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Fish farming on the moon: Innovations countering professional and conventional ways

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Abstract. Innovations that counter professional and conventional ways meet barriers to acceptance in communities of experts. How small businesses meet and seek to overcome these barriers may determine the ultimate success of their innovations. A collective case study of 32 firms involving 40 innovation projects revealed that this initial opposition from scientific and professional groups may overwhelm entrepreneurs. Entrepreneurs lack strategies to deal with and move beyond this opposition to gain entry and acceptance in professional communities. Interpreting the findings through the lens of practice theory, we find that entrepreneurial practices pose challenges to professional practices, to professional authority, to accepted methods and to the imagination. Successful entrepreneurs demonstrate flexibility, aligning their practices to the practices of the professional groups. Mutual alignment of practices will serve both entrepreneurs and professions.

Keywords. Innovations, Practices, Entrepreneurs, Professional, Barriers

1 Introduction

For both small and large firms, failure to receive acceptance in professional communities may make commercialization of ideas difficult, or even impossible, thus thwarting innovation processes. This paper explores how innovations characterized by a high degree of novelty encountered barriers to acceptance in professional communities. The reported barriers, which we term "professional opposition", emerged through the analyses of interview data collected in a multiple case study, involving 32 small firms and 40 innovation projects. Although almost all of the projects studied achieved verified technical success, only seven of these projects had achieved business success, at the time of interview.

The paper seeks to analyze the nature of the particular barriers of "professional opposition". To understand the barriers, we allude to literature on the nature of professions, though this is not the focus of the paper. We seek both to access the nature of the barrier and to assess the importance of the barrier for the innovation process. In so doing, we respond to calls by both Doern (2009) and Parry (2010) and try to unpack a specific barrier that appears to be of significance to the firms in our study. In order to identify how entrepreneurs perceive and meet these barriers, we focus on socially embedded activities that are altered or challenged. We construct four portraits types to describe how entrepreneurs perceived the opposition to the innovation: challenging professional consensus, challenging professional authority, challenging accepted

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methods and challenging the imagination. The findings confirm the trans-disciplinary nature of innovation practices and the importance of social processes in these practices (Kerosuo, Kajamaa, & Engeström, 2010). Our theoretical contribution is the development of practice theory in understanding how practices emerge. The findings also provide practical direction for managers and entrepreneurs who may encounter professional opposition and in addition, further the understanding of the nature of the professions.

2 Theoretical background and framing

2.1 Professional ways

We adopt a broad view when referring to professions and professional ways (Mieg, de Sombre, & Näf, 2013). We see professional boundaries as fluid (Brante, 2011; Saks, 2012), and refer to emerging and open professions, such as engineering, bio-chemistry and so on, rather than the classical closed "status" professions (Brante, 2011; Saks, 2012) such as the legal or medical professions, which are governed by codes of ethics and legislation. In line with Brante (2011, p. 17), we see professions as "occupations conducting interventions derived from scientific knowledge of mechanisms, structures and contexts", but while being based on a specialized scientific education is a precondition for a profession it is not sufficient (Saks, 2012). Professions are formed by social factors (Gherardi & Landri, 2014), shaped by context and are space and time dependent. Professions undertake self-regulations regarding organization, moral imperatives, control devices, collegiality and so on (Brante, 2011). Professionals often rely on intuition and on prior experience rather than on scientific theory. Eraut (2000) confirms the significance of tacit knowledge for professional work. Such tacit knowledge, or knowing (Gherardi, 2001), may be a source of competitive advantage, sustaining effective established ways of working that are difficult to emulate. However, it may also function as a conservative rather than innovative force, maintaining old practices and rejecting new, even when these practices are contradicted by fresh or improved scientific knowledge (Gourlay, 2006). Munro (2010) investigated how belief contradicting scientific information elicited resistance processes, and was often perceived as a threat to self-image. The new information produced cognitive dissonance and informants often responded by discounting the scientific method. Reliance on a collective tacit knowledge, expressed in strongly held ideologies, traditions and routines or more simply "the way we do things" is a hallmark of professions.

Collaboration often requires the opening of professional boundaries. Pfeffer and Sutton (2006) point out that, practitioners often prefer to rely on established professional wisdom and their own experience, and embrace only evidence that fits their own strengths. Alternatively, they may look to high performers and mimic these, rather than support lone geniuses or gurus. In general, practitioners are suspicious of breakthroughs, as these are rare.

Stringfellow, Shaw, and Maclean (2014) investigate how small firms, without a record of solid past performance, seek to acquire and maintain "legitimacy" from the professional field. Legitimacy originates from social judgment and concerns the acceptance, appropriateness and desirability of an entity to the norms and values of the

social context. They found that firms adopting a habitus, which was at odds with the dominant dispositions of the field, failed in acquiring legitimacy and were subsequently, denied access to resources. Thorpe, Gold, Holt, and Clarke (2006) found that entrepreneurs need to develop "maturity" through interaction with mature-others to survive and grow. Entrepreneurs develop maturity through embedding their ideas within the wider economic and social activities of their community. These processes however, demand access to appropriate networks.

The insights discussed provide a background for understanding the complex social processes underlying the barriers, which professions raise when introduced to innovative ideas, and processes.

2.2 Innovation management and barriers to innovation

Understanding and managing innovation processes, by identifying enabling and constraining mechanisms, is essential for successful business development (K. B. Kahn, Barczak, & Moss, 2006; Kenneth B. Kahn, Barczak, Nicholas, Ledwith, & Perks, 2012). In general, innovation research sees alliances, partnerships and collaborative constellations between organizations as enabling mechanisms for innovation (Beers & Zand, 2014; Huang, Chung, & Lin, 2009; Lin & Wu, 2010; Musteen & Ahsan, 2013; Narula, 2004; Teirlinck & Spithoven, 2013; van de Vrande, de Jong, Vanhaverbeke, & de Rochemont, 2009). In product development, collaboration with external partners on innovation activities augments the performance of the firm (Beers & Zand, 2014). In our study, we look particularly at the barriers, which entrepreneurs experience when they seek partners and collaborators amongst those already established within the field. These barriers may be perceived and/or real.

Doern and Goss (2013) note that while studies listing perceived barriers abound, these studies tend to depict barriers as static objective obstacles rather than as socio-emotional processes. Social barriers may include forms of discrimination, forms of social exclusion, corrupt financial practices and conflicts in inter-personal relationships. In a study of Russian entrepreneurs, Doern and Goss (2013) analyzed the power rituals occurring when entrepreneurs meet hostile institutional environments and bureaucracies that deny them access to funding and other support. Entrepreneurs reported experiencing a context of unequal resources, where they had little scope to influence the outcome and little trust in the motives of the other party. Entrepreneurs responded with three different strategies: open resistance, reluctant acquiescence and withdrawal. In a study of small manufacturing firms, Freel (2000) found that lack of trust and an inability to identify suitable partners are principal barriers to collaboration. Considering barriers as socio-emotional processes is critical when analyzing how professionals react to innovative ideas and how innovators react to initial negative responses from professional communities.

2.3 Entrepreneurial practices

The issues of understanding how entrepreneurs innovate and how they build appropriate networks with exiting communities are addressed in different theory streams. Accessing appropriate networks and building partnerships is one of the three principles in entrepreneurial effectual theorizing (Sarasvathy, 2001, 2009). It stands

alongside finding ways to reach the market with a minimum of resources and turning the unexpected into the profitable. Effectual reasoning begins with a set of means while the goals emerge over time. This reasoning is fundamentally different from casual reasoning which begins with a pre-determined goal and given means, and seeks to identify the optimal way to realize the stated goal (Sarasvathy, 2001). Entrepreneurial effectuation theorizing thus explains how and why entrepreneurs are entrepreneurial; as opposed to managers and strategists. Entrepreneurial effectual theorizing believes in a future that is shaped by human action (Sarasvathy, 2001). Entrepreneurial effectuation thus rests on ontological individualism, which claims that social life is an aggregate of the actions of individuals. However, it cannot be claimed that all social phenomena are constructed of individuals and their relations. There is something beyond individuals that needs to be explained (Schatzki, 2005). Social ontologies, and specifically practice ontology, offers a way to grasp and understand activities that are performed by multiple people; social phenomena are rooted in practices (Schatzki, 2005). Understanding entrepreneurial practices builds on Johannisson (Johannisson, 2011, 2012; Steyaert & Landström, 2011), and connects the understanding of entrepreneurship to the practice turn in social sciences (Schatzki, Knorr Cetina, & von Savigny, 2001). This tradition depicts entrepreneurship as "the ongoing practice of creatively organizing people and resources according to opportunity" (Johannisson, 2011, p. 137).

In practice theory, as developed by Schatzki (1997, 2002, 2005, 2006, 2012, 2013; 2016a, 2016b; 2001), practices are understood as a set of organized activities, and these activities are in turn composed of different actions. Activities reflect the contexts within which these are performed. Practices are thus situated. By viewing the entrepreneurial action that forms activities, and how these activities in turn form practices, we emphasize the socially embedded and situated nature of entrepreneurship.

In this paper, we use practice theory as a lens to illuminate the nature of particular barriers experienced by entrepreneurs when promoting the initial innovative idea to potential external collaborators. De Clercq and Voronov (2009) uncover how activities of conformity reinforce existing practices and institutions, while activities of change transform existing practices (De Clercq & Voronov, 2009). De Clercq and Voronov (2009) claim that institutional reinforcement is related to professionalism, where members are sensitive to normative organizations, upholding what is prescribed, adhering to what is known as acceptable and being in line with regularities (Schatzki, 2012). We wish to go further, by questioning how professional practices appear to emerge and persist when challenged by entrepreneurial innovation.

According to practice theory (Schatzki, 2012), human activities are not predetermined, and activities are subject to new starts and changes in directions that may be surprising or unexpected. Schatzki explains how activities are laden with the past: "Past practice organizations circumscribe present activity, people react to and act in the light of past states of affairs, and the bodily actions that publicly manifest performances reflect bodily repertoires and practical understandings that are left behind by past activity and experience. Activity is circumscribed, induced/oriented, and given public presence by the past" (2010, p. 214). Thus, the pasts of practices induce their emergence and persistence. This understanding of the emergence and persistence of practice allows us to interpret how novel innovations as presented through entrepreneurs are met by professional communities; "what people do, how they react to things, is circumscribed,

oriented, and given public presence by or through the past" (Schatzki, 2010, p. 215). Practice emergence may stem from different components, which in turn brings us back to what practices are. Practices are organized activities that are composed of, i) practical understandings (bodily actions), ii) rules (directives, procedures), iii) teleological structures (acceptable ends) and iv) general understandings (senses of the worth) (Schatzki, 2012, 2013). The *emergence* of practices relates to the development of these practical understanding, to rules, to teleological structures or general understandings. However, there are other ways in which practices may emerge, such as through the introduction of new material entities that require new practices, or when particular individuals, such as entrepreneurs, depart from a situation and start anew, through a "line of flight" (Schatzki, 2013, p. 38).

We use practice theory as a lens to investigate more closely the meeting between entrepreneurial practices and professional practices. The research questions we consider are: How do entrepreneurial practices appear to challenge professional practices? How do specific professional practices oppose innovation in SMEs? In answering these questions, we illuminate particular practices in both product development and in professional communities. We further highlight the different challenges arising and the barriers which need to be overcome if innovation processes are to succeed.

3 Method

3.1 Approach and sample

The data analyzed in this paper stems from a collective case study of 40 innovation projects in 32 firms, in the county of Rogaland, Norway. The sampling was purposeful (Silverman, 2005). Each of the projects in the study had received funding through a regional innovation initiative "The Programme for Regional R&D and Innovation" (hereafter VRI) in the period 2008- 2012. The VRI programme was designed and funded by the Research Council of Norway but is implemented regionally, in all counties in Norway. VRI offers support to firms and networks engaging in innovation. One of the support mechanisms is a grant of up to 33000 euros earmarked collaboration with a research institute. Rogaland County awarded these grants primarily to small and medium sized enterprises (SMEs)[1]. In accordance with the VRI design, the county selected firms from target industry sectors. In Rogaland, these sectors were Energy, Food, Maritime and Health. Each of these industries employs professionals within different disciplines; biologists, engineers chemists and could thus be described as a professional field (Brante, 2011). In carrying out the case study, we attempted contact with all firms that had received grants, in the four-year period, approximately 120 firms. However, some firms had been dissolved, others had moved location, and still others were unavailable for interview for various reasons. The final sample consisted of 40 projects in 32 firms. The final portfolio was characterized by diversity; project goals

[1] The Research Council of Norway defines SME as firms with "*less than 250 employees and a yearly turnover under 50 mill. Euro or a balance 43 mill. Euro (or both)*"

ranged from developing new methods of growing strawberries to the design and construction of tidal windmills. The majority of the projects stemmed from the energy and food industry reflecting the industrial profile of the region. The entrepreneurs categorized their innovation projects as incremental, radical or quantum step. The projects were predominately stand-alone technological product innovations. Table 1 presents an overview of the projects in the study

Table 1. Overview of projects in the study.

Target Sector	Projects	New product development	Start– up	Single target	Incremental/radical/ quantum innovation		
Energy	18	17	12	11	7	8	3
Food	19	18	12	15	10	8	1
Maritime	2	2	2	2	1	1	0
Health	1	1	1	1	0	1	0
Total	**40**	**38**	**27**	**29**	**18**	**18**	**4**

The object of the original study was the innovation project from the idea to very commercialization. To this end, we supplemented interview data with comprehensive document study. However, in this paper, we focus on the interview data. We conducted semi-structured interviews either with the entrepreneur in the case of start-ups or with the person in charge of the innovation project. Each interview was of one to two hours' duration. The interviews were audio taped and transcribed.

3.2 Analysis

The theory development and research process may be viewed as similar to mystery construction, involving a critical dialogue between the theoretical framework and the empirical material (Alvesson & Kärreman, 2007). In the analysis, we followed the approach of Alvesson and Kärreman (2007) employing the inference mechanism of abduction. Abduction consists of three steps: applying a theory or established theoretical rule, being surprised by empirical phenomena, and articulating a new theory resolving the surprise. Alvesson and Kärreman (2007, pp. p. 58-60) address this process through reflexivity, sensitive constructions and interpretive repertoires.

Our initial intention was to identify the barriers encountered by firms during the innovation process, on the path towards commercialization. We analyzed the empirical material in-depth, referring to relevant theory (Alvesson & Kärreman, 2007). Three barriers, commonly identified in earlier research are: lack of time, lack of money and lack of people (competence/skills) (Kaufmann & Tödtling, 2002). While the firms in our study reported these same barriers, a less tangible barrier emerged consistently from the data. This less tangible barrier can be explained as a surprise or puzzle (Alvesson & Kärreman, 2007). Such a puzzle is understood as a breakdown in our understanding where empirical findings cannot be explained by existing theory (Alvesson & Kärreman, 2007). The barrier, which we termed "professional opposition", represented a breakdown in our existing understanding, demanding attention.

In coding the interview data, "Professional opposition" was an extended code, describing negative reactions to the innovation by external parties, expressly those

parties with recognized professional expertise in the field of the innovation, as reported by the entrepreneur. These external parties were potential collaboration partners: competitors, suppliers, customers or scientists in research institutions. A limitation and possibly a provocation for external parties was that the innovators often sought to sell their ideas without offering detailed explanations, being afraid that others might steal the idea. An innovator explains his position in this way:

> *"I have been paranoid; felt that I had to have a patent before I could talk … it was important for me", (oil pressing project).*

Potential stakeholders may thus be operating with imperfect information and therefore be more likely to rely on prior beliefs and understandings. (Hall, Bachor, & Matos, 2014).

We understand the concept "opposition" to represent a phenomenon, a reaction experienced by the entrepreneurs and innovators (Corbin and Strauss 1998) and illustrate with the following quote from a project manager:

> *"… if we had listened to everyone, we would have stopped all this a long time ago. And some of those who have supported the project also slaughtered it in the beginning and because they slaughtered it we had to find explanations and we put the numbers into formulas and we got positive results and these conflicts have been the most important learning points we have had really and the most important competence has come from these conflicts", (renewable energy project).*

The entrepreneur clearly describes a negative reaction from the professional field, and how the reaction provoked a response, on his part. In this instance, the encounter strengthened his practice. This constructive response extends the repertoire of responses, as reported by Doern and Goss (2013). In general, the objections recorded related to the perceived technical feasibility of the innovation expressed in phrases such as "it won't work" or "it is not how we do it". Objections to the economic viability of production and marketing of the innovation, expressed phrases such as "it won't pay" or "it is too risky", were not coded as professional opposition. These were not prevalent in the data material.

4 Findings

One distinguishing feature of "innovation" is novelty (Slappendel, 1996), and it is precisely this *novelty in practice* which appears to challenge professional practices and provoke an oppositional response. In the subsequent analysis, we seek to unfold the perceived response "professional opposition".

Our interpretation is that the practices of the entrepreneurs contested professional practices. Professional practices are established ways of doing things that express the norms, values, visions of the professional community. From the analysis of the coded data, we constructed the following typology:

- Challenges to professional consensus
- Challenges to professional authority
- Challenges to accepted methods

- Challenges to the imagination

We discuss each of these giving illustrative examples from a number of projects. In all 33 of the projects reported these less tangible types of barrier. Many projects reported experiencing more than one type of challenge. Obtaining a deeper and more analytical grasp of the nature of the initial professional response, provides a basis understanding of the demands on entrepreneurial practices. Entrepreneurs need to develop ways to respond rationally rather than emotionally to professional communities.

4.1 When innovative practices challenge professional consensus

Challenges to professional consensus were those instances where the innovation flouted accepted professional knowledge in the area of the innovation. The first case we describe is in the Energy sector and concerned the production of renewable fossil free energy through the combination of two well-recognized and established technologies, as described by the innovator:

> *"…the process is well known and an old process really, but using the technology in this way is totally new", (alternative energy project).*

The innovation is a technical success and is well on the way to commercialization with industrial partners now committed. When asked about what had been most difficult in the process, the innovator answered:

> *"…personally, it has been economy, but the most difficult for us has been to get acceptance for* ***this that*** *physics wins over professional theory. It has been difficult to get acceptance for this. It is easy to think of professional know-how, the way we do things, is what counts, but when this comes in conflict with basic physics then something is wrong somewhere and it has to be accepted," (alternative energy project).*

The innovator explained that his own professional background was inadequate and he need to learn more:

> *"I was a psychologist…I had to take a physics course after I started this and that was lucky too because all Norwegian trade books say that it can't be colder *(*reference to technical issue that is at the core of project). What is important here is to not to have a professional education but to understand physics," (alternative energy project).*

This conflict, with professional knowledge and understanding, made it difficult for the innovator to receive monetary support from various sources. Professional experts evaluated his applications and consistently rejected his ideas. He used "*a lot of energy*" trying to convince people. He was fortunate and found a physicist who was willing to listen to him and to test out the idea. Together they were able to develop a scientific platform for the innovation that proved acceptable to professional expertise. The physicist also represented professional authority. "*Sam, the physicist, he was critical at first but now he is on board*."

Another case in the study where professional consensus played in was the development of a system to "deactivate" salmon lice with electrical impulses, causing the parasite to fall off the salmon. The generally accepted view is that "water and electricity don't mix" and as such, the idea generated extreme skepticism. As the project manager

explained:

> *"In 2011, Norway used over 3 billion NOK to fight salmon lice and salmon escape. And we can solve the salmon lice problem. We had the idea of using electric current. Seawater is highly conductive… It was a wild trial and we saw the reactions on the salmon lice at the first controlled test. We found out that it worked. We went to the industry, but since we had done the research ourselves, no one believed us. Electricity and seawater, they smiled and shook their heads. We had to verify what we had found out…In the aftermath, they told us that they had concluded quickly that we were either idiots or geniuses. Crazy idiots," (salmon lice project I).*

Eventually, the industry and research partners were convinced by the results of scientific tests. It is possible to establish electric fences in seawater installations and in this manner effectively neutralize salmon lice.

In both these cases, the professionals reacted defensively with non-analytical responses, initially rejecting the innovation idea, referring to professional consensus (Gourlay, 2006). In both cases the firms succeeded by aligning their practices further to the scientific practices of the professional communities.

4.2 When innovative practices challenge professional authority

In these cases, the innovators had generally developed a solid scientific platform, in one case investing over 100 million Norwegian kroner in scientific research:

> *"...It is very high quality; we have developed something no one else has, extremely high quality. Professional folk are wide eyed and they listen when we explain what we have done. This is a good product; we have come a long way," (energy technology for maritime industry).*

Despite this solid scientific foundation, professional communities responded with disbelief or suspicion. A typical response, as reported by the innovators, was:

> *"'We have been trying to do this for 25 years and we have not had any success and so come two amateurs and you do it in two years' …. well they would not invest," (oil pressing project).*

Many of the informants described industry as "conservative" and as "sitting on the fence". Another example was a project involving the recertification of materials stemming from oil platforms. This project challenged both professional authority and accepted methods.

> *"Recycling was the idea…We did not get any of the industrial players involved, nor politicians. It is so hard to turn an entire industry. There is a network of companies..." (metal recycling project).*

When innovative practices challenged professional authority, the smaller firms in the study often folded or gave up on their idea. Larger firms, on the other hand, had the economic resources to continue their practices pursuing ideas and bringing them to the market.

4.3 When innovative practices challenge accepted methods

In these cases, the introduction of the innovation had potential to dramatically affect the daily practice of the professional community. An illustrative example comes from a dairy project where farms have introduced milking robots. Established practice in the industry is to milk cows twice daily at regular times. The introduction of robots allows the cows to wander in for milking at will. Robots perform the milking operation. Cows decide! A diary producer in the pilot explains:

> *"For the farmer, the work day is completely changed. He has to read a lot of statistics. It is a different way of working. He does not need to get up at 7 am, and he can drive his son to football. We have received very good feedback. The flexibility and possibility for more social family life is important. And the work practices have also changed. Some (farmers) are very good at attending in the barn, to follow and observe the animals wander freely. It is a different way of working than when the cows are standing in the milking shed," (milk robot project).*

The farmers expressed concerns about the diffusion of innovation because it demands significant changes in husbandry practice. Without support in the diffusion process, the innovation could easily fail. Those responsible for the innovation concluded:

> *"We received positive feedback from the farmers, after they had received a lot of advice and help from the producers and from advisors. To participate in this project, the farmers had to pay, and for a lot of older farmers, the data from the robots became too much to handle. How satisfied the farmers were? … [it] goes both ways. The farmers need practical advice. We have received feedback on what they find challenging, what is hard to tackle and what they need more of. On this basis, we will design more courses and come up with suggestions for improvements. The farmers need to make it work; the farmers need to wander around among the cows and observe in a new way…" (milk robot project).*

Another example comes from a software project, which demanded reorganization of workplaces, breaking down existing barriers and demarcations between professions.

> *"With this software, everyone will have a creative role. It is very much like a work process. Now, people use time on making things available in Excel, instead of being a geologist. …. Today many professional disciplines are working each their way, while they work with the same data, resulting in duplication of data. It is teamwork without a team. We force a multidisciplinary approach. The user experience will reflect a work process which is hard to perform practically, without this tool," (software project).*

The trial company was hesitant about changing work practices and decided not to

participate in further development, despite initial interest in the idea. In such cases, the entrepreneurs had little recourse for action. One industrial player did decide to invest in the project.

4.4 When innovative practices challenge the imagination

The title of this paper "fish farming on the moon" refers to an actual project, sponsored by NASA, which we came across in our study. The project exemplifies projects that may encounter opposition because they challenge the imagination, the way we think, our expectations.

Returning to the salmon lice problem, a different project developed a salmon-like odor or scent, which would serve to attract the lice thus deterring them from the real salmon. The entrepreneur explains how he looked outside of the confines of his discipline:

> *"It is in the news almost every day, the problems and challenges in dealing with salmon lice, so I was sitting and thinking about what could be done. What is possible? I have read about chemo taxis, things tried in the research field … I am a marine biologist, with experience from livestock and environment. And when I meet new challenges I try to make connections, when searching through academic articles…" (salmon lice project II).*

> *"Actually, this is an alternative to kill salmon lice with chemicals. The method is to drive the lice to something else. The idea was to lure the salmon lice towards the odor of salmon and not to the real salmon," (salmon lice project II).*

The idea was successfully patented eventually, although by another firm.

Other projects in the study attempted to "trick" nature. An example is the steering of fish production by using artificial light to create the illusion of a longer spring and summer season.

> *"We try to fool nature and it hits back. Quality was not good enough… We have to keep working on more advanced techniques …trick them a bit more …both light and temperature …" (fish production project).*

Several other projects in this category cannot be described here, due to promised anonymity, but suffice to say these were "far out". The projects received support in a regional VRI innovation programme by convincing technical experts in the evaluation committees. Convincing collaborators was more difficult and one of the entrepreneurs took a step-wise or gradual approach, suggesting a less radical innovation as the first step.

5 Discussion and conclusion

This paper addressed the following research questions: How do entrepreneurial practices challenge professional practices? How do specific professional practices oppose innovation in SMEs. From the data, we constructed at typology to illustrate four ways in which innovative practices challenged professional practices. These were neither exclusive, nor exhaustive. Some innovators challenged established professional

consensus, the *why of professional practices*, the reason behind an understanding, where acceptance would involve altering professional understanding, rewriting textbooks and so on. Other projects challenged the authority of the professional, the *who of professional practices*; the innovators met closed doors since they were challenging experts, big players in the game. We also identified innovations that challenged accepted methods, being the *how of professional practices,* demanding the development of new everyday practices. Finally, several projects challenged the imagination; the vision of professional practices. These challenges concerned the *what*, i.e. what is possible to do.

Projects challenging existing the "why, who, how or what" should by definition be innovative, since these demand change to existing professional practice or provoke new practices. We thus identified four different ways in which established practices engage when confronted with changes in directions that are surprising. Each of these responses is oppositional but the responses are differently reactive in relation to whether the why, who, how or what is involved.

In practice theory, these nuances of reactive human behavior are neither established, nor explained. Schatzki (2013) claims that the past of practices induces their emergence and persistence, but does not elucidate the differences between practice emergence and persistence, in relation to the why, who, how or what is involved. Our empirical findings contribute to extend practice theory in relation to the notion of practice emergence. In this study, new practices emerged in both communities (professions and entrepreneurs). Schatzki (2013) also claims that the emergence of practices requires the re-organizing of the practices through the development of practical understanding, rules, teleological structures or general understanding, or in relation to new material arrangements (Schatzki, 2013). Our findings confirm that professional practices are inclined to remain relatively stable, when challenged. On the other hand, for new practices to be established or to emerge, these have to be developed through altering existing understanding. Practice emergence in relation to the *why*, involves convincing existing professional knowledge and authorities through exposition, scientific testing and proof. In relation to the *who*, innovators need a strong partner, resources or a strong reputation to be able to succeed with practice emergence. The *how* relates to changes in everyday practices where innovative solutions and new ways of doing emerge through experience by the actors over time. Practice emergence in relation to the *what* involves providing proof of possibilities. Change must be envisaged. Thus, practice emergence is differently emphasized in relation to convincing, partnering, experiencing or engaging in the new practices. These findings constitute a contribution to practice theories.

In this study, the innovator meets the professional community. The nature of "professions" is well discussed and documented. In some cases, the innovator overcame the negative response and the innovation process has proceeded on the way to commercialization and diffusion. In several cases, the innovation process has halted. In the majority of cases, the entrepreneurs did not have successful strategies to deal with the opposition encountered. Hawkins and Rezazade (2012) confirm Dewey's claim, that when individuals are exposed to new knowledge that does not confirm to their interpretative framework they may hold this knowledge in suspense while looking for additional support. All the projects in the study have achieved technical success,

verified by the research collaboration for which they received funding. It would therefore seem that the opposition did not have a basis in scientific research but rather in the established, norms, methods, and authority inherent in the professional community. A study of Norwegian entrepreneurship (Berglann, Moen, Røed, & Skogstrøm, 2009) indicated that the least entrepreneurial workers are to be found in the professions, amongst people with high educational attainment e.g. researchers (with PhD), nurses, social scientists and teachers. Perhaps it should not then be surprising that our innovators encounter opposition in their meeting with these different professions.

This paper explores barriers experienced by firms in the initial stages in the innovation process. One particular barrier, consistently reported by firms, was the barrier of professional opposition, encountered in various forms by innovators when introducing their idea to the professional community. To promote a deeper understanding of the practices of both the professionals and the entrepreneurs we have "unpacked" the barrier of professional opposition identifying four different types of challenge. This understanding may guide the formation of appropriate strategies for SMEs and entrepreneurs to introduce new practices.

The findings have implications for innovation management and for the development of the professions. For the professions, there may be distinct advantages in developing a culture of openness and on-going learning. A study by Burcharth, Knudsen, and Søndergaard (2014) indicates that professional training increased the adoption of inbound practices and innovations.

Regarding innovation management, the findings indicate that larger firms have an advantage as they have the resources to nurse the novel idea. Small firms may need to take a risk and "open up" supplying more detailed information on their idea or enlist the aid of an intermediary with a professional affiliation. Entrepreneurs need to unpack the barriers and react strategically rather than emotionally to gain entrance to the field. An alignment of new and existing practices would lead to a fruitful collaboration.

A major limitation of this study is that we present only the view of the entrepreneurs and not the views of external professionals. As stated, we approached the study from the field of innovation. We refer specifically to new product management literature together with practice theory to highlight countering forces to new practices. We suggest that future research explore entrepreneurial practices and professional practices in juxtaposition, thus better highlighting the practices involved for innovation acceptance. Another direction for further research is investigate the identified barriers in a larger quantitative study to identify whether and to what degree professional opposition varies in relation to different industries and professional communities.

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