texts, which, seem to emphasise the agency of academic actors rather than limiting their agency (Tomlinson et al., 2021). As the present study focuses on Finnish academic entrepreneurs, it is important to acknowledge the impact of national culture and entrepreneurial activity discourses as well as the discourse of AE, on the sensemaking of AE. (Karhunen et al., 2017; Koskinen, 2020; Suopajarvi et al., 2021)

Formative contexts represent the dominant social assumptions that define what is acceptable and expected in social life. This concept of formative contexts was first introduced by Unger (1987), who argues that the formation of social order and governments is deeply rooted in past social conflicts and arrangements. Formative contexts define a range of acceptable social organisation, and they can be imagined or institutional. For example, Unger (1987) suggests that Western democracies' formative contexts define the distinction between management and labour, individuals' rights with regard to the state and other individuals in terms of the control of capital, the organisation of government and safeguards for its misuse of power, and the division of labour and the material rewards and experiences associated with these social groups. For an institution or arrangement to be perceived as included in the formative context, Unger (1987) argues that its existence has to be taken for granted in actors' strategic choices and, further, that its transformation or exchange would result in a drastic shift in the routines of society. Formative contexts are reflected in the rules and practices of organisations, as they conform to the expectations set by the formative contexts (Mills & Murgatroyd, 1991).

The formative context of AE has not previously been thoroughly studied. Prior studies have, however, hinted at there being specific formative contexts that define the rules and expectations of research spin-offs. For example, Powell and Baker (2017) examine how identity processes affect the organising of nascent ventures. Their study suggests that the interaction and development of the social identities of such ventures' founders specifically shape the organisational identities of the ventures. The authors also suggest that the contexts of new ventures influence this dynamic, for example through the venture capital backers of start-ups setting expectations for the founding teams. Universities' traditional non-commercial orientation is recognised as

having a major influence on scientists' entrepreneurial activity (Wright et al., 2004). The establishment of academic norms within spin-off teams can hinder interaction among team members and lead to prioritisation of academic working practices over business development concerns (Samsom & Gurdon, 1993; Visintin & Pittino, 2014; Palo-oja, 2018). According to Palo-oja et al. (2019), accelerator programmes, which are often used to rapidly enhance the growth capabilities of research spin-offs, can also provide for a distinct formative context in which the mentor-mentee relationship defines the rules and expectations for working. Moreover, Karhunen et al. (2017) suggest that the national context can affect how scientists perceive the expectations set for them in terms of the commercialisation of research. For instance, in Finland, societal expectations have been found to influence university management's decision-making processes with regard to the introduction of entrepreneurial education into the university curricula (Tuunainen et al., 2021).

Organisational rules are social practices that determine how things, including organising, are done within an organisation. They can be both formal and informal and they can restrict the actions and sensemaking of individuals within an organisation. Organisational rules affect sensemaking through contributing to the cues that are extracted for sensemaking as well as what is considered as a plausible sense in an organisation. As with other aspects of CSM, organisational rules are themselves subject to contextual factors because the availability of organisational rules is dependent on the formative contexts and discourses. The enactment of, as well as resistance to, organisational rules can also provide insight into the power relations within an organisation. (Helms Mills et al., 2010; Thurlow & Helms Mills, 2009)

CSM researchers have utilised and developed the concept through a variety of approaches and organisational contexts. Aromaa et al. (2018) suggest that there are four directions of CSM research: agency, contextual sensemaking, the theory of CSM and the fusion of other theories with CSM. CSM has previously been utilised to study, for example, organisational change (Helms Mills, 2003; Thurlow, 2007), the workplace experiences of immigrants (Hilde, 2013; Shenoy-Packer, 2014), the use of language in organisational change processes (Thurlow & Helms Mills, 2009) and gender issues in the Canadian space industry (Ruel, 2018). In the field of AE research, sensemaking

and CSM have both been used to study the sensegiving and sensemaking that occurs between a business advisor and academic entrepreneurs (Montonen et al., 2016), the sensemaking associated with commercialisation and scientists' roles in a commercialisation project (Palo-oja & Kivijärvi, 2015; Palo-oja et al., 2017), and the development of credibility in board meetings of a commercialisation project (Palo-oja, 2018).

3 RESEARCH APPROACH AND METHODOLOGY

In this chapter, I will describe my research approach and the methodology used for the study in detail. More specifically, the chapter will describe the collection of the research data, the analysis of the collected data and the choices made during the research process. The research data consist of recording of both interviews and meetings with academic entrepreneurs from several research-based spin-off companies, as well as the business advisors or mentors of the spin-offs.

3.1 Research approach

In this dissertation, I study AE from the social process perspective. As a consequence, I am interested in how the sense of AE is constructed in social interaction among the USTs and their stakeholders. To examine how this social construction of meaning unfolds, I utilise the sensemaking and CSM frameworks as heuristics, which enables me to focus on both the social interaction of scientists and their stakeholders and the influence of the structural and post-structural aspects of sensemaking.

The present study consists of qualitative case studies of AE. Case study research involves the study of a case, such as an individual, group or activity, in a specific context utilising a variety of data, such as observations, interviews or documents, which are used to craft a description of the case and related themes (Creswell, 2007). The sub-studies included in this dissertation are intensive (or intrinsic) case studies, as I and my co-authors are interested in the cases themselves (in this case, the USTs) as the subject of study. An intensive case study aims to describe and interpret the cases and their contexts in a rich manner. While the aim is to present a well-reasoned interpretation of the case in question, such studies do not aim to make generalised assumptions about it. Instead, intensive case studies focus on examining the perspectives of the participants as situated in the contexts of the cases (Stake, 1995; Eriksson & Koistinen, 2014). As such, the present study represents an example of a

classic case study, which Dyer and Wilkins (1991) argue provides for a deep understanding of a social setting. In this study, the cases themselves are of interest due to the lack of prior research on the pre-founding USTs who are aiming to found spin-off companies while still employed at their universities.

The use of an intensive case study as a research approach, aside from offering the chance to tell an interesting story, also enables the researcher to examine the case for emerging themes as well as to form the research questions as the understanding of the case evolves throughout the research process. As this research approach has been subject to criticism due to the apparent lack of sufficient proof of its findings, its use requires the researcher to carefully craft the empirical analysis in such a way that it is well-reasoned and transparent to the reader. (Eriksson & Koistinen, 2014)

AE has previously been studied through many different yet interrelated concepts. I have chosen USTs as the focus of study in order to examine how AE unfolds as a social process. In this study, I use the term 'UST' to refer to the teams of scientists who participate in commercialisation programmes prior to the founding of their spin-off companies. In all of the case USTs, the core team members were scientists who were employed at universities during the spin-off process. Moreover, in all of the cases, the USTs also had either an experienced business advisor, who represented the university technology transfer office, or a mentor, who was assigned to the team through an accelerator programme. In total, 15 interviews were conducted with UST members and advisors from four spin-offs. In addition, the data includes recordings from nine meetings between the UST members and their advisors. In the first two sub-studies, the case consists of one UST, while in the third sub-study, the case consists of three USTs who were participating in an accelerator programme, which serves as the research context of the case study. The accelerator programme in question also included non-academic entrepreneurial teams, although the interviews with these teams were not utilised in this research. While the data from the accelerator programme consist of interviews with multiple USTs, the aim of the third sub-study is not to conduct a comparative study of the cases as Eisenhardt (1989) argues for; rather, the aim is to provide a deep understanding and a rich, interesting story of the case, as Dyer and Wilkins (1991) advocate.

To protect the identities of the informants, all of the names of the participants in this study, as well as the names of their spin-offs, have been pseudonymised. In addition, to avoid the potential of publishing any sensitive information, all information related to any specific inventions developed by the USTs has also been abstracted. The decision to pseudonymise the data does not impact the richness of the collected data, as the interview data have not been otherwise reduced by this decision, while the pseudonymisation has not affected the analysis of the data.

The aim of the present study is to understand how AE unfolds as a social process. It is, therefore, the actors in the USTs, the academic entrepreneurs and their stakeholders, such as their mentors and business advisors, whose experiences and interpretations of AE are key to the understanding. As a qualitative case study, this research builds on my interpretation of the actors' interviews (Eriksson & Kovalainen, 2016). As such, although I aim to represent the data as faithfully as possible in my analysis, there nevertheless exists a subjective element to the present study that is intrinsic to all qualitative case studies.

3.2 Data collection

In this section, I present in detail the empirical data used in the study, the method used to collect the data, and the data analysis.

The main data for this study were collected during meetings and one-on-one interviews with UST members and their business advisors. More specifically, the data were collected from a total of four USTs. All of the teams that participated in this study had secured grant funding specifically for commercialisation purposes. Three of the USTs were yet to found the spin-off firm, while one of the USTs had already founded a company although all of the team members were still primarily employed as researchers and were yet to receive funding for the firm. The data from the first UST were collected over a period of two years between 2015 and 2017. These data included nine recorded meetings in which the team members and their business advisor discussed the development of the business. Moreover, the

three core members of the UST were each interviewed twice, first in late 2015 and again in early 2017, which enabled the analysis of the development of their sensemaking over time. The first round of interviews were conducted by my co-author Tero Montonen, who also recorded and participated in the meetings that were used in this study. I conducted the second round of interviews with the UST members. The interviews were conducted in a conversational and open-ended manner, which enabled the interlocutors to openly discuss their perspectives (Bryman & Bell, 2011). Further interview questions were informed by the interviewees' previous answers so as to gain additional insights into the topics they raised. Aside from the interviews, background materials such as project documents and emails were used as supplementary materials when building an understanding of the cases.

The data from the other three USTs in this study were collected via an accelerator programme in which all of the teams in question were participating. The interview data from the accelerator were collected by my co-author Outi-Maaria Palo-oja, who interviewed the entrepreneurs and the mentors assigned by the programme and also made research notes during the accelerator. A total of nine interviews conducted during the accelerator programme were used in this study. Additional interviews, in which the participants either did not belong to a UST or were not a mentor for one were also conducted during the programme. However, as the focus of this study is on providing insights into AE as a social process, these interviews were not utilised in the present research.

The use of interview data collected by other researchers poses a number of methodological issues. Often, interviews are contextualised in a way that does not translate well into raw transcripts of the gathered data. In open-ended interviews, the interviewer makes choices about following up on specific cues included in the participants' answers, and the reasoning behind such choices can be lost along with the relevant context when using data collected by someone other than the researcher. Not having conducted all of the interviews myself meant that I did not have the choice to ask the participants to expand on specific answers that could have been interesting to me as a researcher. For the most part, however, these issues were mitigated by writing the relevant papers with my co-authors, who were responsible

for collecting the data. This process provided us with invaluable insights into how the interviews were conducted, in addition to contextual information concerning the actors who participated in the research. The empirical data used in the present study are described in Table 1. The USTs and mentors that participated in this study are described in Table 2.

Table 1. Empirical data

Source	Materials	Articles
Spin-off A	<p>Nine recordings of meetings between the three core members of the UST and their business advisor. The average length of each meeting was 53 minutes, while the total length of the recordings was 8 hours 2 minutes. The meetings were recorded in 2015.</p> <p>Six one-on-one interviews with the entrepreneurs. All of the entrepreneurs were interviewed twice, first in late 2015 and then again early 2017. The business advisor was interviewed independently in 2016. The total length of the interviews was 7 hours 31 minutes, with the average length being 1 hour 4 minutes.</p>	1,2
Accelerator project B	<p>Nine interviews with the core members of the USTs of three different spin-offs and their mentors. The total length of interviews was 4 hours 57 minutes, with the average interview length being 37 minutes. In addition, supplementary material was collected during the accelerator programme to increase the richness of the cases.</p>	3

Table 2. The spin-off teams and their mentors/business advisors

Spin-off team	Description of the team	Mentor(s)	Mentors' backgrounds
Spin-off A	A three-member research group consisting of a professor and two PhD researchers.	Business advisor	Entrepreneur with experience growing multiple successful companies.
Degene	A four-member research group consisting of two PhDs, a business advisor, and an IT specialist.	Penrose	Professional business advisor specialising in Degene's industry.
Esencial	A four-member spin-off formed by PhDs, founded less than one year prior to the programme	Pereira and Ruff	Professional business advisors in various industries.
Gemstone	A five-member research group of consisting of three PhDs, a technology advisor, and a business advisor	Walker	A serial entrepreneur in various industries; no previous experience in Gemstone's industry

3.3 Analysis

Following the data collection, all of the recordings of the interviews were transcribed verbatim into text form. As the interviews were conducted in Finnish, the transcriptions were also in Finnish. The coding was performed based on the Finnish transcriptions, and only the excerpts chosen to represent the findings were translated into English. Although some of the nuances of language can be lost during the translation process, the aim was to represent the original meanings as closely as possible. To achieve this, the translations were tabulated with the original excerpts and then cross-checked for accuracy.

In terms of the analysis, the transcriptions were read closely on a line-by-line basis so as to identify the ideas and concepts present in the data.

The focus of the analysis was on ideas and concepts related to AE. The key considerations during the analysis included what was said, by whom, and in relation to which concept. For example, the scientists might discuss funding by comparing research funding and business funding, while the mentors might discuss the expectations of the entrepreneurs in relation to their interpretation of academic culture. After this initial reading of the data, open coding was performed to recognise specific excerpts related to the identified concepts. For coding purposes, we used mainly descriptive coding by summarising the primary topic of the data fragment or in vivo coding using the terms used by the participants (Saldaña, 2009). The codes used in the analysis included terms such as 'funding', 'start-ups', 'research', 'university' and 'entrepreneurship'. For two of the sub-studies, Atlas.ti software was used to code and then group the codes for further analysis. For one sub-study, the data were coded and tabulated utilising spreadsheet software rather than Atlas.ti. The analysis was, however, conducted in a similar manner regardless of the software used.

The process of qualitative analysis is rarely linear (Eriksson & Koistinen, 2014; Saldaña, 2009), and the coding, analysis and even research questions in this study were iterated as we became more familiar with both the data and the underlying concepts. The preliminary coding provided us with the ability to interpret the data and recognise recurring concepts and themes, which we then focused on during a more in-depth analysis of what was being said in relation to the identified concepts (Eriksson & Kovalainen, 2016).

Once we began recognising the recurring concepts, we started reading the texts while specifically focusing on how these concepts emerged, as seen through the theoretical lenses of sensemaking (for the first sub-study) and CSM (the second and third sub-studies). When using the sensemaking perspective, we focused on interpreting how Weick's (1995) seven sensemaking properties were present in the material. For the two studies involving the CSM approach, we aimed to interpret how the aspects of power, discourse, organisational rules, and formative contexts shaped the participants' understanding (Helms Mills, 2003; Helms Mills et al., 2010). By examining the data using these theoretical lenses, we were able to focus on how the aspects of sensemaking and CSM formed the participants' sensemaking process. We approached the

data with the aim of answering open-ended questions such as the following: How are the formative contexts reflected in the data? What identities do the participants enact? What power relations are present, and do they affect sensemaking? Using this analytical approach, we were able to pinpoint the underlying concepts related to AE which were key to the sensemaking processes in the cases.

While sensemaking and CSM draw on different onto-epistemological perspectives and focus on different aspects of analysis, we combined them as modes of analysis to achieve a richer perspective on sensemaking. It should be noted, however, that sensemaking and CSM are not equivalents, even though some sensemaking studies seem to conflate them (Aromaa et al., 2018). Weickian sensemaking requires the researcher to look at sensemaking as a cognitive process, typically using the seven sensemaking properties as guidelines for the analysis. Sensemaking is, therefore, more concerned with understanding how, on an individual level, people react to and make sense of their situation, whereas CSM is concerned with questioning how contextual aspects influence people's sensemaking. While this distinction is important to understand, combining the two approaches represents a viable means of forming a complete picture of sensemaking. Moreover, a sensemaking analysis can serve as the basis for CSM analysis, helping the researcher to direct the CSM analysis towards specific aspects of the sensemaking process in order to analyse the influence of power, formative contexts, organisational rules, and discourses, in addition to examining, for example, how they contribute to the plausibility of a given sense or privilege certain identities. (Aromaa et al., 2018; Helms Mills et al., 2010; Thurlow & Helms Mills, 2009)

The application of CSM to an analysis is not entirely straightforward for the researcher. Indeed, CSM is still an emerging approach, meaning that there is no formalised way of conducting a CSM analysis. For a junior researcher who is still in the process of finding their own voice in research in particular, making claims regarding the sensemaking of others is a difficult task. Despite often being proposed as a heuristic (Helms Mills, 2010; Helms Mills et al., 2010), CSM seems to require a certain level of analytical maturity before it can confidently be reported on. Related to this challenge is the issue of the researcher's own sensemaking process and its impact on the analysis of others'

sensemaking, as Aromaa et al. (2018) note. The prior reports on sensemaking, that is, the academic papers, are both shaped by the sensemaking of their authors and affected by the context in which they are situated. The wide epistemological foundation of CSM research represents another hurdle for researchers to overcome. The CSM approach provides for a multitude of onto-epistemological frames, which offers researchers a variety to choose from, although it can also make it difficult to fully grasp the knowledge claims of CSM research (Aromaa, 2020; Hilde, 2013).

3.4 Descriptions of the studies and methodological choices

3.4.1 Article 1: Where does it lead to? Nowhere! Problematic sensemaking concerning commercialisation

This article, which was co-authored with Tero Montonen and Päivi Eriksson, examined AE as a social process utilising Weick's (1995) sensemaking framework. More specifically, the study investigated the problematic sensemaking related to commercialisation activities and AE. The associated research question focused on how university commercialisation systems provide (or do not provide) resources for sensemaking.

The study was conducted in the form of an intensive case study of the commercialisation process of a UST who were aiming to commercialise their research. The data for the case were gathered during eight meetings between the UST and their business advisor as well as through four individual interviews with core team members. We coded the transcriptions of the interviews using codes that described what topic or theme was being discussed. Here, we utilised codes such as 'research', 'commercialisation', 'university', 'ownership', and 'decision-making'. After coding the data, we tabulated the excerpts for further analysis. We utilised the seven properties of Weick's (1995) sensemaking framework as a guide when analysing the data. Examples of the questions we used as guidelines for understanding the participants' sensemaking included the following:

- What cues are extracted by the participants?
- How do the participants enact their environment within the data?
- How does the sense develop through social activity?

Our analysis revealed that the sensemaking of the UST was problematic due to lack of resources provided by the environment in which they were operating during their commercialisation process. Using the concept of problematic sensemaking as a cue for our analysis, we recognised three themes of organising in which the sensemaking was more problematic than successful. We used these findings to construct a sensemaking narrative which was structured based on the three themes and illustrated by quotations from the UST members' interviews.

3.4.2 Article 2: The conflictual sense of commercialisation and academic entrepreneurship

This article was written with my co-authors Tero Montonen and Päivi Eriksson. In the study, we examined the CSM processes of three scientists, who formed the core group of a UST. The study's research question sought to explore how a conflictual sense of commercialisation is constructed by scientists working on a project focusing on the commercialisation of their academic research.

The data for the study were gathered through two rounds of interviews with the scientists as well as supplementary material collected from the commercialisation project. The additional data included project documents, presentations, emails, and audio recordings of meetings. We used the first round of interviews and the supplementary material to help us interpret the second round of interviews, which allowed us to form an understanding of the social processes involved. We conducted the analysis as a qualitative content analysis, utilising the CSM framework as a lens (Helms Mills et al., 2010).

We analysed the transcripts for the different meanings the scientists attached to commercialisation. The first phase of analysis indicated that the scientists contrasted the commercialisation discourse with the academic research discourse. In doing so, they constructed a variety of tensions and conflictual senses between the two discourses. We selected this concept

of tension as the focus of the analysis because it emerged as focal in the participants' sensemaking process. Next, we coded the transcriptions to highlight the fragments of data related to the sense of conflict and tension within the interviews. We used codes that were most relevant to the source of the tension, such as 'entrepreneurship', 'researchers', 'funding', and 'the university'. The themes identified during the analysis were then used as the basis for further CSM analysis, in which we aimed to interpret the effects of contextual factors on the participants' sensemaking as well as the sensemaking outcomes of the process.

3.4.3 Article 3: Becoming credible? An alternative narrative of start-ups in an accelerator program

In this sub-study, we investigated how the AE narrative unfolds during an accelerator programme. The article was written with my co-authors Outi-Maaria Palo-oja, Eeva Aromaa and Tero Montonen. The research question that informed the study focused on how the credibility of start-up entrepreneurs is constructed during the acceleration process.

The study was conducted during an accelerator programme that provided the participating teams and companies with commercialisation-related help from an experienced business mentor over an intensive period of six months. While the accelerator programme also involved non-academic entrepreneurial teams, our analysis included only the three teams in which at least one core team member was from a university faculty (i.e. academic entrepreneurs in the context of this dissertation). The lead entrepreneurs and team mentors were interviewed twice for the study, once at the beginning of the accelerator programme and then again at the end. Aside from the interview data, the participation of one of the co-authors, Outi-Maaria Palo-oja, in the accelerator programme provided us with information on how the team members interacted during the programme outside of the interviews. Our analysis was, however, conducted solely based on the interview transcriptions, with the additional information only being used as to support the analysis.

During the coding process, we aimed to recognise fragments of data that would represent the recurring themes within the data as a whole. Examples of the words used for coding purposes included 'pitching', 'investors',

'growth' and 'raakile' (a Finnish colloquialism for something in the process of maturing). After the initial coding process, the fragments were analysed using the CSM framework as a lens. We tabulated the quotations and analysed the emergence of the CSM aspects of power, rules, discourses, and formative contexts within them. During this process, we interpreted how the different aspects were present in the sensemaking of the academic entrepreneurs and their mentors. Examples from the analysis include the following: 'The external business expertise is enacted as the most critical aspect of the sensemaking', 'Science discourse contrasted with sales discourse', and 'Makes sense of business discourse and the act of making promises and generalising as the correct way of speaking'.

Based on the qualitative analysis, we constructed a composite sensemaking narrative (Willis, 2019) of how the sense of credibility in relation to AE unfolded during the accelerator programme. When constructing the narrative of the interviews, we recognised that two themes emerged from the interviews, namely learning the rules of the start-up game and the partial questioning of those rules. Moreover, the narrative highlighted how the sensemaking process is a social process, in which the sensemaking is intertwined with the collaboration both within the teams and between the academic entrepreneurs and their mentors.

3.5 Ethical considerations

In this study and all of the sub-studies, we aimed to conduct the research in an ethical manner. The main focus with regard to ethical considerations was the protection of the research subjects. The subjects were, therefore, asked to provide informed consent to participate in the research interviews. In addition, they participated in the interviews voluntarily and with knowledge of how interview data would be used (Flynn & Goldsmith, 2016).

As the subjects of the case studies were entrepreneurial teams consisting of only a few individuals who openly discussed personal issues related to their workplace and their interactions with both fellow team members and other stakeholders, we also took care to avoid including any potentially harmful

information during the presentation of the research findings. This involved the pseudonymisation of the real names of any individuals and organisations in the transcriptions. Moreover, we decided not to use data from a specific case interviewed in this study due to the potential for harm to be caused to the individual team members. As the interviews also included discussion about the technological innovations and business plans of the participating USTs, we decided to only refer to such information in a generalised manner in order to avoid publishing potentially harmful information. (Eriksson & Kovalainen, 2016)

Furthermore, the sub-studies included in this dissertation were the result of cooperation between my co-authors and myself in terms of the data collection, analysis, and writing. Accordingly, we aimed to attribute all of the work fairly to all collaborators based on their individual contributions to the research.

4 FINDINGS

In this chapter, I present the findings of this study as well as those of the papers included in this dissertation. The included papers comprise of two articles that have been published in peer-reviewed journals and one article that has been published as a chapter in a peer-reviewed book.

The main research question addressed in this dissertation is as follows: How does the sense of tensioned academic entrepreneurship unfold in social interaction? Prior studies concerning AE have suggested that spin-off teams operate in a tensioned environment (Brennan & McGowan, 2006; D'Este & Perkmann, 2011; Philpott et al., 2011), and the present study explores how such tension unfolds in social interaction, specifically among pre-founding USTs and their stakeholders. To answer this main question, I utilised two empirical research questions, which I will now examine in more detail.

The first empirical question is as follows: How are differences between the academic and commercial worlds constructed in social interaction among scientists and stakeholders? The construction of the differences between the academic and commercial worlds unfolds in retrospective sensemaking, where social interaction with scientific peers and the rules of academia, as well as interaction with business advisors and the rules of commercialisation provide cues for making sense of AE. The present study finds that these differences are constructed through three distinct questions related to the two worlds: identity reflection, ethical considerations, and competence judgements. The evaluative nature of these questions transforms the differences into tensions. The questions and the ways of negotiating and resolving the related tensions are presented in Table 3.

Table 3. Questions related to constructing differences between the academic and commercial worlds as well as ways of negotiating and resolving tensions

Negotiation and resolution	Conforming	Resisting	Rejecting
Questions			
Identity reflection	Entrepreneur identity, willingness to take risks to capitalise on opportunities	Hybrid academic entrepreneur identity (Jain et al., 2009), finding a middle ground	Scientist identity, being critical of commercialisation, avoiding risks
Ethical considerations	Accepting the ethics of commercialisation, emphasising the societal impacts of entrepreneurship	Ruling out extreme options related to commercialisation, (e.g., funding sources that conflict with academic ethics)	Rejection of commercialisation due to conflict with academic ethics: community, science as a common good, truth-seeking
Competence judgements	Adopting new competences: e.g., sales, digital marketing, generalised manner of presenting	Taking on some of the expected competences, externalising via surrogate entrepreneur or role specialisation	Assuming a purely research-focused role, rejecting new competence expectations

The USTs in this study construct distinct differences between the academic and commercial worlds by describing the scientist identity as incompatible with the commercial world. The UST members describe aspects of the scientist identity based on their interaction with other research group members, who represent central stakeholders for the team within the university. Based on these experiences, being critical of commercialisation is constructed as a part of the scientist identity and personality, as the professor in the second article explains: ‘Some of the scientists in our research group are critical of commercialisation... I feel that it stems from the fact that these people are

scientists. They identify as scientists, and it comes from their personality.' The perceived incompatibility of the scientist identity and commercialisation is further supported by the USTs' mentors, who argue that scientists are too careful and cautious when it comes to making promises to investors and prospective clients. The team members also reproduce the perspectives of their mentors, who are their main source of practical guidance in the context of the commercialisation projects.

The entrepreneur identity is contrasted with the scientist identity. The construction of the entrepreneur identity centres on risk-taking. In fact, entrepreneurs are described as being willing to take action to exploit market opportunities, even if there is considerable risk involved. Selling and pitching are both key activities on which the construction of the entrepreneur identity is based. Entrepreneurs are considered to be willing to generalise complex topics, even to such an extent that might be considered untruthful by the more conservative scientist, which is seen as a requirement for performing the aforementioned tasks.

From the scientists' perspective, entrepreneurs tend to prioritise the commercial performance of spin-offs over the academic values. This construction reflects the formative context of the spin-offs, which sees scientists who are familiar with the academic discourse venture into, and make sense of, the world of commercialisation through the associated discourse and the rules embedded within it. From this perspective, the entrepreneur identity is constructed as the antithesis of the scientist identity, with entrepreneurs being willing to act based on limited knowledge and take risks to pursue success. Their scientist counterparts, however, would rather focus on research even if the time needed to do so would mean missing a market opportunity. The construction of the scientist and entrepreneur identities as different emerges from the cues drawn from social interaction with academic peers and the USTs' business advisors and mentors, as well as from the understanding of the academic and commercial discourses.

The second question when it comes to how the two worlds are constructed as different concerns ethical considerations. In terms of this study, I define ethics as what is valued and what is understood as right and wrong. Although the ethics of the academic and commercial worlds are not explicitly defined by

the scientists in this study, they imply that academic ethics prioritise scientific validity and the search for knowledge over personal gain, which quite closely follows the traditional Mertonian norms of science (Owen-Smith & Powell, 2001). When these ethical perspectives appear in the research data, they are usually contrasted with the ethics of commercialisation. The ethics of the commercial world prioritise risk-taking, the exploitation of opportunities and financial gain. When compared with the academic world, the commercial world is constructed by the scientists as having less strict rules and ethics. This is especially prominent in relation to the funding options available for the spin-offs, as one of the team members in the third article describes: ‘... there is an extreme where every method is allowed and the funding is the most important thing, and it doesn’t matter where the money comes from’.

The perspective concerning the incompatibility of the ethics of the two worlds is again constructed through social interaction with academic peers. The UST members in this study refer to commercialisation as being a difficult topic to even discuss within the university due to the negative opinions associated with the commercialisation of research. According to the UST members, university scientists generally associate commercialisation efforts with the pursuit of personal gain, which is considered to corrupt the purity of academic research. Academic ethics are also ingrained in the informal rules of academia, which provide cues for the UST members’ sensemaking. The university values research and encourages scientists to consistently publish their findings so as to advance their careers. Drawing on their experiences with the scientific community, the UST members argue that being perceived as sacrificing academic integrity in the pursuit of commercial opportunities would harm their credibility within the university and, therefore, negatively impact their career prospects.

Social interaction with their mentors also contributes to the construction of the commercial world as incompatible with academic ethics. According to the UST members, their mentors do not seem to consider academic ethics when advising them to act on the basis of limited research in order to take advantage of a market opportunity or secure funding from investors. Such expectations violate academic ethics and, in the process, endanger their credibility as scientists. This perception contributes to the construction of

the commercial world as being less grounded on ethics. This finding is in keeping with the findings of prior studies suggesting that spin-off creation conflicts with the traditional view of academic ethics (Van Burg, 2014; Ylijoki & Ursin, 2013).

The third question through which the differences between the academic and commercial worlds are constructed involves competence judgments. Within the data, commercialisation is constructed as a distinct competence, which is perceived to be difficult for scientists to adapt to. Such adaptation is suggested to require knowledge and capabilities that are difficult to learn, even if the scientists are willing to commercialise their research outcomes. This understanding is constructed through social interaction with the commercialisation stakeholders of the UST, principally the mentors and business advisors, but also the university commercialisation support systems. Such stakeholders provide the scientists with expectations regarding the activities that are perceived to be necessary for the development of a spin-off firm, including sales presentations, digital marketing, and funding.

The USTs make sense of these new competence expectations against the backdrop of the academic world, which further highlights the differences between the two worlds. For example, the scientists are used to an academic presentation style, which the mentors argue is too rigid and conservative when compared with the flashy pitching style expected by investors. While the UST members describe being competent in relation to seeking funding for research projects, they consider that funding a business feels like a completely different world to them. Some of the UST members also describe feeling uncomfortable with the competence expectations associated with commercialisation, suggesting a preference for assuming a purely research-oriented role within the team.

The USTs and mentors in this study are all receptive to the idea of recruiting a surrogate entrepreneur who has prior entrepreneurial experience to fulfil the competence expectations. This willingness to externalise these competences in a non-scientist team member contributes to the construction of the commercial world as different, because it suggests that scientists might not be willing or able to learn the tasks expected of them as entrepreneurs. One mentor interviewed for the third article even describes finding a surrogate

entrepreneur as the most critical thing for their UST, implying that the scientists experience difficulties developing spin-offs and finding investors.

To sum up the findings with regard to the first sub-question, this study finds that the differences between the academic and commercial worlds are constructed discursively by drawing cues from social interaction with the USTs' key stakeholders. In addition to direct interaction with mentors and research group members throughout the spin-off process, the social construction is influenced by prior experiences of interaction between the academic and commercial worlds. This social construction of the two worlds as different is also influenced by the discourses and rules of both worlds, as they define how actors are expected and allowed to act in certain contexts. As the USTs attempt to make sense of these discourses and rules, they often find that the two worlds provide conflicting expectations of them as academic entrepreneurs.

The second sub-question addressed in this study is as follows: How are tensions associated with academic entrepreneurship negotiated and resolved in interaction among scientists and stakeholders? As explored in relation to the first sub-question, USTs construct the academic and commercial worlds as different during the spin-off process. As they evaluate the differences and contrast the worlds with one another through questions associated with identity reflection, ethical considerations, and competence judgments, these differences are transformed into tensions.

I propose that sensemaking is central to the negotiation and resolution of the tensions that emerge between the two worlds. As the UST members negotiate and resolve the experienced tensions, they attempt to construct a plausible sense of AE. The USTs start negotiating the tensions between the two worlds using the reference frame of the academic world, which they are most familiar with. They may negotiate and resolve the tensions either by maintaining the academic perspective as a coherent means of understanding the world or adjusting to the new understanding of the world that is offered by the stakeholders representing the commercial world. The present study finds that the tensions between the two worlds are negotiated and resolved in three key ways: the UST members either conform to the commercial world,

resist so as to find their own way, or reject the commercial world in order to maintain the primacy of the academic world.

In terms of identity reflection, the possibility of conforming to the commercial world is evidenced by the UST members exhibiting certain identity features that are compatible with the constructed entrepreneur identity. For instance, a scientist interviewed for the second article describes being enthusiastic with regard to commercialisation and willing to proceed with the spin-off project even though their colleagues consider the situation to be too risky due to the limited research. Some of the scientists are also more willing to, for example, assume the salesperson role, even if it requires them to generalise complex topics into layperson's terms in order to attract investors. Adopting these identity features resolves the tensions by at least partially fulfilling the expectations of the commercial world.

While some of the UST members exhibit a dislike of those aspects of the entrepreneur identity that conflict with their scientist identity, as well as a willingness to maintain their scientist identity, outright rejection of the entrepreneur identity is not evident in this study. The scientists seem to rationalise that a more entrepreneurial identity is necessary for a spin-off to succeed, even if they wish to maintain a primary scientist identity. In resisting the expectations of the commercial world, they describe the entrepreneur identity as an extreme that conflicts with the academic world, although they also consider the scientist identity to be incompatible with commercialisation. Through resistance to the commercial world, they construct an academic entrepreneur identity, which allows them to maintain some of the aspects of the scientist identity while also partially assuming an entrepreneur identity. Prior studies have referred to this as the construction of a hybrid identity and suggested that it may be a common phenomenon in relation to academics operating at organisational boundaries (Jain et al., 2009; Lam, 2017; Montonen et al., 2021a).

The identity construction of the UST members is influenced by their social interaction with their mentors, who present aspects of the entrepreneur identity as being vital to the success of the spin-off. At the same time, however, their mentors also contribute to the construction of the entrepreneur identity as something that the UST members might have, rather than as something that

can be adopted or learned. This suggests that the spin-off process, especially in terms of intensive accelerator programmes, might not provide USTs with the tools necessary to deal with the identity-related issues associated with AE.

The relatively short-term context also limits the ability of the UST members to conform to the competence expectations of the commercial world. The mentors and university support system stakeholders frame certain tasks and competences as being requirements for the successful operation and growth of spin-offs. While the USTs in this study describe learning and being interested in adopting these competences, some of them are constructed as difficult for scientists to learn, especially within the limited time frame of the programme and spin-off project. The construction of these competences as unachievable restricts the UST members' ability to negotiate and resolve the tensions through conforming to related expectations.

Resistance to the competence requirements of the commercial world is also evident in the UST members' unwillingness to perform certain tasks perceived as important by the mentors and other commercial stakeholders. This resistance enables them to focus on tasks that they are comfortable performing, either due to personal preference or a lack of time to properly learn other tasks during the programme. Interaction with the mentors contributes to the identified resistance, as they propose that the USTs could resolve any competence deficits by recruiting individuals with experience of entrepreneurship to take on the tasks that are considered unsuitable for the scientists. The recruitment of a so-called surrogate entrepreneur would, therefore, resolve the tensions by negating the need for the scientists to adopt the new competences, which are constructed as unavailable to them in the context of short-term programmes. For individual scientists, role division among the UST provides the option to reject the competence requirements of the commercial world and instead focus on research-related tasks. However, the core UST members in this study did assume at least some of the competences considered vital in relation to the commercial world, even when they personally objected to performing such tasks.

Conforming to the ethics of the commercial world is less evident in the USTs, as questions concerning ethics are mainly discussed when there is a perceived conflict between the commercial and academic worlds. This

suggests that the ethical aspects of AE are not properly addressed by the accelerator programme or the commercialisation projects. Yet, some of the UST members bring up contributing to society as a reason for seeking opportunities to commercialise their research. Indeed, when discussing the positive impacts of AE, they refer to the larger societal discourse on AE as a source of both innovation and national competitiveness as well as a contributor to local employment opportunities. Interestingly, the mentors suggest that the USTs should emphasise or even exaggerate the societal impacts of their products when they pitch their inventions to investors, calling for 'death and explosions' in the scientists' performances.

Tensions related to ethical issues are most clearly resolved through resistance to the ethics of the commercial world. When facing ethical tensions between the commercial and academic worlds, scientists often suggest the need for compromise in order to adhere to academic ethical standards. For example, certain funding options that are available to normal start-up companies are said to conflict with academic ethics, which rules such options out for the USTs. Likewise, the use of overly generalised or unsubstantiated claims concerning the technology is interpreted as unethical from the academic perspective. Providing UST members with the ability to make informed choices from among several different options might enable them to negotiate and resolve the ethical tensions associated with AE. The UST members suggest, for example, that while their mentors propose certain solutions that conflict with academic ethics, they are able to make their own choices based on the other options provided to them.

Following Mills and Helms Mills (2017) perspective on power and resistance in terms of CSM, resistance to the exercise of power by the mentors represents a constructive effort to achieve a sense of the world that allows the scientists to maintain the plausibility of the academic perspective of the world. Such resistance does not imply that the scientists reject the commercial world; rather, it suggests that they enact their own power to make decisions concerning their spin-off that conform to their own ethical perspective. Resisting the ethics of commercialisation enables the scientists to engage in the construction of a sense of AE that is more compatible with the academic world. Resistance to the ethics of the commercial world may

also be associated with the construction of a scientist identity, as suggested by Ylijoki and Ursin (2013).

The ethics of commercialisation are rejected when the tensions between academic and commercial ethics are most severe. Among the UST members included in the second article, ethical tensions emerge when the commercial stakeholders push for commercialisation even though the scientists argue that the research data are insufficient to support commercialisation. In such a case, the scientists suggest that proceeding with commercialisation would go against their academic ethics and harm their credibility as scientists. As the limited time frame of the typical commercialisation project does not allow for UST members to wait until the research is completed, the commercialisation efforts are halted, since there are no viable options available that would enable the scientists to adhere to the ethics of the academic world and meet the expectations of the commercial world. This rejection is also associated with difficulties in the social interaction amongst the UST and their commercialisation stakeholders. In fact, the scientists refer to the proponents of research and the proponents of commercialisation as being unable to speak the same language, which leads to a breakdown of communication and, ultimately, to the decision not to continue with the spin-off process, thereby resolving the experienced tension through the rejection of the commercial world.

4.1 Where does it lead to? Nowhere! Problematic sensemaking concerning commercialisation

This article examined the sensemaking of academic entrepreneurs in order to provide insights into how AE unfolds as a social process. Thus, in this article, we sought to study how scientists involved in a business project make sense of commercialisation. Using an intensive case study approach, we focused on how the university provides (or does not provide) resources for sensemaking.

In this study, we identified three key areas of organising in relation to which the sensemaking of the scientists was more problematic than successful. First, the university commercialisation system did not provide the scientists

with the instructions and processes they expected with regard to setting up the spin-off. While the commercialisation specialists from the university did communicate with the scientists, they did not consider that the system provided them with enough guidance. The commercialisation funding, as provided by several funding bodies, was also a source of confusion for the scientists. The available funding mechanisms seemed to provide instructions that changed between projects and, even once the funding was secured, it remained unclear how they were allowed to use the funds in relation to developing their business. Finally, the social dynamics within the research group made it difficult for the scientists to proceed with the actions required to set up the spin-off. Some members of the research group exhibited negative attitudes towards commercialisation, which generated some tension among the scientists. For the more entrepreneurially minded scientists, this meant that they experienced difficulties communicating and connecting with some of the research group. In addition, not all of the scientists named in the invention disclosure formed a part of the core group during the commercialisation process, which made it difficult for the core UST members to make decisions concerning the activities required to found the spin-off.

In terms of AE research, this study contributes to the understanding of the involved social micro-processes. Utilising the sensemaking framework, the study highlights how AE unfolds as a longitudinal social process from the scientists' perspective. The problematic sensemaking associated with university commercialisation systems, research commercialisation funding mechanisms and the tensioned relationship between research and business in a research group all lead to difficulties in relation to founding a spin-off. The findings, therefore, illustrate how the difficulties of organising commercialisation are linked to problems in terms of sensemaking at both the individual and team levels.

4.2 The conflictual sense of commercialisation and academic entrepreneurship

In this article, we examined how the contextual elements of sensemaking influence scientists' sensemaking during a commercialisation project. The study was based on empirical data regarding a research commercialisation project that were gathered over a two-year period.

In this study, we used a CSM approach to analyse the gathered data. We found that the identity issues related to the commercialisation of research were a potential source of tension with regard to the scientists' sensemaking. The study suggested that the scientists who had a more stable researcher identity considered commercialisation to be an anti-identity, which reflected something they do not want to be. If commercialisation activities were forced on these scientists, identity struggles tended to occur. The tension between research and commercialisation was also a source of conflict in terms of the scientists' sensemaking. The scientists found that commercialisation-related activities tended to create tension with regard to the university atmosphere. Similarly, their scientific ideals were considered to conflict with the expectations of commercialisation. While the scientists would have liked to take the time to finish their research and validate their results, the development of a spin-off required them to take advantage of being early to the market and act even if they were not yet completely confident in their research. These struggles and tensions made it difficult for the UST to proceed with regard to setting up the spin-off. This failure to proceed led to disappointment for the more entrepreneurially oriented scientist in the team, who became discouraged about the possibility of even founding a spin-off firm and having a career as an academic entrepreneur.

This study contributes to the AE literature by illustrating how scientists draw on and use competing discourses within the power dynamic of their university. The research shows how such discourses set expectations and rules for scientists, who then both enact and challenge those rules. The academic discourse, which highly values research as a means of career advancement, was drawn upon by the more senior scientists with stable scientist identities and career ambitions within academia, which meant that

they prioritised research over commercialisation. The more junior scientist, however, attempted to shift towards a new sense of identity, drawing on the commercialisation discourse. Prior studies have found that scientists are less likely to participate in commercialisation activities early on in their careers (Haeussler & Colyvas, 2011), although our research suggests that proneness to commercialisation is not merely a matter of career status but is also strongly influenced by the underlying discourses. In addition, this study highlights the impact of power dynamics on the spin-off process. The findings suggest that the power of senior scientists can restrict the agency of junior scientists, even in projects focused on commercialisation, thereby limiting their ability to influence the sensemaking process.

4.3 Becoming credible? An alternative narrative of start-ups in an accelerator program

This study examined AE in the context of an accelerator programme. As such, the study sought to explore how the (lack of) credibility of start-up entrepreneurs is constructed during the acceleration process.

In this study, we utilised a CSM approach to analyse how contextual factors influenced the construction of sense during the accelerator programme. In our analysis, we identified two main sensemaking themes specifically related to the construction of a sense of lacking credibility. First, the sensemaking of both entrepreneurs and their mentors focused on the performative aspects of start-up entrepreneurship as a means of being credible. In this case, the lack of credibility stemmed from the USTs' way of presenting, which was based on their experience as scientists, as well as from their lack of business acumen. The USTs and their mentors constructed an understanding according to which they would have to bring in surrogate entrepreneurs to lead the businesses in order to appear credible as start-ups. The second theme concerned adjusting to the rules of the start-up world. The focus of this theme was the differences between the academic and start-up worlds and the realisation that the investor perspective should serve as the guide for start-up entrepreneurs if they aim to attract funding from venture capitalists

or business angels. The UST members also experienced difficulties adjusting to the expectations of the start-up world, as they felt that such expectations were at odds with their academic ethics and, further, that adopting the associated rules could pose a risk to their careers as scientists.

This study contributes to the AE research by highlighting the social construction of AE in the context of an accelerator programme. The analysis presented a narrative of start-up entrepreneurship that is contrasted with established narratives of start-up entrepreneurship in Finland. Whereas in prior studies start-up entrepreneurs were portrayed as rock stars or vital entrepreneurs (Katila et al., 2019) or rebels against traditional Finnish society and economy (Koskinen, 2020), the narrative constructed in this study from the perspectives of the scientists and their mentors showed that AE was constructed as lacking credibility in the context of the start-up world. To be credible in the start-up world, academic entrepreneurs were expected to abandon the scientific discourse which was deemed to be a barrier to a confident pitching performance. In our analysis, we also found funding to be another focal point when it came to the difference between AE and prior start-up narratives. While funding was considered a reward or a break from tradition in other narratives, in the accelerator programme in this study, it was considered one of the defining aspects of credibility for academic entrepreneurs. Learning to appear credible as start-up entrepreneurs was specifically constructed as a means of securing funding for the spin-off businesses.

5 DISCUSSION AND CONCLUSIONS

In this chapter, I will discuss the findings of this study in relation to the prior literature and set out the conclusions of the research. First, I will present the findings concerning the main research question addressed in this study: How does the sense of tensioned academic entrepreneurship unfold in social interaction?

This study sought to explore how the sense of tensioned AE is constructed through social interaction between USTs and their stakeholders, who represented both the academic and commercial worlds. The two worlds have their own discourses, rules, and expectations, which define what is expected of USTs and what they are allowed to do in the relevant context. The two worlds are also constructed as different through the complex network of social interaction between USTs and their academic and commercial stakeholders, as well as through the discursive elements associated with the two worlds. These differences relate to identity reflection, ethical considerations, and competence judgments, and they are transformed into tensions as scientists evaluate the questions associated with these issues. To arrive at a plausible sense of AE, UST members, in relation to their stakeholders, engage in a social process of negotiating and resolving the experienced tensions.

The present study finds that the construction of the academic world is influenced by USTs' interaction with academic stakeholders. For instance, the scientists refer to the experiences of other academic entrepreneurs, as well as to the perspectives and opinions of other research group members when examining what the academic world expects of them. The explicit and implicit organisational rules of academia, such as the Mertonian norms of science, the rules of research funding bodies, and the expectation to consistently publish in order to progress in one's academic career, also represent a significant influence on the construction of the academic world.

In addition, the construction of the commercial world is influenced by the USTs' mentors and business advisors. These experienced individuals guide the academic entrepreneurs during the spin-off process and provide both task and role expectations to the team members. For USTs, they represent the

commercial world and its discourse, which has its own set of rules concerning what entrepreneurs should do and how they should present their business concepts. Other stakeholders, including university commercialisation systems and commercialisation funding bodies, also contribute to the construction of the commercial world through defining rules for spin-off activities.

To arrive at a plausible sense of AE, academic entrepreneurs must negotiate and resolve the identified differences. This study suggests that they may negotiate and resolve these tensions by either conforming to the commercial world, finding a way to accommodate both worlds via resistance to the new expectations, or, ultimately, rejecting the commercial world if the severity of the experienced tensions does not allow for the construction of a plausible sense of AE.

5.1 Theoretical and empirical contributions

This study contributes to the AE literature through studying AE as a social and interactive process by utilising the sensemaking and CSM frameworks as theoretical lenses. This approach has allowed me to focus on the social construction of the tensioned sense of AE, as related to the evaluation of the differences between the academic and commercial worlds.

Prior studies concerning AE have highlighted its tensioned and conflictual nature. It should be noted, however, that these studies have not investigated USTs during the pre-founding phase; rather, they have either examined the issue at the university level (e.g., Holloway, 2015; Owen-Smith & Powell, 2001) or focused on spin-offs during the post-founding phase (Tuunainen & Knuuttila, 2009). Some studies have recognised the tensions between traditional academic objectives and the commercialisation of research (Siegel & Wright, 2015). In addition to institutional issues concerning the boundary between higher education and industry, AE has been found to be a source of tensions for both individual scientists and spin-off teams. Prior studies have suggested that such tensions may be associated with challenges in terms of blending spin-off firms with the traditional institutions of universities (Tuunainen, 2005), the conflict between academic career progression

and entrepreneurial activities (Philpott et al., 2011), difficulties combining academic functions with commercialisation (Tuunainen & Knuuttila, 2009), conflicts of priority between research and commercialisation (Palo-oja et al., 2017), and scientist colleagues' disapproval of the commercialisation of research (Brennan & McGowan, 2006). Yet, while these studies have noted the existence and sources of tensions and, to some extent at least, the ways individuals handle them (e.g. Jain et al., 2009), the ways in which such tensions are constructed and resolved in social interaction have not previously been explored. This study contributes to the literature by exploring how tensions emerge in social interaction among USTs and their stakeholders. The study finds that the tensioned sense of AE emerges from the social construction of the academic and commercial worlds as different as well as from the evaluation of the questions related to identity reflection, ethical considerations, and competence judgments associated with AE.

Only a few prior studies have touched upon the issue of ethics as it relates to AE. For example, Siegel and Wright (2015) highlight the ethical concerns regarding AE as a potential avenue for further research, although it seems that this issue has yet to be explored to any significant extent. Some studies have suggested that the commercialisation of research and the founding of university spin-offs contradicts traditional academic ethics, even though the increased importance of the universities' third mission has already shifted the ethics of universities, especially at the managerial level (Shore & McLauchlan, 2012; Van Burg, 2014). Ylijoki and Ursin (2013) suggest that scientists' resistance to commercialisation may be rooted in ethical issues and, further, that such resistance may enable scientists to construct an identity that is rooted in traditional academic ideals. Zhang et al. (2020) also suggest that academic entrepreneurs seek to hold themselves to higher ethical standards than their business counterparts, which can prove disadvantageous for them during negotiations. The present study suggests that ethical questions related to the commercialisation of research may be an ongoing concern for scientists participating in spin-off activities. The ethics of commercialisation are constructed to value risk-taking and the swift exploitation of market opportunities for personal gain or company growth, whereas academic ethics are constructed to value research, truth-seeking

and science as a common good. The challenges associated with negotiating the differences between these two ethical perspectives can influence USTs' sensemaking when it comes to of AE and even cause them to withdraw from entrepreneurial activity if the ethical differences prove too severe.

Prior studies have emphasised the importance of identity in relation to scientists' entrepreneurial activity and performance (Guo et al., 2019; Lam, 2011), in addition to the ways in which academic entrepreneurs deal with tensions that arise between research and commercialisation by adapting their identities (Jain et al., 2009; Montonen, 2014; Montonen et al., 2021a). The present study contributes to the literature in this area by highlighting how identity is one of the key issues involved in the construction of the tensioned sense of AE. The study suggests that both USTs and their stakeholders contribute to the construction of the scientist identity as being wary of or even negative towards the commercialisation of research, meaning that scientists are too risk averse to be entrepreneurs. In contrast to scientists, entrepreneurs are constructed as willing to take risks and to exhibit a salesperson-like approach when dealing with investors and other stakeholders. The spin-off process is understood as pressuring scientists to modify their identities in order to satisfy at least some aspects of the entrepreneur identity, even if they do not fully conform to the expectations of the commercial world.

Prior research on university spin-offs has recognised the need for USTs to learn or otherwise secure new competences throughout the development of the spin-off (Lockett & Wright, 2005; Sandström et al., 2016). Studies have also suggested that the acquisition of the competences required for spin-off growth may require considerable time and experience within the relevant industry, which causes spin-offs to turn to external actors to gain the necessary competences, especially in the short term (Clarysse & Moray, 2004; Rasmussen et al., 2011). Hytti and Heinonen (2010) recognise the potential tension associated with combining the development of practical entrepreneurial skills and university education, although it should be noted that this study focused on the context of higher education. Previous studies have not explored how new competence expectations shape the social process of AE. The present study suggests that the competence expectations for entrepreneurial teams are constructed by USTs and their stakeholders during the spin-off process

as difficult, or even impossible for scientists without managerial experience to acquire, especially over the course of intensive accelerator programmes or short-term commercialisation projects. This difficulty in conforming to the apparent requirements of the commercial world may drive USTs to recruit surrogate entrepreneurs or other experienced commercial actors to handle the tasks considered unachievable for scientists.

This study also contributes to the research on AE by focusing on the experiences and perspectives of both individual scientists and the USTs formed by them. Several recent studies have called for further research into the micro-level processes of university spin-offs (Balven et al., 2018; Hayter et al., 2018; Mathisen & Rasmussen, 2019; Nikiforou et al., 2018). This study contributes to the research on the micro-level processes emerging among university spin-offs and their stakeholders (Cunningham & Menter, 2020) by studying how the social construction of AE is influenced by social interaction between UST members and their academic and commercial stakeholders. Moreover, this study supports the findings of prior research highlighting the importance of experienced business advisors and mentors as key stakeholders in relation to university spin-offs (Hochberg, 2016; Pauwels et al., 2016; Siegel & Wright, 2015) as well as the influence of academic stakeholders during the early stages of spin-offs (Wood, 2011; Nikiforou et al., 2018). The present study extends these findings by revealing that social interactions with these stakeholders contribute to the social construction of AE as tensioned. Importantly, this study also provides new knowledge concerning the pre-founding phase of spin-offs, whereas the majority of previous studies related to spin-offs have focused on the post-founding phase.

A number of recent studies have examined AE as a socially constructed phenomenon (e.g. MacNeil et al., 2021; Montonen et al., 2021b; Tuunainen et al. 2021). The present study extends this body of literature by focusing on the social construction of meaning among USTs and their stakeholders as well as utilising the CSM perspective to explore the post-structural facets of this social process. This perspective has allowed me to examine how the underlying discourses, rules, and power relationships of spin-offs influence academic entrepreneurs' sensemaking. This study finds that the academic and commercial worlds are constructed as different. In addition, the evaluation

of the differences related to the questions of identity reflection, ethical considerations, and competence judgments transforms them into tensions, which must be resolved either through conforming to, resisting, or rejecting the commercial world, as the UST members construct a plausible sense of AE.

5.2 Implications of the research

The present study highlights the challenges associated with combining academic research and entrepreneurship. While prior studies exploring the subject from different theoretical perspectives have reported similar findings (e.g. Billot, 2010; Brennan & McGowan, 2006; Montonen, 2014; Palo-oja et al., 2017), the findings of this study provide novel insights into how USTs come to understand AE as tensioned.

For scientists who are considering pursuing AE, this study highlights the tensions that they might face when working in USTs. The present study not only shows that AE is tensioned, but also delves deeper into how the identified tensions are related to the differences between the academic and commercial worlds as well as to the evaluation of those differences. Especially salient are the ethical considerations that scientists face when operating at the boundary between research and commercialisation. While resolving these ethical issues requires personal consideration, this study shows that academic entrepreneurs have options that enable them to hold on to their academic ethics even when acting as UST members. In addition, the importance of new competence expectations as a source of tensions represents another significant practical implication. Short-term programmes may not provide scientists with sufficient time to properly adopt new competences, while some competences may be considered incompatible with the scientist identity. This study shows that USTs may, however, resolve issues related to competences by, for example recruiting people with more commercial experience or implementing role division between existing team members.

In terms of the mentors and business advisors of USTs, this study shows that they play an important role in how USTs come to understand AE. In fact, the present research highlights their importance in providing practical

advice to USTs as well as their influence over how the expectations of the commercial world are constructed by scientists and their stakeholders during the spin-off process. Recognising the tensions that USTs construct when working between the academic world and the commercial world, or when transitioning from one world to the other, is an important step towards being able to support USTs in negotiating these tensions. It might not be possible to completely resolve the tensions between commercialisation and research, although understanding where such tensions lie could enable mentors and advisors to ease their severity and provide scientists with options when it comes to facing the challenges of AE.

With regard to university entrepreneurship support systems and accelerator programmes directed towards USTs, the present study highlights the need to provide academic entrepreneurs with more support when dealing with the tensions between commercialisation and research. While current support models are able to provide solutions to practical issues (e.g. finding funding or developing the skills to supplement the UST), they appear to lack support for dealing with tensions related to ethics, identity, and competence. If more scientists are expected to commercialise their research, the support systems available to them should reflect the tensions associated with AE, which is not purely a matter of addressing practical concerns regarding the founding or operating of a spin-off. Informing scientists about these issues could help to prepare them to negotiate and resolve related tensions. Moreover, providing knowledge of the different options associated with spin-off activities rather than ready-made solutions could help USTs to make their own choices during the spin-off process.

5.3 Evaluation of the research

As elaborated in the methodology chapter of this dissertation, the present study consists of intrinsic case studies. This research approach aims to provide a rich understanding of the cases in their social setting, by identifying emerging themes and shaping the research questions through the research process (Dyer & Wilkins, 1991; Eriksson & Koistinen, 2014; Stake, 1995). While

this approach has provided the opportunity to explore the cases with regard to interesting avenues for further research, it has required me to carefully consider the process involved in crafting this research.

The selection of the evaluation criteria for research should be performed in accordance with the research approach in question. As Eriksson and Kovalainen (2016) note, the classical evaluation criteria of validity, reliability and generalisability can prove problematic when evaluating qualitative research, while in terms of post-structural or cultural research, local and context-specific criteria are considered more appropriate. To evaluate the present research, I utilise Lincoln and Guba's (1985) criteria for establishing the trustworthiness of qualitative research, namely credibility, transferability, dependability, and confirmability.

According to Lincoln and Guba (1985), the issue of credibility refers to conducting the research in a manner that ensures the results will be reproducible by other researchers using the same data. While performing this study, I and my co-authors conducted interviews and attended meetings with four separate USTs as well as their mentors or business advisors. The inclusion of multiple cases of spin-offs allowed for the triangulation of sources (Bryman & Bell, 2011) through both multiple interviewees from the same spin-off and multiple cases upon which to base the analysis. Eriksson and Kovalainen (2016) also note the strength of the logical connections between the observations and the categories to be a potential measure of credibility. In this regard, having multiple investigators who were familiar with the data participating in the research enabled us to critically evaluate the analysis during the writing process and rule out any potential misrepresentations of the data.

The transferability of the research refers to the potential to uncover similar findings in a separate context. The key findings of this study are supported by prior research concerning AE, even though the study makes new contributions that have not previously been extensively researched. For example, the tensions between commercialisation and research have been recognised in a number of studies (Brennan & McGowan, 2006; D'Este & Perkmann, 2011; Philpott et al., 2011), although the ethical dilemmas that scientists face have remained a sidenote featured in only a few studies (Abreu & Grinevich, 2017;

Murray & Graham, 2006; Shane, 2004). This suggests that these ethical issues and the difficulties in negotiating them can be found in other spin-off contexts outside the context of this study if they were the focus of the research.

To ensure the dependability of this study's findings, the research process was conducted in a manner that is both logical and documented. Indeed, the research approach and methodology of this study have been presented in the third chapter of this dissertation. The chapter details the data collection and analysis processes as well as the research methodology chosen for this study. The chapter also provides insights into the use of CSM and sensemaking frameworks and their combination during the analysis. The methodological choices made in relation to the sub-studies included in this dissertation are discussed in detail in section 3.4.

The confirmability of research refers to the linking of the findings to the data. In short, this means that the researcher should be able to show that their interpretations are grounded in the collected data (Kovalainen & Eriksson, 2016; Lincoln & Guba, 1985). The analysis process described in section 3.3 of this dissertation contributes to the confirmability of this research, as does the participation of multiple investigators. Moreover, we also utilised quotations from the interviews when presenting our findings so as to highlight what our interpretations of the data were based on.

5.4 Further research

The findings of this study suggest a few clear avenues for further research concerning AE. First, there is the role of ethics in the field of AE. While prior studies have recognised the existence of ethical conflicts between commercialisation and research (Murray & Graham, 2007; Shane, 2004; Ylijoki & Ursin, 2013), the influence of ethics on the social processes associated with AE has not yet been thoroughly studied. This study suggests that there are underlying ethical issues concerning AE, which may influence not only the likelihood of scientists becoming academic entrepreneurs (Abreu & Grinevich, 2017), but also how USTs interact and operate with regard to their stakeholders. Future studies specifically focusing on these issues would likely provide

even more detailed insights into how scientists deal with the ethical conflicts associated with the commercialisation of research. A similar research agenda was recently suggested by Hirvonen and Van Langenhove (2021), who argue that AE is situated in a field of moral orders that define the responsibilities, duties and rights of both individuals and collectives. Relatedly, Hirvonen and Van Langenhove (2021) propose that positioning theory could provide a valuable perspective for studying the variety of positions and the associated moral connotations concerning AE on the intrapersonal, interpersonal, and intercultural levels. Montonen (2014) utilises positioning theory to examine the different identity positions of individual academic entrepreneurs, but as Hirvonen and Van Langenhove (2021) suggest, the interpersonal positioning that unfolds in social interaction between individuals offers many possibilities for novel research approaches.

Given the findings of this study, the competence requirements of spin-offs are another central aspect of the tensions associated with AE. Prior studies have noted scientists' lack of commercial experience (Nikiforou et al., 2018; Vanaelst et al., 2006), highlighted the shortcomings of universities' entrepreneurial training (Heinonen & Hytti, 2010; Heinonen et al., 2006), and suggested that incubators and accelerators may provide USTs a way of gaining the required competence (Clarysse et al., 2015; Mustar et al., 2008). The present study suggests, however, that the competence expectations of spin-offs not only involve the practical matter of learning new skills, but also represent a source of tension for academic entrepreneurs because the relevant competences seem to be considered out of scientists' reach, especially during the short time frames of accelerator programmes and commercialisation projects. Further studies could focus on how scientists deal with the pressures associated with adopting new skills throughout the spin-off process.

As studies concerning sensemaking on the part of USTs remain quite rare, there are still several avenues available for generating interesting insights based on this theoretical perspective. The majority of prior AE studies conducted from the sensemaking perspective have focused on Finnish university spin-offs (Montonen et al., 2016; Palo-oja, 2018; Palo-oja & Kivijärvi, 2015; Palo-oja et al., 2017). This study, along with the prior research, suggests

that AE is influenced by national discourses regarding entrepreneurship and the role of universities in society (Karhunen et al., 2017; Sengupta, 2021; Tuunainen et al., 2021). To elucidate the link between national discourses and local organisational contexts, the CSM perspective could be used to study university spin-offs in different cultural settings.

While many studies have investigated the phenomenon of AE by focusing on spin-off teams during the post-founding phase, especially utilising quantitative methodologies, longitudinal qualitative studies of spin-offs spanning the pre-founding phases through to successful growth are practically non-existent. Such an empirical setting would provide many options for focusing on the social process perspective, as prior studies have suggested that spin-offs are quite volatile during their early stages (Rasmussen, 2011; Vanaelst et al., 2006). This kind of research would benefit from more varied data, which could include other materials from spin-offs or more participatory approaches.

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ARTICLES

ARTICLE I

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ARTICLE I

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Where Does It Lead To? Nowhere!

Problematic Sensemaking Concerning Commercialization

Abstract

This study utilized Weick's sensemaking framework to understand academic entrepreneurship as a social process. This paper presents an analysis of the sensemaking process of a group of scientists, assisted by a university business advisor, who aimed to establish a university spin-off company. The case study shows how the scientists failed to construct a new sense of commercialization in their business development project. Analysing personal interviews with the scientists, this study investigated problematic sensemaking concerning commercialization activities and academic entrepreneurship. In addition to showing how problems in sensemaking produced hesitation rather than action in business development, the findings emphasize the centrality of identities, enactments, salient cues and social contexts in organizing commercialization activities at universities.

Keywords: academic entrepreneurship, commercialization, business development, university spin-off, sensemaking

Where Does It Lead To? Nowhere!

To emphasize their impact on society, many universities have adopted an increasing number of policies and practices with an entrepreneurial focus (Jarvis, 2013). This transition (Etzkowitz, 2014; Foss & Gibson, 2015) affects most universities and universities have started to encourage their faculty and students to become commercially oriented. As such, many researchers consider academic entrepreneurship a subject of practical interest and an important area of scholarly research (Link, Siegel, & Wright, 2015; Siegel & Wright, 2015).

In previous research, academic entrepreneurship referred to the commercialization of research results, new technologies and related competencies through patenting, licensing, university spin-offs, contract research and other university-industry partnerships to generate revenue for the university (Wright, 2014; Bozeman, Fay, & Slade, 2013). Some researchers claimed that universities are ill-suited to develop new business ventures due to potential conflicts of interest with their traditional roles in research and teaching. Some suggested university-based spin-offs require development paths that are, by definition, not supported by academic practices (Rasmussen, Mosey, & Wright, 2011). Thus, academic entrepreneurs often struggle to overcome the tension between their academic and commercial motivations and outputs (Jain, George, & Maltarich 2009).

This study draws from the conceptual ideas of sensemaking (Weick, 1995, 2001) to focus on how scientists develop a sense of commercialization in their business-related projects. This study is based on a definition of academic entrepreneurship as the social and transformational process involving the systems, practices and people who undertake commercial activities at universities. The sensemaking framework was used to analyse how university commercialization systems provide (or do not provide) resources for sensemaking. In the case presented in this paper, the scientists lacked key resources for sensemaking and

lost their grasp on what was going on. Consequently, they were unable to act or move the commercialization process forward.

This paper begins with the conceptual background of commercialization, academic entrepreneurship and sensemaking are provided in the next section. In the third section, the data and methods of analysis are presented, and a detailed analysis of one new venture creation case and the relayed sensemaking process by the scientists are provided in the fourth section. Next, the findings are discussed, and concluding thoughts are given in the sixth section.

Conceptual Background

Commercialization and Academic Entrepreneurship

New venture creation, assisted by technology transfer offices, is at the core of commercialization and academic entrepreneurship activities at universities (Grimaldi, Kenney, Siegel, & Wright, 2011). Technology transfer from a university to an industry has a historical precedent not only in the natural sciences, but also in applied sciences like engineering, information and communications technology (ICT) and medicine (Kalar & Antoncic, 2015). Mirroring successful North American examples, governments and universities around the globe put high hopes in the potential societal impact of university-industry co-operation and as an important source of extra revenue for universities (Powers & McDougall, 2005).

Some researchers have analysed how universities (Owen-Smith & Powell, 2001) and technology transfer infrastructures (Lockett & Wright, 2005) influence the rate of commercialization and academic entrepreneurship at different universities. The quality of research at a scientist's home university increased commercialization efforts by the scientist (O'Shea, Allen, Chevalier, & Roche, 2005; Owen-Smith & Powell, 2001). Furthermore, the use of formal technology transfer mechanisms increased the likelihood of faculty

commercialization activities (Markman, Gianiodis, Phan, & Balkin, 2005). Finally, academic entrepreneurship was enhanced by the presence of entrepreneurial colleagues of the same rank and department (Bercovitz & Feldman, 2008; Stuart & Ding, 2006).

Prior research also provided knowledge of what kinds of scientists pursue academic entrepreneurship, as well as their motivations. Scientists active in technology transfers, commercialization and firm-founding have diverse goals and motivations, including careers in business and increased personal income (Jain et al., 2009; D'este & Perkmann, 2011; Ding & Choi, 2011; Krabel & Mueller, 2009; Montonen, 2014). Furthermore, they seemed interested in building their reputation in science and generating extra funds resources for their research groups (Lam, 2011).

What lacked in the literature was the perspective of scientists participating in various commercialization activities (Abreu & Grinevich, 2013) and a longitudinal approach to spin-off developments (Rasmussen, 2011). Previous research investigated individual scientists' paths to academic entrepreneurship over time (Lam, 2007), particularly from the identity perspective (Pilegaard, Moroz, & Neergaard, 2010; Montonen, 2014). This article joins other researchers who suggest scientists should be followed longitudinally to understand how commercialization and academic entrepreneurship are initiated, sustained and transformed. Furthermore, the sensemaking framework enabled the study of commercialization and academic entrepreneurship as social processes from the perspective of the actors involved (Montonen, Eriksson, & Lehikoinen 2016; Palo-oja, 2018).

Sensemaking: Successful and Problematic

The concept of sensemaking began in the 1970s, but interest in sensemaking research has steadily grown in the last couple decades (Maitlis & Christianson, 2014). Sensemaking, understood as a social psychological process, focuses on how meanings are attached to events, activities and circumstances, including interactions between people (Weick, 1995;

Weick, Sutcliffe, & Obstfeld, 2005). To make sense means to understand what is happening and what can be reasonably expected to come next.

According to Weick (2001), sensemaking is an ‘ongoing retrospective development of plausible images that rationalize what people are doing’ (p. 460). This process is better characterized by ‘accomplishing reality’ rather than ‘discovering it’. Sensemaking researchers emphasize the active nature of sensemaking in producing the realities people face. While sensemaking is not a rational process, it nevertheless has the capacity to rationalize past events for sensemakers (Weick et al., 2005). Sensemaking is ongoing, and intensifies when individuals and organizations enter situations that differ from their expectations. In such situations, sensemaking is an effort to confer a meaning to an unfamiliar, unexpected, unclear or otherwise routine-breaking situation.

In sensemaking processes, sensemakers use seven interrelated properties as key resources for sensemaking (Weick, 2001). First, the social context consists of the presence of others in the process, whether actual or imagined. Second, sensemaking is grounded in identity construction, which means that making sense of a situation is inherently connected to making sense of one’s own identity. Third, sensemaking is retrospective in that prior experiences are used to make sense of current situations. Fourth, extracted cues trigger intensified sensemaking that require interpretation. Fifth, sensemaking is an ongoing process of attempting to understand the flow of events. Sixth, it does not necessarily aim for accuracy, but rather plausibility. While the factors that make up a meaning need to be accepted, they do not necessarily need to be accurate. Seventh, enactment refers to meaning-making and the development of understanding through action. In different sensemaking situations, some of the seven properties may serve as more important resources than others (Maitlis & Christianson, 2014).

Weick (2001) elaborated on the differences between problematic and successful sensemaking in which the surrounding system and its organizational design (e.g. university and its technology transfer offices) either weaken or strengthen sensemaking resources. Weick suggested that weak sensemaking systems lead to problems, crises and even tragedies. Strong sensemaking systems, however, lead to successful new and shared understandings, overcoming even overwhelming odds. When sensemaking occurs in an organizational framework (Weick, 1995), sensemaking problems indicate organizational problems and successful sensemaking indicates organizational success.

Purposeful organizing for sensemaking makes a difference since there are more organizational features and conditions that facilitate sensemaking than those that thwart it. Weick (2001) suggested that when actors have a choice of different organizational designs and forms, they should favor those that make space for extensive conversations, clear identities, use of elapsed action as a guide, visible cues, attention to interruptions in the process and wide dissemination of stories.

Sensemaking is both an individual and collective social process. Individuals and collectives do not develop a new sense of what is happening by merely thinking of it—they only create meaning through active engagement (Weick, 2001). The social constructionist approach contends that sensemaking occurs in discourses where participants construct meaning socially. Accordingly, sensemaking can be studied by analyzing discourse in organizations, such as universities (Maitlis & Christianson, 2014).

Methods and Analysis

This study followed the intensive case study strategy in which the commercialization process was the case (Eriksson & Kovalainen, 2010). This study applied a qualitative research methodology, which was necessary to study emerging phenomena and longitudinal meaning-making processes (Eriksson & Kovalainen, 2016). The analysis of the case was

conducted through a total of eight meetings between the scientists and their business advisor and four personal interviews of the same scientists.

The interactive meetings and conversational interviews were recorded in audio format and transcribed verbatim. Through listening to these files and reading the transcriptions, sensemaking was first explored by analysing key sensemaking moments, developments of shared understandings as well as confusion or lack of sensemaking.

Thereafter, the seven properties of sensemaking (Weick, 1995, 2001) were used to guide a more in-depth analysis. The main purpose of this phase was to analyse specific themes in sensemaking (e.g., research, commercialization, university, ownership, decision making). Key excerpts from the data were collected into a table, which was analysed again and combined into a narrative of the scientists' sensemaking processes and problems. The purpose of the narrative was to elaborate on how sensemaking unfolded through the narrative flow, as told by the scientists. The sensemaking narrative was illustrated using quotes from scientists' personal interviews.

The Commercialization Case

'When we start from basic research and then it leads to something, it becomes applied research and then it becomes commercial. We have a very clear value chain...'. (Professor)

The professor considered commercialization as a logical part of the research conducted by the research group. The group completed several projects in which they tried to apply their research results and new technologies for commercial use. However, commercialization in patenting, licencing or spin-off companies were unsuccessful. The scientists expected the university would do more to help scientists' commercialization efforts.

'We went to many places to reach for help asking if someone could explain the process and tell us what is needed. For some reason no such help was available'. (Scientist 1)

In the context of this quote, the scientists developed a promising technology that could improve the production of a specific raw material. Working in a commercialization-prone academic atmosphere, combined with changes in research funding that emphasized the societal impact of academic research, some scientists started to think about establishing a university spin-off company to commercialize that technology. With this idea, they met the new business advisor (BA) hired by the university.

We definitely accept all the help because it is our deficit... that we do not have the competence... it has been extremely beneficial with this person [the BA], the university did not have such a person before. It is really needed. (Professor)

The task of the new BA was to offer advice to faculty who wanted to commercialize their research results, especially concerning university spin-off companies that would appeal to external investors. The scientists felt that the BA's competence and help was not only welcomed but urgently needed, as they considered themselves unfamiliar with the practical requirements of developing research-based businesses.

'It was the first time when the BA came that we got really something concrete in practice, that somebody really helps... that somebody would finally tell us, how we should carry out these things'. (Scientist 1)

'I would like for things to be constantly moving forward. If there are questions that need to be answered, then we will find the solutions'. (Scientist 2)

The BA worked intensively with three members of the research group (professor, Scientist 1 and Scientist 2) who made up the core business team. These team members wanted to be involved with creating their prospective company, working in either full-time or part-time roles. Compared to their prior experiences, the core team felt that with the help of their experienced entrepreneur BA, the commercialization process would have more chances of success.

‘The BA said that he has gone through this process, he knows. This way, this way and this way you can do it, and then it became clear that this is how it happens’. (Scientist 1)

The BA guided the core team monthly, advising them on building the business case, choosing an operations team, deciding on ownership and outlining their business model. The BA also emphasized that the core team should contact potential customers early in the process to gain contacts and feedback from the industry. In addition to building the business case, the BA and scientists agreed on immaterial rights protection by patenting different elements of their new technology.

With the help of the BA, some key initiatives moved forward, but not as quickly or efficiently as the scientists had hoped. Although they made good progress in the beginning of the commercialization process, their efforts soon decelerated.

‘It has been smooth, but of course it could move forward even faster, we are always so busy... it is difficult when things move so slowly forward. Also concerning technology... it takes time and you need to be patient’. (Professor)

‘I wish it had been a more rapid [process]’. (Scientist 1)

The core team felt they had severe difficulties making the final decisions for establishing the spin-off company. They completed the ownership negotiations among themselves, but the final decision to sign the memorandum of association, as recommended by the BA, was not made.

‘To get to this stage, we’ve done all of the negotiations and such, but now we have stopped moving. We’re stuck here...’. (Scientist 2)

The more detailed plan for business development was not completed, as there was no final agreement on the target market and the final product they would offer to customers. Although the core team knew that they should act, final decisions were not made.

‘Well, we would need to draw up a memorandum of association. We need to actually establish this firm. And then I don’t know if the people are still... I don’t know what we are waiting for’. (Scientist 2)

The scientists reasoned that their difficulties might be caused by a lack of funding. However, when they received their funding, it was difficult to determine how to use the money, and they decided to focus on researching the technology rather than continue developing the business.

Findings: Problems in Sensemaking

The findings from the case analysis show that the scientists’ sensemaking was more problematic than successful in three areas of organizing: the university commercialization system, commercialization funding and social dynamics within the research group.

The University Commercialization System

‘So many times I have been sitting at the [commercialization] offices jabbering this jargon. Almost endlessly, many times, and the result has been a merry-go-round with patent applications and patents. Where does it lead to, nowhere!’ (Scientist 1)

Retrospectively, the scientists felt they had done their part to understand the logic behind the business development process with little support from the university commercialization system. According to the scientists, university commercialization experts were good at talking, but not moving things forward.

The support organization [for commercialization] is rather modest. There are no clear instructions for the researchers... When somebody makes an invention disclosure and then asks, for instance, ‘how should I proceed with this?... In what ways does the university support this [commercialization] and what do I need to do myself?’ Clear instructions about that. (Professor)

In addition to the lack of clear instructions and an understandable process to follow, there was confusion about how a new business venture could be spun out of the university and the role of the university in that venture. The core team felt that they expressed their frustration about the lack of clarity on several occasions, since it impeded their work on commercializing the research.

Well, one concrete issue, when the spin-off wants to become independent from the university, how does the university support this, or does it want to support this, and how that would be done? Make clear what is in the interests of the university and what is the interests of the spin-off. Does the university just support spin-offs or does it want to have a stake in it? (Professor)

The scientists saw small steps to reorganize the university commercialization system, such as hiring the BA, as clear improvements. However, while the BA provided practical advice to the scientists, the BA's contribution didn't have notable influence on changing the university commercialization system itself.

Commercialization Funding

The lack of clarity was not limited to the university, but also applied to the funding bodies. The scientists observed that the instructions and rules given to them by the funders and university commercialization experts were often unclear. Also, the instructions and rules seemed to change from project to project, even concerning different versions of the same funding application.

They throw these [criteria] back and forth, they do not seem to be able to decide about these. Earlier they said that 'too much research' [in our funding proposal]. Now they are saying that 'too little research'. It is so you can never make a proposal that would be... [satisfactory], because they keep changing the criteria all the time. (Scientist 2)

The scientists also faced problems with the changing research environment and the cues they extracted from it. The university commercialization system was closely linked to the research system, which relies on external project-based funding. The scientists needed to raise external funds, not only for their research, but for their commercialization activities. Without specific external funding for commercialization activities, the scientists felt there was little they could do to develop their business. However, when the scientists finally received commercialization funding, they were unsure how to use that funding.

According to the funding instructions, you cannot perform [an] action that would benefit something, or directly some business, but then you need to perform something in a general way that benefits the whole, so there is some conflict there... you have an experience that you are operating in a grey area, you are not quite sure what is allowed and what is not. (Scientist 1)

The scientists had trouble understanding why commercialization funding should not be used to fund any business operations of their prospective spin-off, but rather for preparatory activities that would lead to a new business venture after the commercialization project ended. This lack of clarity impeded the team's ability to craft a plausible account of their situation and possibilities.

It somehow fizzled out when we went there [to the funding organization] and then they said that 'no, no, we cannot give this kind of support directly to companies'. And then they said that 'well, you should somehow, through the university, to beat around the bush' and... Well, I do not know if it influences doing, but it is a mental thing that you are still doing that [new venture creation] here [at the university]... (Scientist 1)

Social Dynamics within the Research Group

‘It [commercialization] always raises tensions in everybody, also with scientists, also in my own group some or part of the scientists have a negative attitude towards this [commercialization]’. (Professor)

The BA had little influence over integrating attitudes and opinions towards commercialization within the research group or establishing shared values concerning commercialization activities. The on-going sensemaking process produced tensions within the research group, especially between pro and anti-commercialization activists. In addition, another division of scientists unintentionally emerged in the commercialization process: the core team who met with the BA on a regular basis and the other prospective spin-off owners who did not meet with the BA.

The core team had the task of discussing and negotiating all issues with the other scientists, including all prospective spin-off owners. This was not always easy because not everyone had the same knowledge, interest or experience concerning the commercialization process. While the core team was anxious to accelerate the spin-off development process, they also sensed hesitation, rather than action, from their peers.

‘I feel that this is floating. Yes of course you need to ponder and think, but I feel that nothing concrete ever happens. And we do not even tell anybody that we have not really made any decisions’. (Scientist 2)

Decision-making was difficult because everybody mentioned in the invention disclosure needed to have a chance to be involved in the spin-off, even if they lacked interest in commercialization activities. Operating within the university commercialization system, and having little first-hand experience of business operations, the core team was unable to take cues from the business world’s decision-making practices.

In a way, I have to listen to those people who have some connection with this, how would I say it, their opinion. So that I cannot decide anything before that, I cannot... I

could say that let's do it in this way, but when the other [team member] has a different opinion, the other just has that different opinion. Then the other can do whatever it wants. (Scientist 1)

The scientists in the core team hoped that signing off on the memorandum of association among all future spin-off owners would bring some clarity to the situation, especially concerning decision-making. The memorandum of association would assign leadership positions to those responsible for managing the business venture, rather than the positions established by the hierarchy in the research group.

I think that this will be cleared out when we make the agreement, for instance... So maybe in that phase when that is done, now we do not have it yet. At that point, I would get the freedom to operate, so that "here is this deal and this is that" and who are the people in charge? Us. Then we would proceed according to our decisions. (Scientist 1)

However, without the memorandum of association for the university spin-off company, there was no clear mandate for the core team to act in their new business roles. There was no freedom to operate and make decisions regarding the business issues at hand. Furthermore, facing criticism from their peers, the pro-commercialization activists lost their social anchors within their research group and found it difficult to communicate and justify their interests to the non-activists, as one of the scientists explained:

It is a little bit, at least I have experienced, at least on the level of our group, that people have slightly negative attitudes [towards commercialization]... I do not know if it comes from the idea that business should not be mixed with the university side or is a matter of envy that 'soon it will be driving a BMW' or something... that somehow, we would wrongly benefit of something, I do not know how... it is unbelievable... (Scientist 1)

These tensions within the research group added to the difficulty of developing a new sense of commercialization in the core team. The core team was not comfortable with discussing the commercialization activities openly within the research group, and thus were wary of developing an academic entrepreneurial identity.

Discussion

The commercialization process presented in this article is an example of problematic sensemaking (Weick, 2001), since the organizing systems did not provide adequate resources for individual and collective sensemaking. These resources manifested themselves in the seven properties of sensemaking, although varied in relevance. The findings of this study point out the centrality of identities, enactment, salient cues and social contexts.

The relevance of identity construction in sensemaking has been discussed by several researchers (Helms Mills, 2003; Bird, 2007; Maitlis, 2009). At universities, research is an important element in scientists' identity constructions. University organizations provide ample resources for collective sensemaking concerning research: research education and training, clear rules, instructions and policies of how to carry out research, how to raise funding and how to publish. These resources provide grounds for building collective identities for university researchers who have a well-rounded understanding about who they are and what they are doing. Compared to research, commercialization and academic entrepreneurial sensemaking is more difficult to accomplish.

The findings of the case study illustrate how the university commercialization system did not support the construction of new identities, with a focus on strong agency in commercialization. For the scientists in this study, an academic entrepreneur identity, in terms of the roles and responsibilities that were both offered and expected of them, remained mostly unclear. Resorting to retrospective sensemaking was not useful either because they had no prior experience regarding smooth commercialization processes. Rather, their prior

experiences centred on a lack of clear instructions and policies combined with unclear demands and requirements from the university commercialization system and funding bodies alike. Facing these problems, the scientists were left confused and resorted to 'scientist' rather than 'academic entrepreneur' identities.

In sensemaking, 'Action is a means to gain some sense of what one is up against' (Weick, 2001, p. 462–3). In other words, without enactment, a new understanding of what is going on cannot be constructed. As indicated in the description of the commercialization process, the problems in sensemaking experienced by the scientists discouraged action even when follow-on steps were agreed upon with their BA. During the process, some confusion emerged concerning why nothing was happening and why the scientists could not make key decisions.

The findings of the case study illustrate how the university commercialization and funding systems did not enable scientists to direct their actions towards relevant business activities. Instead, the funding arrangements tightly tied them to the university research system. Not being able to start concrete business operations with available funding, a new process for commercialization was needed to overcome past negative experiences. Thus, the university commercialization system, even with specific commercialization funding, created a situation where scientists could not move forward to establish their spin-off company.

Weick (1995, 2001) suggested that the main task of organizing is to advance sensemaking. This means that the way something is organized influences how people can make sense of what they face. Furthermore, sensemaking sets the framework for decision-making. When sensemaking succeeds, individuals and collectives extract a limited set of cues from their environment and elaborate those into plausible, pragmatic and locally useful guides for action. When sensemaking is problematic, individuals and collectives have

difficulty grasping what happens around them and why, and what they should do to improve their understanding or prospects.

In addition to the difficulties in identity construction and enactment of commercialization, the case study showed multiple sensemaking weak points occurred in several areas of organizing for commercialization and academic entrepreneurship. The scientists felt that the university commercialization system did not encourage autonomous action. With the words of Weick (2001), the system did not allow them to follow their enthusiasms, permit exploration with resources they already possessed or allow them to find spaces for permissible manoeuvres. Furthermore, the social context at the university lacked salient, systemwide cues that encouraged action within the core team, which might have led to successful commercialization. In fact, the scientists found most cues from the university and funding bodies contradictory and uncondusive for taking action steps towards commercialization.

The cues provided by the BA were exceptional in their clarity, but were not enough to create 'a plausible, pragmatic, momentarily useful guide for action' (Weick, 2001, p. 460) for the scientists to follow and reformulate during the commercialization process. While the BA was helpful in building the business case and providing advice on the ownership arrangements, the BA did not have much influence on how the university commercialization system, funding arrangements or the research group dynamics operated in this case.

Finally, the social context did not encourage open conversation (Weick, 2001) regarding academic entrepreneurship within the university organization or among the members of the research group. Since the scientists experienced more negative than positive attitudes towards academic entrepreneurship from university commercialization experts, funding bodies and even their peers', the scientists ultimately focused their actions on

research instead of commercialization. This reinforced their identities as scientists rather than academic entrepreneurs.

This article makes an important contribution to the literature on academic entrepreneurship, in that it focused on the micro-level processes of commercialization activities and university spin-off development (Lam, 2011; Montonen, 2014; Pilegaard et al., 2010). The main aim of the study was to observe the sensemaking processes of scientists who aspired to become academic entrepreneurs. The findings elaborated on the difficulties experienced by the scientists when trying to establish a new spin-off company. In addition to showing the problems in identity construction and the lack of action in the case, the study also highlighted the problems of sensemaking relating to the social context of commercialization.

Conclusion

This paper has highlighted the usefulness of Weick's (1995, 2001) sensemaking framework for studying academic entrepreneurship as a longitudinal social process from the scientists' perspective. In academic entrepreneurship, represented through the commercialization case in this article, sensemaking is a complex process where success is not guaranteed. The novelty of academic entrepreneurship in many universities compared to research and teaching means that there can be lack of knowledge and experience concerning how commercialization activities should be organized. The case study illustrated how systemwide difficulties in organizing commercialization efforts were related to problems in sensemaking at both the individual and team level. Based on these findings, it would help universities to increase awareness of how to improve successful sensemaking for academic entrepreneurship, and the consequences of problematic sensemaking.

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ARTICLE II

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The Conflictual Sense of Commercialization and Academic Entrepreneurship

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Abstract

This article draws attention to how scientists make sense of commercialization activities at the university. Using the critical sensemaking lens (CSM), it illustrates how the juxtaposition of the dominant discourse of academic research and the emerging discourse of commercialization in academic work (re)produces a tensioned and conflictual sense of commercialization and academic entrepreneurship (AE). The article is based on empirical data gathered from a 2-year study of scientists working on a project that included both research and commercialization activities. The contribution of this article is twofold; it argues that commercialization is not only about organizing and funding, but also about power dynamics; and it demonstrates how hybrid projects that aim to integrate research with commercialization activities offer rich data for the researchers of AE.

Keywords: academic entrepreneurship, commercialization, scientists, critical sensemaking, formative context, rules, discourse, power

Introduction

This article draws attention to the changing roles of scientists in universities and societies (Brundenius & Göransson, 2011; Tuunainen & Kantasalmi, 2017). While research and teaching have remained the primary tasks of academic institutions, more active participation in the surrounding society is expected from universities and their faculty. Governments, administrators, decision-makers, and university top management have started to emphasize entrepreneurialism, university-industry relationships, and related commercialization activities in their policy guidelines and strategies (Etzkowitz et al., 2000; Radder, 2010).

In Finland, the 21st century has witnessed a new push for university-industry co-operation (Tuunainen & Knuutila, 2009). The Finnish government has identified commercialization of research as one of the key long-term projects of the nation (Finnish Government, 2011, 2015). Accordingly, new types of funding mechanisms (externally funded projects combining research and commercialization) have been developed to support the transfer of research knowledge from universities to industries (Woiceshyn & Eriksson, 2014). These changes, among others, have increased the prominence of AE in Finnish universities, i.e. they have encouraged more faculty to participate in the commercialization of their research (Haila et al., 2014; Ilmavirta et al., 2013).

Prior research offers various definitions for AE and commercialization. These vary from establishing university spin-off companies and consulting offered to industry to the transfer of technology from universities to society through patents and licensing of intellectual property (Haeussler & Colyvas, 2011; Powers & McDougall, 2005; Shane 2004). This article contributes to this literature by illustrating how a tensioned and conflictual sense of commercialization was constructed by scientists working in a new type of project, the purpose of which was to combine academic research and commercialization activities at the university.

The article proceeds to offer a theoretical framing of prior research on AE and the use of the

“critical sensemaking lens (CSM)” to study AE at the micro level, i.e. focusing on scientists’ sensemaking. Following this, the methods and the data are presented. These data show how the juxtaposition of the dominant discourse of academic research and the emerging discourse of commercialization influenced scientists’ sensemaking and their search for plausible cues. The article concludes by arguing that the exploration of the sense of AE and commercialization in different contexts provides researchers with new avenues to understand the current development of academic work.

Theoretical Framework

Three levels of AE have been recognized in prior studies (Djokovic & Souitaris, 2008). The macro level research focuses on the macroeconomic environment of national policies and support systems, and the meso level research addresses support for AE offered by universities and business advisory services. Micro-level studies, emphasizing the social and individual aspects are fewer compared to the macro- and meso-level studies on academic entrepreneurship (Abreu & Grinevich, 2013; Montonen, 2014). This article contributes to the micro-level research, in particular, also exploring the influence of the other levels on that.

Much of the micro-level research has explored why scientists become academic entrepreneurs (Jain et al., 2009; D’este & Perkmann, 2011; Ding & Choi, 2011; Krabel & Mueller, 2009; Lam, 2011). Among the motivations and goals are personal gain through wealth and career opportunities and scientists seem to embark to AE to generate funding for their capital-intensive research. Other motivational factors include tenure, gender and group identity. More experienced and male, as well as scientists who work in entrepreneurship-oriented environments have been found to be most active in AE (Haeussler & Colyvas, 2011; Goethner et al., 2011; Bercovitz & Feldman, 2008; Stuart & Ding, 2006).

Prior studies have also addressed the lived experience of existing and aspiring academic

entrepreneurs. Recent studies show how university spin-off managers with a scientist background engage in long-term identity work, and the challenges of commercialization activities at the university ((Montonen, 2014; Montonen, et al., 2016; Palo-oja & Kivijärvi, 2015; Palo-oja, et al., 2017; Palo-oja, 2018; Tuunainen, 2004). This article joins this body of research by exploring how scientists make sense of commercialization in a new type of hybrid project that aims to integrate it with research activities.

This article brings scientists' commercialization activities into the spotlight by using the CSM lens, which draws attention to how formative contexts, rules, discourses, and power influence individuals' sensemaking (Helms Mills, 2003; Mills, 2008; Helms Mills, et al., 2010). Individual sensemaking is described by Weick (2001) through seven interrelated social-psychological properties. According to these properties, sensemaking is *retrospective, social, ongoing, enactive* of the environment and focused on *identity, extracted cues* and *plausibility*. Accordingly, sensemaking is triggered by extracted cues from the environment but it is an ongoing process because understanding builds gradually. Sensemaking is grounded in identity construction, i.e. making sense of one's identity, and it is a social process influenced by others, whether the influence is actual or imagined. Sensemaking is enacted, which means that the understanding develops through action, and the generated sense needs to be plausible rather than accurate. Finally, as sense is made by reflection on prior experiences, sensemaking is retrospective.

Hilde's (2013, 2017) CSM analysis, which focuses on tensions and conflicts in sensemaking provides the more detailed background for this study. Hilde outlines formative contexts as structures of social arrangements that manifest themselves as institutional and social practices. Formative contexts shape tensions and conflicts and are hard to challenge and change. The concept of formative contexts was originally proposed by Unger (1987), who described them as institutional and imaginative contexts, which influence social routines. Institutional formative contexts consist of the institutions and practices which structure power and the allocation of capital. Imaginative

formative contexts are the preconceptions about desirable forms of relations between people. Drawing from this understanding, the formative context of this study is the social arrangement according to which Finnish universities are public organizations funded by the government for the purpose of providing common good for the Finnish society. Historically, commercialization activities have not been part of the institutional and social practices at Finnish universities, but this situation has changed considerably since early 2000 (Tuunainen, 2004).

According to Hilde (2017) rules are systems of control, which define the ways in which individuals organize. Together with the formative context, rules guide and limit sensemaking. Rules need to be enacted and interpreted by the actors of the organization, which means that the actors can either ignore, comply with, challenge or reject rules. Formative contexts and rules are both producers and outcomes of discourse, and together these make up the “rules of the game.” The game also includes tensions and conflicts, which are part of the power dynamic of an organization. The analysis presented in this paper presents a case of how the “rules of the game” guide scientists’ sensemaking in one Finnish university.

Methodology

This study is part of a longitudinal research concerning AE as a social process in the context of Finnish universities. As part of the wider study, several teams of scientists that aim to commercialize their research and are considering the possibility to become academic entrepreneurs have been followed for 2 years with repeated interviews carried out with them.

The study presented in this article explores the sensemaking of three Finnish scientists who formed the core team in an externally funded project, the aim of which was to integrate commercialization activities with research. Of the three scientists, the Professor was the head of the wider research group in which the team members worked at. Scientist 1 was the lead scientist for

the new project and responsible for the development of the technology, which was the focus of commercialization. Scientist 2 had recently finished a doctoral dissertation and considered a career outside the university as an academic entrepreneur in a spin-off company that the scientists planned to establish after the project had ended.

The analysis is based on two rounds of interviews with the three scientists (transcribed verbatim, approximately 10 hours of interview talk) and background data (including project documents, power points, emails, and audio recordings of meetings) from this hybrid project. The first round interviews and background data was used to help the authors to interpret the meanings in the second round interview data, which was analyzed in detail for this article. The data were analyzed using qualitative content analysis and CSM analysis (Eriksson & Kovalainen, 2016; Helms Mills et al., 2010; Hilde 2013, 2017; Thurlow, 2007).

The transcripts of the data were analyzed regarding the different meanings attached to commercialization by each of the three scientists. This phase of the analysis indicated that, as used by the scientists, commercialization discourse tended to be juxtaposed with the academic research discourse constructing various types of tensions and conflicts between them. The organized data was then used to craft an analysis of how the tensions and conflicts between commercialization and academic research were made sense of.

Findings: Tensions Between Academic Research and Commercialization

In this section, we present the findings based on data gathered from the interviews and meetings between the core group of scientists.

Scientist Identity and Being Different

The Professor, a senior researcher with a positive attitude and some experience of AE,

points out that those members of the research group who have “a scientist personality” referring to a stable researcher identity, tend to dis-identify with commercialization activities. For them, commercialization is more of an anti-identity, which reflects the self that you do not want to be (Alvesson, et al., 2008).

Professor: Some of the scientists in our research group are critical of commercialization... I feel that it comes from the fact that these people are scientists. They identify as scientists, and it comes from their personality.

In addition to being a question of identity, the Professor suggests that commercialization represents values, such as the dominance of money that people with a strong scientist identity might not consider ethical.

Professor: There might be ethical questions as well that not everything is measured in money and such. Scientists might have these kinds of values.

Identity struggles easily occur if commercialization activities are forced on scientists who have a stable sense of scientist subjectivity; in other words, who know who they are. Scientist 1 in the team referred to such an identity struggle in the context of their on-going project.

Scientist 1: I would be so satisfied if someone would do all the commercialization for me, and I would just comment on if we could do this and say this and if it's okay for to do it like this. If someone would get all of this done. But then I think that it would never work like that, that I would have to do it myself.

Contrary to these experiences of dis-identification and stories of identity struggles, a minor part of scientists in the Professor's research group was actually interested to engage in commercialization activities as part of their academic work. This has made it possible to apply for the new type of funding that aims to integrate commercialization activities with research in the same project. Scientist 2, a junior scientist without a permanent position at the university, described

their identification with commercialization that started already in an earlier project:

Scientist 2: Somehow I feel my own role as such that I was there [earlier project] to learn what commercialization is. I tried to somehow create an understanding of it, which could have been utilized later on in upcoming projects. And perhaps I also felt that I was maybe the most enthusiastic of us to learn and embrace it.

Scientist 2 has noticed being different in the research group in which hardly anybody else is interested in commercialization either as part of a research project or as a career choice as an academic entrepreneur.

The Tensioned and Conflictual Field of Commercialization

Scientist 2 has noticed the general atmosphere at throughout the university that does not encourage faculty to become involved in commercialization activities connected to their research. In contrast to the enthusiasm of the junior scientist, commercialization seems to invoke many negative emotions among the more senior scientists, because commercialization activities are considered to harm science and research.

Scientist 2: It really is a rather conflictual field... the atmosphere still is that if anything inside the university connects to businesses and commercialization, it somehow stirs anxiety in the community. That it's somehow bad, that it shouldn't be here, that science suffers or is corrupted by it.

Scientist 1 reflects their experiences according to which integration of research and commercialization is very difficult. Being optimistic that it might still work, Scientist 1 notes, however, that the integration of commercialization activities with research requires extra effort from the scientists—it never happens easily or accidentally.

Scientist 1: According to my experience, it is challenging, accommodating these two worlds together. It'll probably work, but it'll need a lot of effort.

One of the difficulties is the appropriate timing and scheduling of research and commercialization activities. The Professor also identifies this recurring tension between the ideals of research, i.e. you need to have time to finish your research, that guide scientists and the idea of commercialization, i.e. you need to move forward quickly, that guide those who want to commercialize. This shows one clear difference between the two—while research opportunities are not missed when more time is used, the same does not tend to apply to commercialization.

Professor: There's always the conflict that the research wants that it is too finished and the commercializer will do it too early. So there's a boundary, which can be difficult.

Scientist 1 identifies the same tension in their on-going project in which research results were promising, but they lacked the final proof of how their technology and the final product would work. In such situation, scientists want to wait for more results from their research before moving on with commercialization, but those who want to commercialize do not want to comply with this.

Scientist 1: We had really promising results, but we didn't have final proof if it. And then they would have wanted to go forward swiftly with those lacking results.

Scientist 1 pointed out yet another issue in which the perspectives of the scientists and the commercializers are different. Before the commercialization activities begin, the scientists want to have certainty that their research is actually commercializable—that there are markets and buyers for their technology or product.

Scientist 1: We want to be really sure, that if we are going to do it [commercialize], that we have those markets ready and we have that demand and that if we have the product, that we have the people who will pay for it.

The Professor emphasizes their need to solve or learn to live with these tensions and conflicts by referring to what is required for successful commercialization and especially for AE in a university spin-off that they hoped to establish.

Professor: If we begin commercializing and found the team, we have to have a very coherent vision. If we have conflicts in the founding stage [of the business], differing views, it doesn't bode well. So we have to have a uniform understanding.

Disappointments

Projects that aim to integrate research with commercialization can be disappointing for commercialization-prone scientists, and they can end with these scientists taking distance from both the project and the university. Scientist 2 experienced a deep disappointment in the on-going project in which the commercialization activities could not be carried out in the planned way, despite the fact that part of the funding was ear marked for that purpose.

Scientist 2: [I was] very disappointed. And actually, one reason for my divergence from it was that I couldn't believe anymore that something like that could come from the university.

Scientist 2 could identify many reasons for the tensions and conflicts that increasingly characterized the project as it moved forward. One of the reasons was that, because of the university career structure, even the money that is ear marked for commercialization is often used to primarily benefit academic research. According to his experience, there are little chances that commercialization could be taken seriously and carried out effectively within the current university structure that gives rewards on the basis of research only.

Scientist 2: With the commercialization funding you couldn't do research, so to say, but I would say that it mostly serves research since the internal structure of the university

forces it. If you don't generate articles, you won't have a career. You'll be unemployed from the university in five years.

Another reason mentioned by Scientist 2 was that, even when there is common will to advance commercialization, different parties of the project (those that identify themselves as researchers and those that identify commercializers) are unable to communicate with each other effectively because they do not have a common language for doing that.

Scientist 2: We did not speak the same language. I think that all of us had a somewhat similar volition, but we didn't talk about it enough and communicate enough, so probably that was the primary clash.

Scientist 2 also notes that when research and commercialization interests and research interests get the upper hand, there is little space for commercialization prone scientists to try to influence other scientists' sensemaking.

Scientist 2: There was a clear conflict, where you could say that science won in a traditional sense. So it would have been quite difficult to push a differing view very strongly. There wasn't a spiritual degree of freedom for that.

During the on-going project, Scientist 2 found that it was impossible to perform commercialization activities they were interested in and willing to advance. In this sense, the project discouraged Scientist 2 from becoming an academic entrepreneur in a university spin-off company that they were supposed to establish. Their sensemaking outcome was that this career option was not possible to realize in the research group that was scientifically strong.

Scientist 2: Somehow it became clear that, at least in this group or this university, it isn't possible to do the things I would like to do. But the science itself, what they do over there and all that, it's the real deal.

The sensemaking of the Professor in this situation was that they might need to organize academic research and commercialization activities into separate projects to avoid this type of tensions and conflicts between them.

Professor: I don't know, somehow it might be, it could be bad that there are both research and commercialization in the same project. It might be worth considering if they should be separated.

Two Sensemaking Outcomes

The sensemaking of the three scientists in the project was influenced by the juxtaposition of two discourses—the dominant discourse of academic research and the emerging discourse of commercialization. While the sensemaking of the Professor was influenced by both discourses, their scientist identity remained stable. Thus, the Professor was not displeased when the project turned into a more traditional academic research project. Scientist 1 identified strongly as a scientist and avoided current and future roles as an academic entrepreneur. Scientist 1 reproduced the academic research discourse, for instance, when arguing that their research needs to be “ready” before it can be publicized and suggesting that marketing the product too early would entail not telling the “truth” about it.

The sensemaking of the Professor and Scientist 1 was profoundly influenced by the ideals of the academic research discourse and they reproduced these by voicing their concerns about losing face if they made false promises regarding their product's performance. They further felt that if they compromised their research, they would damage their standing in the academic community and forsake the principles with which they identified personally. They were comfortable with taking sufficient time to establish the viability of their research before commercialization activities would be carried out.

The sensemaking of Scientist 2 was influenced much more by the commercialization discourse that they reproduced by urging the team members to move on with commercialization quickly and seize market opportunities earlier rather than later. All team members had agreed that Scientist 2 was the best choice for assuming responsibility for commercialization activities associated with the project and building contacts with prospective clients and partners. In this position, Scientist 2 voiced deep disappointment over the postponement of the commercialization activities.

The sensemaking of the three scientists outlined two versions of what happened in their project. The Professor and Scientist 1 held that the commercialization activities had not failed or canceled, but were simply postponed. Scientist 1 contended that after more research had been done on the product, it could still be launched to the market successfully. Scientist 2, on the other hand, felt that the opportunity for commercialization had been missed.

Drawing on the academic research discourse, the two senior scientists privileged research over commercialization in their project the main purpose of which was to commercialize their research into an academic spin-off company. Scientist 2 initiated a discussion on this discrepancy in the teams' decisions and activities, but the Professor and Scientist 1 did not consider this as important enough to be thoroughly discussed. These two authority figures contended that the whole team had been unanimous in their decision to postpone commercialization activities and concentrate on the research.

Discussion

The sensemaking stories of the three scientists presented earlier indicate that there are tensions and conflicts between how scientists experience their academic work with a new emphasis on commercialization, and the power dynamics that exist at the university (Tuunainen, 2004, 2005a, 2005b; Palo-oja, 2018). This research has illustrated the uses of competing discourses by the

scientists, namely, the dominant discourse of academic research and the emerging discourse of commercialization, within the power dynamic at the university (Tuunainen & Knuutila, 2009; Montonen, 2014). The main purpose of the discussion that follows is to explore this power dynamic further.

For Finnish scientists, commercialization of research has become more important as the higher education and the innovation policy, and the national funding bodies have started to emphasize AE as part of academic work (Finnish Government, 2011, 2015; Niinikoski, 2011; Woicheshyn & Eriksson, 2014). Universities' support systems for entrepreneurial activities in Finnish universities vary. Some universities have adopted the advancement of entrepreneurial activities as their strategic goal while some have a less unified approach to that (Hytti, et al., 2017). Overall, Finnish universities have been found to promote AE through isolated rather than integrated activities (Viljamaa & Moisio, 2015).

The analysis has shown how the discourses of academic research and commercialization set expectations and rules that scientists enact, reproduce, and challenge. The senior scientists in this study followed the rules set by the academic research discourse, which they took as a key ingredient of their identity as scientists and identification with the university career system. The academic culture has been recognized as valuing research over commercialization, which encourages researchers with career ambitions in universities to seek opportunities in research (Sanberg et al., 2014; Goethner et al., 2011). This sentiment was apparent in the sensemaking by the two senior researchers in this study while the junior scientist subverted their sense of identity towards commercialization, and tried to negotiate a new identity and respective social practices.

The challenges that the academic profession presents to AE have been recognized in prior studies. Haeussler & Colyvas (2011) found that scientists with less experience and fewer published articles were less likely to participate in commercialization than their more experienced, tenured

counterparts. The effect was pronounced in fields where public science goals, such as the number of one's publications and citations, are important. This suggested that scientists in the earlier stages of their academic careers perceived commercialization as a professional risk and were cautious of AE as a career prospect. This was not the case in this study. The sensemaking of the junior scientist, in particular, focused on a hybrid identity, which was worked upon between the two competing discourses (Jain, et al., 2009; Montonen, 2014).

In this study, the conflicting elements of the two discourses—academic research and commercialization—were guiding the sensemaking of the two senior scientists. The dominant discourse of academic research discouraged the senior scientists from taking any career risks. The risk of losing face by going public with research results too early outweighed the potential rewards to them from commercialization and the respective benefits to society. Overall, the senior scientists were feeling shunned and criticized by scientist peers because of participating in a project that included commercialization activities. This choice of not pursuing a career option in commercialization is a rejection of structural rules, in a similar fashion as Hilde & Mills (2015) observed in their CSM study of the experience immigrants in the workplace.

While no formal rules limit scientists from participating in commercialization activities, which are in fact encouraged in Finland, the social practices of the university guided seemed to guide the senior scientists' away from commercialization activities (Finnish Government, 2011, 2015). Their sensemaking outlined a formative context in which scientists are expected to focus on academic research rather than commercialization. Commercialization was not seen as something to be avoided, but the social values restricted the senior scientists' ability to go forward with it, especially when commercialization was at odds with academic research. As Helms Mills et al. (2010) suggest the formative context restricts individual sensemaking by privileging the more traditional rather than the newer course of action. These findings resonate with Rasmussen et al. (2011), who suggested that the roles of key persons in research spin-offs need to be carefully

considered especially in the early stages of commercialization.

Given that commercialization and AE are becoming important to some academics in Finnish universities, it can be asked what their role might be in the future. This study has shown that commercialization and AE were made meaningful by a junior scientist, who was looking for a new career option outside the university after finishing a PhD. However, the power dynamics at universities entail that junior scientists are rarely in a position to lead projects into the direction that they appreciate or even sustain this direction when it has been initiated. According to this study, it seems that there is limited space for junior scientists to influence senior scientists' sensemaking.

Conclusion

This study raises further questions about academics working in different universities and in different disciplines and their senses of commercialization and AE. What meanings are attached to commercialization and AE in various contexts, and what insights might be generated from that? How would these insights impact the social practices of universities concerning commercialization and AE? As described at the beginning of this article, with increasing number of academics working in between research and commercialization, and considering a career as an academic entrepreneur, there is a need to study the diversity of ways in which current changes in the formative context of the universities influence academic work and sensemaking thereof. Thus, more studies of sensemaking regarding AE in universities with different approaches to commercialization are needed. Further studies should also shine light on the practices surrounding the formation of academic entrepreneurship projects, as the research suggest that the composition and roles of the key personnel have a major influence on their successfulness.

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ARTICLE III

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13. Becoming credible? An alternative narrative of start-ups in an accelerator program

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INTRODUCTION

In this chapter, we focus on the journey of academic entrepreneurs with their mentors in an accelerator program, the aim of which was to help university scientists to develop their recently established start-ups. Prior research has analysed the heroic constructions of start-up entrepreneurs as rebels fighting against the cultural conceptions of traditional entrepreneurship in Finnish society (Koskinen, 2020) and as confident, masculine individuals with rock-star-like personas (Katila et al., 2019). Little research, however, has been done on the sensemaking processes that construct start-up entrepreneurs as non-heroic actors, who struggle with the expectations of becoming more business savvy and investment ready in the eyes of venture capitalists and other start-up investors.

Our study contributes to this field of research by analysing the sensemaking processes that unfolded in a regional accelerator program for start-ups in the technology sector. The research question of our study is as follows: How was the lack of credibility among start-up entrepreneurs constructed in the acceleration process?

Start-up accelerators are short programs which aim to provide coaching and training for entrepreneurial teams to develop their business ideas and learn new skills to attract seed funding from investors (Ojala & Heikkilä, 2011; Hochberg, 2016). Cohen and Hochberg (2014) define the seed accelerator as ‘a fixed term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event or demo-day’ (p. 4). In our study, start-ups are both entrepreneurial teams and newly established technology firms which participate in the accelerator program to develop their business plans and obtain better chances of success in the future. Start-up dis-

course emphasises technology, fast market entry, scalability, growth, as well as the importance of entrepreneurial teams (Ries, 2011; Blank, 2013).

The acceleration program in this study (hereafter the Program) followed a standard formula of three to four months of coaching and training, culminating in a public pitching competition with prestigious prizes. The pitch is a short presentation that is often given publicly in a competitive situation. Six teams participated in the Program, and we focused on those three that represented science-based academic entrepreneurship, that is. were established and run by university scientists. Typical to accelerators, business professionals and experienced entrepreneurs were invited to serve as mentors for the start-up teams participating in the Program. Every team had their own mentor, and some were guided by two mentors.

We are interested in collaborative activities performed by scientists with strong academic knowledge and by mentors or advisors with business and entrepreneurship expertise (Montonen et al., 2019; Moilanen et al., 2021). The contrast constructed by both parties between science and business made the Program an interesting setting for critical sensemaking, as the mentors tried to encourage scientists to adopt a new frame for meaning-making of the start-up world and to set aside their existing meaning-making frame of academic research (Montonen et al., 2016; Kim, 2021). Helms Mills (2003) suggests that a powerful actor can guide others to interpret events and provide meaning in such a way that the outcome follows the wishes of the person in power. This suggestion makes the power relationship between scientists and mentors in an accelerator program an interesting focus of research.

Drawing on a mix of ontological perspectives, critical sensemaking (CSM) intertwines together context, power, discourse, and rules for the purpose of studying how actors make sense of what is happening around them (Mills & Helms Mills, 2004; Helms Mills et al., 2010; Aromaa et al., 2019; Aromaa, 2020). Using CSM as a heuristic, we analysed how formative context, discourse, power, and rules around the Program guided the relational and interactive sensemaking process of academic entrepreneurs and mentors. In our study, the Program serves as the formative context (Unger, 1987) and a social framework that allows and restricts activity and understanding (Mills & Helms Mills, 2004). In the standard accelerator format, mentors act as supervisors for start-up teams and this shapes the power relationship between these actors. Power manifests itself in discourses, some of which are more acceptable than others in a specific context (Thurlow & Helms Mills, 2009).

In our study, we use the CSM heuristic to study how scientists and mentors constructed a particular understanding of how to become a credible start-up entrepreneur in the context of an accelerator program. In our case, as in many others concerning science-based start-ups, credibility was related to the success of the entrepreneurs in raising funding from venture capital investors

(Nevalainen et al., 2020). Interacting with the mentors, who pointed out having first-hand knowledge of how everything works in the start-up world, the scientists experienced pressure to adapt to their mentors' expectations of learning to talk the language of business and to abandon more scientific discourses when presenting their business ideas.

A key issue in the Program was for start-up entrepreneurs to learn how to attract attention with their 'killer pitches' (Komulainen et al., 2020). In this sensemaking process, the pitch, which was rehearsed throughout the Program, served as a key boundary object that shaped the collaboration and sensemaking of the scientists and mentors.

RESEARCH NARRATIVES OF THE FINNISH START-UP SOCIAL WORLD

Prior research on the Finnish start-up world has elaborated its culture (Hyrkäs, 2016) and how it differs from traditional entrepreneurship (Koskinen, 2020); it has also explored social movements, such as student-led entrepreneurship societies (Parkkari, 2019), and start-up events, such as the Global Slush Conference held in Helsinki every November (Katila et al., 2019). These studies provide the meta-context for our study. The articles by Koskinen (2020) and Katila et al. (2019), which focus on the heroic aspects of start-up entrepreneurship, provide a point of contrast for the alternative narrative we present in this chapter. Our narrative outlines a less heroic construction of start-up entrepreneurs and their struggles to navigate the worlds of science and business.

Start-up Entrepreneurs as the Rebels of Finnish Start-up Culture

The study by Koskinen (2020) elaborates on how Finnish start-up guidebooks and non-fiction literature construct start-up culture in dialogue with Finnish culture. According to Koskinen, start-up culture has its origins in the tech industry boom of Silicon Valley, and while it has become a global phenomenon, it has taken on local meanings when being domesticated into different local contexts. Koskinen's article outlines how the global start-up culture is about sharing, openness, as well as inclusivity towards new entrants. However, at the same time, it also emphasises self-interest through the entrepreneurs' devotion to their work and the success of their companies. The highly competitive and uncertain nature of start-up companies leads to the acceptance of risk taking and failure.

Koskinen argues that in Finland, the domesticated start-up culture has evolved in dialogue with Finnish culture, specifically through the juxtaposition of the local culture with the start-up culture. Certain aspects of Finnish

culture, such as modesty and quietness, are seen to clash with start-up culture. Koskinen suggests that the traditional understanding of entrepreneurs in Finland is based on too modest expectations of the size of the local market. In contrast to start-up entrepreneurs who are seen as ambitious, inspired and relaxed growth-seekers, the traditional Finnish entrepreneur is constructed as hard working but disgruntled. As a result, in Finnish start-up culture, traditional entrepreneurs who are happy with what they have achieved look mockingly on the enthusiastic, risk-taking start-up entrepreneurs.

Koskinen argues that the materials he analysed present Finnish institutions as incompatible with start-up culture. Public support functions and banks are constructed as unable to respond to the needs of innovative start-up entrepreneurs, and this is why start-ups do not have proper business plans or records required by institutional funding bodies who do not know what start-up entrepreneurship is. Koskinen points out how the rigidity of the Finnish system contrasts with the fluid nature of start-ups, which must be able to pivot to another direction if the market directs them there. The educational system in Finland is further seen to prepare citizens for wage labor rather than entrepreneurship, as start-up entrepreneurship requires people who question the status quo, not those who obey what others say. Finnish universities focus on intellectual knowledge production, which suits thinkers better than start-up entrepreneurs, who are practice oriented and learn by doing.

Drawing from the start-up discourse, Koskinen argues that Finns should be more accepting of failure because it is experimentality as well as the acceptance of risk taking and failure that highlights the rebellious nature of start-up entrepreneurs, who defy the established order of things in society. In this way, start-up culture expects proactivity and risk taking from both society and individual, and the start-up entrepreneur must embody these ideals by constantly questioning the ways things are done and looking for different options.

Koskinen suggests that even with the identified shortcomings, the strengths of Finnish institutions are also a strength on which the start-up culture can capitalise. Free education offers everyone the opportunity to learn the skills required to become entrepreneurs, and social security provides a safety net, even in the case of bankruptcy, which enables entrepreneurs to take risks. While he notes that start-up culture is focused on the entrepreneurs' self-interest, the current discourse aims to define Finnish start-up entrepreneurship as a service for the common good. Successful start-up entrepreneurs feel a sense of duty to the nation, which leans on the Finnish tradition of 'talkoot', a manner of voluntary communal work, to describe the mindset of Finnish start-up entrepreneurs (Koskinen, 2020, p. 16). This communal approach had two meanings in the materials studied: the start-up entrepreneurs were constructed as helping not only one another but also society by paying taxes. Koskinen argues that

this link to patriotic sensibilities is a way of legitimising start-up culture as a nationalistic effort.

Start-up Entrepreneurs as Rock Stars, Vital Entrepreneurs, and Buddies

Katila et al.'s ethnographic study (2019) explores the start-up social world by focusing on the Slush Conference held every year in Finland. The authors examine how start-up entrepreneur identities are constructed over the intensive two-day conference. The authors consider Slush to be the primary start-up event in Finland because it draws entrepreneurs and investors from Finland and abroad and provides start-up companies visibility and the chance to network with other businesses and potential investors. They emphasise the significance of Slush by pointing out that it has grown from just over 1000 participants in 2011 to over 15,000 attendees in 2015; the number of investors participating in the event has increased from just four to 800 during the same time.

Katila et al. (2019, p. 386) outline what they describe as 'the rock festival atmosphere' of Slush, in which the 'intense rhythm of the bass and rapidly flashing lights' bombard the senses and over a hundred speakers from around the globe deliver their talks to the audience. The article illustrates how Slush creates a festival atmosphere by using loud electronic music, fog machines and laser lights, which cut through the darkness enveloping the thousands of attendants walking the pathways constructed in the huge open hall. According to the article, Slush focuses on its stars—the famous founders of start-ups, investors, and CEOs—who give talks on stages small and large, depending on their prominence. The stars of the start-up show are established personalities, which is why the festival lends an opportunity for up-and-comers to make their mark in the start-up scene. The Slush pitching contest gives 100 aspiring performers a chance to present their business ideas to the audience, the number of which rises steadily from the starting round to the finals. The finals, held on a raised stage, are meant to create a feeling of a rock concert, as multiple cameras follow the entrepreneurs and the audience takes pictures with their smartphones to post on social media. The article compares the announcement of the winner to a television music industry competition. Suspense is created by delaying the announcement, which is intensified by laser lights and shouting from the audience, who begin to see start-up entrepreneurs as rock stars.

Katila et al. (2019) describe the pitching competition as the key element of Slush. Successful pitching requires entrepreneurs to present their business ideas in a manner that showcases their global potential in solving large-scale societal problems. The most successful start-up entrepreneurs in the pitching contest are those who are truly confident in their performance; they know what is expected of them and are able to build their pitches accordingly, thereby representing the 'current entrepreneurial ideal' (Katila et al., 2019, p. 387). In

addition to presenting exact figures about the market and growth potential of their idea, the most celebrated entrepreneurs in Slush are able to argue convincingly that their team has the skills and experience to succeed as a company. In the pitching competition, the start-up that convinces the judges of the company's viability will be rewarded with considerable funding. The authors describe how this moment constructs an image of start-up entrepreneurship as reaching for the stars. The setting is said to create a depiction of start-up entrepreneurship as a fantasy attainable for everyone, even though the rock star identity seems to build upon quite traditional meanings of entrepreneurship.

According to the authors, another important part of start-up entrepreneurship is networking, which is encouraged by the organisers through the provision of several open areas and meeting spaces that are available for everyone visiting Slush. The encouragement is echoed in the materials given to the participants. The setting and the attendees of the conference should create an atmosphere of equality, fewer hierarchies. The areas are open to everyone and even the famous and powerful people at the event are dressed more casually than usual, blending into the crowd as participants among others. With the sense of community created at the event, the attendees construct an identity of buddies in the start-up ecosystem, in which all of them can feel included. The feeling of bonding continues after the event during the afterparties. The main party is designed to rip the last bits of formality from the participants, with students, executives, and politicians alike mingling without any sign of hierarchy.

METHODOLOGY

Narrative in our study is an analytic frame that orients our use of the CSM heuristic in both generating and analysing empirical data and outlining the study findings. The significance of narration in meaning-making and production of worldviews is widely recognised in the social sciences (Bruner, 1987), critical sensemaking (Thurlow & Helms Mills, 2015), and entrepreneurship research (Steyaert & Bouwen, 1997; Hytti, 2003; Hjorth, 2007). This body of literature highlights the agential or performative nature of narratives, for instance, their worldmaking power in the context of academic entrepreneurship. Accordingly, our study pays attention to the consequences of narratives that circulate within the start-up world, but it also follows the request of researchers to tell alternative stories (Hytti, 2003).

One of the four authors of this chapter collected the data for this study, monitored the design and implementation of the Program, and participated in its final evaluation. During the Program, she videotaped the training days and interviewed scientists in the three selected start-up teams and their mentors at the beginning and at the end of the Program. She was also involved in encouraging the teams when they participated in the pitching competition at the end

Table 13.1 Start-up teams and mentors in this study

Start-up team ^a	Description of the team	Mentors' names ^a	Mentors' backgrounds
Degene	A four-member research group of two PhDs, a business advisor and an IT specialist	Penrose	Professional business advisor specialised in the industry of Degene
Esencial	A four-member company of PhDs, founded less than one year prior to the Program	Pereira and Ruff	Professional business advisors in various industries
Gemstone	A five-member research group of three PhDs, a technology advisor and a business advisor	Walker	A serial entrepreneur in various industries, no previous experience in the industry of Gemstone

Note: ^a The names of the start-up teams/companies and mentors are pseudonyms.

of the Program and gathered feedback from them throughout the program. A total of 25 conversational interviews (Eriksson & Kovalainen, 2015) were conducted. The close involvement of one of the authors of this book chapter into the Program benefited the analysis by providing additional insight into the interaction between the start-up teams and the mentors.

In addition to monitoring and evaluating the Program, the data provide rich insights into how academic entrepreneurs and their mentors make sense of what happens in the Program. The science-based start-up teams and the mentors that participated in this study are briefly described in Table 13.1. One team that we studied had established a firm, and the other two teams were in the process of establishing one soon. The members of the start-up teams were highly educated, and all but one of the teams had some business expertise. One of the teams was assigned a mentor with previous entrepreneurial background, and two others had professional business advisors as their mentors. One of the mentors was an expert in the health technology industry; others had experience across different industries.

After the initial reading of the interview transcripts, we conducted qualitative content analysis with Atlas.ti software. In the first round of coding the data, we focused on broad themes around entrepreneurship and academic activities, using such codes as university, start-up, research, mentor, investor and pitching. In the second round of coding, we identified those sections of text within the broader themes that were related to academic entrepreneurship. When reading and analysing these further in dialogue between three researchers, we identified how the meanings constructed for academic entrepreneurship in our data could be crystallised around credibility as start-up entrepreneurs and the lack of this credibility. Thereafter, we analysed the sections of the data around

the notion of credibility as academic entrepreneurs with the critical sense-making framework, paying attention to discourse, power, rules, and formative context. Finally, we constructed a composite narrative (Willis, 2019), which we present in the next section to outline the findings of our study. The composite narrative is divided into two sections that focus on the rules of the start-up game and partly questioning these rules.

CO-CONSTRUCTING THE SENSE OF LACKING CREDIBILITY AS START-UP ENTREPRENEURS

Performing Like a Start-up: Enacting Two Key Rules of the Start-up World

The Program offered training sessions on how to develop a start-up firm and coaching on how to perform a successful pitch. The four months of interaction between the scientists and their mentors culminated in a pitching competition in which the start-up teams' most successful teams could secure funding from business angels who were there to see and evaluate the pitches. When coaching the scientists for the competition, the mentors encouraged and guided them to present their business idea in a short and memorable oral performance, which could capture the interest of investors in just a few minutes. Mentor Ruff explained that an excellent pitch needs to have drama in it: 'The starting point is that there's death and explosions in there [in the pitch].'

At the beginning of the Program, the mentors advocated the notion that delivering a successful pitch performance is difficult for scientists with academic backgrounds. As mentioned by mentor Walker, their main problem is that their pitches are about something else than business: 'Their presentations are very scientific, and I've had great difficulties in understanding what they are talking about.' The mentors emphasised that business ideas should be presented in a way that is understandable to an audience which is not knowledgeable of the scientific details related to the business idea.

The scientists in the Program were used to giving scientific presentations, in which their credibility was defined on the basis of the quality of their research methods and the scientific novelty of their findings. They were skilful and accustomed to speaking to other academic researchers, who could understand their more scientific language. The mentors, however, were not convinced that this kind of language would attract the audience of the pitching competition. As mentor Walker summarised: 'Ann [scientist in Gemstone's team] talks like a researcher, and there's a connection to that scientists are very wary of saying anything, when they should go there with their head up high to tell how unique an opportunity they have to join this journey.'

The mentors pushed the scientists in the Program to learn to present their business idea to non-academic audiences in a different way, emphasising the attractiveness and accessibility of the idea instead of detailing its scientific accuracy. ‘You can’t present in a way where no one understands what we’re talking about,’ as mentor Walker advised. Furthermore, it was not merely the understandability of the pitch that was expected from the scientists. Following the pitching rule of the start-up world, the mentors demanded the scientist to generalise their idea in understandable language so as to sell it to potential investors.

The mentors pointed out that these kinds of skills can be learned through business education and entrepreneurial experience but not through academic practice. Mentor Walker took Larry, a member of Gemstone’s research team who had some business education, as an example of a scientist who can perform in the expected manner: ‘Larry ... has business education, so he talks a bit from the salesman perspective; he can generalise.’ Drawing from a psychological discourse, the mentors explained that the personality of all the scientists was too cautious for attractive pitch performances, which are a must in the start-up world. The mentors argued that a start-up firm needs a salesperson who is proud to paint grand visions of the products and the future, even when these visions are not accurate from a scientific point of view. To set themselves apart from the other teams applying for funding from investors, the scientist in the Program should present a great business opportunity for the investors.

For the mentors, the scientists’ way of speaking and presenting their business ideas by drawing from more scientific discourses was a sign of lacking credibility as start-up entrepreneurs. Per the pitching rule of the start-up world, the mentors outlined their expectations concerning how proper start-up entrepreneurs should speak about their business ideas. Using scientific language in a pitch was clearly against this rule as well as against the pitching expectations of both mentors and investors. The scientists felt strong pressure from the mentors to use more business language, thereby increasing their credibility as start-up entrepreneurs who have competence to engage in dramatic pitching performances that offer great promises to the investors.

The mentors also pointed out that to gain and maintain credibility in the start-up world, the scientists need to appoint one of the team members as the CEO of their firm. Constructing the CEO as the most powerful actor in the firm, the teams took a pragmatic approach to this demand. ‘I’m the CEO because there has to be one, and if there isn’t, it’ll look bad,’ as one of the Esencial team members said. However, both mentors and scientists constructed an understanding that in the longer run, a scientist-CEO is not the most credible actor in the eyes of investors. Even if the scientist-CEO has some expertise in business, it might not be enough to ensure investors of the viability of the start-up as an investment.

For the mentors, bringing in an outsider CEO into the start-up was one of the key indicators of strong credibility in the eyes of the investors. Mentor Walker even considered this to be the most important decision in a science-based start-up: ‘The most critical thing is that they [investors] need to find someone with business acumen, who could be the seeker in the founding stage, and they would also be the CEO of the company and would be responsible for developing the business and seeing through the funding round.’ Adopting the rule of hiring an external CEO, the scientists felt insecure about pitching their ideas to the investors by themselves. As one team member of Esencial explained, ‘So there was a thought that we can then bring in a professional CEO or other kind of business knowledge once we start meeting the investors.’

Adjusting to the Rules of the Game?

For the scientists, academic expertise is one of the key indicators of credibility in science-based start-ups: ‘The starting point was that the team members could certainly do what we planned to do, so all the team members are researchers and professionals of the field.’ When starting to learn how to advance their business ideas, the scientists enacted practices they were familiar with, for example, using scientific discourses to justify the solid research background of their business ideas. The mentors did not understand how business could be developed through scientific arguments, and they provided feedback for the scientists to change their way of communicating in their pitches.

Through this social dynamic, both parties constructed the differences between the world of science and the world of start-ups (Montonen et al., 2016). This is well illustrated in how the scientists constructed the difference between academic and business funding processes. One of the Esencial team members said the following: ‘All of the possibilities, they are completely new for all of us. Every one of us researchers is pretty familiar with seeking research funding and those instruments, but it’s a completely different world when we are discussing funding a business.’

Despite having extensive experience in seeking funding for academic research, the scientists felt less capable to finance their businesses. It was difficult to see how their knowledge and skills in seeking academic research funding could be useful in the start-up world. Furthermore, searching for start-up funding based on selling points that were not ‘solid scientific facts’ could put their credibility in the academic world at risk. As one of the members of the Degene team argued: ‘I’m not too afraid of this, but somehow there is an extreme where every method is allowed and the funding is the most important thing, and it doesn’t matter where the money comes from. If I would go into this [start-up] that would be the rest of my life there. Then I would be here, and no one would ever take me seriously [in academia].’

For scientists, it is necessary to safeguard one's integrity and to conduct ethical research to remain a position of respect in academic circles. For them, the funding-related morals of the start-up world are at odds with the morals of academia, and, therefore, the scientists need to draw a line indicating how far into the start-up world they are willing to move with their business ideas.

The power relations in the Program positioned the mentors as more knowledgeable than the scientists. Emphasising their expertise in business development and start-up funding, the mentors provided practical guidance to the start-up teams in a way that the scientists considered occasionally too straightforward and even dismissive. One of the members of the Degene team explained the mentors' authoritative style as follows: 'In a way, these mentors, some of them say "look, you don't understand, it goes like this".' During the Program, the scientists partly accepted and partly resisted the investor perspective to define the requirement for new skills and actions that they would need to appear as credible start-up entrepreneurs.

Face-to-face meetings with investors was a turning point for the scientists to understand their position and options in the start-up world. In these meetings, the lack of credibility among scientists to run a business and attract investors was constructed through collective sensemaking. 'Now, we understand the investor side better. We've done a lot of work with the business model, and even though we haven't decided on anything, we at least have a better understanding of what the options are,' as one of the members of the Gemstone team concluded. A collective sense was constructed of the rules of the game: an investor perspective should guide start-ups if they wish to attract venture capital or business funding.

While mentors' and investors' advice were appreciated by the scientists, not all of them bought into them as the unquestionable truth. Some of them questioned and partly resisted the rules of the start-up world offered to them in the Program (Parkkari, 2019). The scientists' sensemaking was that since they are the ones who carry the major risk, they should make the final decisions concerning whose rules they will follow. One Degene team member put it this way: 'It's not like there was one correct way, but there are many ways to do it, and then you just have to choose one.' They might be less experienced than mentors and investors in business issues, but they are capable of making difficult decisions for themselves once they have enough knowledge of their options.

DISCUSSION AND CONCLUSION

Using the CSM heuristic (Mills & Helms Mills, 2004; Helms Mills et al., 2010; Aromaa et al., 2019), our study illustrates how start-up entrepreneurship is not only about larger than life rock stars, viable entrepreneurs, buddies and those

Table 13.2 Three narratives of the Finnish start-up world

Characteristics of the narrative	Moilanen et al. (in this volume) Start-up entrepreneurship as credibility	Katila et al. (2019) Start-up entrepreneurship as celebration of success	Koskinen (2020) Start-up entrepreneurship as rebellion
Start-up entrepreneurs as	lacking credibility	credible	established
Start-up discourse	tensioned	reinforcing	defining
Start-up entrepreneur agency	novice	empowered	transformative
Role of funding	defines activities	rewards success	breaks from tradition

who rebel against established institutions of society. It can also be about tensioned power relations, contrasting discourses and rigid rules concerning the game of the start-up world. In our narrative, university scientists try to adapt to the expectations of their mentors in an accelerator program for high growth technology and to become credible start-up entrepreneurs in the eyes of their mentors and potential investors. The sensemaking narrative in our study shows how this credibility, as well as the lack of it, was collectively constructed.

At the beginning of this chapter, we examined two start-up narratives from the Finnish start-up world and presented an alternative narrative based on our study. Our study provides novel insight into the accelerator program as the context of an early phase science-based start-up entrepreneurship, while Katila et al. (2019) focus on a broader group of start-up entrepreneurs at the Slush Conference. Koskinen (2020) discusses the Finnish start-up culture on the basis of publicly available materials on start-up entrepreneurship. We discuss these three narratives illustrating how they construct different meanings of the Finnish start-up world (Table 13.2).

In our study, scientists acting as academic entrepreneurs become constructed as novices, who lack credibility in the start-up world. They are experts of academic practices and scientific discourses, but this does not help them to increase their credibility as start-up entrepreneurs in the eyes of their mentors in the accelerator program. This construction of start-up entrepreneurs with a scientific background as lacking credibility is rather different from the articles by Katila et al. (2019), in which they are presented as rock stars, vital entrepreneurs, and buddies as well as Koskinen's (2020) article, in which they are presented as rebels against Finnish society and its economy.

In Katila et al.'s study, start-up entrepreneurs confidently present their business ideas to investors and the media. They network and easily share their ideas among other start-ups, potential customers, and established business people. The confidence of start-up entrepreneurs is a strong story line also

in Koskinen's article, in which they are young and bold; they also question established institutions and societal practices and take risks even in the face of insurmountable odds, since 'nine out of ten startups fail' (Koskinen, 2020, p. 14). They are also narrated as practice-oriented doers in contrast to academic thinkers, who should stay in the university rather than go into business. Here, the difference between the start-up world and the academic world is constructed in a similar way as in our study.

To make sense of the differences between the start-up world and the academic world, our study illustrated how scientific discourses, as well as the academic way of talking were constructed as a barrier to successful pitching. In academia, expertise is defined through competence, and the results of activities are evaluated on the basis of science-specific criteria (Palo-oja, 2018). The social rules of science do not allow making unfounded promises or generalising research results without a solid scientific basis. In the accelerator program that we studied, scientists were expected to abandon scientific discourses and learn new ways of talking business to make their ideas understandable to the investors, which was difficult.

In contrast, Katila et al. (2019) illustrate how start-up entrepreneurs competing at the Slush Conference present their business ideas concisely and offer technological solutions that are scalable to global solutions. The authors describe this performance as a 'business dance' (Katila et al., 2019, p. 388), which highlights the confident and business-savvy start-up entrepreneur. For Koskinen (2020), start-up entrepreneurs are established actors not only participating in the start-up culture but also redefining the way business is talked about in society. Start-up entrepreneurs leave behind the humbleness of ordinary Finnish entrepreneurs, who are modest and withdrawn.

Funding is another focal point in all three start-up narratives. The accelerator program in our study culminates in a pitching competition, where the aim is for the start-ups to present their ideas as a worthwhile investment in the eyes of investors (Ojala & Heikkilä, 2011). The investment focus in our study defines how the credibility of the start-up entrepreneurs was constructed. While funding is also a focus in Katila et al. (2019), the start-ups that participate at the Slush Conference know the rules of the game, how to perform their pitch and how to construct the credibility of their team. In Koskinen (2020), funding is one of the factors that distinguish start-ups from traditional entrepreneurs and the institutions of Finnish society.

Finally, the CSM perspective (Helms Mills et al., 2010; Aromaa et al., 2019) was helpful in studying scientists' start-up journey and analysing how the rules of the game in the start-up world were partly adopted and partly questioned by the scientists, especially when they were struggling to appear credible in the eyes of mentors and investors. The movements of these scientists in between academic and start-up discourses were shaped by the power dynamics with

the mentors, who tried to help them advance their business ideas. While the start-up discourse presents the start-up world as inclusive to new entrants, adapting to the rules of the game was difficult for scientists, who were unfamiliar with such a discourse.

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This dissertation explores academic entrepreneurship from a social process perspective. By examining the sensemaking of university spin-off teams, this dissertation explores how the tensioned sense of academic entrepreneurship is constructed. The results of this research present new insights into how tensions in academic entrepreneurship emerge from the differences between the academic and commercial worlds and how they are resolved in social interaction.



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