

Towards Open Innovation in Educational Design

A case study on open innovation practices at Danish Universities



Authors: Tina Aakjær Kristensen (109644) & Gitte Kramhøft Jakobsen (72970)

Date of submission: 18th May 2018

Programme: Graduate Diploma in Innovation Management

Advisor: Merethe Stjerne Thomsen

Number of pages: 70

Number of characters: 155.032

Abstract

Higher education institutions are exposed to increasing pressure from the radical changes in the external environment. Advanced technology, globalisation, competition from Massive Open Online Courses (MOOCs), policymakers, and the business community pose many possible implications for higher education institutions' educational design to meet competencies of the future and follow trends of competitors, as well as potential competitors.

Open Innovation is one of the most debated topics in management literature in the pursuit of innovation performance. Nevertheless, academic research has paid little attention to universities and the organisational and individual challenges in the activity of open innovation. As a result, there is little understanding of the organisational antecedents and their impact on open innovation performance in the university context.

Drawing on the experiences of employees at the University of Copenhagen, Copenhagen Business School and Technical University of Copenhagen, this project identifies and analyse four main themes related to leadership, organisational structures and individuals. It proposes open innovation practices that organisations must facilitate to undertake external engagement. This project will make use of open innovation literature, knowledge management and motivational theories in order to examine the openness from the perspective of employees at the University of Copenhagen, Copenhagen Business School and Danish and Technical University of Copenhagen.

Table of Contents

1	INTRODUCTION	4
1.1	PURPOSE OF STUDY	6
1.2	RESEARCH QUESTION	7
1.3	DEFINITION OF TERMS	7
1.4	RESEARCH STATEMENT	8
1.5	DELIMITATIONS	8
1.6	THESIS STRUCTURE	10
2	LITERATURE REVIEW	10
2.1	DEFINING OPEN INNOVATION	11
2.2	MOVING FROM CLOSED TO OPEN INNOVATION	12
2.3	PRODUCT VERSUS SERVICE ORIENTATION IN OPEN INNOVATION	13
2.4	CONCEPTUAL FRAMEWORK FOR AN INTEGRATED PERSPECTIVE IN OPEN INNOVATION	14
2.5	THE ROLE OF KNOWLEDGE MANAGEMENT IN OPEN INNOVATION	16
2.6	THE ROLE OF THE LEADER IN OPEN INNOVATION AND KNOWLEDGE CREATION	17
2.7	THE ROLE OF ABSORPTIVE CAPACITY IN OPEN INNOVATION	19
2.8	MOTIVATION IN OPEN INNOVATION	21
2.9	ORGANISATIONAL CULTURE AND STRUCTURE	23
2.10	SUMMARY OF LITERATURE REVIEW	26
3	METHODOLOGY	26
3.1	RESEARCH STRATEGY	26
3.2	PRIMARY DATA COLLECTION	26
3.3	SECONDARY DATA COLLECTION	27
3.4	DEDUCTION VS. INDUCTION	27
3.5	EPISTEMOLOGY	28
3.6	ONTOLOGY	29
3.7	RESEARCH DESIGN	29
3.8	CASE STUDY	30
3.9	RESEARCH METHOD	30
3.10	INTERVIEW PROCESS	31
3.11	CHARACTERISTICS OF INTERVIEWEES	31
3.12	RECORDING AND TRANSCRIPTION	34
3.13	TRUSTWORTHINESS AND AUTHENTICITY	34
3.14	LEVEL OF ANALYSIS	35
3.15	PURPOSIVE SAMPLING	36
3.16	SAMPLE	36
3.17	COPENHAGEN BUSINESS SCHOOL (CBS) STRATEGY: 2017 - 2020	38
3.18	UNIVERSITY OF COPENHAGEN (UCPH) STRATEGY: 2018 - 2023	39
3.19	TECHNICAL UNIVERSITY OF DENMARK (DTU) STRATEGY: 2014 - 2019	39
3.20	GROUNDING THEORY	39
4	EMPIRICAL FINDINGS	40
4.1	ANALYSIS CLUSTERS	41
4.2	STRATEGY AND LEADERSHIP	43
4.3	MOTIVATION AND INCENTIVES	45
4.4	PROFESSIONAL IDENTITY	47
4.5	INCENTIVE STRUCTURE	49

4.6	ORGANISATIONAL STRUCTURE AND CULTURE	52
4.7	EDUCATIONAL OPENNESS	57
5	DISCUSSION AND MANAGERIAL IMPLICATIONS	60
5.1	KNOWLEDGE EXPLORATION, RETENTION AND EXPLOITATION	60
5.2	ORGANISATIONAL STRUCTURES	62
5.3	PROFESSIONAL IDENTITY	63
5.4	ABSORPTIVE CAPACITY.....	64
5.5	LEADERSHIP	65
6	CONCLUSION	67
7	FUTURE RESEARCH	69
8	BIBLIOGRAPHY	71
9	LINKS	74
10	APPENDICES	75
10.1	APPENDIX 1 - NOTES FROM CBS BOARD OF MANAGEMENT MEETING ON 14TH DECEMBER 2017	75
10.2	APPENDIX 2 - THE DANISH HIGHER EDUCATION SYSTEM.....	75
10.3	APPENDIX 3 - LEADERSHIP ACTIVITIES FOR KNOWLEDGE CREATION	75
10.4	APPENDIX 4 - INTERVIEW GUIDE.....	75
10.5	APPENDIX 5 - CODE RANKING	75
10.6	APPENDIX 6 - ORGANISATIONAL CHARTS CBS / DTU / UCPH	75

1 Introduction

Knowledge economies are increasingly concerned with requirements to future competencies of its workforces. The pace at which globalisation, demography, digitisation and advanced technologies change the agenda of society and industry broadens the scope of innovation, education and lifelong learning. The platform economy is in the early stages of disrupting higher education institutions by democratising higher education offering online higher education. Following, new opportunities and requirements as well as challenges arise for the established higher education institutions (HEIs).

“Learning for the knowledge based economy, according to policymakers’ claims, requires individuals to acquire measurable knowledge or skills in the form of qualifications through formal education and training” (James et al. 2013, p. 243). Reports on higher education from Uddannelses – og Forskningsministeriet¹ (March 2018) and European Commission (2013², forthcoming³) show new value propositions in the HEIs external environment, in terms of learning objectives, learning formats and students capabilities.

Business leaders from the Danish business community actively and often contribute to this debate. Flemming Besenbacher (2018)⁴, Carlsbergfondet, is one of the leaders who take a stand. He believes that the Danish educational system should carry characteristics of flexibility, boldness, and focus on integrating research into society and business. He believes that the fourth industrial revolution calls for a “flexication” model where students can update their competencies in agile ways to respond to the rapid changes in society. This sentiment is shared by Pernille Erenbjerg, TDC, and Stine Vrang Elias, DEA (2018)⁵, who are both members of the Danish Disruption Council. They find a misalignment in the fact that Denmark has one of the most flexible and agile labour markets in the world, but an educational system that hinders students from moving across university programmes and with a lack of focus in terms of bridging theory and practice. Furthermore, the new generations already have the options to “shop online” when it comes to educational offerings like e.g. MOOCs (Massive Open Online Courses). Flemming Besenbacher

¹ <https://ufm.dk/publikationer/2018/filer/rapport-universitetsuddannelser-til-fremtiden.pdf>

² <https://publications.europa.eu/en/publication-detail/-/publication/fbd4c2aa-aeb7-41ac-ab4c-a94f6ea9eb1f>

³ http://ec.europa.eu/education/policy/higher-education/quality-relevance_en

⁴ http://www.carlsbergfondet.dk/da/Nyheder/Nyt-fra-fondet/Nyheder/Kronik_Taenk-vildt-taenk-nyt-taenk-langsigtet

⁵ <https://www.b.dk/kronikker/saadan-uddanner-vi-klogt-til-fremtiden>

challenges the conditions under which university researchers work as the heavy focus on research publications fosters a very individualistic mindset, where measures of quality becomes absent due to the quantification of research. “Unfortunately, this has resulted in the fact that many researchers’ sole focus is on I, me, and myself, on publication of articles and improvement of their scientific cv.”⁶ This trend is counterproductive to a world of rapid changes in need of research like ever before, and where researchers have the obligation to contribute. The universities have a huge responsibility as lifelong learning has become a basic condition. Unfortunately, according to Flemming Besenbacher, the universities show distinct conservatism and change inertia.

As such, the Danish HEIs will need to decide how to respond to these changing needs. Moreover, they will need to proactively stay ahead of the competition arising from a rapidly changing environment. Innovation is the driver for growth and differentiation, and HEIs need to find new ways to meet new educational targets and the potential threat of disruptors. Furthermore, the HEIs have a strong obligation towards society in terms of bridging research into practice. One way is to leverage their dynamic capabilities (Zahra and George 2002) in their innovation efforts. Innovation sources can be widely distributed and possess different types of knowledge, which influences the novelty of their inventions/innovations (Schilling 2017). Open innovation is increasingly being used to leverage innovation capabilities (Chesbrough and Crowther, 2006); however, the open innovation literature also evidences that the transition from closed to open innovation comes with challenges related to company culture and how employees adapt as well as changes in leader roles.

How Danish HEIs currently prepare educational design for students to meet the demands of these radical changes has therefore been the inspiration of this project.

The Danish HEIs are aware of the importance of thinking openly and innovatively within both research and educational environments (elaborated further in the methodology section). At a Management Board meeting at CBS on 14th December 2017, (appendix 1) the Dean of Education expressed that the “largest challenge for the educational area is that the focus from students, faculty, university management as well as politicians and authorities to a high degree is on

⁶ http://www.carlsbergfondet.dk/da/Nyheder/Nyt-fra-fondet/Nyheder/Kronik_Taenk-vildt-taenk-nyt-taenk-langsigtet (translated by authors)

performance and very little on substance (learning, values, innovation and development force)⁷. The Board discussed the possibility of this challenge being routed in e.g. lack of enthusiasm within the organisation and the significance of leadership in that connection. As such, an awareness of a need to respond to changes is established, but it also seems to be recognised that innovation within the educational area is strongly linked to enthusiasm and leadership.

1.1 Purpose of study

There are many definitions of innovation depending on the outlook. However, in this context innovation is defined as “the creation of new knowledge from the application of existing knowledge” (Gold et al. 2001 p. 190). Knowledge creation is therefore a driver for innovation “..that seeks to optimize the firm’s capacity to create and apply new knowledge in order to facilitate organizational innovation..” (Riordan 2013). With knowledge being the very foundation of education, and a driver for innovation, this project will explore how an open innovation mindset in the design of education is currently integrated in a sample of three Danish HEIs. As knowledge creation is seen as a driver for innovation and the definition of open innovation being “the use of purposive inflows and outflows of knowledge to accelerate internal innovation” (Chesbrough, 2006), the HEI context is a natural environment to seek to explore the phenomenon of Open Innovation. Looking pragmatically at HEIs, it could be assumed that all competencies and preconditions to initiate open innovation resided in-house. At least when trusting the notion that knowledge is the foundation of innovation, and that HEIs are generators and facilitators of knowledge. However, opening up for letting knowledge flow beyond organisational boundaries requires an organisational design which supports that. “Design elements of the organisation need to adapt as the organisation transitions to Open Innovation (OI)” (Bogers et al. 2017 p. 22). Lašáková et al. (2017) have identified “detailed conscious strategic planning and vision for innovativeness” as a driver directly linked to innovation in the HEIs. This requires a further look into the organisational antecedents of the HEIs as the integration of open innovation is linked to strategy and organisational culture.

Open innovation has proved successful in many other contexts (Chesbrough 2003a, b, 2006, Gassmann et al. 2010). However, through an extensive search through open innovation literature,

⁷ Notes from CBS Management Board meeting on 14th December 2017. Translated by authors.

the phenomenon remains rather unexplored in an HEI context. The findings derived from this project seek to fill this gap to contribute to the existing literature by findings and understandings of the open innovation phenomenon in a higher education context in Denmark.

1.2 Research question

Research question:

How integrated is open innovation in the design of education currently in selected Danish HEIs?

1. What are the organisational antecedents critical for facilitating open innovation?
2. What is the leadership approach to open innovation?
3. What are the main obstacles faced by Danish HEIs in order to implement open innovation?

1.3 Definition of terms

HEIs	Higher Education Institutions in this project is defined as the sample of Danish universities only. In a broader definition, Higher Education Institutions in Denmark also count business academies and university colleges. See overview in Appendix 2.
Educational design	Educational design means the process of designing and redesigning programmes and courses for teaching and learning purposes.
Antecedents	Critical factors that affect the open innovation environment by blocking or enabling open innovation.
Dynamic capabilities	The firm's ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments (Teece et al. 1997).
Capabilities/capacities	The conceptual framework defines capabilities as capacities needed to form the basis of developing dynamic capabilities for managing open innovation. E.g. absorptive capacity.
Faculty	Teaching and research staff at the sampled HEIs.
Professional Identity	Relates to the research area of the individual faculty and the fact that faculty has a dual profession, i.e. teaching and researching.

1.4 Research statement

The case study aims at evaluating the current environment for integrating open innovation practices in the educational design with individual and firm level capabilities as the point of departure. The case study furthermore seeks to investigate the organisational antecedents enabling or blocking open innovation practices.

Open innovation in this context is concerned with the design of education. This means sourcing external knowledge by opening programme development to include knowledge and competencies from external parties (students, alumni, universities, companies, high schools, or other industries.). As such, this case study was designed to explore the organisational factors critical for creating open innovation processes with focus on programme development for Danish HEIs. This includes how an open innovation approach to educational offerings may help meet the changing needs for competence development.

1.5 Delimitations

During the initial phases of the research, it became clear that the research area of open innovation within the HEI context is limited. Therefore, the conceptual framework guiding the data collection and the literature review supporting the analysis were not specifically developed to the HEI context. These limitations will be argued in the literature review. The fact that this is an immature research area triggered curiosity to explore this further hoping to contribute with new perspectives.

The interviews were decided to only carry the opinions of engaged faculty at the sampled Danish HEIs. This means that the opinions of external parties were not included empirically. The external parties such as collaboration partners and contributors to knowledge were merely treated through the viewpoints of interviewed staff at the sampled HEIs and through secondary qualitative data. However, it would have been interesting to research the needs, competencies and viewpoints of collaboration partners as well. That would however mean that the project was likely to take character of a market research project, which was not the intention.

A decision was made to sample only three Danish universities to provide insight into the research topic. As there are eight universities in Denmark, sampling all of them would likely have

contributed to a more in-depth analysis. Furthermore, as it was decided most interesting to reach the engaged faculty who had personal experience in opening up the knowledge search to benefit programme development, the characteristics of the interviewees (except one) did not include those who were less engaged. In case of a more holistic approach to all faculty, the findings would likely include broader variety of aspects. For example the NIH attitude, which is explained in the literature review, would likely be more evident had the disengaged faculty been included. It is acknowledged that due to the rather small sample, this project cannot finally conclude the scope at each organisation, nor to which extent open innovation is practiced at department or faculty level.

Another limitation concerns the large clusters that were derived from the coding of the interviews. Each of the clusters could provide for entire research projects on their own, but all of them was deemed relevant to include. As such, attempts were made to go deeply into each cluster, knowing that more perspectives could have been provided. However, the clusters were treated with the specific focus of open innovation in educational design, and not sought to include elements beyond this subject.

A final limitation was to not include the business model of the HEIs. It is acknowledged that when implementing open innovation into an organisation, an alignment of the business model is needed (Foss & Saebi 2014). However, including business model innovation would direct the project in a different direction and require a much larger emphasis on strategy than was deemed possible within the nature of this project. The aim was to research the faculty attitude and capabilities towards open innovation within educational design, and how the HEIs are structured to support that.

1.6 Thesis structure

In the following a brief overview of the structure of this project is provided.

Chapter 1:

Introduction: introduces the background, purpose, relevance and research question behind this case study.

Chapter 2:

Literature review: introduction of the conceptual framework and supporting literature relevant for the case study.

Chapter 3:

Methodology: introduction of methodological approach to answer the research question and sub-questions, including elaboration on data collection and analysis.

Chapter 4:

Analysis: analysis of empirical data and connection to applied theories and literature.

Chapter 5 & 6:

Discussion and conclusion: discussion of significant findings from the analysis as well as reflections.

Chapter 7:

Future research: suggestions for future research paths.

2 Literature review

In this section, literature relevant to the research will be reviewed in order to qualify researching open innovation in the context of Danish HEIs. The point of departure is in the open innovation literature. While it will be further elaborated, it is important to state in which terms open innovation is treated. Attention is given to the capabilities of knowledge exploration and exploitation in HEIs with focus on educational design, in particular on the individual and firm level. The organisational capabilities and antecedents in open innovation define the boundaries of this project, and as such are guidance for our review of extant literature.

The transition from closed to open innovation entails cultural and structural implications which were sought to identify and analyse, integrating theory from other research directions which links to open innovation practices relevant to the project. These theories include motivational theory, knowledge management theory and theoretical perspectives on leadership for open innovation, absorptive capacity and organisational culture.

2.1 Defining open innovation

Open innovation assumes that the firm can exploit opportunities in their innovation efforts by systematically exploring a range of both internal and external sources of knowledge and integrate with existing capabilities. Extant literature has provided different perspectives on external knowledge sources in open innovation, such as networks, partnerships and alliances, customers and users and suppliers (Bogers et al. 2017, Gassmann et al. 2010).

Chesbrough is considered the father of open innovation and has defined open innovation as “.. the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively”. Moreover stating that “Firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology” (Chesbrough, Vanhaverbeke, & West, 2006, p. 1).

Over time, the literature extended beyond R&D and technological leverage to understanding how open innovation is practiced, and define the determinants leading to successful implementation of open innovation. Open innovation is a relatively young concept, and while a lot of research has been done, the concept of open innovation has not yet qualified entirely as a theory per se. Lichtenthaler (2011, p. 80) quotes Chesbrough et al. (2006) in saying that open innovation may rather be perceived as a framework which entails various approaches to managing innovation. Bogers et al. (2017, p. 9) supports this view by encouraging much more research to be done on open innovation as it is currently to regard as a phenomenon rather than a theory. Therefore, open innovation is treated as a phenomenon and a concept throughout this project, which direct the approach to be conceptually based. This does not mean that the research is not qualified theoretically; it means that the approach to the framework used in this project is based on a conceptual framework. The theoretical foundation is found in related and more mature research fields, which is largely chosen based on the answers retrieved in the qualitative data collection.

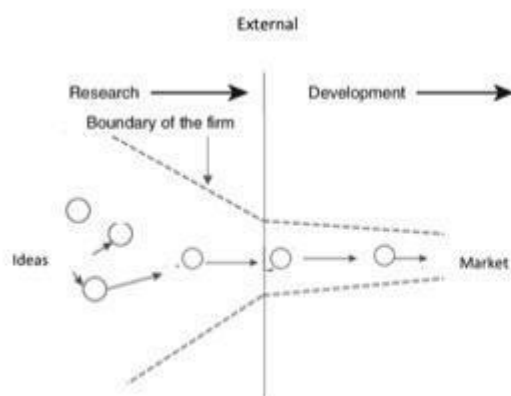
Upon an extent literature review that acknowledges the broader perspectives grown out of Chesbrough’s (2003a) first formulation, Chesbrough & Bogers (2014) suggest that open innovation should be conceptualised to “..a distributed innovation process based on purposively managed knowledge flows across organizational boundaries”. This will serve as the definition of open innovation for this project.

2.2 Moving from closed to open innovation

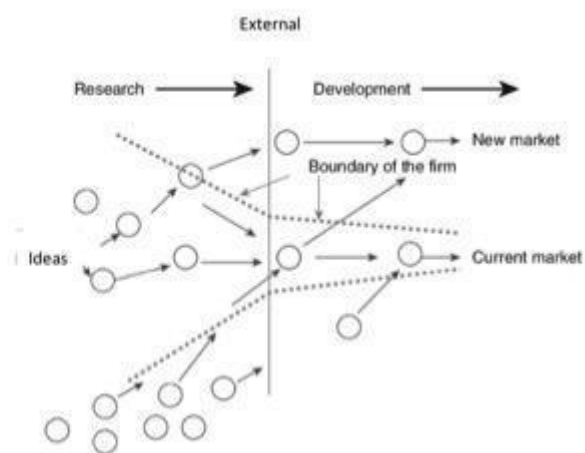
In contrast, closed innovation principles prompt a high degree of self-reliance and purpose of control assuming that the best ideas reside inside the firm and profit from these should only be developed and used internally to gain competitive advantage (Chesbrough 2003a, 2003b). Moreover, focus is on the ability to control intellectual property (IP). The innovation funnels in figure 1 illustrate the conceptual difference in the innovation model, showing that innovative outcome with a closed innovation is based on in-house knowledge capabilities, while the open innovation approach depends on the interaction with external sources of knowledge and research across firm boundaries to enhance the innovative outcome and commercialisation into new markets.

Figure 1

Closed innovation funnel



Open innovation funnel



Source: Chesbrough 2003a, 2003b, modified by authors

2.3 Product versus service orientation in open innovation

The perspective of manufacturing firms and commercialisation of products dominate extant open innovation literature. Particularly technology and R&D heavy businesses have received attention on how innovation is shaped and developed (Chesbrough, 2003a, 2006) and leveraged.

The limitations to the HEI context are recognised, and little literature has been identified in the university context. The open innovation research covering HEIs addresses mostly the university and industry interaction around R&D, implicating different aspects related to knowledge transfer in collaborations, implications of IPs and control systems. An attempt to frame this limitation of the literature has been done in the following.

In the context of HEIs' openness to educational design, this project proposes that HEIs share the characteristics of service firms. HEIs are knowledge institutions with firm characteristics, providing education services to students benefiting both students, business community and society.

Open innovation for products and services are both concerned with leverage into commercialisation. However, there are distinct differences in the value capture and innovation processes. Open innovation of **products** focus on the value capture that lies in, and is measured by, economic, technological and/or R&D performance. Leverage of open innovation is therefore often achieved through collaborations and partnerships with actors in the value chain. Open innovation in **services** is less tangible and more difficult to measure, which is why the value capture is reflected in the customer experience (Chesbrough 2011). Open innovation in **services** therefore requires working closely with customers to develop new solutions, suggesting iterative approaches involving customers in co-creation and transfer of tacit knowledge between supplier and customer to meet customer utility in the offerings (Chesbrough 2011).

This project is concerned with open innovation practices and even more the underlying organisational capabilities and antecedents relating to the open innovation knowledge processes. Since the antecedents of openness are perceived to share contingencies in the cultural perspective across different types of organisations, it is trusted that the open innovation concept can be applied to the HEI context of open innovation adoption. However, bearing in mind the implications

of product vs. services open innovation when drawing from the product and service open innovation literature.

2.4 Conceptual framework for an integrated perspective in open innovation

The lens through which managing capabilities for open innovation will be analysed is introduced in the conceptual framework by Lichtenthaler (2011). This will be used to understand the “distinct capabilities and skills that firms need to develop internally at multiple levels to become successful in implementing open innovation” (Lichtenthaler 2011, p. 84). Lichtenthaler & Lichtenthaler already introduced the predecessor for this framework in 2009. However, the initial concept had a broader view into managing knowledge towards innovation and dynamic capabilities: “Knowledge management capacity is a dynamic capability, which reconfigures and realigns the knowledge capacities” (Lichtenthaler 2009, p. 1315). The capacities developed in 2009 are equivalent to those in the 2011 framework, and are through this lens regarded as dynamic capabilities. The initial concept was seen as a framework for knowledge exploration, retention and exploitation internally and externally. With the 2011 framework, Lichtenthaler takes a distinct interest in the attitudes of individuals and capacities (capabilities) at both individual and firm level. Furthermore, the knowledge management processes for managing open innovation at three levels of analysis come into focus. As such, the framework takes its starting point in managing capabilities for knowledge exploration, retention and exploitation respectively. It suggests looking at these three modes internally and externally while concentrating on three levels of analysis: individual, project and firm level.

The complete Lichtenthaler (2011) framework is illustrated below:

		Knowledge exploration	Knowledge retention	Knowledge exploitation
Internal	Organizational level	Inventive capacity	Transformative capacity	Innovative capacity
	Project level	Make decision	Integrate decision	Keep decision
	Individual level	Not-invented-here	Not-connected here	Not-sold-here
External	Organizational level	Absorptive capacity	Connective capacity	Desorptive capacity
	Project level	Buy decision	Relate decision	Sell decision
	Individual level	Buy-in	Relate-out	Sell-out

Source: Lichtenthaler (2011, p. 80)

This is an integrated framework developed via experience from private-sector production companies primarily. As such, going through the entire framework from A-Z did not make sense in this public-sector context and due to the limitations of this project. Therefore, the attention was given to only two of the levels of analysis, leaving out the project level. As such, the capabilities at individual and firm level in the sampled Danish HEIs were investigated through this framework looking at knowledge exploration, knowledge retention and knowledge exploitation internally and externally. The framework, even with its shortcomings in terms of total match to the open innovation management at Danish HEIs, was found transferable to the context as far as capabilities at individual and firm level are concerned. The first is relevant as it links to attitudes of the individuals, e.g. with regards to incentives for open innovation, and the second is essential to provide perspectives on managing open innovation and investigating organisational capabilities. The framework also suggests the link between open innovation capabilities and organisational structure for e.g. incentives, as well as organisational culture for open innovation. As displayed in the framework visual above, Lichtenthaler (2011) is concerned with capacities in the different modes of knowledge at the different levels of analysis. Leaving out the project level, the adjusted framework for the analysis of this project looks like this:

		Knowledge exploration	Knowledge retention	Knowledge exploitation
Internal	Organizational level	Inventive capacity	Transformative capacity	Innovative capacity
	Individual level	Not-invented-here	Not-connected here	Not-sold-here
External	Organizational level	Absorptive capacity	Connective capacity	Desorptive capacity
	Individual level	Buy-in	Relate-out	Sell-out

Source: Lichtenthaler (2011, p. 80)

Therefore, to answer our research question on how an open innovation approach is integrated currently and which organisational antecedents are critical for facilitating open innovation at the sampled Danish HEIs, the analysis was made by means of Lichtenthaler's conceptual framework, the theories explained in the following section and empirical findings.

Lichtenthaler framework explained:

		Knowledge exploration	Knowledge retention	Knowledge exploitation
Internal	Organizational level	Inventive capacity	Transformative capacity	Innovative capacity
		Ability to explore and generate new knowledge	Ability to maintain knowledge	Ability to match inventions with context of final markets
	Individual level	Not-invented-here attitude	Not-connected here attitude	Not-sold-here attitude
		Negative attitudes toward externally exploring knowledge	Negative attitudes toward externally retaining knowledge	Negative attitudes toward externally exploiting knowledge
External	Organizational level	Absorptive capacity	Connective capacity	Desorptive capacity
		Ability to explore knowledge	Ability to maintain knowledge	Ability to transfer knowledge to recipient
	Individual level	Buy-in attitude	Relate-out attitude	Sell-out attitude
		Positive attitudes toward externally exploring knowledge	Positive attitudes toward externally retaining knowledge	Positive attitudes toward externally exploiting knowledge

Source: Lichtenthaler (2011, p. 80)

2.5 The role of knowledge management in open innovation

As earlier indicated, open innovation within services is closely related to knowledge transfer. In order to understand the integrated perspective of Lichtenthaler's conceptual framework (Lichtenthaler 2011), it is important for this project to discuss the literature perspective on organisational knowledge creation.

In his seminal work on organisational knowledge creation, Nonaka (1994) demonstrates four different modes of knowledge conversion, named SECI, covering;

- Socialisation, from tacit to tacit knowledge, arising from shared experience
- Externalisation, from tacit to explicit knowledge, arising from relating contradicting concepts
- Combination, from explicit to explicit knowledge, arising from reconfiguring of existing knowledge
- and Internalisation; from explicit to tacit knowledge, arising from learning.

The knowledge creation is generated in the conversion between tacit and explicit knowledge, initiated by the individual and enlarged in the interaction between individuals. Tacit knowledge is contextual and informal from experience and values at the individual level, whereas explicit knowledge is factual and formalised. When passing through the four modes in a spiral knowledge process, knowledge is enlarged from the individual to the collective and up to the organisational level, and becomes useful for the whole organization.

Nonaka uses *Ba* to synthesise the knowledge conversion (Nonaka & Konno 1998). *Ba* represents a shared space for emerging relationships, whether physical, virtual or mental or combined, thus *Ba* provides a platform for advancing individual and/or collective knowledge. Nonaka (1998) suggests four different *Ba*'s, each enabling a certain process in the SECI knowledge conversion modes;

- the Originating *Ba* representing socialisation, characterised by the conversion and transfer of tacit knowledge in face to face interactions;
- the Interacting *Ba* representing externalisation, characterised by the tacit knowledge converted to explicit knowledge in peer to peer interactions;
- the Cyber *Ba* representing combination, characterised by the new explicit knowledge being assimilated to existing knowledge through communication and diffusion in group to group interactions;
- and the Exercising *Ba* representing internalisation, characterised by explicit knowledge conversion into on-site tacit knowledge, often relating to strategy and innovation.

Failure or constraints in the knowledge conversion prevent the organisational knowledge creation (Nonaka 1994). Managing the knowledge creation process thus affects the scope of the organisational knowledge creation.

2.6 The role of the leader in open innovation and knowledge creation

Open innovation stipulates different traits of the leader than closed innovation. Blurred boundaries and increased complexity from new collaborations and partnerships affect open innovation leadership in terms of competencies, behaviours and interactions in building motivation, trust and coherence. The literature does not directly address open innovation leadership attributes, nor define open innovation leadership. However, knowledge sharing is a

prerequisite for knowledge creation, which in turn is the basis for innovation. In the following, leadership is therefore treated in the interplay of knowledge management and open innovation.

Nonaka (1994) distinguishes between top-down-, middle-up-down and bottom-up management having different sources and effects on the knowledge creation and the role of the leader. Nonaka thereby demonstrates how different leadership approaches influence the knowledge conversion. Top-down management is hierarchical and controlled leading to explicit knowledge accumulation primarily. Middle-up management is distributed leadership with self-organising team orientation and middle managers as catalysts enabling explicit and tacit knowledge accumulation. Bottom-up allows a high degree of individual autonomy with high accumulation of tacit knowledge at the individual level, with the leader as sponsor. The different leadership approaches demonstrate the level of knowledge conversion and the organisational capabilities to create new knowledge in the interchange of explicit and tacit knowledge.

Open innovation requires dynamic intra- and inter-organisational interaction and extent knowledge sharing. Achieving critical organisational objectives, such as interests and results, is often subject to inadequate resources and internal resistance. To support these objectives, Nonaka et al. (2008) emphasises the importance of communication. Developing shared goals requires shifts and negotiations of self-identities in order to expand the perspective of individuals, which is why open innovation leadership needs to integrate self-interest, vision and purpose. "The role of the leader begins with setting the vision and the driving objective, and ensuring the consistent understanding of these so the entire organisation can understand and commit to them" Nonaka et. al (2008, p. 206). Therefore, the guiding principle for open innovation leadership is to unleash the collective potential and common purpose, which includes coherence and trust.

In an extensive literature review on leadership in organisational knowledge creation, von Krogh et al. (2012) builds upon Nonaka and the work of other scholars and suggests that "Leadership activities are recognized by organizational members as 'virtuous acts' by individuals who serve their practices beyond their short-term self-interest" (von Krogh et al., 2012, p. 256). Open innovation leadership produces and maintains self-managing structures that cross organisational boundaries. Authority in distributed leadership is fluid and not fixed to roles or structural positions (von Krogh et al. 2012), and therefore open innovation leadership relies on trusting individuals to

make the right decisions. The literature review extends findings into a theoretical framework that offers an integrated view between leadership and the interaction of SECI, *Ba* and knowledge assets. The framework suggests three layers in the knowledge creation process where the role of the leader differs and at times requires simultaneous leadership approaches. For instance this can be seen in the conditional layer where centralised and distributed leadership co-exist within the same organisation, with top management as coordinator and facilitator, and self-management at lower levels. Resources are represented by distributed leadership, whereas context is represented by centralised leadership. The core layer represents the local knowledge creation with distributed leadership and self-organisation, opposite to the structural layer where centralised leadership is required to set the goals, direction and frame for knowledge creation (appendix 3).

Open innovation leadership must promote the development of knowledge infrastructure capabilities, enabling knowledge creation and value capture across organisational boundaries.

2.7 The role of absorptive capacity in open innovation

When opening up the organisational boundaries to the external environment, the open innovation literature shows that different organisational capacities are required, and to benefit from external knowledge, firms must initially develop their “absorptive capacity” (Cohen and Levinthal 1990; Laursen and Salter 2006). The literature on absorptive capacity shows different perspectives of its components. This project selects a few, which will be reviewed in the following, whereafter the perspective of this project will be provided, acknowledging the limitations to extant literature on absorptive capacity.

In their seminal paper, Cohen and Levinthal define absorptive capacity as “the ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen and Levinthal, 1990: 128). Zahra and George (2002) broadened the perspective of absorptive capacity to comprise four dimensions of dynamic capabilities, acquisition and assimilation as “potential absorptive capacity”; and transformation and exploitation as “realised absorptive capacity”, both being complementary components of absorptive capacity. Acquisition refers to identifying and acquiring new external knowledge. Assimilation refers to the processes used to interpret and process new external knowledge into the existing knowledge base. Transformation refers to facilitating and combining the acquired knowledge to create new

knowledge and is particularly relevant when new knowledge is not easily assimilated. Exploitation refers to leveraging the new knowledge and building upon existing competencies. Lichtenthaler and Lichtenthaler (2009) addresses the subset integrative capacity which encompasses the ability to assimilate external knowledge into the innovation process and transform it into new knowledge, defining absorptive capacity as “a firm’s ability to explore external knowledge” (Lichtenthaler and Lichtenthaler 2009 p. 1319).

The literature shows that different antecedents to absorptive capacity exist on both the individual, organisational and management level. Cohen & Levinthal argue that “An organization’s absorptive capacity will depend on the absorptive capacities of its individual members” (Cohen and Levinthal, 1990: p. 131), but also recognize that “...an organization’s absorptive capacity is not resident in any single individual, but depends on the link across a mosaic of individual capabilities” (Cohen and Levinthal, 1990: 133). In a literature review on absorptive capacity by Volberda et al. (2009), existing theory on managerial cognition is retrieved showing that managers may be subject to their own perception, and in their role gradually form what is termed “dominant management logic”. Managers can strongly impact knowledge-related processes in organisations, hence absorptive capacity, by continuously developing theories about their environment and adopt these in their dominant logic, influencing the cognitive processes on the managerial level.

Dominant management logic limiting absorptive capacity is more often seen in traditional hierarchical organisations, where the organisation is often perceived as a tool rather than an organism. As such, opportunities in the surrounding environment are not acknowledged. However, “dominant management logic” can also support absorptive capacity by communication to potential adopters in the organisation which emphasises the importance of individuals’ competencies and motivate to absorb external knowledge. The effectiveness of these actions however is subject to the existing knowledge base of these individuals. Previous adopters and prior knowledge have a restraining effect from central information, while related experiences seem to strengthen it. Cohen and Levinthal (1990) posit that the learning potential for absorptive capacity is determined by prior related knowledge, which is supported by other empirical studies. Volberda et al. (2009) shows that common knowledge in terms of expertise, training or background characteristics support absorptive capacity.

In regard to the intra- and inter-organizational antecedents, Volberda et al. (2009) further establishes from the literature that knowledge-sharing within organisations and between organisations is important for absorptive capacity. The internal organisation structure having separate departments may be able to absorb different kinds of knowledge and possesses different capabilities to transfer knowledge. The level of interaction activity and depth increase mutual understanding and connectedness, and thereby the prospect of knowledge transfer and assimilation. This in particular applies to tacit knowledge. Moreover, Zahra & George (2002) suggest that formal and informal social integration mechanisms will lower the barriers between assimilation and transformation in the exchange of knowledge and ideas.

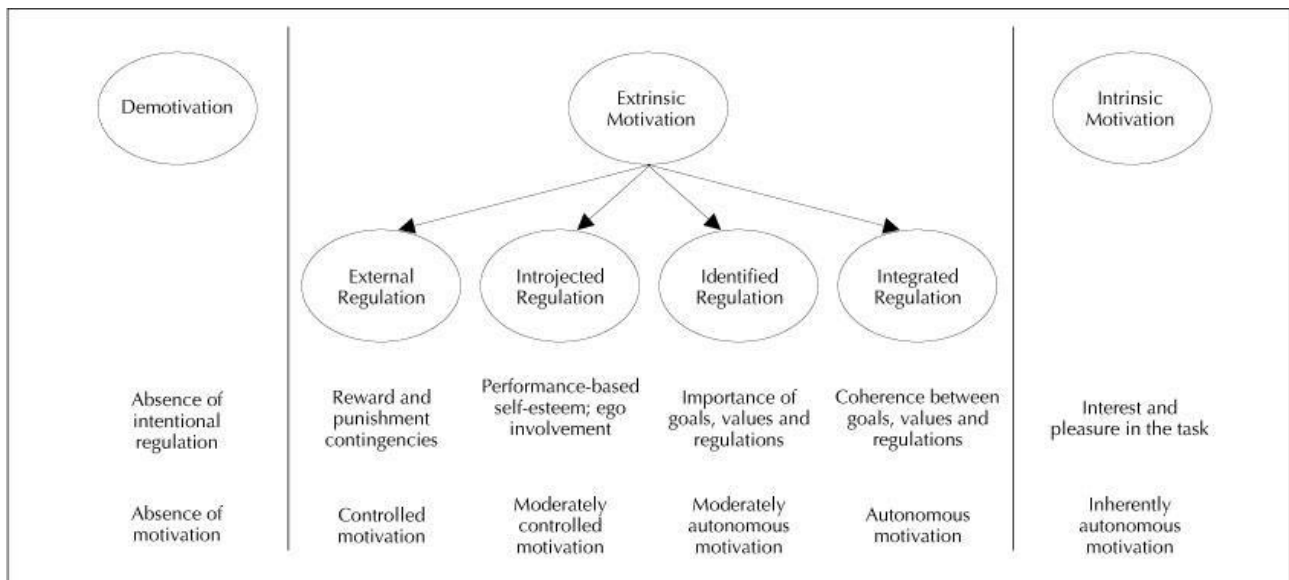
In this project, absorptive capacity is further considered to cover the ability to explore and recognise the value of new external knowledge, the integration with existing knowledge, the forming of new knowledge and the exploitation of new knowledge by building upon existing competencies.

2.8 Motivation in open innovation

At the heart of innovative efforts whether it involves open or closed innovation lies motivation. Motivation is a key component in enabling and encouraging individuals to perform an activity, and it comes in different types. According to the self-determination continuum (SDT) presented by Deci & Ryan (1985) in Gagné & Deci (2005), there are behavioural reasons why individuals are motivated differently, which has to do with basic needs. These are the need for autonomy, competence and relatedness which will be addressed further below. In the SDT, Deci & Ryan (1985) distinguish between intrinsic and extrinsic motivation, but on a larger scale than just the two terms in isolation. Intrinsic motivation is triggered when an individual has a sincere interest in an activity where the reward is satisfaction and fulfilment at a personal level. The intrinsic motivation is prototypically autonomous. Extrinsic motivation is recognised by exerting behaviour towards a reward that lies outside of the individual, e.g. a monetary or verbal reward. Extrinsic motivation is prototypically controlled. While acting extrinsically provides a controlled form of motivation in its pure form characterised by external regulation, acting with autonomy imposes a sense of volition and choice, which provides internal regulation (Gagné & Deci 2005, p. 334). Both

autonomous and controlled motivations are intentional and contrast the term demotivation on the SDT continuum:

Figure 2



Source: Gagné & Deci (2005, p. 336)

A component of the SDT is that the self-regulation and integration of organisational goals, values and regulations within the activities that the individuals perform are key to intrinsic motivation, which leads to creative processes needed for innovation. “..Tangible rewards and other extrinsic factors such as competition and evaluations can be detrimental to outcomes such as creativity, cognitive flexibility, and problem solving which have been found to be associated with intrinsic motivation” (Gagné & Deci 2005, p. 333). A similar viewpoint on intrinsic motivation is shared by Herzog (2011, p. 98): “Intrinsic motivation drives self-initiated activities and, thus, high levels of intrinsic motivation are assumed to result in high levels of spontaneous, innovative behaviours from innovation team members”. In summary, intrinsic motivation is a driver for innovation as the reward itself carries out the activity with a feeling of pleasure and autonomy, which leads to creative processes. However, it is also evident that extrinsic motivation can act as a generator of innovation. Trusting the SDT continuum and the theories on fulfilling needs such as competence, autonomy and relatedness, the type of extrinsic motivation that comes closest to intrinsic motivation is the Integrated Regulation (figure 2). The difference between this extrinsic type of motivation and the intrinsic type is essential even though they are quite related. Within extrinsic integrated regulation, the activity becomes autonomous, even though the activity is not

necessarily of sincere interest to the individual. However, the activity will be instrumentally important for personal goals and regulated accordingly (Gagné & Deci 2005, p. 335). Thereby it can possibly lead to an innovative mindset. Herzog (2011) establishes that extrovert, proactive and results-oriented personality is more driven by intrinsic than extrinsic motivational factors. Firms with incentive systems stimulating intrinsic and extrinsic motivation, such as reward and recognition, achieve higher innovation outcome (Amabile 1996, Fu 2012). It is also recognised that continuous commitment correlates with long-term incentive schemes (Fu 2012).

As such, motivation is relevant on the parameters of what drives the individual towards an activity and how well that individual integrates own values with organisational goals.

2.9 Organisational culture and structure

Succeeding with open innovation on the organizational level requires a culture and structures that appreciate and pay attention to new ideas regardless of whether these ideas originate from internal or external sources.

Ideas usually originate from individuals. Innovation is however often the result of different individuals, who in joint effort are willing to develop ideas into innovation. A positive innovation culture must encourage and reward the development of new ideas. Emphasising creativity is therefore one of the most important features of an innovation culture (Herzog 2011). From a structural point of view, Amabile & Khairi (2008) suggest that innovators should be protected from bureaucracy in order to be able to explore the creativity for innovation without having to consider all the possible restraints. Also, showing the impact of the innovative outcome as well as granting independence is key. Independence and intellectual challenge are also highlighted as key drivers, which relates to the SDT in terms of need for autonomy and competence. Furthermore, Amabile & Khairi (2008, p. 7) state that the desire for independence is associated with high productivity and that passionate individuals need support to pursue and apply the innovative mindset. In essence, to achieve open innovation capabilities and creative processes, a decentralised structure allowing for experimentation and bottom-up inspiration is needed (Amabile & Khairi 2008, p. 5).

Amabile (1996) emphasises the work environment that fosters creativity and creative behaviour and finds that autonomy and freedom will foster ownership, as well as resources may influence the level of creativity. More importantly, encouragement of creativity, which associates with risk willingness and tolerance of failure, will encourage experimentation and learning from failure. Herzog (2011) establishes from the literature that innovation is promoted in cultures which permit freedom of expression in communication and discussion. Along accepting failure, individual participants need to feel free to express their opinions and beliefs during the innovation process.

Hierarchical structures of many organisations create barriers for sharing knowledge across functions and among people of different status (Amabile & Khaire 2008). The opposite structure to the hierarchical structure is the adhocracy, which supports open innovation. Where hierarchy is characterised by rules, regulations and uniformity, adhocracy is characterised by entrepreneurship, creativity and adaptability. Furthermore, the hierarchical structure focuses on stability and predictability while the structure of adhocracy has its emphasis on innovation, growth and new resources (Herzog 2011, p. 67).

Although firms may be willing to open innovation approaches, they might not be able to do so without sufficient absorptive capacity. The “not-invented-here syndrome” (NIH), which exists on the individual level, is obstructive to absorptive capacity. NIH is therefore often suggested to be among the main cultural challenges and barriers to open innovation (Chesbrough & Crowther 2006, Gassmann et al. 2010, Salter et al. 2014, Burcharth et al. 2014), implicating that to practice open innovation, a cultural open mindset to external knowledge must be present. Katz and Allen (1982) were the first to introduce the NIH based on an empirical study in R&D project groups that showed resistance to external ideas which were restricting performance gains. Intra-organisational challenges arise from employees’ unwillingness to extra-organisational knowledge as well as extra-organisational knowledge transactions in the form of negative attitudes against the sourcing of external knowledge (NIH) and against the external exploitation of knowledge assets (the not-shared-here (NSH) syndrome) (Burcharth, Knudsen, and Søndergaard 2014). In the Lichtenthaler (2011) framework, the opposite of NIH is a buy-in attitude. The buy-in attitude is characterised by the interest and willingness to explore external knowledge (Lichtenthaler 2011, p. 83). It is not established exactly what drives this attitude, but it is mentioned that it may stem from an

underestimation of the difficulties in absorbing external knowledge (as an organisation), or that it simply reduces complexity. It may also be lack of confidence in the expertise of the organisation. However, according to Menon & Pfeffer (2003), this attitude comes from being able to value and appreciate external knowledge. Their research was done with emphasis on how knowledge of external value is something “more special and unique” (Menon & Pfeffer 2003, p. 497) and less readily available than internal knowledge. Today, 15 years later, the access to external knowledge is indeed ready and available, so the buy-in attitude of individuals is likely to be characterised differently. Still, merely valuing external knowledge for something not residing within the organisation that can complement internal competencies is a main driver for open innovation activity.

As such, systems and structures supporting company values affect the firm’s cultural foundation and practices for open innovation (Gassman et al. 2010; Burcharth et al. 2014, Lichtenthaler 2011). Lichtenthaler (2011) outlines significant determinants for enhancing open innovation capabilities of the organisation based on the integrated view behind the conceptual framework. This means adapting incentive systems and creating support and commitment from a leadership perspective. This is necessary in order to develop organisational capabilities and link open innovation initiatives to the overall strategy.

Chiaroni et. al (2011) are among the few scholars conducting research beyond high-tech industries and R&D industries on the cultural aspects of a mature firm’s transition from closed to open innovation practices. The study was conducted applying a framework comprising the dimensions of open innovation, the managerial levers and the process of adoption. Their findings demonstrated the importance of top management promoting the transition and championing change along the managerial levers of the framework. This entails knowledge management systems, evaluation processes, organisation structures and networks. Moreover, Chiaroni et. al (2011) suggests benefits of having an organisational unit for innovation separated from the parent organisation. This unit for innovation will then demonstrate change through innovation initiatives, while still protecting existing tasks and processes.

Summarising the research related to the cultural aspects in the adoption of open innovation shows that a clear link to the strategy must be established and institutionalised in the culture to

overcome barriers. Management must make an effort to support and facilitate that this takes place. Kotter (1996) underlines that management must first establish a “guiding coalition”, meaning that management must be aligned in organisational transformations. This can be realised through structures and systems that create incentive and purpose and develop organisational capabilities.

2.10 Summary of literature review

The literature presented was selected to understand the perspective of the literature to the objectives of this project. Lichtenthaler’s conceptual framework (Lichtenthaler 2011) provides the framework to analyse the organisational and individual capabilities and dependencies, enabling or blocking knowledge creation and value capture, when crossing organisational boundaries. The literature furthermore shows that a different leadership approach is key to support transformation of structures, culture, motivation, incentives and knowledge infrastructure. Moreover to promote, enable and enhance organisational and individual capabilities in the transition from closed to open innovation.

3 Methodology

3.1 Research strategy

When deciding on the research strategy, there are several considerations to make. It is necessary to reflect upon how the data collected will contribute to the research question, how the data will be gathered, which kind of data will be needed, and which stance to take in terms of viewing the world. Essentially, the research strategy should reflect the lens through which the relationship between theory and research is viewed (Bryman & Bell 2015).

3.2 Primary data collection

The choice was made to collect primary data through semi-structured interviews, i.e. applying a research strategy of generating qualitative data. As such, emphasis was on words rather than quantification. The reason for choosing the semi-structured interview as the source of primary data was the explorative research question starting with “how”. The semi-structured interview allowed for flexibility in terms of how the topics were brought forward, and even more

importantly, it created the basis for the interviewees to speak widely on the issues (Denscombe, 2010). The semi-structured interview as a research method will be elaborated further in a separate section under the section Research design. The primary data collection played the most significant role in this project with secondary data playing a minor role. As the area on open innovation in Danish HEIs has not yet been thoroughly researched, it was a challenge to find secondary data on the actual findings. Therefore, research on innovation within education from other areas of the world was used, as explained below.

3.3 Secondary data collection

In order to understand the current context of HEIs, a couple of studies on barriers and drivers for innovation at HEIs were selected. The findings presented in one article⁸ were particularly interesting. It provided a qualitative study of the innovative environment at a sample of European universities.

The findings from the study contributed to the understanding of already researched enablers and barriers for innovation within teaching, but also to understanding the factors of organisational culture and leadership when approaching innovation in a university climate. These findings, though collected in a different location and with focus on innovation within education in general (hence not open innovation), served as providers of robustness of the qualitative data collected for this project. Furthermore, this article provided a direction for the questions consequently formulated in the interview guide (appendix 4). Finally, the strategies of the selected HEIs alongside editorials from Danish business leaders complemented by material from a CBS Management Board meeting were used to qualify the relevance of the research.

3.4 Deduction vs. induction

A very common way of viewing the relationship between theory and research is deductive reasoning. Deduction means that there is a theoretical point of departure, which is then tested through data collection.

The opposite view is induction where theory is the outcome of the research and *'involves drawing generalizable, inferences out of observation'* (Bryman & Bell 2015 p. 15).

⁸ Lašáková, A., et al. (2017) *'Barriers and drivers of innovation in higher education: Case study-based evidence across ten European universities'*

Deduction	Theory --> observations/findings
Induction	Observations/findings --> theory

Where deduction is primarily concerned with collecting quantitative data, an inductive approach to research strategy primarily involves data of qualitative nature. However, there are exemptions to this distinction, and Bryman & Bell (2015) recommend viewing deduction and induction as tendencies rather than distinguishing them “hard-and-fast”. The theory development should occur in “*a data-driven manner*” by means of qualitative data collection, and theory is defined as “*a set of proportional statements linking the key concepts in theory to another*” (Mantere and Ketokivi 2013, p. 75, quoted in Bryman & Bell 2015, p. 26). This project was led by an inductive approach as the main driver was curiosity to the area of open innovation in an educational context, which is a relatively under-researched area. As mentioned in the literature review, the area is so immature that open innovation is not yet regarded a theory. This fact also contributes to the inductive reasoning as this project contributed to conceptual and theoretical findings to the work of open innovation.

3.5 Epistemology

In order to understand how theory is developed, a stance in terms of how the social world is studied was taken. Epistemology represents the aforementioned viewpoint as to how the social world is studied and understood. This includes three major positions: Realism, Positivism and Interpretivism. Realists believe that the world exists independently of observers, and as such there is an “*external (...) reality separate from our description of it*” (ibid. p. 29). Positivism is often related to science, and positivists view the physical world and society as objective and working by general laws⁹. Interpretivism ascribes meaning to the logic of understanding human behaviour where positivism views human behavior as something that can be explained. Interpretivism is concerned with the understanding of human actions (ibid. p. 28) and the notion of having a social scientist to grasp the subjective meaning of social action (ibid. p. 29).

⁹ <https://en.wikipedia.org/wiki/Positivism>

In this project, the epistemological stance is within interpretivism. The learning from the perceptions of the interviewees in order to understand their contexts and behaviors is of utmost priority. The meaning and value of their own words have reflected the reality in which the data was developed and connected to concepts and theories. In order to answer the research question on how well the Danish HEIs are currently working with an open innovation approach to educational design, the opinions of the interviewees were explored expecting these to be as varied as the humans behind them. Therefore, the exploration of their perceptions became crucial to understanding and interpreting the status quo of Danish HEIs, knowing that this status quo could not have a one-sided measurement attached.

3.6 Ontology

In relation to understanding how reality is viewed, it was also decided which ontological position to take. There are two ontological considerations: Either the approach relies on objectivism or constructivism. Objectivism represents the notion that social phenomena and their meanings can be viewed separately from social actors (ibid. p. 32), and that there is an objective reality independent of actors. Again, this being a project of explorative nature driven by curiosity of perceptions of humans in their contexts, the constructionist perspective was applied. Constructivism implies that social objects and categories cannot be viewed objectively, nor in isolation but rather as socially constructed (ibid. p. 33). As such, the data collected was developed as a result of a social construction between the interviewees, their contexts and the interpretation made of their perceptions. With that, no objective result from the research was the intention nor chased.

3.7 Research design

The framework in which the collection and analysis of data are reflected is the research design and research method. When choosing research design, a perspective on causality, generalisation issues and understanding human behaviour in specific social contexts needs to be considered (ibid. p. 49).

3.8 Case study

A case study design was chosen as it allowed studying the phenomena of open innovation and organisations in an explorative way expected to learn from the interviewees. The case study is often used to answer “how” and “why” questions and *“should be based first and foremost on the anticipation of the opportunity to learn”* (Stake, 1995 quoted in Bryman & Bell 2015, p. 68). This also confirms having an inductive approach to the relationship between theory and research, where the empirical findings are drivers towards findings that can contribute to existing literature. There are extensions of the traditional case study as the case study can include more than one case, and e.g. also have characteristics of a longitudinal case study. Since this project was carried out within a relatively short period of time (three months), the element of time was decided not to have any importance in terms of how the research was carried out. In other words, had the data been collected over a longer period of time, they were not likely to be essentially different as the question driving the research was investigating the here-and-now of Danish HEIs. Although it was decided to sample three Danish HEIs (further elaboration in the section on sampling), this is not a multiple-case study. Had the multiple-case study been chosen, the main interest would have been the uniqueness of every single case, which was not the idea. The idea was to study more cases to get a broader perspective with the hope to be able to generalise to the larger HEI area in Denmark. As such, the focus was not on the comparison between the cases. According to Bryman & Bell (2015, p. 72), this rather relates the case study to the nature of the cross-sectional design as the sample as a whole at a single point in time was the object of interest. Still, the cross-sectional design often involves a large sample as well as both quantitative and qualitative data. Also, this does not mean that what these sample organisations share and where they differ was not interesting. It is merely to state that in terms of categorisation, this study is not a comparative case study per se.

3.9 Research method

As mentioned in the above, the technique used to collect data for this project was interviewing. The semi-structured interview was applied in order to seek thorough information on the subjects included in the research question and subquestions, and to let the interviewees’ responses flourish. In this way, the themes emerged showing respect for the individual, while the

investigators still provided a direction. All of the interviewees were very passionate about their subjects, which meant that it was sometimes rather challenging to keep them 'on track' while still carrying out the interviews on their premises too. While working with an interview guide with specific themes of interest, the interviewees' responses most often inspired the following question, although it was not necessarily in the interview guide. It was very important to get detailed answers as there was an awareness of the construction that everyone was a part of. That means that the interpretations of what was said was always present. Therefore, getting as elaborate answers as possible to all of the questions were important to attempt getting as close to the interviewee's perception as possible. That said, the findings were affected by the investigators' views, biases and other implications of life, experience, knowledge, etc.

3.10 Interview process

It was decided to have five out of eight interviews as an initial round to digest and work with the data provided by these. Already after the first two interviews, certain themes were identified especially concerning organisational antecedents for having an open innovation approach to educational design. In addition, another theme emerged which was not considered beforehand, but which then was taken into account for the remaining interviews. This way of letting the initial answers guide and inspire the following interviews, showing respect for the research questions, provided an understanding of the craft and power of interviewing. It was confirming that the right approach to the project had been made, letting the curiosity of open innovation and empirical findings lead the way. The first five interviews were conducted within 12 days with all three sample organisations included followed by a week off interviewing to reflect on the input while searching for additional literature to understand the themes that emerged through the interviews. The last interview round was conducted within 10 days and served a dual purpose. The interviewees' answers and reflection on the themes were as important as within the first round; however, the interviews were also used to confirm the findings from the first round of interviews.

3.11 Characteristics of interviewees

The interviewees were all employed within the three sampled Danish HEIs. The interviewees were selected based on their experience from being part of innovating educational design by including competences in the design or re-design of education, from outside of their organisations. This

includes faculty but also two innovation consultants who worked closely with faculty. The reflections of attitude of faculty were therefore sometimes reflected by an innovation consultant. It was decided to triangulate the innovation profiles with a non-innovation profile to see if certain topics were similar despite this difference. Accordingly, one of the interviewees (E) was disengaged in open innovation, and his field of research was not “obvious” towards this either.

Three levels of involvement were defined, and at the beginning of each interview, the interviewees were asked to characterise themselves within these three levels/criteria:

- How have you been involved in the development of open innovation in educational design?
- Have you taught others how to use open innovation in educational design?
- Have you had a strategic say in directing open innovation within educational design?

The interviewees had all been pre-selected before agreeing to categorise themselves within the above levels. This means that the levels were based on interpretation from what was known about these interviewees, and this formed the basis of the pre-selection. The people were found through networks due to the narrowness of the subject. It was of importance that the interviewees would quickly catch on to the subject and have experience within the field. As this project has tried to create grounds to make informed impressions of the “here and now” of Danish HEIs, the interviewee segment could have been broader and include faculty who do not work with an open innovation approach to design their courses. Including all “types” of faculty could have provided a more truthful picture of the status quo of open innovation within educational design at Danish HEIs. Having said that, this was not the purpose of this project. The idea was to retrieve data through experiences from faculty and innovation staff already involved in this subject to see how well this is progressing currently and to learn their points of view in terms of enablers and barriers. Had we had a broader scope of this project, data could have been collected from both “innovators” and “non-innovators” which could be interesting too. Within the boundaries of this project however, when the question on how open innovation to educational design at Danish HEIs is currently integrated is asked, it is directed towards those who make an effort to contribute to this integration actively. As mentioned, eventually, we did however decide to include one interviewee to provide us with information on how this subject was viewed and understood when

not being actively involved. A young researcher at the start of his career was chosen as it was assumed that due to his age he would have an interest in an innovative approach to education. However, it turned out to be modest. Interestingly, his reflections being a “non-innovator” were not very different from the “innovators” in terms of leadership and motivation for innovation.

While the interviewees would hopefully reflect on their own role and capabilities, it was also important to search for reflection at strategy and leadership levels. The latter especially in order to answer the sub questions on antecedents of the organisation that need to be in place to facilitate open innovation. However, also in terms of the leadership approach to such initiatives. The interview guide was initially made in relation to the research and sub questions, but it came to include other questions as the interviews progressed. For example, the strategy and leadership topic was given immediate and heavy attention from the interviewees, so to stay on their premises, the value of adding extra reflection time for the interviewees along the way within certain topics proved worthwhile. The pauses made in general were the most valuable ones as they allowed for additional reflections for everyone. As mentioned earlier, an unexpected theme emerged during the interviews. The theme was the professional domain of researchers and to which extent this affects the motivation and competence to openly innovate the educational offering. For example, faculty of market research and innovation believed it to be in their DNA to seek knowledge beyond the organisational boundaries. When speaking to innovation consultants whose main responsibilities are to support faculty towards innovation within their teaching design, they confirmed this view. For example, they said it was easier to work with food scientists than mathematicians. These findings will be treated in more detail in the analysis section.

All of the interviews were initially planned to happen in person, but due to unforeseen circumstances two interviews had to be carried out by phone.

All interviews with Danes were carried out in Danish to secure linguistic confidence and to ensure that nuances to the answers were as pure as they came. This means that when using quotes in the analysis, these have been translated by the authors. However, before using the quotes they were sent to the respective interviewees for approval of content and translation.

Table 1 Interviewee overview

Interviewee	Position	Organisation	Date	Duration (minutes)	Meeting Format
A	Innovation Consultant	UCPH	16/03/2018	35	Personal
B	Professor	CBS	21/03/2018	28	Personal
C	Innovation Consultant	UCPH	22/03/2018	41	Personal
D	Associate Professor and Scientific Director	CBS	24/03/2018	29	Telephone
E	Associate Professor	DTU	27/03/2018	26	Personal
F	Associate Professor, prev. Vice Dean	CBS	04/04/2018	29	Personal
G	Assistant Professor	UCPH	05/04/2018	24	Personal
H	Professor	DTU	12/04/2018	33	Telephone

3.12 Recording and transcription

All interviews were recorded by permission of the interviewees and afterwards transcribed. Both parts proved essential during the coding and data analysis as it was not only the words that were said, but also the context in which they were said that was important to the meaning. Also, the level of concentration from the interviewer was not distracted by having to note everything down. The exercise of transcription, although time-consuming, proved beneficial to the memory of the interview situation and the essential quotes that were later chosen to add to the data analysis.

3.13 Trustworthiness and authenticity

Reliability and validity are commonly used criteria in quantitative research as they are concerned with the adequacy of measures (ibid. p. 51). As a qualitative research strategy was taken, the criteria “trustworthiness” and “authenticity” provide alternatives to reliability and validity as a way

of measuring the quality, according to Lincoln and Guba (1985 & 1994) quoted in Bryman & Bell (2015, p. 400).

The main reason for applying such terms instead of the commonly used reliability and validity is due to the notion that not one absolute truth applies in the social world. Instead, Guba and Lincoln argue that there can be several “accounts of reality” (ibid. p. 401). A way of establishing credibility to the research is by getting confirmation from the members of the social world who were studied (interviewees) that the researcher has understood their perceptions, as was the intention. In this research, eight people were interviewed. All of them afterwards received an email to show which overall themes were derived from the interviews, and that the statements used were congruent with their views. This method is called respondent validation and relates to the technique of triangulation, where more than one method of data collection is used resulting in greater confidence in findings (ibid. p. 402). Triangulation could also be achieved in the shape of focus group interviews or questionnaires. However, since the focus in this project is the individuals in their organisational contexts, it made more sense to have a rather personal approach to our interviewees. Having said that, it would have been interesting to observe a group discussion on these themes as well. Every single one of the interviewees encouraged the sharing of findings with them, so this also served as inspiration to have a more personal approach to confirming the themes rather than gathering a group. The latter was also rejected due to time constraints. As such, respondent validation was gathered to add trustworthiness and authenticity to the research.

3.14 Level of analysis

When conducting business research, it is necessary to consider the primary unit of measurement and analysis. The various levels of analysis are described as the SOGI-model (societies, organisations, groups and individuals) (ibid. p. 75). As explained in the literature review, Lichtenthaler’s (2011) conceptual framework for managing open innovation provided the point of departure. Here, the capabilities on both individual and firm level are essential for open innovation which is why the questions in the interview guide sought to discover both. This means that the level of analysis for this project is a combination of levels, i.e. on individuals and organisations. Accordingly, to avoid misinterpretations, awareness was on how data on both levels

contributed to the analysis and how data at the individual level contributed to findings on the organisational level (and vice versa).

3.15 Purposive sampling

The sampling method used for this project was the purposive sampling characterised by selecting the units of analysis (people and organisations) with direct reference to the research questions asked (Bryman & Bell 2015, p. 428). Since asking how integrated open innovation in educational design was at the time of investigation, it was deemed essential to select profiles with knowledge of the subject and proven experience with integration. However, as mentioned, it was decided to choose one interviewee without this profile to test whether the attitude differed from that of the so-called innovation profiles. The interviewees were also believed to contribute to the sub-questions on organisational antecedents as they through their own experience had to relate to organisational barriers and enablers. As such a non-probability sampling method was used as it was of importance that the samples made were relevant to the research question. The theoretical sampling level was applied to discover categories and their properties to suggest interrelationships into theory (ibid. p. 431). The interviews were carried out to collect data until the point of saturation. This means that when the first five to six interviews stopped generating novelty to the categories under research, it was decided to start wrapping up the data collection. The final two interviews were used to confirm data within the categories developed through the interview guide and as the interviews progressed. Therefore, it was decided that the saturation point for this research was reached with eight interviews.

3.16 Sample

The HEIs selected for the research is University of Copenhagen (UCPH), Copenhagen Business School (CBS) and Technical University of Denmark (DTU). These three schools represent very different educational disciplines, which perhaps would have an impact in terms of how open innovation is viewed. For example, it could be assumed that DTU has a rather progressive view on open innovation as they were recently ranked among top 10 in the Reuters Top 100: Europe's Most Innovative Universities – 2018¹⁰. UCPH is found on the list as no. 43, while CBS is not

¹⁰ <https://www.reuters.com/article/us-emea-reuters-ranking-innovative-unive/europes-most-innovative-universities-2018-idUSKBN1HW0B4/> / <http://www.dtu.dk/english/collaboration/collaboration-news/nyhed?id=BB34067A-282D-49D5-BC26-6B96DB1C9BB7>

present. So, it was interesting in the research to see how these HEIs actively agree to open innovation efforts within education. All three HEIs have innovation as part of their strategies both regarding research and education. Also, while all of the HEIs are governed under the Danish University Law¹¹ § 2 and thereby share an obligation to contribute to societal growth through education and research dissemination, they are essentially very similar. The organisations are structured quite alike when looking at their organisational charts (appendix 6). The interviews showed that there are many differences concerning innovative approaches in general, which among other things is reflected in disciplines of the subjects, individual drive and by strategic approach to open innovation from a leadership perspective. Here, it would have been interesting to investigate all eight of the Danish universities. However, the data collected from the three chosen cases were deemed to have enough robustness for the scope of this project. As mentioned, the last two interviews were used as validation, while still providing slight novelty to the findings already made. They did however imply that the saturation point had been reached as there were a lot of repetitive answers. Also, the answers did not differ much whether they were retrieved from staff at DTU, UPCH or CBS. The differences observed could definitely be attributed to the individual level of drive and motivation no matter “home organisation”.

The choice made for this sample was to a certain degree biased by the following facts: As this thesis was written within an innovation management programme from CBS carrying many characteristics of open innovation, CBS seemed like a natural choice to include. Also, the programme has served as a sincere inspiration to the research topic of this project. Furthermore, it was convenient in terms of getting access to the resources behind designing and implementing this programme. As such, the direction towards CBS was inspired by personal interest as students, but also since one of the authors (Gitte) is an employee of CBS. The fact that three of the interviewees from CBS were former or distant colleagues Gitte created an awareness of bias in the interview situations. The intention was to let Tina carry out these interviews to avoid any biases, but that was not possible due to the busy calendars of the interviewees. Therefore, Gitte carried out two of these interviews with high awareness of potential bias. Another reason for choosing CBS is because they have recently launched a new Master of Science programme co-created with

¹¹ <https://www.retsinformation.dk/Forms/R0710.aspx?id=198434>

students and businesses, which gives a very recent example to collect data from (interviewee B). In terms of choosing UCPH, there is a similar bias in relation to the authors as students. The reason being that as a part of the open innovation approach to design the innovation management programme, key innovation profiles from UCPH were involved. The relationships established through this were also utilised for data collection. DTU was the only organisation with no previous relationships attached. It was however chosen due to the aforementioned notion that the educational disciplines of this institution are generally geared towards innovation alongside the recent ranking achievement. The view from external partners (students, alumni, companies, etc.) will not be included in the data collection beyond secondary data derived from public sources, business leader editorials, trends, etc. The reason for this exclusion is that the primary focus is on the capabilities for open innovation management at individual and firm level at the HEIs. Thereby, the potential contributors of knowledge for the activity were not included.

Through interviews, the level of motivation and organisational premises for embarking on an open innovation path in terms of design of education was investigated to find out which individual and firm level capabilities were regarded as essential through these overall questions:

- a) How well are the HEIs organised for open innovation from a staff perspective?
- b) What is the strategic stand of the HEIs to encourage open innovation?

Since strategy and open innovation are interlinked, strategy became a part of the questions in the interview guide. Furthermore, as the subject relates to motivation and incentives, the question on general perception of career trajectory for staff was also included in the interview guide.

The sampled HEIs all include innovation as a part of their strategic objections. Links to the entire strategies can be found as footnotes. Extracts from the respective strategies with respect to innovation, openness and collaboration are also provided.

3.17 Copenhagen Business School (CBS) Strategy¹²: 2017 - 2020

“We nurture an entrepreneurial spirit within CBS, encouraging to new ideas, open to individual initiative and flexible in the face of new opportunities (..) The precondition is an attractive,

¹² <https://www.cbs.dk/en/about-cbs/strategy>

responsible and engaging workplace that involves employees and students and high international standard in everything we do – and an organisation that has the capacity to integrate and co-create with the surrounding society.”

3.18 University of Copenhagen (UCPH) Strategy¹³: 2018 - 2023

“We will strengthen the integration of research into teaching. Students should experience closer interactions with academic staff and contribute to creating intensive learning environments. Our point of departure will be the development of innovative and evidence-based teaching across the University.”

3.19 Technical University of Denmark (DTU) Strategy¹⁴: 2014 - 2019

“DTU’s study programmes will be designed to ensure that sustainability is an integrated part of all courses. Similarly, all students will complete programme components intended to boost skills in innovation and entrepreneurship.”

3.20 Grounded theory

The contributions made from this project can be regarded within the category of grounded theory. Quoting Strauss and Corbin (1998), Bryman & Bell (2015, p. 584) define grounded theory as *“theory that was derived from data, systematically gathered and analysed through the research process”*. The grounded theory has two essential features, namely the theories or concepts derived from the data, and the approach to which these were generated. The approach within grounded theory is iterative, which means that data collection and analysis is done simultaneously, referring back to each other repeatedly (ibid. p. 584). The tools used to ensure this was the theoretical sampling and the process of coding the data. The coding started already after the initial interviews where certain themes emerged. The coding continued throughout the interviews continuously building on and developing the categories as the data emerged. The themes were put into categories, whether mentioned as an enabler or a barrier towards open innovation. For example, when the interviewees mentioned motivation, whether it was

¹³ <http://introduction.ku.dk/strategy2023/>

¹⁴ <http://www.dtu.dk/english/about/organization/strategy>

intrinsically, extrinsically or even demotivation, it all came into the category of motivation. This was deemed qualifying as the attention given to motivation from all angles then pushed the emphasis on the subject via the coding. (appendix 5 displays the codes and how they were ranked). When coding, there was a continuous awareness that the interpretations from the researchers created a bias in terms of what was understood in the statements. Here, it sometimes proved necessary to revisit the recording of the interviews to try and pick up a certain notion or mood at the time of a particular expression. Grounded theory has been criticised for decontextualising a text and fragmenting the data by expense of the narrative flow (ibid p. 598). This was tried to encounter for by revisiting the interviews often and by confirming citations used in the project with interviewees afterwards. However, no matter how cautious or aware, the interpretation of the researchers will always have an influence on how data is categorised and perceived.

The categories that emerged from the coding were compiled into four clusters. These clusters will form the basis of the analysis below. The clusters show that many different factors are at stake when researching the individual and firm level capabilities for open innovation. Although each cluster covers very large areas, these were sought to be analysed to an in-depth level bearing in mind the limitations of this project.

4 Empirical findings

As a natural consequence of building the interview guide to provide questions relevant to the research, the categories derived from the interviews showed which organisational antecedents were critical. Furthermore, derived from the antecedents, the analysis showed which obstacles the sampled HEIs faced.

4.1 Analysis clusters

After transcribing the eight interviews, coding was used as a tool to understand the data relevant to the analysis. The interviews were initially grouped into six main categories based on theory, but even more on the recurring themes addressed during the interviews.

The initial categories were:

- Organisation
- Individual
- Incentives
- Structures and systems
- External environment
- Closed innovation

Each sentence or paragraph was coded and assigned a category. This resulted in 49 codes which can be found in appendix 5. Some of the codes could both have a positive and a negative meaning. It was chosen not to divide those, since the purpose at large was to understand the influencing factors relevant to the analysis. Since each main category evidenced single codes of significance, clusters different from the main categories were formed, subject to their dependencies. The clusters are shown in table 2, including the categories that will be the themes of the analysis. The subcategories are addressed according to their importance evidenced in the coding. The results of the coding can be found in appendix 5.

In the following sections, the clusters will be analysed as to how it affects openness to educational design, subject to the categories. Based on the findings of the interviews, the categories represent the most influential antecedents to open innovation in educational design. They are interrelated and appear in particular in the knowledge exploration phase in Lichentaler's conceptual framework, both in regard to the internal and external capacities with impact on knowledge retention and exploitation.

Table 2

Clusters	Categories	Subcategories
Strategy and leadership	Strategy	Management support
	Leadership	Resource allocation
		Support HoD
		Policy
		Funding
		Ambidexterity
	Policy	
Motivation and incentives		
	Research and output	Course repetition
	Incentive, reward and motivation	Motivation
	Intrinsic motivation driven	Incentive
	Career	Professional identity
	Professional identity	Courage
		Creativity, commitment, autonomy
		Ambition
		Experimenting
	Academic field	
Org. culture and structure		
	Organisational structures	Academic field
	Culture	Ambidextrous organisation
	Not invented here	ECTS, STÅ
	Bottom-up inspiration	Experimenting
		Role models
		Organisational DNA, culture
		Narratives - common language
	Time constraint	
Educational openness		
	Involving the external environment	Other HEIs
	Education quality	Firms & Business community
	Linking teaching and research	Collaboration
		Network
		Society
		Accreditation
		Students

4.2 Strategy and leadership

The result of the interviews showed that strategy and leadership to a high extent influence the level of innovation in educational design. Both in the way new initiatives were supported in terms of resource allocation, how openness and contribution of external sources were considered relevant, and how the strategy was communicated and implemented. Merely all interviewees explicitly expressed that top-down management would prove inefficient to anchor new approaches to educational design. As it is also recognised by the literature (Nonaka 1994, 1998, von Krogh et. al 2012) top-down management is not perceived effective for knowledge creation, which is a prerequisite for innovation. As demonstrated by Nonaka (1994), top-down accumulates explicit knowledge and fails to include tacit knowledge in the knowledge conversion, which may result in lack of commitment and, consequently, the organisational capabilities to create new knowledge. Interviewee A for instance highlighted that in some foras or towards certain colleagues with a high strong professional identity or “dominant management logic”, she would not present herself as innovation consultant, rather a supporter, because she would often experience that the term “innovation” in itself would create an immediate distance and rejection.

The majority of the interviewees found that instead management should facilitate, encourage and create the environment for bottom-up initiatives to minimise organisational and individual contingencies of barriers to adoption, such as NIH attitude (Katz & Allen 1982). The majority of the interviewees mentioned that this would lead to be more openness towards experiences of peers, and this would create another inspiration and energy. The knowledge creation in the bottom-up model allows for autonomy and high degree of self-organisation to entrepreneurial individuals (Nonaka 1994). However, it may suffer from tacit knowledge being accumulated at the individual level, hence not sufficiently contributing and enriching the knowledge creation at the organisational level.

Much aligned with other interviewees, and the recommendations of the literature (Amabile 1996, Amabile & Khair 2008) fostering organisational creativity, interviewee H clearly expressed this in reference to the role of the leader in the HEI context of open innovation:

"... act as inspirator and show examples of cases, maybe advocate what has been done by others and in other places, and provide people with courage by communicating that here we also value these initiatives, so it is perceived that internal management supports people with resources and opportunities ."

Many of the interviewees shared experiences with colleagues showing curiosity, potential and intrinsic motivation to pursue new approaches to educational design. However, for reasons of organisational structures and systems, policies, incentives and fear of career setback compared to peers, they had a tendency to disengage. So a strong perception of research performance being at the core of management's priority along with organisational bureaucracy persists. This attitude was both expressed among the interviewees of CBS, DTU and UCPH as a barrier to engage and continuously commit. It was expressed that although innovation and involving the external environment were part of the strategy, vision, mission and values, it was not understood how it should be implemented or how it could achieve organisational anchorage. In that respect, there are indications of a gap between the strategy set out at the upper echelon of management and downstream to organisational and individual values and culture. This was often referred to as organisational silos based on the size of the organisations and multifaceted academic disciplines with diverse perception on how and why innovation may have relevance within their particular discipline.

At the same time, there seems to be more openness and engagement when the inspiration comes from peers, or colleagues from own organisation, or other HEIs that have applied new approaches to educational design. Interviewee A expressed this by:

"... either people are curious or they are not. We have not resolved how to change this. We are here at the core of the issues with the strategy, because I think colleagues can. If there is someone with credibility in the environments, it can inspire others. If it is a professor showing openness, others will be inclined to follow. Peer-to-peer wise. Not top-down, as it would risk that people shy away."

The interviewees conveyed an organisational and individual distance to the overall strategy. Despite all of the HEIs having innovation and interaction with the external environment formulated in their vision, mission and/or strategy, this indicates that top management fails to establish a shared vision and purpose as well as a guiding coalition (Kotter 1996). In terms of resource allocations, such as funding and time, it was indicated by some of the interviewees that this was primarily determined by the persistence at the individual level and that the level of autonomy to a high extent related to their research domain. These findings demonstrate the absence of absorptive capacity at the individual and organisational level, since open innovation activities within educational design had been successfully carried out. Moreover, a high degree of “dominant management logic” which may be reversed through a more explicit communication and motivation of adopters bearing in mind the potential barriers. In summary, this may show that the interviewees favour distributed leadership above centralised leadership as this proves more efficient to facilitate and increase innovation output. Moreover, leadership should seek knowledge creation and capture in the continuum of centralised and distributed leadership in the conditional layer, and strengthen leadership activities of top management in the structural layer (von Krogh et al. 2012). As such, the persistence and drive at the individual level seem to be the key when successfully carrying out open innovation within educational design.

4.3 Motivation and incentives

As established in the literature review, incentives influence the adoption of open innovation. Intrinsic motivation arises from interest, curiosity, challenge and personal satisfaction, while extrinsic motivation stems from tangible and verbal rewards (Gagné & Deci 2005, Amabile 1996). All of the interviews showed that motivation is a recurring theme when talking about opening up the educational design to the external environment. The activity of doing so is not seen as a necessity from the leadership of the organisation, rather as something intrinsically motivated by the individual. When asked how ready the organisation was geared towards interacting with the external environment with regards to educational design, interviewee H said:

“We are in a situation where it takes personal courage and personal initiative to do this. You can have a splendid professional career as faculty at DTU without having this approach. Having said

this, we need the more theoretical researchers to make the foundation we (who are drawing on outside competencies) can stand on”.

The interviewee thereby recognises the importance of individual motivation and that the openness in itself is not a necessity for a career at DTU. She appreciates the importance of various approaches to the profession as a researcher, and that not all academic disciplines are perhaps equally suited for external knowledge exploration. This implies that a uniform approach to the individual researcher is not likely to be successful as not only are the researches different in terms of motivation for external outreach, they are also very different according to academic discipline. As mentioned, the individual motivation for combining existing knowledge with the external environment was emphasised throughout the interviews. A reason for this emphasis may be that all interviewees were chosen due to their commitment except for one (interviewee E), who however also highlighted motivation. He elaborated on autonomy as a motivational driver for innovation. He is at a relatively early stage in his career, where he is only able to teach one course that relates to his research area. The other courses he teaches are very basic, and he is not in charge of the content as these classes are mass productions delivered simultaneously to hundreds of students by four different teachers.

“I just walk in and deliver my lecture and exits without knowing the name of a single student. That is not motivating.”

When asked how he approached the courses related to his research area, it was a different response:

“Here, I am in charge, so I can take it a lot further and take alternative routes to teaching. It means a lot to me to be in charge – it makes teaching far more motivating.”

This indicates a sense of both competence and autonomy and that intrinsic motivation is present. Furthermore, it becomes evident that when teaching a course related to own research field or academic domain, there is increased possibility of creating extraordinary and innovative courses. Linking teaching and research as an approach to deliver courses based on knowledge and competencies beyond organisational boundaries will be further treated in the section on Educational openness.

As such, it is clear that motivation is a central theme and so are the individual faculty's personality traits to perform activities within open innovation. As interviewee H said, both courage to experiment but also courage to lean in and be comfortable with the fact that someone "outside" is smarter than you is essential:

" besides having an open mindset you need to have the courage to do projects, where you do not know the answers (...) we need to have the courage to let go and recognise that there are both students who are smarter, and someone else out there in the world who are smarter. To be able to freely put your competencies into play around the table and let things evolve is the largest barrier. That takes courage".

Therefore, having the courage to not only experiment, but also letting someone smarter than yourself enter the stage, is pivotal to opening up the educational design to external resources. Experimentation in itself is not a very common approach to activities within public-sector employees as they are used to being held accountable for how public resources are spent. However, experimenting is decisive in innovation matters, which is why interviewee H brought this forward in the interview. Another perspective from interviewee G is similar. This, however, is not only said by the facilitator of learning experimenting, it also involves the students:

"I facilitate different processes to create an environment. Not only for learning purposes. I also think about how to create a format in class, where new innovations can appear, and where people have the courage to share their knowledge".

Both examples indicate that the interviewees' holistic view on the learning situation, including physical surroundings, competencies of teachers, students and other interested parties, is part of creating the innovative foundation which moves beyond the boundaries of the organisation.

4.4 Professional identity

Another theme that emerged from the interviews was the dualism in balancing two professional identities simultaneously, namely being both a researcher and a teacher. It was never expressed directly as professional identity issues, but the challenge of balancing these two modes often appeared when the interviewees spoke about their work lives. The demands faculty meet are many, and they are high. Being a great researcher does not necessarily make a great teacher and

vice versa. However, faculty is obligated to perform well on both arenas, even if it could be argued that professional characteristics of a researcher resemble those of a teacher. As mentioned above, there are cases where faculty succeeds in bridging research and teaching, and accordingly it starts to make sense. However, to some it is not the prospect of the teaching activity that motivates them. Research drives them. Interviewee E shares this viewpoint when asked whether higher recognition of his teaching efforts would lead him towards open innovation:

“.. it might if there was increased focus on this. But I am very aware that research has my priority. It is not only most important to my head of department, it is also most important to me - any day. It does not mean that I do not enjoy teaching, but it does not have me jumping out of bed in the morning with excitement. I jump out of bed to come to work and solve mathematical problems.”

This interviewee is the one person interviewed without an innovation profile, which perhaps makes this answer rather black and white in terms of teaching and research priorities. Nevertheless, the remaining interviewees with innovation profiles still shared this contradiction of sometimes struggling with the dual identity and priorities. During the interviews, this often came up as being closely linked to reflections on incentive structure at the universities, and the interviewee's view on either personal career trajectory or observations of the same in general. Interviewee H had succeeded in establishing a centre focusing on learning technologies as she saw a need for it, primarily for teaching and learning purposes. However, the support she received was only granted as it was linked to her research. When asked, if she would have received support for it had it only been established to enhance learning technologies at the university, she shared the following reflection:

“.. the teaching could stand alone, but then I would not have been able to receive my professorship. So the mere fact that I am now a professor of learning technologies is novel – that would not have been possible earlier. It is a way of having two ends meet, and for me it is the key to success internationally also”.

This example supports the dualism in the professional identity, but with a level of novelty. The current organisational structures around establishing such a centre would not allow creating a centre for teaching and learning purposes only. Still, the interviewee considers it as a step in the right direction, and according to Wilkesmann (2015, p. 202) it is a modern way of incentivising for

innovation within the structures given: *“For innovation in teaching as well as scientific development, professors must become ‘institutional entrepreneurs’ who are creative and who change the organization and their scientific field. These ‘institutional entrepreneurs’ need ‘opportunity structures’ that provide opportunities for success. If professors are guided only by a carrot-and-stick policy, they will not be innovative”*

The interviewee H serves as a great example of an institutional entrepreneur. The support she received from the leadership of the organisation created an incentive for innovation within her teaching. She does however also state that the support was rather of a moral character, but still it is an opportunity for success. The term institutional entrepreneur gives thought to the demands that faculty is faced with and again, the dualism within their professional lives. This interviewee was able to create the link between her innovation drive and her research, but the incentive structure at universities can also act as a barrier for embarking on innovative journeys.

4.5 Incentive structure

As already established motivation, whether it be intrinsic or extrinsic, drives human behaviour towards a certain task or activity. The dualism in the professional identity, being a teacher and a researcher, is also challenged in terms of incentives. After all, there are many requirements to fulfil in both areas when choosing this profession, and individuals tend to go in the direction in which they are measured (Kaplan & Norton 1992). In this case it rather presents a paradox as the faculty, even if intrinsically motivated, is perhaps not able to truly explore innovative teaching avenues due to research requirements. In the end, it is a matter of how resources are spent. Interviewee F elaborated on the issue:

“There is an imbalance within the universities, when it comes to research and education. About 70-75% of the funding to a university is derived from education. So, are we a research institution, or are we an educational institution? (..) If you go to the departments, faculty is primarily teachers, but they see themselves as researchers. Research has priority to teaching, so you teach in order to have time to research. The link between research and education should be strong, and not viewed as a competition, as it is today”

Here the term identity comes into play, in terms of how faculty views themselves, and where to put in the effort. This quote reveals that balancing teaching and research is a competition for

resources, and that research has priority to teaching. If the link is not created, the teaching portion of the profession will most likely suffer as faculty is primarily incentivised towards research. The bibliometric measurement of research is evident, where the qualification of what constitutes good teaching is not. This view is supported by Anderson et al. (2011, p. 152): “The reward systems at research universities heavily weight efforts of many professors toward research at the expense of teaching.”

Lam (2015, p. 178) describes various types of rewards for scientists and that the “ribbon” (reputational/career rewards) is the dominant one: “scientists are strongly motivated by the recognition and prestige bestowed by their professional peers, but also other rewards, such as salary and research funds are usually graduated in accordance with the degree of recognition achieved”. Lam (2015, p. 178) further states that the highest currency is publication. So not only is it easier to measure research output than educational quality, their own career paths also drive faculty towards research efforts. When balancing these two tasks, the creative, innovative efforts (knowledge exploration) will likely tend to be used towards research whereas teaching activities risk becoming repetitive. This at least when looking at the incentive structure.

The interviewees with a lot of intrinsic motivation towards openly inviting in competencies to the research design did not seem inhibited by this, but they showed a continuous awareness of this issue. Interviewee D said:

“In academia we are primarily measured by our research success and research output, so getting tenure is mainly on the basis of your research performance, and that is measured by publishing in top journals (...) it’s difficult to do good teaching, and to also engage in more than just regular classroom teaching, to do the research and also reach out to the real world (...) very frankly you can do the greatest teaching in the world, but it doesn’t give you tenure, so that’s what it is. So you have to perform in your research.”

Tenure is another strong incentive towards research as the example above shows. Faculty is focused on their careers perhaps, even rather than on the organisation, in which they are employed in at the given time. This may create a barrier towards open innovation as an organisational strategy, i.e. the loyalty to pursue organisational goals, may be less important. According to Hüther & Krücken (2015, p. 74), “career prospects can hardly be utilized to motivate

professors to excel at teaching or fully engage in academic self-administration (..) lead to career prospects and ambitions being channelled into motivation for research and reputation building, which are the overarching criteria for a successful career in the academic system". In addition, they state that "research is far more visible and easier to evaluate for other universities that decide about careers, in contrast to teaching and participation in academic self-administration" (ibid p. 74).

Interviewee H offered her view:

".. the problem at the universities is that people, in contrast to other workplaces, have their personal career as the far most important thing. It is their personal CV and how to build it to become attractive, if they would like to work somewhere else"

As such, when viewing the incentive structure as an important part of obtaining open innovation capabilities, there is an obstacle in terms of the individuals approach to the career. Furthermore, linking this back to the motivational theory regarding the need for autonomy, the faculty can be characterised as especially focused on this. Again, in terms of strategy and culture for open innovation, this can also serve as a barrier. At the same time, looking at the individual level capabilities in this regard, the need for autonomy is so strong that faculty will go ahead and spend their resources as they see fit. Lam (2015) relates autonomy to the self-regulation on the SDT continuum stating that this is especially important for academics as they "enjoy considerable freedom in their work" (Lam 2015, p. 176). Furthermore, the need for autonomy in both teaching and research is seen as the "most important pillar of science, innovation and creativity" (Quack 2015, p. 232).

In essence, faculty as key resources for creating open innovation in educational design will be motivated both extrinsically and intrinsically. An example of encompassing both types of motivation can be seen within industries of highly autonomous individuals (e.g. scientists or artists) who "may be strongly intrinsically interested in the activity and, at the same time, be strongly motivated to acquire extrinsic rewards (e.g., recognition, careers and money) for that activity" (Lam 2015, p. 173).

Whether employees work in an open or closed Innovation environment, they are likely to be motivated by the same forms – regardless of specific designs – of intrinsic and extrinsic factors (Herzog 2011, p. 99).

In relation hereto, empirical findings more than imply that the intrinsic motivation is especially relevant for this subject, and that the extrinsic motivation to a large extent will be directed towards research efforts. In other words, the self-regulation of values combined with the need for autonomy will not only prove necessary, but also be an enabler of open innovation activity. The dual professional identity in combination with organisational incentive structure can be regarded as complex, and something that relates to both individual and firm level capabilities. These findings may contribute to understanding what kind of contingencies the innovation culture is subject to in the HEI context.

4.6 Organisational structure and culture

Management guru, Peter Drucker, has been attributed the quote “Culture eats strategy for breakfast” expressing that the underlying behaviour and beliefs of the employees determine how they respond and act to change. Furthermore, Kratzer et al. (2017) states that because people perform innovation within the rules and regulations of the institution, which may support or impede innovation, the actual openness of these individuals needs attention (Kratzer et. al 2017, p. 128).

In this section, the culture and structure of the sampled HEIs will be analysed in the manner they were brought forward by the interviewees. This regards how the organisations seem to be structured to embrace or hinder open innovation within educational design and regarding the behaviours of individuals, i.e. faculty.

As mentioned in the literature review, the “not-invented-here” (NIH) syndrome is often said to create a large barrier for open innovation adoption and absorptive capacity and is also mentioned in the Lichtenthaler (2011) framework as an important element for managing open innovation. However, the empirical findings from the interviewees showed that this attitude was not dominant. At least this was the case from the interviewees who, granted, were also largely chosen due to their commitment. Rather, they displayed a buy-in or “proudly-found-elsewhere” attitude

towards open innovation. The term barrier did however often appear, but it was not in terms of the behaviours of the individuals – it was aimed at frustrations around the current structures, which seem to play a vital role for the involvement of the external environment.

As such, the interviews revealed that the barrier is not likely the attitude of individuals as much as the lack of structural support. The various organisational structures do not seem to be complementing open innovation behaviour, or overall innovation within teaching for that matter. When talking about structure, it also included incentive structure, but this will not be included in this section.

Taking a leadership view on how structure coincides with culture is when looking at how knowledge is created and assimilated at the HEIs. Interviewee F explains that:

“the universities are no longer a reservoir of unique and privileged knowledge you can pour out to society. This reservoir of knowledge is also available in the business society to a much larger extent today than ever before.”

The general issue presented here is that in the culture of the universities, this knowledge is still regarded as privileged and therefore the search for knowledge and competencies outside is not largely attractive. In the same manner as dynamic capabilities are regarded as a core competence, the knowledge creation at universities may be regarded equally so. However, core competencies run the risk of becoming core rigidities, when they inhibit a firm to think outside the box. “Due to their cumulative and path-dependent character, existing competencies may not allow a firm to look at the right or left side of that specific path” (Herzog 2011, p. 97). As such, knowledge creation being a core competence can actually become a hindrance to open innovation at the universities.

According to interviewee F, the universities are closed around themselves and struggle to find quality indicators when it comes to education. It is further explained that when it comes to research, there are various rankings and obvious bibliometric parameters of measurement. However, when it comes to education, the only tool is accreditation and student evaluation. From his leadership perspective, the accreditations have brought something good as they have *“demanded a conversation around educational quality with the universities”*. This structure of

accreditation enabled a conversation around education quality, but it also puts demands on the freedom of both teaching and research.

At UCPH the structural element was brought up as a limitation to the innovative freedom within teaching as the learning objectives and the ECTS¹⁵ were always the final measurement. Also, opening the courses to collaboration across the HEIs, and thereby sharing knowledge and benefitting more students, was expressed to be under pressure by this. Interviewee A shares her view:

“It is really important that we are able to work across disciplines and think outside the box. At the same time we have a system that makes it difficult for a CBS student to meet a student at UCPH. I once co-taught a course on social innovation with someone from CBS, which was amazing. The students really enjoyed engaging, but it was a nightmare from a structural point of view. For example, the demands to the CBS students were not as high as those for the UCPH students, because their programmes were structured differently.”

She further elaborates on the use of ECTS as a barrier, which is shared by her colleague interviewee C who explains that she had tried collaboration across UCPH, CBS and DTU, which almost proved impossible:

“It was difficult making the project happen especially with CBS as the ECTS structure was hopeless. You would think that it was the same standards, but it is not. We can collaborate across Europe but not with CBS. (...) You need to look at the basic design of education with a flexible orientation, so we can share knowledge and programmes. The will is there, but the structures exhaust people beforehand.”

When this interviewee was asked how strategy from a leadership perspective could help lift off these structural barriers, the answer was that it would probably be beneficial, but also that open innovation initiatives should not become too performance measurement oriented.

As such, the governance structures of learning objectives, ECTS and accreditation were spoken of as barriers, but from a leadership perspective also as an enabler for having an informed (however initially forced) conversation around educational quality. Nonetheless, the interviewees of this

¹⁵ https://da.wikipedia.org/wiki/European_Credit_Transfer_and_Accumulation_System

project had overcome these barriers as they were motivated and driven towards searching for and combining knowledge with the external environment. This was achieved in spite of structural difficulties, however with a constant awareness hereof.

Looking at the organisational structure, it was expressed several times that the way the universities are built in silos also creates hindrance to knowledge sharing. The hierarchical structure dominated by rules, regulations and rigidities seem to have a fit to the structure explained by the interviewees on HEIs. Although the adhocracy structure lifting off these barriers by focusing on experimentation, entrepreneurship and risk-taking may seem far away, the interviewees as “institutional entrepreneurs” seem to navigate around these limitations.

Although these difficulties may appear as having a severely strong impact in the university environment, interviewee D explains that structural barriers will occur in any environment:

“It’s not different from when you innovate an educational programme as to when innovating a product or service in a company. The more novel it is, the more it will clash with the existing structures.”

As established in the above, a culture with high awareness on individual capabilities for open innovation exists, but empirical findings indicate that these capabilities are utilised primarily via initiatives of the individuals. This means that the innovation culture is distributed among individuals and not necessarily anchored in the organisations. This is likely a consequence of how faculty is incentivised through research, but can also be related to the complexity of the organisational structure. Furthermore, a third element is the personal career trajectory of the individual faculty. So, the extent to which the individual capabilities come into play might have to do with the incentive structures from a governance perspective and an overall cultural perspective. The inherent university language and concrete incentives that give research priority to teaching may act as a barrier to create a proper innovation culture. The efforts of the innovative faculty seem to be appreciated, but not recognised in terms of promotions to e.g. professor level. Hüther & Krücken (2015, p. 70) explain the rather problematic link between appreciation of teaching efforts, research activity and organisational goals. They state that “organisational goals and structures are of paramount importance towards teaching activities, while the research function is connected towards scientific communities outside the organisation”. This may indicate

that research efforts to a low degree are bound to the university as an organisation. This may imply that although some faculty is motivated to pursue open innovation, it is not in order to meet demands from the organisation they “inhabit” at the given time. Trusting the empirical data, faculty does not necessarily feel connected to the university as an organisation. It is rather their profession, i.e. their individual competencies, research results and career paths that create grounds for faculty culture. It was evident in the interviews that this individualist approach drives the innovation profiles towards open innovation in the organisational design, which is an advantage. However, it can also be seen as counterproductive to creating an innovation environment. The reason is that when faculty is oriented towards own career goals, the organisational grounds for creating environments of innovation or other initiatives may become a struggle. Linking this to the SDT continuum of extrinsic and intrinsic motivation, the integration of organisational goals and values may be absent and hence not act as a motivating factor towards benefitting the organisation. Still, in contrast to this idea, there are many creative forces within the organisations, and thereby both competence and motivation to engage in an innovation culture. It may however require that innovation efforts, within teaching, become legitimate and formally recognised. Herzog (2011, p. 79) states that a “positive innovation culture also encourages and rewards the development of new ideas”, and that creativity is one of the most important elements of an innovation culture. The interviewees revealed that a high level of creativity is present within the faculty who are driven to openly innovate. However, it does not seem that the HEIs are largely rewarding these efforts. Encouragement and a lot of moral support are present, but there it ends. As interviewee D says:

“CBS is generally an organisation that gives you a lot of freedom doing new things (..). On the other hand side, off course that means support is limited. There is a lot of cool people that help if you ask them, but there is no systematic help.”

This also indicates that while support and freedom are provided, you are left on your own unless you ask for help. Asking for help within novel areas may be difficult as perhaps the person is unaware what to ask for. Especially in an HEI context dominated by not only hierarchical structures but also public-sector governance. As the interviewees (A + C) mentioned, even the

ECTS system can be hard to navigate. As such, the creative processes flow, but it is based on individual drive rather than an innovation culture per se. As mentioned in the literature review, if a true innovation culture should be established, it needs to shield the innovators from bureaucracy freeing them from considering restraints (Ambaile & Khaire 2008). However, building an innovation culture as such may have harsh conditions, unless the leaderships of the organisations do more than encourage and morally support exploring knowledge from beyond organisational boundaries towards innovation within teaching. According to Herzog (2011, p. 79), welcoming and appreciating new ideas both intra- and extra organisational is essential to create an innovation culture as it also needs to link to absorptive capacity. “Although firms may be willing to consider the adoption of new ideas, they might not be able to do so without adequate absorptive capacity”. The interviews implied that absorptive capacity within the individuals was present, but also that at the organisational level new knowledge was not properly assimilated.

4.7 Educational openness

Moving from closed to open innovation requires organisational readiness and support, distributed sources of knowledge and innovation. The interviews did not centre around the nature of the interaction per se, rather the organisational capabilities associated to the in- and outbound knowledge processes in terms of “potential” and “realised” absorptive capacity (Zahra and George 2002), and only within education design.

All of the interviewed HEIs have developed educational content or programmes implicating an open innovation approach involving students, other HEIs, firms and/or networks. The purpose was at large to source and recombine knowledge in terms of education format, content, exercises, trends and pedagogical approaches. Some of the examples provided by the interviewees were multidisciplinary programmes across HEIs, workshops and co-creations with students, business community and other HEIs. It entailed students engaging with the business community in case studies, lab work, on (firm) site work and online learning. Despite the evidence of absorptive capacities among the interviewees and a sincere openness to explore and integrate external knowledge, they were biased towards openness as a general concept in educational design. This was with reference to the applicability to the academic fields.

It was however expressed that a consistent approach does not exist with any of the HEIs. New approaches originated and were primarily driven at the individual level without synergies across faculties. This means that the internalisation and combination in the knowledge conversion implicating the organisational knowledge creation was difficult. These individuals are all career driven, but also highly intrinsically motivated to seek knowledge outside the organisational boundaries and to experiment and engage. The majority of the interviewees explained this by the ability to link their research to their teaching as a strong personal driver as well as a way to incentivise management to support and allocate resources. Three of the interviewees who had developed new programmes with an open innovation approach reflected;

Interviewee B

"I believe it is very beneficial if you can use your research in your teaching. When teachers achieve synergy between their research and teaching, it generates a win-win situation for researchers and students. The researchers can make the teaching much more inspiring and involving for the students when talking about their own research and students will gain the newest knowledge within the field."

Interviewee H: "My advantage has been to be able to translate teaching into research. I established a research and innovation centre, and due to my background in statistics, I can work with technological development and learning technology and big data in a scientific way. That is key, otherwise it would "just" have been teaching, and then I am not certain, I would have been able to do what I have done. I think it very much depends on the research. This has been the driver and made it prestigious in another way than if it had not been research driven."

Interviewee C: "Now, I have been here for 6 years and I understand why something is more anchored than other. It has to do with the purpose in relation to the research and academic discipline that exist."

Similar reflections were apparent among all the interviewees, including in their reference to colleagues. Their view was that teachers are more passionate and inclined to open approaches and experimenting when they are able to link their research with their teaching. This indicates that

even with intrinsic motivation, incentive to openness and experimenting show strong correlation with research among the interviewees.

When comparing external sources that contribute to education quality, it was clear to all the interviewees that external sources of knowledge were important. The reason they provided was that important knowledge from practice, research, and/or market trends often exist outside the organisational boundaries. As stated by interviewee B;

“... it’s very much based on us having academic knowledge, and we study what other esteemed universities do. This is however not sufficient. The perspective of the business community has to be included, because sometimes they are heading in another direction. That is why it is so important to recognise the business community demands.”

The view on external sources of knowledge as value adding to education quality is however not shared, nor representative for the general perception of the HEIs. Various attitudes persist at the organisational and individual level in the different academic domains. Moreover, there is no quality measure attached to education quality as is the case with research. Interviewee F elaborated:

“..and if you look towards education, it is interesting to see what quality indicators are available for education, there are none. If you take research, we have all kinds of rankings, but in education, there are none. This means that without any indicators, there is no language for quality, and then it is really difficult to have a conversation with the external environment, in respect to what represent good education.”

There were other rhetorical questions raised along the subject of measuring quality, whether it should be student’s feedback, which often relates to the teacher and not necessarily content, or societal and business community demands to the teaching competencies. The absence of a consistent language or common understanding of education quality may affect the absorptive capacity in the open innovation process, since prior knowledge, which includes a shared language, is required to recognise the value and use of new knowledge as well as assimilate new knowledge.

5 Discussion and managerial implications

This chapter aims to answer the research question How integrated is open innovation in the design of education currently in Danish HEIs? This question is supported by answering the sub-research questions:

1. What are the organisational antecedents critical for facilitating open innovation?

The organisational antecedents that were identified and therefore will be discussed are: Organisational structures, professional identity and absorptive capacity. The leadership approach is also to be regarded as a critical organisational antecedent, but will receive separate attention in order to answer sub-research question number 2:

2. What is the leadership approach to open innovation?

The leadership approach will be discussed in terms of strategy, communication and distributed leadership. Here, it is important to keep in mind that empirically, leadership was seen through the eyes of the interviewees, who did not include current leaders of any of the HEIs.

3. What are the main obstacles faced by Danish HEIs in order to implement open innovation?

The main obstacles will be treated through the discussions of organisational antecedents and leadership approach, but emphasised in the conclusion.

This is pursued through discussion of the empirical findings of the interviews conducted at CBS, UCPH and DTU and synthesised through Lichtenthaler's conceptual framework and the theoretical framework of this project.

5.1 Knowledge exploration, retention and exploitation

By looking through the lens of Lichtenthaler's framework for managing open innovation processes, emphasis has been on how the sampled HEIs explore, retain and exploit knowledge. Furthermore, the capacities/capabilities that form the basis of achieving dynamic capabilities, i.e. successful open innovation processes, were researched. The empirical findings showed that the HEIs do engage in open innovation approaches. They do this by sourcing external knowledge, most often

related to their research domains, but for educational design purposes. Examples given in the interviews were that students were involved in co-creations in terms of content and learning format. It also became clear that students express a direct interest in cross-disciplinary learning as well as they valued the interaction with the business community. The interviewees who worked with the business community explained that there were various ways of engaging with them. For example, the business community provides input regarding professional trends and challenges. Moreover they engage in mentoring students, entrepreneurship activities and specific case- and lab works while opening up for students to participate in on-(firm)-site learnings. Inspiration and collaborations with other HEIs, domestically and internationally, were also brought forward as great sources of external knowledge. The results of the interviews however conveyed that when faculty designs or redesigns programmes, knowledge was often only sourced internally. Perhaps across research departments, but not outside of the organisation.

When open innovation approaches appeared, it primarily originated from intrinsically motivated and highly driven individuals. These individuals could with reference to literature be named institutional entrepreneurs, meaning that they have a certain responsibility to entrepreneurship within the institution through their drive. All three HEIs had driven individuals as the main source of open innovation activity. The critical factors related to internal, and in particular external knowledge exploration, appear in the knowledge exploration at both the organisational and individual level. This is acknowledged to be a natural consequence of the attention given to openness and how knowledge was sourced when conducting the interviews. Through these, ideas and input from the external environment were recognised to have importance for designing course content and learning objectives. There are however indications of insufficient knowledge transfer and knowledge conversion at the organisational level. Tacit knowledge, which is here considered the antecedent to knowledge retention and exploitation in Lichtentaler's conceptual framework, may then fail to be enlarged to benefit the whole organisation.

A recent real-life example of knowledge exploitation demonstrating open innovation results, by integrating individual and organisational capacities, is DTU, CBS and UPCH in cooperation with the financial sector. DTU, CBS, and UPCH recently launched a summer school programme¹⁶ designed

¹⁶ Finansforbundet, <https://www.finansforbundet.dk/da/nyheder-aktuelt/Sider/Finansforbundetlancerernysommerskole.aspx>

to meet the urgent needs of the financial sector to incorporate advanced technology opportunities into their business model. This new programme demonstrates an example of open innovation that expands existing knowledge into new applications and markets.

Returning to the opinions of the interviewees, it was however not the general perception that new knowledge is accumulated, developed and utilised for new applications. Therefore, the value capture of these efforts at firm level does not seem to happen.

In the following subsections, selected organisational antecedents which impact knowledge flows and dynamic capabilities in open innovation efforts will be discussed separately. The leadership approach to open innovation will conclude this chapter.

5.2 Organisational structures

During the interviews, many references were made to organisational structures as a barrier to openness. This was done as personal reflection and experience from the interviewees, but also when they sometimes made references to colleagues who were disengaged in this area.

As can be seen in the organisational charts in appendix 6, the HEIs all have matrix organisations with one leader per department. The interviews showed that this structure increases complexity to uniform approaches to open innovation often referred to as “working in silos”. Furthermore, the focus on the individual career path and own academic discipline can imply leadership barriers as the freedom of research and high individualism make it difficult to impose a top-down strategy related to teaching innovation, which is also what the interviewees suggested as not beneficial.

The nature of the HEIs is that they contain extensive knowledge bases, and that they continuously generate and accumulate knowledge. This knowledge primarily originates from research activities, but also from different levels of interaction with the external environment through collaboration, networks, etc. When working with knowledge-generation as a profession, many knowledge resources reside inside the organisation by nature. This may prevent the sense of need to search outside the organisational boundaries in the design of education. This prevention does however shape a bit of a paradox as the nature within research is to search for knowledge to complement

the existing knowledge, i.e. knowledge recombination. Looking at faculty as researchers, it can be assumed that they often explore and use external knowledge for research purposes.

From the interviews and literature, it became apparent that managing open innovation requires advancement of the organisational structures. This could be via dedicated open innovation units, task forces or cross-functional teams as well as looking at the incentive structure for teaching. The organisation structures however must be dedicated to acquire and assimilate external knowledge into the innovation process, as well as towards exploiting ideas developed internally.

5.3 Professional identity

What was termed “professional identity” in this project proved to be the most dominant antecedent in the empirical data, both as enabler as well as barrier to open innovation.

Three archetypes of professional identity were identified through this project’s interpretation of the interviewees’ perceptions. Both personal experience, but also when the interviewees made references to those of their colleagues who showed characteristics of NIH attitudes. The first archetype was the driven individual or institutional entrepreneur, who showed a high degree of intrinsic motivation and buy-in-attitude to explore and transform knowledge. They did however also express that despite strong intrinsic motivation, the synergy between research and teaching was of great influence to passion and drive. The ability to link research and teaching was repeated as a general motivational factor.

The second archetype also showed intrinsic motivation, but also lack of reward, career considerations and being aligned with peers often prevented sustainable involvement in open innovation approaches. The reasons given were time constraints, organisational structures and lack of incentives.

The third archetype was the individual with strong professional identity, who tended to find internal knowledge superior to external knowledge, and did not have a mindset towards integrating practice into the classroom. Signalling this resistance whether in terms of organisational structure or official research priorities to teaching relates to the NIH attitude. This applied for the second and third archetypes too from whom the NIH attitude arose from faculty being measured on research results, lack of reward in teaching, and peer recognition. What they

all shared was that the career path is enabled by research results and not teaching and innovation. However, the institutional entrepreneur, who has the drive in their DNA, would never dream of developing programmes in isolation, even if it does not generate a professor title. However, some of them succeeded in both. In these cases, it was also clear that the academic discipline of the individual (e.g. marketing, technology or innovation) had a strong impact on the choice to develop programmes using external knowledge.

5.4 Absorptive capacity

While the NIH is perceived to be the greatest barrier for open innovation activity, the interviewees rather showed a buy-in attitude (or proudly-found-elsewhere) towards open innovation. This implies that the attitude of the engaged faculty serves as a strong enabler as they appear intrinsically motivated to pursue the external environment in their quest for knowledge. Therefore, it can be assumed that the capabilities at individual level in terms of attitude are an antecedent enabling open innovation. Disengaged faculty only appeared directly in the interviewees via interviewee E, who felt prohibited by his academic discipline (mathematics) to explore external knowledge. Otherwise, disengaged faculty was referred to by engaged interviewees. As such, the NIH was hardly present when coding the interviews. However, as mentioned above, the second archetype who believed that there were limitations to pursue open innovation in a pure form due to, e.g. organisational structure, actually represents a NIH attitude in combination with the buy-in attitude.

As such, absorptive capacity was not explicitly addressed during the interviews, but the individual and organisational antecedents of absorptive capacity were indicated in a different context. As established in the analysis, management support, organisational structures and incentives, which do not sufficiently support open innovation processes, were found to have a negative impact on absorptive capacity.

Enabling the absorptive capacity in relation to educational design was found among the initiatives motivated by the institutional entrepreneurs, who had succeeded in including the external environment, and through the intra- and inter-organisational arrangements were set up with peers to inspire and knowledge share across academic fields. As found in the literature, the possibility of knowledge transfer and assimilation increase with a sense of coherence and mutual

understanding that arise from interaction. The level of interactive activity across departments and research areas will increase absorptive capacity, in particular in relation to tacit knowledge, which is also aligned with the role of *B α* in the SECI knowledge conversion.

Although open innovation activities took place, the interviews did not demonstrate that distinct knowledge transfer and assimilation were currently present. The reason could be the not-invented-here attitude as the second and third archetype previously described, which may disturb or prevent knowledge integration at the organisational level. However, as mentioned, there seems to be potential for enabling extrinsically motivated actions, which management can facilitate.

There were indications that all of the HEIs experience both restraining and supportive “dominant management logic” to absorptive capacity, since differences across faculty exist. This may influence why some faculty members are more open than others. Moreover it may impact why absorptive capacity at the organisational level is challenged and fails to adopt open innovation across the HEIs.

As established, the NIH attitude is viewed as a significant barrier to absorptive capacity in the literature. The NIH attitude, which is believed to be present among faculty for various reasons, may therefore disturb or prevent knowledge integration at the organisational level.

5.5 Leadership

As the literature shows, open innovation leadership has different traits than closed innovation leadership. Open innovation leadership must be concerned with the organisational knowledge creation and value capture through vision, purpose and communication. The interviews indicate a lack of sense of collective purpose, while heavily focusing on individual career tracks and professional identity. This seems to influence incentives to adopt open innovation approaches unless the faculty in question is the driven type who carry the characteristics of an institutional entrepreneur. However, references to lack of reward were also present, indicating that extrinsic motivation may be achieved through incentive structures which support open innovation. A number of the interviewees recognised that distinct knowledge is increasingly generated in the external environment, and that HEIs should acknowledge that value propositions and value capture in an educational context are changing from the perspective of the students, the business community and society at large. However, the interviews also showed inconsistency and unclarity

in terms of how the strategy was understood and operationalised. This could evidence a gap in communication and ability to commit the employees to the overall strategy, which for all of the HEIs includes interaction with the external environment as well as education quality. Even commitment was hard to identify as that, as well as the term innovation, could be interpreted in various ways.

It was clear that top-down management was not desired, nor perceived as a way of anchoring new open innovation approaches at the organisational or individual level. This sentiment is aligned with the literature that emphasises distributed leadership as a preferred approach to open innovation. Management must however facilitate organisational roles (e.g. innovation champions), incentive systems and knowledge management systems which support open innovation (Chiaroni 2011) and dynamic capabilities.

Although a bottom-up approach was perceived to have most probability of impact and anchorage by the interviewees, securing the knowledge creation and value capture requires managerial support. This support can be seen through strategically communicating collective purposes, organisational structures, incentive systems and organisational roles. The latter could be champions leading and interacting across the organisation with focus on open innovation adoption (Chesbrough and Crowther 2006). Management must make an effort to ensure that knowledge is transferred, transformed and exploited. As found in the literature, the bottom-up approach provides a high degree of individual autonomy and accumulation of tacit knowledge at the individual level. It may however not translate into absorptive capacity at the organisational level, which eventually will affect the inventive, transformative and innovative capacity as displayed in the conceptual framework by Lichtenthaler. The feeling of autonomy and competence as well as relatedness were high indicators of intrinsic motivation, as seen in the SDT continuum. In accordance with this, management also has a task in creating the culture and sense of relatedness within the organisation. This would likely enable more intrinsic motivation and bottom-up initiatives as well as act as an enabler towards integration of organisational goals and values for the individual faculty member.

6 Conclusion

During this project, we have had the privilege to look into the nature of Danish HEIs represented by CBS, UPCH and DTU. We searched for experience with open innovation within educational design and to learn which organisational antecedents were either blocking or supporting these initiatives. Furthermore, we sought to learn the leadership approach to these initiatives. Not only has the research enabled an understanding of how the universities work from a structural perspective, but it also revealed a number of paradoxes. The point of departure was that innovating openly by inviting in competencies and knowledge from the external environment contributes to relevant and new learning opportunities. Not only for students, but also for the business community, the universities and society at large. The faculty who succeeded in doing this even benefitted their own research, and thereby career opportunities by creating a virtuous circle where research and education came together. However, the first paradox that became clear was that while the universities have innovation as a part of their strategic agendas, it was very unclear how it was materialised to their employees. The interviewees expressed a lack of strategic direction, even though they were quite uninterested in receiving top-down management within this area. Still, a sense of coherence was missing. If management had succeeded in creating a sense of coherence and relatedness to the organisation, the integration of organisational goals into the individual's own values and agenda might have taken place. Instead, these driven individuals aligned their personal career goals and academic discipline with open innovation initiatives, which was a part of their motivation. It does not mean that they were only benefiting themselves. On the contrary, as previously mentioned, they benefitted many stakeholders, including the university of employment. This presents the second paradox as it means that if the HEIs were able to create a culture where open innovation initiatives were incentivised and supported by means of academic promotion and attention, the number of faculty initiating open innovation may be higher. Still, the interviews revealed they dismissed the organisational goals to focus on own career trajectory.

Finally, an alignment between academic discipline and the motivation to pursue knowledge from outside of the organisation seemed to be present. The professional identity of the individual, whether they research within marketing, technologies, mathematics or innovation, seems to be a

factor for the mindset towards integrating the external environment. This finding complements the notion of dismissing top-down management as some of the academic disciplines would find this more natural than others. However, the main finding is that open innovation practices are derived from driven individuals and these can be found in all research areas.

In a culture where priority is given to research, strong communication of impact of open innovation initiatives is needed if this way of creating programmes should find organisational anchorage. If it is not possible to reach professor level by means of teaching activities, management needs to create legitimacy towards the innovative teaching faculty and create rewards in other ways. The bottom-up initiatives sharing inspiration and knowledge across departments and universities were often mentioned as a powerful mean to achieve awareness and peer-to-peer motivation. However, the way knowledge flows in the current structures is a challenge as it tends to stay with the individual rather than translating to absorptive capacity at the organisational level. A management focus on the impact of absorptive capacity on inventive, transformative and innovative capacity would support strategic targets. It could lift off the barriers of the NIH attitude and realise absorptive capacity.

The raw material in terms of knowledge creation is indeed present at the HEIs. The key resources for open innovation towards educational design is however currently to be regarded as unlocked potential. Faculty, being both teachers and researchers, in their profession have the competencies and the autonomy required to perform open innovation activity. Even if they are not actively applying it for educational purposes, the mindset has been established for research purposes as the nature of being a researcher requires an external outlook. From this perspective, open innovation within educational design has good terms.

As such, based on empirical findings in combination with theoretical perspectives, we conclude that the HEIs have the competencies and the individuals to perform open innovation within educational design. However, open innovation needs to have strategic anchorage and a culture for rewarding these initiatives. Furthermore, there is a large challenge in terms of organisational structures as these are currently counterproductive to open innovation. Therefore, if the HEIs should truly walk the talk of their strategies, the organisations need to be orchestrated towards

open innovation within educational design, and a strong emphasis on communicating impact should be prioritised.

7 Future research

Suggestions for future research stand on two pillars. The first one is suggestions for research that would have benefitted the research for this project, and the second is suggesting areas to further build upon this project.

As mentioned, open innovation as a phenomenon is a relatively immature research area. Especially when it comes to the context of HEIs, but also in terms of open innovation leadership and open innovation culture.

While this project contributes to understanding the open innovation phenomenon in a HEI context by researching attitudes and capabilities of the engaged faculty, suggestions for future research would be to include the faculty who are less engaged. Including all types of faculty will likely create a more holistic picture when investigating the environment for open innovation practices. The semi-structured interview would be a recommended approach, but by broadening the scope to include all types of faculty, the research will benefit from being triangulated with questionnaires and focus group interviews. It would be interesting to let engaged and less engaged faculty interact in a focus group and even try to facilitate examples of inspirational workshops to see the perceived effect of peer-to-peer learning.

Another direction is to include more universities, but also high schools (gymnasiums). High schools are in many ways ahead of the universities, and they work closely with the students who will eventually become university students. High schools are also publicly financed and governed, but their sole purpose is education. Therefore, their priorities are not mixed, their teachers are focused on education and on continuously developing their learning technologies and approaches towards the need of their students.

A third area for future research would be to include the Danish business community. This in order to qualify an understanding of the businesses' perception of the obligations that universities have

to bridging theory and practice as well as integrating knowledge from business and into the classrooms.

Finally, building on our recommendation for Danish HEIs designing their organisation and incentive structures to match open innovation practices, it will be important to include business model innovation as a next step. While the business model is a tool for value creation and capture, it also serves as a prototype strategy. Making decisions around the business model and open innovation will require strong, strategic alignment within the leadership layers in collaboration with the external knowledge sources (partners, networks, etc.).

8 Bibliography

- Amabile, T.M. & Khaire, M., 2008. Creativity and the Role of the Leader. *Harvard Business Review* 86 (10), 101-109.
- Amabile, T.M, Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the Work Environment for Creativity. *The Academy of Management Journal*, 39(5), 1154-1184.
- Anderson, W.A., Banerjee, U., Drennan, C. L., Elgin, S.C.R., Epstein, I.R., Handelsman, J., Hatfull, G.F., Losick, R., O'Dowd, D.K., Olivera, B.M., Strobel, S.A., Walker, G.C., Warner, I.M. 2011. Changing the Culture of Science Education at Research Universities. *Science* 14 Jan 2011: Vol. 331, Issue 6014, pp. 152-153
- Bogers, M., Zobel, A., Afuah, A., Almirall, E., Brunswicker, S., Dahlander, L., Ter Wal, A. (2017). The open innovation research landscape: Established perspectives and emerging themes across different levels of analysis. *Industry and Innovation*, 24(1), 8-40.
- Bryman, A.& Bell, E. (2015). *Business research methods* (4.th ed.). Oxford: Oxford University Press
- Burcharth, Knudsen, & Søndergaard. (2014). Neither invented nor shared here: The impact and management of attitudes for the adoption of open innovation practices. *Technovation*,34(3), 149-161.
- Chesbrough, H. W (2003a). *Open innovation: the new imperative for creating and profiting from technology*. Boston Massachusetts: Harvard Business School Press.
- Chesbrough, H. W. (2003b) "The Era of Open Innovation". *MIT SLOAN Management Review*
- Chesbrough, H. W. (2011). *Open Services Innovation: Rethinking Your Business to Grow and Compete in a New Era*. San Francisco, CA: Jossey-Bass.
- Chesbrough, H.W. & Crowther, A. (2006). Beyond high tech: Early adopters of open innovation in other industries. *R&D Management*, 36(3), 229-236.
- Chesbrough, H. W, Vanhaverbeke, W. and West, J. (eds.) (2006). *Open innovation: researching a new paradigm*. Oxford University Press.
- Chesbrough, H.W. (2006) *Open Business Models: How to Thrive in the New Innovation Landscape*. Cambridge, MA: Harvard Business School Publishing.
- Chiaroni, C.& Frattini. (2011). The Open Innovation Journey: How firms dynamically implement the emerging innovation management paradigm. *Technovation*, 31(1), 34-43.
- Cohen, W.M., & Levinthal, D.A. (1990). Absorptive-capacity—a new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128–152.
- Corbin, J., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, 13(1), 3-21.
- Dahlander, L. & D. M. Gann. (2010). How open is innovation? *Research Policy* 39(6), 699-709.
- Deci, E.L. & Ryan, R.M. (1985b). The general causality orientations scale: self-determination in personality. *Journal of Research in Personality*, 19, 109–134.
- Denscombe, M. *Good Research Guide : For small-scale social research projects* (4th Edition). Berkshire, GBR: McGraw-Hill Education, 2010. ProQuest ebrary. Web. 25 September 2014.

- Fu, X. 2012. How does openness affect the importance of incentives for innovation? *Research Policy* 41(3), 512-23.
- Gagné, M. & Deci, E. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26(4), 331-362.
- Gassmann, O., Enkel, E., & Chesbrough, H. (2010). The future of open innovation. *R&D Management*, 40(3), 213-221.
- Gassmann, O. & Enkel, E. (2004) "Towards a theory of open innovation: three core process archetypes". Proceedings of The R&D Management Conference, Lisbon, Portugal, July 6–9.
- Gold, A.H., Malhotra, A. & Segars, A.H. 2001. "Knowledge Management: An Organizational Capabilities Perspective," *Journal of Management Information Systems* (18:1), pp. 185-214.
- Herzog, P. (2008). "Open and Closed Innovation. Different cultures for different strategies". Wiesbaden: Gabler.
- Hüther O., Krücken G. (2015) Incentives and Power: An Organizational Perspective. In: Welpel I., Wollersheim J., Ringelhan S., Osterloh M. (eds) *Incentives and Performance*. Springer, Cham
- James, L, David, G., & Lorna; U. (2013) Learning and innovation in the knowledge-based economy: beyond clusters and qualifications, *Journal of Education and Work*, 01 July 2013, Vol.26(3), p.243-266
- Kaplan, R.S & Norton, D.P. (1992). *The Balanced Scorecard—Measures that Drive Performance*. Harvard Business Review
- Katz, R. and Allen, T.J. (1982) Investigating the not invented here (NIH) syndrome: a look at the performance, tenure, and communication patterns of 50 R&D project groups. *R&D Management*, 12, 1, 7–19.
- Kotter, J. (1996). *Leading change*. Boston, Mass: Harvard Business School Press.
- Kratzer, Meissner, & Roud. (2017). Open innovation and company culture: Internal openness makes the difference. *Technological Forecasting & Social Change*, 119, 128-138.
- Lam A. (2015) Academic Scientists and Knowledge Commercialization: Self-Determination and Diverse Motivations. In: Welpel I., Wollersheim J., Ringelhan S., Osterloh M. (eds) *Incentives and Performance*. Springer, Cham
- Lane, Peter J., et al. "The Reification of Absorptive Capacity: A Critical Review and Rejuvenation of the Construct." *The Academy of Management Review*, vol. 31, no. 4, 2006, pp. 833–863
- Lašáková, Bajžíková, & Dedze. (2017). Barriers and drivers of innovation in higher education: Case study-based evidence across ten European universities. *International Journal of Educational Development*, 55, 69-79.
- Laursen, K. and Salter, A. (2006). "Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms". *Strategic Management Journal*, 27, 2, 131–150.
- Lichtenthaler, U. (2011). Open Innovation: Past Research, Current Debates, and Future Directions. *Academy of Management Perspectives*, 25(1), 75-93.

- Lichtenthaler, U. & Lichtenthaler, E. (2009). A Capability-Based Framework for Open Innovation: Complementing Absorptive Capacity. *Journal of Management Studies*, 46(8), 1315-1338.
- Lincoln, Y. & Guba, E. (1985 & 1994). *Naturalistic Inquiry*. Beverly Hills, CA: Sage
- Mantere, S. and Ketokivi, M. (2013). Reasoning in Organizational Science. *Academy of Management Review*. 38 (1): 70-89
- Menon, T. & Pfeffer, J. (2003). Valuing Internal vs. External Knowledge: Explaining the Preference for Outsiders. *Management Science*, 49(4), 497-513.
- Mention, A. L. (2011). Co-operation and co-opetition as open innovation practices in the service sector: Which influence on innovation novelty? *Technovation*, 31, 44–53.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science* / vol. 5, no. 1.
- Nonaka, Ikujiro, & Konno, Noboru. (1998). The Concept of 'Ba': Building a Foundation for Knowledge Creation. *California Management Review* / Vol. 40, no. 3.
- Nonaka, Ikujiro, Toyama, Ryoko, & Hirata, Toru. (2008). *Managing flow: A process theory of the knowledge-based firm*. Basingstoke England New York: Palgrave Macmillan.
- Quack, M. (2015) Myths, Challenges, Risks and Opportunities in Evaluating and Supporting Scientific Research. In: Welpel I., Wollersheim J., Ringelhan S., Osterloh M. (eds) *Incentives and Performance*. Springer, Cham.
- Riordan, N. (2013). *Knowledge creation: Hidden driver of Innovation in the Digital Era*. Business Information Systems National University of Ireland.
- Saebi, T. & Foss, N.J. (2014). Business Models for Open Innovation; Matching Heterogenous Open Innovation Strategies with Business Model Dimensions.
- Salter, A., Criscuolo, P., & Ter Wal, A. (2014). Coping with Open Innovation: Responding to the Challenges of External Engagement in R&D. *California Management Review*, 56(2), 77-94.
- Schilling, M. (2017). *Strategic management of technological innovation* (5.th ed.). New York: McGraw-Hill Education
- Stake, R.E. (1995). *The Art of case Study research*. Thousand Oaks, CA: Sage
- Volberda, H. W, Foss, N.J. & Lyles, M. A. (2010). Absorbing the concept of absorptive capacity: How to realize its potential in the organization field. *Organization science* / vol. 21, nr. 4.
- Von Krogh, G., Nonaka, I., & Rechsteiner, L. (2012). Leadership in Organizational Knowledge Creation: A Review and Framework. *Journal of Management Studies*, 49(1), 240-277.
- Wilkesmann U. (2015) Imaginary Contradictions of University Governance. In: Welpel I., Wollersheim J., Ringelhan S., Osterloh M. (eds) *Incentives and Performance*. Springer, Cham
- Zahra, Shaker A., and Gerard George. "Absorptive Capacity: A Review, Reconceptualization, and Extension." *The Academy of Management Review*, vol. 27, no. 2, 2002, pp. 185–203

9 Links

- Note 1: <https://ufm.dk/publikationer/2018/filer/rapport-universitetsuddannelser-til-fremtiden.pdf>
Uddannelses - og Forskningsministeriet, Udvalg om bedre Universitetsuddannelser (March 2018), Universitetsuddannelser til Fremtiden (pp. 197 - 199)
- Note 2: <https://publications.europa.eu/en/publication-detail/-/publication/fbd4c2aa-aeb7-41ac-ab4c-a94f6ea9eb1f>
- Note 3: http://ec.europa.eu/education/policy/higher-education/quality-relevance_en
- Note 4 & 6: http://www.carlsbergfondet.dk/da/Nyheder/Nyt-fra-fondet/Nyheder/Kronik_Taenk-vildt-taenk-nyt-taenk-langsigtet
- Note 5: <https://www.b.dk/kronikker/saadan-uddanner-vi-klogt-til-fremtiden>
- Note 9: <https://en.wikipedia.org/wiki/Positivism>
- Note 10: [https://www.reuters.com/article/us-emea-reuters-ranking-innovative-unive/europes-most-innovative-universities-2018-idUSKBN1HW0B4 /](https://www.reuters.com/article/us-emea-reuters-ranking-innovative-unive/europes-most-innovative-universities-2018-idUSKBN1HW0B4/)
<http://www.dtu.dk/english/collaboration/collaboration-news/nyhed?id=BB34067A-282D-49D5-BC26-6B96DB1C9BB7>
- Note 11: <https://www.retsinformation.dk/Forms/R0710.aspx?id=198434>
- Note 12: <https://www.cbs.dk/en/about-cbs/strategy>
- Note 13: <http://introduction.ku.dk/strategy2023/>
- Note 14: <http://www.dtu.dk/english/about/organization/strategy>
- Note 15: https://da.wikipedia.org/wiki/European_Credit_Transfer_and_Accumulation_System
- Note 16: <https://www.finansforbundet.dk/da/nyheder/aktuelt/Sider/Finansforbundetlancerernysommerskole.aspx>

10 Appendices

10.1 Appendix 1 - Notes from CBS Board of Management meeting on 14th December 2017

10.2 Appendix 2 - The Danish Higher Education System

10.3 Appendix 3 - Leadership activities for knowledge creation

10.4 Appendix 4 - Interview guide

10.5 Appendix 5 - Code ranking

10.6 Appendix 6 - Organisational charts CBS / DTU / UCPH