

6 The Third Mission

Enhancing Academic Engagement with Industry

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Abstract

There is an ongoing debate in the literature about a “third mission” for universities. Examples of successful academic spin-offs have led to a widespread policy of encouraging collaboration between the academic and commercial worlds. However, the commercialization of research-based innovations often suggests a conflict of interest to academics. In this study we explore what types of knowledge spillover are preferable for academics and how universities can support them. Analysing a survey of 226 academics in a medium-sized university in Norway, we found that supporting the entrepreneurial knowledge and skills of academics might cause a modest increase in their entrepreneurial intentions. At the same time, we found that incentives for joint research projects with industrial partners enhance academics’ desire to take part in such collaborations. We conclude by questioning the well-publicized policy efforts focused on boosting academic start-ups. We argue that more knowledge about starting and running a business would be helpful, but only for a small number of academics who are already interested in such activities. To enhance broader academic involvement in the “third mission”, policies should encourage a wider range of activities and focus on providing incentives, such as tax regimes or co-funding possibilities, for other types of research-industry collaboration, such as joint research projects.

Introduction

As this book focuses on the everyday engagements of universities and higher educational institutions with regional partners, our chapter adds to this discussion by looking at different methods for such knowledge transfer. There is an ongoing debate in the literature, started by Leydesdorff and Etzkowitz (1996), as to whether universities can and should fulfil a “third mission” in addition to education and basic research (Bruneel et al., 2010; Ankrah & Omar, 2015;

Kaklauskas et al., 2018; Perkmann et al., 2013). This third mission resembles the “entrepreneurial university” model, which focuses on outreach activities based upon generating technology transfer and knowledge-based start-ups, or the “engaged university” model, which involves collaborative projects with industrial and other regional actors (Sánchez-Barrioluengo & Benneworth, 2019). Various channels are available for establishing these links, ranging from applied research and joint research projects with regional and industrial actors, to commercial efforts such as licensing, patenting, and academic spin-offs.

The Bayh–Dole Act and its European equivalents, along with other policy changes, introduced the concept of the “entrepreneurial university”. An embryonic academic entrepreneurial dynamic originated in US universities during the late 19th century, when the lack of a formal research funding system made necessary individual and collective initiatives to obtain resources to support original research (Etzkowitz, 2003). The US entrepreneurial university emerged from the “bottom up”, in contrast to Europe, where the introduction of academic entrepreneurship has been a recent “top-down” phenomenon, in response to the innovation gap between the United States and Europe (Soete, 1999; Lopes et al., 2018). Etzkowitz (2003) views the emergence of the university as a form of collective entrepreneurship. He argues that groups of individuals, irrespective of their cultural and social backgrounds, can be trained in entrepreneurial spirit and that modern policies can facilitate entrepreneurial thinking at university leadership level to stimulate both research and commercial activities.

The assumption among policymakers is that the entrepreneurial university will contribute to inspire more entrepreneurs among students and academics, which in turn will increase the direct contribution of universities to the local and national economy (Foss & Gibson, 2015; D’Este & Perkmann, 2011; Clarysse et al., 2011). At the same time, Clark (1998, 2001, 2004) points out that this transformation is not unproblematic: he particularly notes a growing imbalance between the demands made upon universities and the universities’ capacity to respond if they remain in their traditional form. The demand-response imbalance is especially evident in public universities that are mainly supported by a national or regional ministry of education or education and science – as is often the case with universities located in Europe. In addition, he argues for three pathways that need to be present for transformation to occur:

[T]he extended developmental periphery, in all of its grand profusion of new forms and relationships; the stimulated academic heartland, with its well-rooted but quite varied departments that have to join the overall transformation or else it probably will not occur; and the integrated entrepreneurial culture, voiced with pride and passion, where a new point of view becomes characteristic of the entire university.

(Clark, 2001, p. 8)

In their recent article, Sánchez-Barrioluengo and Benneworth (2019) distinguish between the entrepreneurial university and the engaged university. The

“entrepreneurial university” refers to commercial activities involving spin-offs, patents, and licensing, while the “engaged university model” refers to collaborative projects with industrial and regional partners. The engagement approach acknowledges the university’s role in knowledge production but regards the primary contribution as coming from structural improvements to the knowledge exchange environment, organization, governance, and policy frameworks.

This chapter is intended to contribute to this debate, to highlight which channels of knowledge transfer are preferred by academics, and to show how universities can facilitate their transformation into entrepreneurial universities. In particular, we aim to investigate *the role the university context plays in academics’ entrepreneurial intentions and their willingness to collaborate with industry*. To study how the third role of university can be fostered, we are focusing on the university context by applying Scott’s (2014) institutional pillars: the regulative, normative, and cognitive pillars. The regulative dimension consists of formal support mechanisms, such as rewards and recognition, for involvement in third-mission activities. The normative aspects are the informal actions, beliefs, and attitudes of academics towards the third mission. The cognitive aspects are the knowledge and skills of academics concerning the implementation of the third mission, ranging from the commercialization of innovations through spin-offs to the broader spectrum of academic-industrial collaboration. In this chapter we are looking on University of Stavanger, located in Norway. Using a survey sample of 226 academics, we empirically test our hypothesis that a university context that is supportive towards the third mission increases academics’ ability and willingness to engage in entrepreneurial activities and collaborate with industry.

The rest of this chapter is organized as follows. We first present a theoretical framework and discuss the importance of the university context in entrepreneurial university transformation. We then describe our method and analyse the findings from our study. We conclude with the discussion of the implications of this study for theory and practice.

The university context as enabler and constrainer of the transformative process

When an institution is attempting to move itself into an entrepreneurial mode, it is pertinent to consider how this implementation of entrepreneurial modes occurs. Transformation of any organization, including universities, can be seen as institutional change (Scott, 2014), consisting of the roles, norms, and conventions that society has identified for how universities are expected to perform. We view the transformation towards an entrepreneurial university as being heavily influenced by the institutional environment in which the university is embedded. Despite an increasing number of books and articles on universities’ third mission (Morris et al., 2013; Fayolle & Redford, 2014; Foss et al., 2013) scant attention has been given to the role of context in the transformative process of universities. Moreover, universities are comprised of rules,

laws, formal and informal policies, as well as the organization of key groups or communities, which affect and form the university context (Etzkowitz, 2003; Storper, 2013, p. 8). These groups form networks with civic associations, businesses, and other neighbouring communities. In this way, the university context can both enable and constrain its groups, and it can reinforce regional and national perceptions on the role of universities in regional development (Foss & Gibson, 2015; Valdez & Richardson, 2013).

In this chapter we consider “the university context” as an organizational context that has a significant influence on the propensity of an organization towards innovation by affecting employee behaviour (Tidd et al., 2001; Tolbert et al., 2011; Oftedal et al., 2018). McLaughlin et al. (2005) set out the characteristics of organizational structure that supports innovation. The university context possesses many characteristics that are enablers of innovation. The university, by the nature of its primary objective of developing knowledge, has a structure that facilitates knowledge gathering. On the other hand, the university is highly institutionalized and is seen as resistant to change (Bercovitz & Feldman, 2008). This suggests that universities have some of the important characteristics that typify organizations that are well positioned for change but equally that they display factors that inhibit change. In this way, the university context can both enable and constrain transformative change towards the fulfilment of the third mission.

This study considers the institutional context in an academic setting as consisting of regulative, normative, and cognitive structures. Scott (2014, p. 56) defines institutions as “regulative, normative and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life”. Applying the same logic, we study the university context through these three pillars, where “regulative” relates to formal rules and regulations, “normative” to informal norms and values, and “cognitive” to shared knowledge and interpretation.

The regulative structure implies that rules and regulations exist separately and objectively from the agent. At the same time, agents’ actions are dependent upon their perceptions of the rules. Thus, formal rules affect agents’ behaviour through constituting and regulating activities (Scott, 2014). Although rules and regulations can be viewed at a state level, it is their local adoption in the form of university regulations, policies, and strategies that matters for academics. A number of studies address the regulative dimension of the university context (Kraaijenbrink et al., 2009; Saeed & Muffatto, 2012; Turker & Selcuk, 2009; Oftedal et al., 2018). These studies indicate a positive relationship between university support for entrepreneurship in the form of competitions and monetary rewards for involvement in entrepreneurial activities (Todorovic et al., 2011), but they are mainly based on the study of student samples.

The normative dimension is based on the values and norms that prevail in the organization. Values are conceptions of the preferred or the desirable, together with the construction of standards with which existing structures or behaviour can be compared and by which they can be assessed. Norms specify how

things should be done: they define goals or objectives, and they also designate appropriate ways to pursue these goals or objectives. The logic of appropriateness is a perspective that sees human action as driven by rules of appropriate or exemplary behaviour, organized into institutions. Rules are followed because they are seen as natural, rightful, expected, and legitimate. Actors seek to fulfil the obligations encapsulated in a role, an identity, or a membership of a political community or group, and the ethos, practices, and expectations of its institutions. Embedded in social collectivity, they do what they see as appropriate for themselves in a specific type of situation (March & Olsen, 2006, p. 2). Some values and norms are applicable to all members of the collective, others to specific types of actors or positions (Scott, 2014).

The cognitive aspect of organizational context is concerned with acceptable behaviour based on the knowledge of what lies within a certain context. Cognitive structures can be described as the shared conception that constitutes the nature of social reality and creates the frames through which meaning is made (Scott, 2014, p. 67). The cultural-cognitive dimension reveals the cognitive structures and social information shared by the people in a given country, region, or organization. In relation to the entrepreneurial university, the cognitive aspect relates to shared knowledge, traditions, identities, and practices that have become institutionalized (taken for granted) over time among faculty and students in relation to starting and running a business or enrolling in industry collaborations. In our study, we are focusing particularly on academics.

A number of recent studies have indicated the positive relationship between a university climate supportive of entrepreneurship and entrepreneurial intentions on the part of students (Todorovic et al., 2011; Oftedal et al., 2018). Engagement in entrepreneurial activities can be explained by behavioural theories, and therefore research has evolved around entrepreneurial intention as a powerful theoretical framework (Liñán & Fayolle, 2015). Intention in this sense is viewed as a predictor of actual behaviour (Ajzen, 1991; Liñán & Chen, 2009; Iakovleva et al., 2011).

Thus, a university's offer of rewards in the form of monetary and non-monetary incentives, its fostering of entrepreneurial culture, and its promotion of education programmes on entrepreneurship have proved to result in increased entrepreneurial intentions among students (Bae et al., 2014; Rauch & Hulsink, 2015; Oosterbeek et al., 2010; Souitaris et al., 2007). Different factors, such as gender, age, and self-employment experience (Westhead & Solesvik, 2016; Welter, 2011; Liñán et al., 2015; Gundray et al., 2014), might moderate the effects of the cognitive and normative dimensions of the university context.

However, there is a lack of studies looking at whether the same stimulus would promote the intentions and competence of academics. As we assume that behavioural theories should apply across different social groups, this argument leads us to suggest that the university context comprised the aforementioned regulative, normative, and cognitive pillars should equally affect the intention of academics to engage in entrepreneurial behaviour. Moreover, looking at

other behaviour, such as collaboration with industry, we suggest that a university context supportive of that behaviour will lead equally to an increased desire to collaborate with industry. Academic engagement in industrial collaboration represents instances of inter-organizational collaboration, usually involving “person-to-person interactions” (Cohen et al., 2002) that link universities and other organizations, notably firms (Bonaccorsi & Piccaluga, 1994; Meyer-Krahmer & Schmoch, 1998; Schartinger et al., 2002). In a literature review of academic engagement, Perkmann et al. (2013) found that academic engagement is a multi-level phenomenon and that it is determined by the characteristics of individuals and the organizational and institutional context in which individuals work. Some argue that a policy (regulation) emphasis on commercialization obscures the fact that industry engagement often generates considerable benefits for academic research and that academics are motivated to engage with industry to further their own research (D’Este & Perkmann, 2011; Perkmann et al., 2013).

On the basis of the earlier discussion, we suggest that a university context supportive of entrepreneurial activities and industry collaboration across regulative, normative, and cognitive dimensions should be positively related to the intention of academics to engage in entrepreneurial activities and their desire to engage in industrial collaboration. The following hypotheses are presented in Table 6.1.

Methodology

To test the hypotheses, we conducted a survey of academics in a medium-sized regional university located in western Norway. The University of Stavanger is one of the youngest universities in Norway, having been established in 2005, although its colleges in engineering, nursery, business, and the arts were in place for a long period before then. The university is located in a region dominated by oil exploration activities, in the city of Stavanger, which is often called the oil capital of Norway. Petroleum engineering was one of the main drivers of the establishment of Stavanger’s colleges in the 1970s. Today, the university comprises five faculties and accommodates around 12,000 students. It is the workplace of around 1,600 academics, administration, and service staff. The University of Stavanger can be characterized as a regional university that mainly plays a support role for the local industries of oil and gas, engineering specialists, IT firms, the maritime industry, and a relatively large regional hospital. It also educates teachers, social workers, business managers, journalists, and other specialist occupations. The university collaborates with the technology transfer office (TTO Valide), a separate entity of which the university is a co-owner. The TTO is located in an innovation park not far from the university. The TTO plays an important role in commercializing innovations that derive from the University of Stavanger. Since 2003, Norwegian universities have been given ownership of intellectual property rights (IPR) which previously belonged

Table 6.1 Summary of hypotheses

<i>N</i>	<i>Hypotheses</i>
H1	<i>The regulative dimension of a university context supportive towards entrepreneurship leads to stronger entrepreneurship intentions among academics.</i>
H2	<i>The normative dimension of a university context supportive towards entrepreneurship leads to stronger entrepreneurship intentions among academics.</i>
H3	<i>The cognitive dimension of a university context supportive towards entrepreneurship leads to stronger entrepreneurship intentions among academics.</i>
H4	<i>A university context supportive of industrial collaboration leads to increased industrial collaboration among academics.</i>

to individual researchers. Significant changes have also taken place at the university level, as TTOs have been established at many universities, which are actively encouraging university spin-offs. The role of the TTO is to help an inventor develop a sound business model and find partners for their prospective business. Despite the fact that TTO Valide is well equipped with competent personnel, the rate of commercialization at the University of Stavanger remains quite low, mainly occurring in technical departments and the university hospital. This research was sponsored by TTO Valide to find out more about entrepreneurial intentions within the university's faculties as well as attitudes towards other forms of industrial collaboration and the commercialization of research inventions.

To ensure validity, the survey draft was reviewed by university students from the business school, by staff from three different faculties at the university, by a professor of research methodology from another Norwegian university, and by staff belonging to the technology transfer office. Input was also sought from a professional with considerable surveying experience who was not linked to academia. A total of eight different people were involved in the reviewing process.

An online survey was emailed to all academics on behalf of the researchers by the rector of the university. The survey was conducted during December 2017 and January 2018. The survey was available in Norwegian and English. Around 10% of responses were completed in English, while the rest were completed in Norwegian. Our population comprised all academic staff, including PhD students and post-doctoral researchers. The survey was distributed to 1,406 respondents. The response rate was 16%. The final sample consisted of 226 completed questionnaires. The sample characteristics relative to the population are presented in Table 6.2 in the "Findings" section of this chapter.

Whenever possible we used well-developed scales for dependent variables and adapted them for the needs of the present research. Principal component analysis was used to create reliable scales for the constructs that were new, and multiple regression analysis was utilized to test the hypotheses. A summary of the constructs and control variables applied is presented in Appendix 6.1.

Table 6.2 Descriptive sample statistics

<i>Item</i>	<i>Characteristic survey sample (%)</i>	<i>University as a whole (%)</i>
Female	50	55
Male	50	45
Faculty of science and technology	29	32
Faculty of health sciences	16	8
Faculty of social sciences	12	17
Faculty of arts and education	27	31
Business school	11	6
Other faculties	5	9

Table 6.3 Involvement in entrepreneurial activities and in industry collaboration

<i>Item</i>	<i>Characteristic survey sample (%)</i>
Have licensed an idea	3
Have patented an idea	6
Currently involved with a business	8
This business is based on your research	4
Collaboration projects with industry in the past 2 years	51
Worked on collaboration projects where 30% or more of whose financing came from industry	34

Findings

This section will first present some descriptive statistics of the sample (Table 6.2). It will then provide some key figures in relation to two major types of knowledge transfer: that made through commercialization activities (including licensing, patenting, and business start-ups) and that made through collaboration with broader industry (collaboration projects with industry, research projects co-funded by industry partners). These figures are presented in Table 6.3. In addition, we have tested the hypotheses from Table 6.1 using linear regression analysis. The results are presented in Tables 6.4 and 6.5.

As Table 6.2 reveals, respondents from the health sciences faculty and the business school are over-represented in our sample and respondents from the faculty of social sciences are slightly under-represented, while other faculties appear in more or less representative proportions. The sample is also representative in relation to gender. In terms of age, 74% of all respondents were between 30 and 60 years old, with 7% between 20 and 30, and 18% over 60 years old.

Table 6.3 shows the actual involvement of academics in entrepreneurial activities and industrial collaboration. These data were self-reported. Our study findings indicate that only 8% of academics are involved in an entrepreneurial start-up. This is in line with overall statistics for entrepreneurial activities in Norway, which show variations from 5 to 8% over the last 10 years in the

Table 6.4 Linear regression analysis of the effect of the university context on entrepreneurial intentions

	<i>Entrepreneurial intentions</i>	<i>Tolerance</i>
	Model 1	
	St. Beta	
<i>Controls</i>		
Gender	.26***	0.909
Age	-.200**	0.909
Department	.031	0.968
Self-employment experience	.374***	0.928
Adjusted R ²	.204	
F-value	13.409***	
University context regulative	-.0290	0.735
University context normative	-.009	0.692
University context cognitive	.204**	0.792
ΔR^2	.036	
Adjusted R ²	.229	
F-value	9.209***	
n	n = 195	

Notes: † p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001.

Table 6.5 Linear regression analysis of the university context on industry collaboration

	<i>Industry collaboration</i>	<i>Tolerance</i>
	Model 1	
	St. Beta	
<i>Controls</i>		
Gender	-.097	.918
Age	-.021	.935
Department	-.014	.972
Self-employment experience	-.066	.930
Adjusted R ²	-.002	
F-value	.907	
University context towards IC	.320***	
ΔR^2	.099***	
Adjusted R ²	.094***	
F-value	5.079***	
n	n = 197	

Notes: † p < 0.1; * p < 0.05; ** p < 0.01; *** p < 0.001.

involvement of the general population in Norway in entrepreneurial start-ups (GEM study, 2014). It is also remarkable that only 4% of our sample say that the business they are involved with is related to their research.

At the same time, our study reveals that 51% of academics are involved in different kinds of collaboration with industry for research. This resembles previous research findings and confirms that academics are keener to collaborate

with industry than engage in the commercialization of their research results via spin-offs (D'Este & Perkmann, 2011; Perkmann et al., 2013).

To test hypotheses H1–H3 on whether the regulative, normative, and cognitive dimensions of the university context affect the entrepreneurial intentions of academics, we performed the linear regression analysis presented in Table 6.4.

Our control variables explain 20.4% of variance in entrepreneurial intentions among academics. Self-employment experience is in particular a strong predictor of future entrepreneurial intentions. This supports arguments in favour of entrepreneurialism being self-perpetuating. Age also has a significant impact on entrepreneurial intentions, with younger members of staff being more likely to display entrepreneurial intentions. Being male is strongly positively related to entrepreneurial intentions, as is expected and in line with previous studies (Solesvik et al., 2019; Verheul et al., 2006).

Surprisingly, departmental membership did not prove to be a significant variable in explaining entrepreneurial intentions. This contradicts the findings of previous studies (Bercovitz & Feldman, 2008; Clarysse et al., 2011), which have shown that academics involved in engineering and science-related areas have a greater inclination towards entrepreneurial activities than academics in other fields. One explanation for this could be specific to the Norwegian or even the regional context. The majority of externally financed research activities occur in cooperation with a research institute partly owned by the University of Stavanger: the International Research Institute of Stavanger (IRIS), which was recently renamed and merged with a larger research institute, Norce. This research institute encompasses most applied projects, with research and related activities in petroleum, new energy, marine environment, biotechnology, the social sciences, and business development (Ofteidal & Iakovleva, 2015).

Our findings reveal that, contrary to our expectations, the regulative and normative dimensions of the university context do not seem to influence the entrepreneurial intentions of academics. This is surprising, as the same constructs have been proven to have a strong relationship to entrepreneurial intentions among students (Ofteidal et al., 2018). One explanation for this might be that academics choose their careers vocationally, and they perceive their careers as being related to scientific development rather than business development. Additionally, the technical and disciplinary environments in which Norwegian universities operate do not put pressure on academics to reach out to industry, compared with other contexts (Bercovitz & Feldman, 2008; Bereznitz & Feldman, 2012). However, the cognitive dimension, which instils knowledge about start-ups, licensing, and patenting processes, seems to be an important facilitator of entrepreneurial intentions among academic staff. Thus, hypotheses H1 and H2 are rejected, while H3 is supported.

We also conducted a regression analysis to test hypothesis H4, the impact of the university context in promoting industrial collaboration intentions. The results are presented in Table 6.5.

None of the control variables were significant. The lower impact of the control variables in comparison with entrepreneurial intentions may indicate that the benefits of industrial collaboration appeal widely to all staff at the university. The findings revealed that a university context supportive of industry collaboration is strongly related to the perceived benefits of such collaboration among academics. Thus, hypothesis H4 is supported.

Discussion

Our study findings indicate that the university context influences the entrepreneurial and industrial collaboration intentions of academics, albeit in different degrees. Firstly, we will further discuss the factors that affect entrepreneurial intentions and thus contribute to building an entrepreneurial university. Secondly, we will examine the findings related to industrial collaboration intentions, which are crucial for building an engaged university.

Building the entrepreneurial university

The entrepreneurial university model (Clark, 2001; Etzkowitz & Leydesdorff, 2000) focuses mainly on commercial activities (Perkmann et al., 2013), with the new university structures of TTOs confirming the importance of actively and strategically promoting commercialization of knowledge through spin-offs, patents, and licensing. Such promotion might be achieved through stimulating the regulatory environment through formal demands and rewards, enhancing the cognitive dimension by boosting knowledge among academics about such activities or even by building an entrepreneurial culture and thereby stimulating the normative organizational context. Our study tested the assumption that these dimensions are useful in stimulating entrepreneurial university.

Our analysis showed that some control variables are important for the entrepreneurial intentions of academics. The male gender was found to be strongly influential in the entrepreneurial intentions of academics. This is in line with gender research on entrepreneurship (De Bruin et al., 2006; Iakovleva & Kickul, 2011). It is important to recognize gender differences and to put in place relevant measures that can help address these differences. For example, universities can implement programmes that enhance women's competence with regard to commercialization or involvement in industrial collaboration through various programmes. Previous start-up experience was also a strongly influential variable for entrepreneurial intentions among academic staff. This is in line with our expectations and in line with previous studies (Liñán & Chen, 2009; Ucbasaran et al., 2006).

However, unlike earlier studies that found a positive and significant relationship between the regulative, normative, and cognitive structures in the university context and the respondents' entrepreneurial intentions (Kraaijenbrink et al., 2009; Oftedal et al., 2018; Todorovic et al., 2011), we found only limited support for this relationship. One explanation might be that previous

studies were based on student samples, while our respondents were academics. Students have yet to make their final career choices, and their values and behavioural norms are easier to influence. Thus, institutional structures that are supportive towards entrepreneurship are helpful in forming students' entrepreneurial intentions. The only dimension found to be strongly and significantly related to academics' entrepreneurial intentions is the cognitive dimension. Scott (2014) defines the cognitive dimension as cognitive structures and social information shared by the people in a given country, region, or organization. Knowledge of the processes of licensing, patenting, and starting up a business might be very helpful in encouraging more academics to think entrepreneurially. That is something which TTOs can easily address via courses, knowledge-sharing platforms, and other means for educating academics in entrepreneurial activities.

The fact that the regulative and normative dimensions are less important for encouraging entrepreneurial behaviour among academics can be explained by the fact that academics, unlike students, have made their career choice. Our research shows that values of academic research are not aligned with entrepreneurial activities, since engaging in commercial activities does not form part of socialization in this disciplinary setting, unlike teaching and research. This is in line with previous research (Rasmussen et al., 2006).

Policymakers should be mindful of this conflicted situation, where there is a clash of logic between science as an institution and the university as a tool for economic development (Olsen, 2007). Academics perceive the university's role as providing cutting-edge research and high-quality education, rather than commercialization of innovations. Our research shows that 8% of sample respondents are currently involved in start-up activities. Among those there is a slight surplus of professors and respondents aged over 60. The average of 8% is close to the national average (GEM report, 2014); however, it is atypical that seniors (people over 60) should be enrolled in such activities. Only 4% of respondents are engaged in business that relates to their main research field. We have to acknowledge that to academic staff, commercial activities suggest a conflict of interest. This was also indicated by previous studies (Gibb & Hannon, 2006; Rasmussen et al., 2006). The advancement of academic careers depends on knowledge openness, while achieving commercial success depends on exclusive distribution of knowledge to gain financial benefit.

Building the engaged university

The engaged approach (Sánchez-Barrioluengo & Benneworth, 2019) acknowledges the university's roles in knowledge production through formal research and development and consultancy transactions, alongside informal knowledge transmission not involving financial compensation. This model distinguishes between "soft" activities (advisory roles, consultancy, industry training, production of highly qualified graduates) that are closer to the traditional academic

paradigm and “hard” initiatives such as patenting, licensing, and spin-off activities that form part of third-mission outputs.

Although commercial activities were not prioritized among academics, an engaged approach through collaboration with industry was practised by 51% of respondents from our academic survey. This percentage is considerably higher than could be expected on the basis of previous studies, which highlight the challenges involved in such collaboration (Gulbrandsen & Nerdrum, 2009; Mowery & Sampat, 2005). However, as is also pointed out by De Fuentes and Dutrénit (2012), the nature of interactions changes as the country develops, as these reflect a co-evolution of factors which depend on context, incentives, and agents’ characteristics, particularly their absorptive capacities and embedded culture. Norwegian innovation policies, in particular funding resources available for firms and universities through Norwegian Research Council programmes, clearly highlight initiatives for promoting industrial collaboration. Thus, industry collaboration though applied research is seen as a natural and important activity for academics to engage in.

These findings also suggest that academics do not consider industrial collaborators’ profiting from research generated by university–industry collaboration to be a barrier. The strongest motivators for industry collaboration were centred on the expansion of knowledge and the access to financing for research projects. Both factors align well with academics’ core objectives of basic research and education. These findings align with previous findings that suggest that academics engage with industry in order to further their own learning or to access funds and other resources (D’Este & Perkmann, 2011; Pinheiro et al., 2017).

Our analysis confirmed that promoting industry collaboration in the university context by means of rules, rewards, knowledge availability, and social norms would further increase industrial collaboration. Thus, promoting collaboration with industry might be a fruitful strategy that will enhance knowledge.

Conclusion

The drive to achieve entrepreneurial and engaged universities has given rise to questions about what motivates academics to engage in commercial activity or industrial collaboration. While Clark (2001, 2004) provides excellent illustrations of the drivers of such transformative processes, using a number of cases from well-known universities such as Harvard Business School, little is still known about the more “average”, regional universities, often located on the periphery. This book argues that “one size does not fit all”, and we can see that our findings support that. Commercial activities and successful spin-offs from academia are often taken as examples of how universities should contribute to regional development. However, one should acknowledge that not all universities or cities or regions have either the capacity or the drivers equal to those of universities located in major cities or in areas with high levels of technological development, such as Silicon Valley.

In this study we have investigated the role of the university context in relation to entrepreneurial intentions and the industrial collaboration intentions of academics. The study revealed that the cognitive dimension of the university context, which includes knowledge about entrepreneurial processes, such as licensing, patenting, or start-up processes, plays a major role in forming entrepreneurial intentions. However, we did not find support for the view that the regulative or normative dimensions of the university context were associated with the entrepreneurial intentions of academics. Although we expected some differences in attitude towards commerce across disciplines or fields, in line with Becher and Trowler's (2001) debate on academic cultures, we did not find evidence for such differences. That could perhaps be explained by differences in academic and professional norms of behaviour. The comments provided to our survey gave us the sense that there is strong loyalty towards the principles of academic freedom and that some academics perceive commercial activities to be a threat to such freedom. This is in line with some "myths" that Clark (2004) argued are not necessarily true, labelling them the "collegiality defensive strategy". However, they still seem to be present in our case study.

On the other hand, we found that engaging in industry collaboration in form of joint research-industry projects and applied research dominates the collaboration landscape. Such collaboration is promoted by the government, and in addition it does allow for publication, which is one of the promotion criteria for academics (Pinheiro et al., 2017). Further, it was found that a university context supportive to such collaboration might be an enabling factor (Etzkowitz et al., 2000), both for industrial collaboration and for the perceived benefits of such collaboration.

This study adds to the discussion on entrepreneurial and engaged universities and their "third mission". While universities' engagement in entrepreneurial and commercial activities is much desired by policymakers, our findings suggest that in the case of regional, middle-sized universities on the peripheries of academia and geographically, industrial collaboration is more prevalent than pure commercialization of research-based ideas. One needs to acknowledge that regional context-embeddedness does matter, but the degree of impact seems to be dependent upon the correspondence between the activities encouraged for agents and their perceived personal goals. In case of Universities, the desire to increase commercialization of innovations from academics through start-ups or licensing might conflict with the academics' perceived personal goals such as ground research or teaching.

Social systems both constrain and enable the discovery, evaluation, and exploitation of opportunities by entrepreneurs. We have established that individuals do not exist separately from their structural context. Attempts to understand them outside of this context cannot, therefore, fully capture their nature. Thus, rather than encourage a general academic population to engage in commercial activities, we suggest that universities in Norway would benefit by directing resources effectively towards a targeted group of academics who feel positively about involvement in commercial activities.

This strategy might increase the success rate of academic entrepreneurs and equip those who are motivated to perform better. Such a strategy would be in line with earlier findings from student surveys, which found that the entrepreneurial intentions of students enrolled in mandatory courses decreased as some of them realized how difficult and demanding entrepreneurial activity was (Oosterbeek et al., 2010). At the same time, the entrepreneurial intentions of students who were enrolled in elective courses, and who were therefore highly motivated to become entrepreneurs, actually increased (Fayolle et al., 2006; Liñán & Fayolle, 2015). This implies that working with targeted populations would provide better results than attempting to engage a larger number of individuals who might not be interested in pursuing an entrepreneurial career.

Our findings have certain policy implications for how to view the “third mission” of regional, medium-sized universities. Understanding and valuing regional context-embeddedness seems to be the key to stimulating the building of truly functional and engaged universities. Instead of attempting to replicate Silicon Valley by raising expectations for university-based start-ups, policies should distinguish between the demands and capacities of regional universities. One evident approach is to encourage industry collaboration through providing supportive regimes, building knowledge among academics about collaboration possibilities, and enhancing collaborative culture. Engaged universities might be of great value in knowledge transfer and in contributing to regional development.

Future research

The objective of this study was to focus on the transformation of a regional, medium-sized Norwegian University into one capable of achieving third-mission goals. This task is not without limitations, as contextual embeddedness does not allow broad generalizations from this study. Our sample was limited to one university, with a rather modest response rate. Therefore, we acknowledge that generalizability of this study is limited, and future research would have to address the same issues applying longitudinal design and in diverse contexts. For example, one might test whether the university context has a different and more distinct effect on academics in other cultures or regions. However, we hope that our results are stimulating and will bring greater attention to the agent-context research in entrepreneurship. Our study calls for more debate on the benefits of having universities encourage academics to become entrepreneurs, and for caution towards “one size fits all” policies. We would also like to see further investigation of means for stimulating an effective and much-needed collaboration with industry and for knowledge spillover from universities to the business world. Can we find ways to change academic values to include a more entrepreneurial approach by resolving conflicts of interest? These questions should be addressed in the future research.

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Appendix 6.1 Constructs used in the study

<i>Construct/source</i>	<i>Items/ Cronbach alpha</i>
Entrepreneurial intentions	Cronbach alpha 0.92
Clarysse et al. (2011), Liñán and Chen (2009), Krueger et al. (2000), and Iakovleva and Kolvereid (2009)	I frequently identify opportunities to start up new businesses I have very seriously thought of starting a business I intend to start a business one day It is very likely that I will start my own business in the next 5 years
Industry collaboration intentions	Cronbach alpha 0.665
inspired by D'Este and Perkmann (2011)	feedback from industry on academic research information of industry problem research income from industry
Controls¹	
Gender	1 for male and 0 for female
Department	categorical variable
Age	ordinal variable
Self-employment experience	1 if yes and 0 if no
University context supportive to entrepreneurship	
adopted from Oftedal et al., 2018	
Regulative dimension	Cronbach alpha 0.936
Financial support licensing	
Financial support patenting	
Financial supporting starting business	
Management recognition starting business	
Management recognition patenting	
Management recognition licensing	
Normative dimension	Cronbach alpha 0.991
Colleagues respect and admire patenting	
Colleagues respect and admire licensing	
Colleagues respect and admire starting business	
Cognitive dimension	Cronbach alpha 0.951
I know of and can speak with colleagues who have licensed ideas	

<i>Construct/source</i>	<i>Items/ Cronbach alpha</i>
I know of and can speak with colleagues who have patented ideas	
University context supportive to industry collaboration	Cronbach alpha 0.951
Financial support and management recognition for IC	
Awareness of and access to colleagues who have IC	

¹ We also tried to enter other control variables such as job title, percentage of research that is applied research, whether respondents were permanent or temporary members of staff, experience of licensing, and experience of patenting, but they were not significant and are not included in final regression.