

The formal organization structure of research innovation centers

– a case-study in search of characteristics and an
explanation

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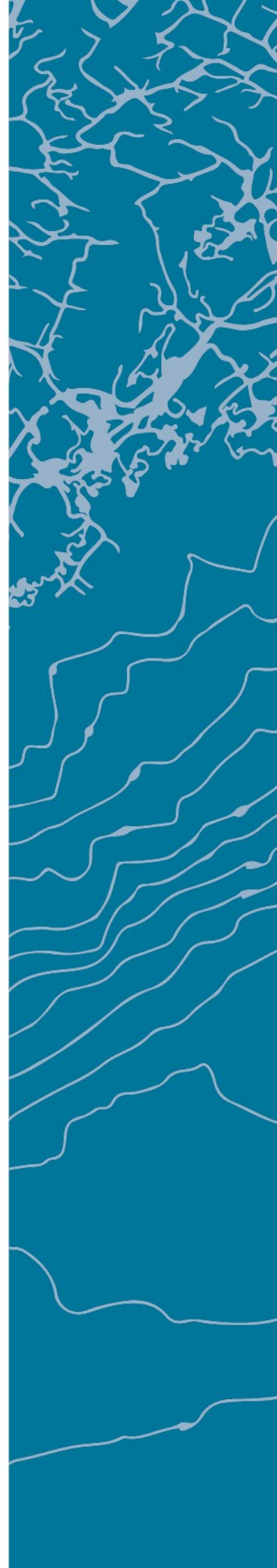
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ABSTRACT

This study sheds light on research innovation centers in a Norwegian setting. Research innovation centers are a hybrid of research groups and innovation centers and belong to the higher education (HE) sector. The aim of this study is to identify the formal organization structure of two cases of research innovation centers and to find a suitable explanation through the analysis of its institutional pillars, according to W. R. Scott (2014). In a qualitative case-analysis it was found that the two cases share most of their characteristics in the formal organization structure. The main findings in both cases are a) a low level of centralization; b) a low level of formalization; and c) a high level of professionalization and specialization (staff composition). The cases differ in their overall order, mainly due to different leadership structures. Further, a second analysis shows that all those findings can be explained by different parts of the cases' institutional pillars, and thus by different isomorphism mechanisms. The predominant one is the normative isomorphism, as described by DiMaggio and Powell (1983). This study is a first empirical contribution to discuss research innovation centers from an organizational perspective. Future research should take new perspectives to expand the knowledge and understanding of this field.

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1 INTRODUCTION

1.1 Norwegian HE as a Case

“IF YOU ALWAYS DO WHAT YOU ALWAYS DID, YOU WILL ALWAYS GET WHAT YOU ALWAYS GOT.”

This famous quote of Albert Einstein is a call to strike out in new directions. During the last 60 years higher education (HE) in Norway faced several changes. In the 1960s, Norway introduced district colleges as an alternative for universities with the intention to establish education oriented towards vocations (Kyvik, 2005, p. 69). District colleges were established at a time where regions received higher importance by becoming another policy level (county), and the regional autonomy was strengthened. According to Stensaker et al. (2005, p. 40) institutions established at that time were desired also by local politicians, industry and other local stakeholders and got also confronted with regional objectives. However, regional policies are traditionally central policies in Norway, which is why HE is part of the national policies. (Stensaker et al., 2005, pp. 39–40)

The district colleges have been successful for a while but when a new governmental commission was established in 1987, they decided that the district colleges had to merge with other non-university colleges in 1994. From 98 non-university colleges, 26 remained after the merger. (Kyvik, 2005, pp. 69–70) At the same time Norway moved to a mass-higher education. Between 1987 and 1994 the number of students at Norwegian higher education institutions (HEIs) has doubled (Stensaker et al., 2005, p. 22). Another considerable change was the introduction of New Public Management (NPM) inspired reforms and the following efficiency enhancement on all levels (Maassen et al., 2011, p. 484). One of those reforms was the quality reform in Norwegian HE, which was implemented in 2001. The importance of quality in research and education was focused already since the beginning of the 1990s (Stensaker et al., 2005, pp. 22–24). This quality reform contained changes in the wake of the Bologna process, as the introduction of international degree levels and the ECTS grading system. Additionally, it included policies to ensure the quality of the Norwegian HE-system. This was done by giving more autonomy to the institutions in organization and management as well as in the decisions on study programs and through the establishment of a national agency for the quality assurance in HE (NOKUT). (Stensaker et al., 2005, p. 24)

In the early 2000s, the importance of universities for societal development gained new interest, which led, according to Stensaker et al. (2005, p. 24), to higher demands and expectations from outside the HE sector. The authors state that while from the 1970s on national policies in HE were

mainly on economic and cultural aspects, the county level passed policies to shape regional innovation systems, in which HEIs have a key role (Stensaker et al., 2005, p. 40). This need for regional collaborations was also strengthened in the quality reform from 2001. Stensaker et al. (2005, pp. 41–42) argue that by making the HEIs competing for students it was intended that the study programs get connected to regional needs and thereby strengthen regional development. Furthermore, the authors claim that the quality reform provided a new framework for external relations of HEIs as well as stimulations for a commercial usage of ideas. This shows that the Norwegian HE sector tried not to do what they always did and change instead.

1.2 Aim and Content of this Study

These changes in the Norwegian HEI sector require changes also within the HEIs themselves. *Research innovation centers*, which are the object of investigation in this study, are one reaction of universities to the demand for more collaboration with external stakeholders. This term is created newly to describe a special type of research structure at a university, which is not part of the common university structure. Based on the literature on research centers (e.g. Boardman & Bozeman, 2007) and innovation labs (e.g. Schuurman & Tönurist, 2017 or Tönurist et al., 2015) it is argued that research innovation centers are a hybrid of those two concepts. That means research innovation centers work in collaboration with internal and external stakeholders, user-centered, interdisciplinary, and experimental, they are often associated with ICT and have a problem-driven approach towards research. The relevance to analyze research innovation centers lies in their character as a rather new and unexplored phenomenon, outside of the typical university structure with new approaches for research and innovation. What makes it interesting from an organizational point of view is that the characteristics concerning the formal organization structure of research innovation centers are not studied yet, and it is unknown how those new hybrids can be classified. Additionally, research innovation centers are funded and supported by several actors, as for example the Norwegian Ministry of Education and Research which has a special program for research-based innovation centers (Norwegian Ministry of Education and Research, 2013). Hence, it is of interest to identify what type of organizations are supported and whether they differ from the common formal organization structure at universities. Moreover, the research innovation centers at Norwegian universities have emerged during the last 10-15 years. This is long enough to see, that the phenomenon is not only interesting for a short period of time and to ensure that organizational issues have been discussed in the organizations internally. After this time, it is also ensured that the centers passed the uncertainties organizations usually face in their early stages, which could disturb the analysis.

This study is of high value for the research literature and in practice for four reasons. First, it fills a research gap by identifying which formal organization structure is present in research innovation centers. Second, due to the most-similar-systems design, it leads to the conclusion that other similar cases might share these characteristics. Third, by identifying the formal organization structure and the institutional pillars the cases might reflect themselves and adjust things where it is necessary. Fourth, this study recognizes research innovation centers as a specific type of organization, which could be interesting from various perspectives in the future. Since it would be too broad for this study to investigate all aspects of an organization structure it is narrowed down to four key aspects of the formal organization structure, which are explained in chapter 2.2. Further, the question “why” is always difficult to answer if it is that broad. That is why institutional isomorphism is chosen as a possible explanation and analyzed later. Institutional isomorphism is part of the neo or new institutionalism perspective in organization theory. DiMaggio and Powell (1983) present three isomorphism mechanisms in their paper and laid thereby the foundation for many studies and discussions. This also means that institutional isomorphism is a common and well tested concept, which still is used to explain institutions. The article of DiMaggio and Powell got cited 48420 times by June, 2020 according to Google Scholar, which further strengthens its influence and credibility. Greenwood and Meyer (2008) celebrate the paper as one of the few ones which is not only cited almost countless times, but also has enduring influence. Until 2008, the authors identified an increasing rate of citations of DiMaggio and Powell’s (1983) paper and this has continued also until today, based on the data of Google Scholar. Moreover, the concept covers the complex environment of organizations, which is interesting in the case of research innovation centers, since their environment might play an important role in their structure. The research question is:

What are the core characteristics of research innovation centers’ formal organization structure in two concrete cases and can those findings be explained by means of institutional isomorphism?

To be able to answer this research question the thesis has a qualitative research design, more precisely it is a multiple case-study with two cases. Since the research question is bipartite the two parts are analyzed separately. While the first part is a descriptive case study the second part is explanatory. The study starts with a broad literature review. Thereby, the context of the phenomenon research innovation center is presented first. It includes an insight in recent developments in the HE sector in Norway and Europe, concepts in HE literature, and a review about research centers and innovation labs. Those are the two concepts on which it is then defined what a research innovation center is. Chapter 2.2 explains Mintzberg’s framework of formal

organization structures which is important for the analysis of the cases' characteristics. After that there is a shift to the field of institutionalism, where the theory of an institutional pillars is presented as well as institutional isomorphism and some later adjustments in Scandinavian institutionalism. In chapter three the research design of this thesis is introduced in two steps. First the methods are described, including the methods of data collection and data analysis, and second the cases are outlined, including a detailed presentation of both cases as well as the explanation of the case selection process. Following the research design, chapter four is the empirical section, starting with the case-analysis, first of center A, then of center B, along all four aspects of the formal organization structure. It is expected to find a formal organization structure, which is a hybrid of what Mintzberg (1989) defines as professional and innovative organizations. This is expected because research innovation centers are defined as a hybrid of a research group, which rather fits in the professional configuration, and an innovation lab, which rather fits in the innovative organization in the manner described by Mintzberg (1989). Chapter four concludes with a comparison of both cases. This shows that they are very similar. The second part of the research question is addressed in chapter five. There it starts with an explanation of the cases' institutional pillars, which are the basis for the analysis to see if institutional isomorphism is a robust explanation for the previous findings. This study cannot exclude the possibility that other explanations could fit better, due to the difficult traceability of adoption processes and limited resources. However, it is expected to find many similarities between the institutional environment and the earlier findings, so that each isomorphism mechanism can explain parts of the formal organization structure in the cases. The study ends with the conclusion in chapter six, where the empirical findings are summarized and discussed. Furthermore, the limitations of this study are presented along with suggestions for future research.

2 LITERATURE REVIEW

2.1 The Context of Research Innovation Centers

First of all, it must be clarified what is meant when writing about research innovation centers; where does this phenomenon come from and what is a research innovation center? To elaborate on those questions, it is therefore necessary to have a look at recent developments and concepts in innovation and the HE sector first, and give an overview of the existing literature on research innovation centers or rather of research centers and innovation labs, second.

2.1.1 Developments in Norwegian and European HE

Norwegian universities traditionally had one key societal function: providing “candidates to the civil service and to learned professions” (Maassen et al., 2011, p.483). At that time, universities in Norway were highly connected with the civil service, which also meant a high level of control. Yet, the university had freedom in teaching and learning, unlike university colleges. (Maassen et al., 2011, p. 483) By the introduction of district colleges in the 1960s, the HEIs got more involved in the regional development (Kyvik, 2005, p. 69; Stensaker et al., 2005, p. 39). Another major change for the Norwegian HE sector was the quality reform, which had influence on many aspects, as described in the previous chapter, *inter alia* on the collaboration of HEIs with external stakeholders (Stensaker et al., 2005, pp. 41–42). Olsen (2007, p. 25) argues that universities in Europe were in a major transformation in the early 2000s which not only questioned the internal processes and dynamics but also the societal, economic and political role. According to Maassen et al. (2011, p.485f.), these changes were not far-reaching in Norway since in 2010, the actions still appeared strategically weak and the funding system encourages the universities to increase their number of students. Instead, the authors contend, Norwegian universities would need effects on academic innovation and co-operation, schemes for teaching and learning as well as higher specialization and less fragmentation.

Those changes in Norwegian HEIs did not happen isolated from the developments in the rest of the world. Basically, one can see two main perspectives of universities in the research literature: the university as a “isolated producer of knowledge” (Prieto Mejia et al., 2019, p. 11) or the university as part of societal development. Several concepts of this scientific perspectives are presented below. The concepts are revisited in the analysis of the cases’ institutional pillars later. Seeber et al. (2015, p. 1450) claim in their paper that universities have been considered to be a specific type of organizations for decades. The authors attribute universities that they are loosely

coupled, guided by external interests, have weak decision-making bodies, and a blurred hierarchy. Olsen (2007, pp. 28–33) presents in his paper four visions of university organizations. The four visions are not meant to be complete, but they are theoretical ideas of how universities could be under which circumstances. The first vision presented by Olsen (2007) is the *University as a Rule-Governed Community of Scholars*, which is quite close to the Humboldtian university model. This means the shared commitment of scholars and researchers are the dominating identity and give own organizational principles to the universities. The university's activities should be beneficial for the society, not for specific stakeholders. (Olsen, 2007, pp. 29–30) *Research universities* are a concept very similar to this one. Pinheiro and Stensaker (2014, p. 500) state in their paper that internally research universities have a loosely-coupled work integration. Further, the authors highlight the importance of academic values and norms just as shared commitment for a research university which has influence on the power structure as well as on internal governance. Another vision Olsen (2007, p. 32) presents is *the University as a Representative Democracy*. Decisions are taken around organized groups in elections, voting and bargaining processes. It is meant to reduce old hierarchic structures and give more power away from senior professors.

According to Seeber et al. (2015, p. 1450), the uniqueness of universities ended in the 1980s, when universities were not considered as unique anymore, but were rather assimilated with other public sector institutions. At that time universities experienced a higher pressure for modernization and efficiency which led to more autonomy, also financially, a stronger but smaller leadership and more competition. (Maassen et al., 2011, p.484f.; Seeber et al., 2015, p.1450) The need for more innovation was present all over the public sector during the last 25 years. Even though authors as Carstensen and Bason (2012, p. 4) describe innovation in the public sector as “an orchestra without a conductor”, because formal processes for innovation are missing, or Schuurman and Tönurist (2017, p. 7) say the public sector is defined as resistant towards innovation, the public sector fosters innovation nowadays. Borins (2002, p. 467), Tönurist et al. (2015, p. 4) and Gascó (2017, p. 90) are stating that the necessity to implement technology in the public sector was an environmental change which led to an increasing need for innovation in the last two decades. Prieto Mejia et al. (2019, p.11) describe that universities are turning “to be part of an regional innovation ecosystem” instead of being an “isolated producer of knowledge”.

A well-known scientific model fitting in this development is the triple helix model introduced by Etzkowitz and Leydesdorff (1995). The model highlights the importance of university – industry – government collaboration for innovation. Later the model was extended into the quadruple helix, which includes the community as a fourth innovation actor (Kolehmainen et al., 2016, p.28f.). In

both models the university is a key actor in an integrated innovation process. Gunasekara (2006, p. 141) describes that individuals in one of the helices in the triple helix model increasingly change their roles and thereby blurry boundaries between industry, state and university. Universities in the triple helix model also gain projects for capital formation and increasing resources according Gunasekara (2006). In regional innovation systems, which is the main theme the helix models belong to, universities usually have the role to facilitate knowledge spillovers based on their research and teaching activities as well as to enhance the creation of norms in regional clusters (Gunasekara, 2006, p. 141). The *University as an Instrument for Shifting National Political Agendas* is one vision presented by Olsen (2007, pp. 31–32) which attributes the universities a similar active role in shaping societal and economic development as the triple and quadruple helix models. The main driver for science in this vision is the applicability and usage of research, which is highly dependent on the political agenda. The author states that scientific work is characterized through cross-disciplinary teamwork and the administration is the core of the university in this vision. It is a vision close to the American-university model. (Olsen, 2007, pp. 31–32)

Also the last vision presented by Olsen (2007, pp. 32–33), the *University as a Service Enterprise Embedded in Competitive Markets*, considers that universities are an actor for economic development and innovation. By acting in national and global markets, the university in this vision has customers which are crucial for the universities structure and processes. Knowledge and information are not considered as public goods, but as resources on a free and competitive market. (Olsen, 2007, pp. 32–33) Another model which is close to this one is the entrepreneurial university. Etzkowitz is a researcher who writes about the *entrepreneurial university* in various papers. The author describes that the economy got increasingly knowledge-based, which also changes policies on research funding. According to Etzkowitz (2016, p. 84) an entrepreneurial university has five key elements:

”1) The organization of group research; 2) The creation of a research base with commercial potential; 3) The development of organizational mechanisms to move research out of the university as protected intellectual property; 4) The capacity to organize firms within the university; and 5) The integration of academic and business elements into new formats such as university–industry research centres.”

Of those five elements, only the last two are crucial for entrepreneurial universities. The author states that the first two elements are in a research university, just as the rule-governed university by Olsen (2007), and the third one is part of the transformation process to the entrepreneurial university. Also Pinheiro and Stensaker (2014, p. 501) present characteristics of the

entrepreneurial university in their paper. *Coupling*, which means internal collaborations, and *bridging*, which means external partnerships, are described as two main characteristics of an entrepreneurial university next to several other prominent features. Those are for example funding, based on various sources, or collaborations in different directions (e.g. research, teaching, technology transfers). Both papers presented for the entrepreneurial university are dealing with the same concept, however, they are not completely congruent. This literature shows main parts of the lively scientific debate about universities as organizations and their role in and for the society and how it changed over time. Nevertheless, authors in this field argue that none of the presented concepts are complete, universities are rather a mixture of aspects from different concepts and on different levels in transformation processes. Research innovation centers occur in the transformation to a university integrated in economic and societal development.

2.1.2 Research Innovation Centers as Hybrids

Organizationally there are two concepts in the scientific literature which are very close to research innovation centers: research centers and innovation labs. Research innovation centers are a hybrid of those two types, which is why both are presented here. Collaboration is, according to Boardman and Corley (2008, p. 900), one key purpose of research centers at universities. The forms of collaborations are thereby multifaceted. From collaboration of researchers within a university across departments or disciplines it can also be externally across universities, with industry or governments. The importance of collaborations for research centers was also strengthened by Boardman and Bozeman (2007, p. 435) and Kumar (2017, p.454f.). Closely linked to collaboration, and also mentioned by the authors as an important element of research centers, is interdisciplinarity. Boardman and Bozeman (2007, pp. 430–432) argue in their paper that different groups are needed in order to answer complex societal problems, also called *wicked problems* (Head, 2008). In that sense, the focus of research centers is on the topic instead of on the disciplines. Further, Boardman and Bozeman (2007, p. 430) studied the so called *multipurpose, multidiscipline university research centers* (MMURCs) which the National Science Foundation (NSF) had established in the US. There are three main characteristics the authors associated with MMURCs: the mix of disciplines and scientific fields, the collaboration and relation to external institutions and diverse research missions. Additionally, the authors strengthen the problem-driven research which is practiced in MMURCs. A different form of research centers is presented by Prieto Mejia et al. (2019, p.11f.). Based on a regional and bottom-up focus of research, the authors present a *hub-based university innovation model*. In this model the external stakeholders from a university's region co-create and co-produce solutions with the university. The concept they

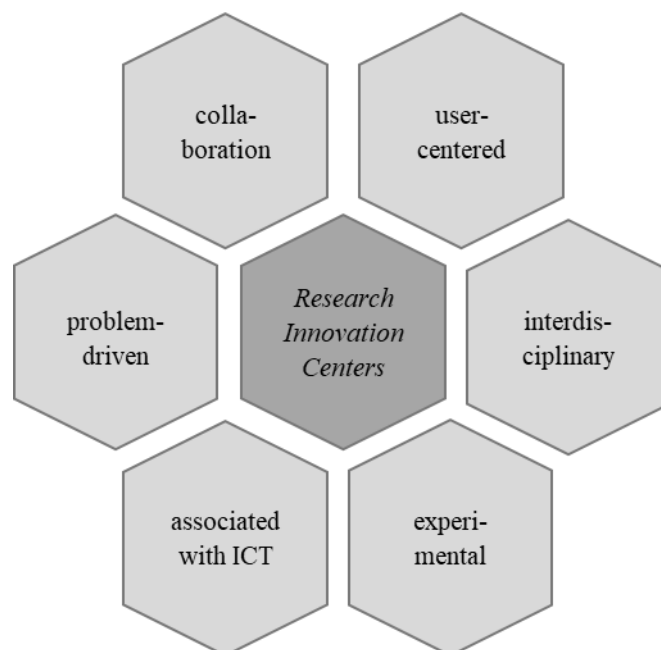
include in this model is social innovation, which means that it is tried to provide “a solution to a social, environmental or cultural problem” (Prieto Mejia et al., 2019, p. 12) with a higher impact for society than for the one owning the solution. It must be mentioned that research centers as presented here are not the same as a working- or research-group, which traditionally are located around a professorship, working in a specific field and topic within a certain department.

Innovation labs are a concept which is not directly or necessarily related to universities. Looking on existing definitions is not very helpful to understand the concept of innovation labs, since there are various terms and definitions, as presented by McGann et al. (2018, p. 253). In their study the authors found already eight different terms and definitions in the literature for the MindLab in Denmark. The lab was one of the first and most famous labs in the world, but it was closed in 2018. Hence, it is easier to identify some key characteristics the field literature agrees on. One of those key characteristics is that public innovation labs are working with an user-centered or even user-driven focus, as well as concentrating on co-creation and collaboration (Almirall et al., 2012, p. 12; Carstensen & Bason, 2012, p. 6; Gascó, 2017, p. 91; Schuurman & Tönurist, 2017, p. 10; Tönurist et al., 2015, p. 5, 2017, p. 1467). Furthermore, there is a common agreement to see innovation in or for the public sector as the main reason for the existence of public innovation labs (Carstensen & Bason, 2012, p. 5; Gascó, 2017, p. 90; McGann et al., 2018, p. 250; Schuurman & Tönurist, 2017, p. 7; Tönurist et al., 2017, p. 1455). There are also other, more precise, reasons which try to explain the main purpose or the reason of existence of public innovation labs. The necessity to address complex societal problems is one popular reason (Carstensen & Bason, 2012, p. 5; Tönurist et al., 2015, p. 5). Another one is to foster “ICT-enabled user-driven service production logic” within the public sector (Schuurman & Tönurist, 2017, p. 10). Even though public innovation labs are often associated with information and communications technology (ICT), only a few IT-engineers are employed in the labs (Tönurist et al., 2015, p. 13). Some see public innovation labs as the “experimentation space within the public sector” (Tönurist et al., 2015, p. 9) or call them the “islands of experimentation” (Schuurman & Tönurist, 2017, p. 10). The experimental character of public innovation labs is closely linked to the characteristics of living labs. Experimentation in real-life settings is one of the main aspects of living labs alongside the co-creation of innovation (Almirall et al., 2012, p. 12; Gascó, 2017, p. 90; Schuurman & Tönurist, 2017, p. 13). The similarities between the concept of living labs and public innovation labs are obvious. Schuurman and Tönurist (2017, p. 10) state that both types are “ways of dealing with innovation without relying purely on [...] innovation in the private sector”. Where exactly the concepts differ from each other remains unclear.

Mostly, the labs analyzed in the literature around the world are newly created, but also part of an existing organization, to which they are communicating monthly or quarterly and with which they have to agree on their budget (Schuurman & Tönurist, 2017, p. 11; Tönurist et al., 2017, p. 1464). Furthermore, most of the public innovation labs worldwide remain small and agile instead of growing, since growing would mean less autonomy (Tönurist et al., 2017, p. 1465). At the same time being small and agile is responsible for the high mortality rate of public innovation labs (Tönurist et al., 2015, p. 10). The paradox is: The smaller ones are easier to close down, the bigger ones are less flexible and have less freedom (Schuurman & Tönurist, 2017, p. 12). The whole concept of public innovation labs is difficult to classify, even though some characteristics are known, and the research literature agrees on some aspects.

Research centers and innovation labs are two different and inconsistent concepts, but they have many similarities as well. Both are working in an interdisciplinarity fashion, collaborate with a large number of actors from different sectors, and are problem driven. Research innovation centers, which are the focus of this thesis, are located between those concepts. They are research centers at a university but at the same time they show characteristics of innovation labs, as working in a user-centered way, being associated with ICT or being slightly experimental. Figure 1 shows the key characteristics of research innovation centers as a hybrid of research centers and innovation labs.

Figure 1. Characteristics of Research Innovation Centers



Source: The author's, Based on Boardman and Bozeman (2007), Schuurman and Tönurist (2017) & Tönurist et al. (2015)

This new hybrid of research center and innovation lab is what makes research innovation centers so interesting for this study, because this hybridity is a new and unexplored form from an organizational perspective. Even though Kumar (2017) presents structure, people and processes of research centers based on his experiences as a leader of a research center, there is a lack of empirically-based and structured in-depth analysis of the formal organization structure of research innovation centers and a classification in the light of organization theory. Also other papers, as for example by Boardman and Bozeman (2007) or Prieto Mejia et al. (2019) concentrate on the outer structure or the outer influence of research centers, respectively innovation-hubs, but not on internal processes or classifications. The same is applicable for the literature on innovation labs. It is studied what the labs focus on, why they exist and for how long, but the formal organization structure has not been studied so far. Moreover, it remains unclear so far why, i.e. under which circumstances, the research innovation centers show certain characteristics in their formal organization structure. These research gaps are tried to be filled with this thesis.

2.2 Mintzberg's Structural Approach

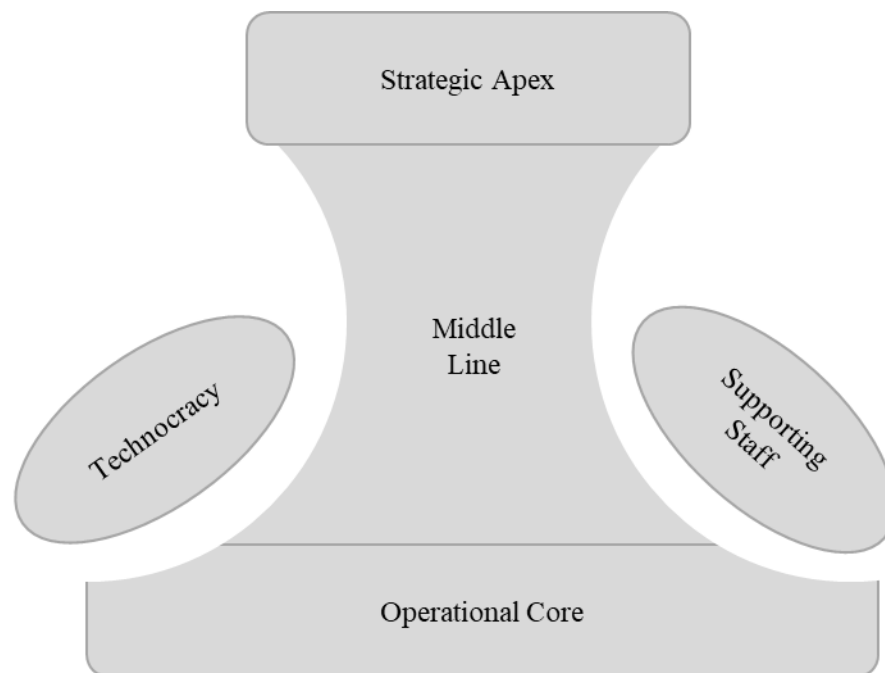
In the previous section a detailed review was made about the conceptual context of research innovation centers. For this thesis, the interest is on analyzing which formal organization structure the research innovation centers adopt, and why. Therefore, it is necessary to get an overview about Mintzberg's (1989) configurations of organization structure, which are used for the data analysis later in this study. After that, it is shown which aspects are considered as most important to identify the formal organization structure and why. By doing so, Mintzberg's configurations get structured and comparable in terms of formal organization structure, which is necessary for the analysis later in this thesis.

First, it needs to be explained why this study uses the rather dated configurations of Mintzberg as a basic framework. Until today Mintzberg's concept is well known, taught to management students and managers, used by researchers and in practice. The book "Mintzberg on management" has 4500 citations in Google Scholar by June 2020, 180 of those during the last year, which further indicates the high influence the framework still has in the scientific field. Furthermore, the configurations are still observable, although some studies revised them partly, as for example Parikh (2016). Albeit there are also other influential categorizations of organization structures, as for example the basic elements of organization structure (functional, divisional, matrix, flat), Mintzberg's work is chosen due to its broad but still detailed insight into organization structures. The author goes deeper than looking at the pure constellation of units by explaining also processes

and challenges behind those structures. Thereby, the configurations offer a broader spectrum for an analysis and classification, which is the primary aim of this study.

First of all, Mintzberg defines the configurations based on their overall order. For that purpose, the author presents five basic parts of organizations, which can be seen in Figure 2, and which have a different emphasis depending on the configuration. The author presented those parts not only in the book “Mintzberg on Management” from the year 1989, but already 10 years earlier in the book “The Structuring of Organizations”. The leadership or head of an organization is described by Mintzberg (1979, pp. 18–21) as the strategic apex. Below the strategic apex there is the middle line, a middle management mediating between the leadership and the operating core. The latter is on the bottom of the main line and, according to the author, responsible for the basic work. On the right the author added the supporting staff, which is not part of the main line, but supporting the organization with activities that are needed around. The technostructure shown on the left is supporting the operational core in specific tasks, which are not value-adding themselves, but necessary for a smooth workflow.

Figure 2. Five basic parts of organizations



Source: Mintzberg (1979, p. 20)

The first category presented by Mintzberg is the *entrepreneurial organization*. One core characteristic of this kind of organization is its simple structure and “it is characterized above all by what it is not: elaborated”, claims Mintzberg (1989, p.117). In this simple structure, which only exists of the main line, the power is quite centralized on the main leader. Quite often there is a

direct communication with the leader, often even informally. Due to the simple structure and the centralization of power, the organization remains flexible. In decision-making processes this allows quick responses, which often reflect the leader's vision (Mintzberg, 1989, p.118). Entrepreneurial organizations are, according to Mintzberg (1989, p.119), mostly young, small and preferably acting in niche markets, which requires specialization. It is stressed that this kind of an organization can also be found in non-profit sectors, and "most new organizations seem to adopt this configuration" (Mintzberg, 1989, p.120). If changes occur in the organization's environment a leader in an entrepreneurial organization has to adapt to the new circumstances. It is often the case that the leader must maneuver the organization into another niche. The centralization on one leader has also some issues, for example if this one person is too enthusiastic routine work may be forgotten or other people might not feel as part of the organization if they are never included in creating a strategy or vision (Mintzberg, 1989, pp. 128–129).

Maybe the most famous configuration presented by Mintzberg (1989) is the *machine organization*. While the entrepreneurial organization was described as not elaborated and simple, the machine organization is, in contrast, highly formalized and standardized. One similarity is the centralization of power. The first one talking about what is described by Mintzberg as machine organization was Max Weber when he wrote about bureaucracy in his book "*Wirtschaft und Gesellschaft*" in the year 1922. Processes in this organization are highly routinized and the structure is strictly hierarchical. In that sense the centralization of power is different from the one in the entrepreneurial organization, since there are middle managers and single units, but everything is organized "with a sharp distinction between line and staff" (Mintzberg, 1989, p.133). Another characteristic is the technocratic structure which is clearly separated from the rest of the hierarchy. The all parts of the organization are strictly organized and fully elaborated. The clear line of hierarchy and the formalization of processes are leading to a strict division of labor, connected with a high degree of job specialization. (Mintzberg, 1989, p.134) Another important aspect is control. This is handled top-down with the intention to remove uncertainty and curb conflicts. Consequently, a machine organization is known to have a closed atmosphere. The role of a leader is mainly to handle conflicts and changes as well as to handle the coordination between different lines (Mintzberg, 1989, p.136). In the most favorable case, control even extends to the organization's environment, in order to "become closed systems [and] immune to external influence" (Mintzberg, 1989, pp. 138–139). What is forgotten in the machine model is that organizations consist of humans. This means conflicts occur, no matter how much it is tried to be controlled, and they cannot be handled well in this structure. Moreover, the strict hierarchy and centralization leads to the same issues as in the entrepreneurial organization. Furthermore, change

can happen in machine organizations though, it will create high cost and pain. (Mintzberg, 1989, pp.142-143/151)

Organizational units or divisions and headquarters are terms which come up in a *diversified organization*. This type is common in many larger private organizations. Single divisions, which are usually specialized on different markets, are “relatively free of direct control by headquarters” (Mintzberg, 1989, p.156). Those headquarters are the central administrative of all the single divisions, responsible for performance control, the creation of a corporate strategy and coordination between the divisions. The complete organization consists of a small technostructure, but a large supporting staff and the operational core is replaced by divisions. The single divisions require a high level of autonomy, which leads to a shift of power from the headquarters to the division managers. Nevertheless, it is decided by the headquarters who those managers are. (Mintzberg, 1989, pp. 156–157) Even though this appears as a rather decentralized structure, Mintzberg (1989, p.158) argues that within the single divisions the power is rather centralized on the division managers. Furthermore, the performance control practiced by the headquarters requires standardized outputs. The author argues that this leads towards a machine organization within the divisions and between the divisions and headquarters (Mintzberg, 1989, p.159). Even though a high level of autonomy is required, it is not present in reality due to the control by the headquarters. This is one issue of the diversified organization. Another is that within a diversified organization, unsuccessful divisions might be supported longer than necessary, because the headquarters have the option to support them with the profits they gain from other divisions. This is a poor base for innovation. (Mintzberg, 1989, pp. 165–170) Mintzberg (1989, p.172) concludes that the diversified organization is “one step away from disintegration – breaking up into separate organizations”.

For the *professional organization* universities are often used as an example. In the foreground are the skills and knowledge of professionals working in these organizations. Those professionals are usually specialists, trained formally as for example through university studies or on-the-job trainings. Therefore, the professionals can work rather independently of their colleagues and control their own work. Usually there is a standardized output they work for, which means that the overall structure is rather bureaucratized. (Mintzberg, 1989, pp. 174–176) In associations professionals meet with their colleagues from other institutions. In this setting, most standards of the professionals are created. Those are the shared norms and values which are described as highly important for the research university in the previous section (Pineiro & Stensaker, 2014, p. 500). Moreover, this aspect gains importance also in the normative isomorphism by DiMaggio and

Powell (1983), which is presented later in this study. Mintzberg (1989, p. 177) describes the professionals and their work as the operating core of a professional organization, but it also has a small technostructure and a large supporting staff. A picture used to illustrate the structure are the “inverse pyramids, with the professional operators on the top and the administrators down below to serve them” (Mintzberg, 1989, p.179). Regarding the distribution of power this means that the professionals have an oligarchy, which is also described in the triangle of coordination in HE by Clark (1983). Within the operational core, there is a rather democratic and flat structure. Hence, the professional organization often has two lines of hierarchy, one bottom-up for the operating core and one top-down for the supporting staff. (Mintzberg, 1989, p.179) However, this does not mean that the formal leaders have no power. Their power lies in handling disturbances for the organization, networking with important external partners for support and independence (Peterson, 2010). Decision-making in professional organizations happens on various levels in different groups to unequal issues. A professional organization has a weakness in coordinating, due to the high autonomy of professionals and their demeanor as experts and specialists. Based on this weakness, it is also difficult to push innovation top-down (Mintzberg, 1989, p. 178). However, bottom-up innovation or other forms are less difficult in a professional organization.

This is very different in the *innovative organization*. Mintzberg (1989, pp. 199–201) claims that in this configuration the whole organization is structured in order to be innovative. Therefore, the middle line is large compared to the other configurations, but there is no supporting staff or technostructure. The innovative organization has an organic structure with specialized jobs and rather little formalization. Many activities in the innovative organization are done in teams, often multidisciplinary with different experts or in ad hoc projects. An innovative organization must avoid the bureaucratic structure, according to Mintzberg (1989, pp. 199–201). The author claims that creating an organization chart is difficult, due to fast changes within the organization. This might have gotten less problematic due to the rise of digital solutions in the last 10-15 years. Managers in innovative organizations are usually coordinators for the teams and units, power is not related to the hierarchy, but to expertise, just as in professional organizations like universities. (Mintzberg, 1989, pp. 199–201) Mintzberg (1989, p.196ff.) calls this kind of structure *adhocracy*. The author defines two types of adhocracies: the operating and the administrative adhocracy. The main difference between those is that in the operating adhocracy the administrative and operational work are intertwined, as in ad hoc projects all those tasks go together, while in the administrative adhocracy the operational core is clearly separated from the administrative structure. (Mintzberg, 1989, pp. 201–203)

This fluent structure results in a minimum of explicit strategies. It is not surprising that, according to Mintzberg (1989, p.207), also the innovative organization's environment is considered to be dynamic and complex, often those environments are even chosen by innovative organizations themselves. However, this structure comes along with some risks, which might lead to failure and to a short lifespan of innovative organizations. Other organizations might succeed and have thereby the threat of growing, becoming more stable, bureaucratic and thus lose the characteristics of an innovative organization. (Mintzberg, 1989, p.208) Besides that, there are also many people who need formal structures and clear processes, for those the innovative organization is inappropriate. It is questionable if there is a high level of efficiency in those organizations regarding the high costs caused by a lack of standardization. (Mintzberg, 1989, pp. 217–220) Another concept which received increasing attention during the last years is ambidexterity. Ambidextrous organizations are “establish[ed] project teams that are structurally independent units, each having its own processes, structures, and cultures, but are integrated into the existing management hierarchy” (O'Reilly & Tushman, 2004, p.79). The innovative the ambidextrous organization have several aspects in common, nevertheless some argue that ambidexterity has overhauled adhocracy (Parikh, 2016).

The last two configurations presented by Mintzberg (1989) are the *missionary* and the *political organization*. The former is characterized by a strong ideology, meaning a “rich system of values and beliefs about an organization” (Mintzberg, 1989, p. 224), consisting of a sense of mission, rich traditions or identifications. This ideology replaces mechanisms which are present in other configurations described above, as standardization of processes or supervision. (Mintzberg, 1989, pp. 223–225) However, the norms in a missionary organization are standardized as well, which is seen as quite powerful. The standardization of norms render mechanisms of control, hierarchy or formal rules unnecessary and even professional skills are described as negative here, since they might import status differences between the members. (Mintzberg, 1989, p.229) Finally, Mintzberg (1989, p.234) concludes that ideology can overlay on the previously presented configurations, but not equally likely on every of them.

The opposite to the missionary organization is the political one. It is argued that political power in an organization is illegitimate, it “is not formally authorized, widely accepted, or officially certified” (Mintzberg, 1989, p.238). Moreover, it leads to conflicts and cleavages inside an organization. The political activities are presented as political games, of which several are identified in organizations. Some political games cannot match with previously presented configurations, due to their legitimate systems (e.g. machine and missionary organization),

according to Mintzberg (1989, p. 238ff.). Further, the author presents how politics can be present in other configurations. In total, power is the key part of a political organization, other structures can only hardly be identified (Mintzberg, 1989, p.241). The missionary as well as the political organization are usually not found as pure organizations, but rather aspects of them can be found in the other configurations (Mintzberg, 1989, pp.223/237). Additionally, management handbooks and textbooks only refer to the other five configurations. That is why the missionary and the political configuration are not considered further in this study.

Mintzberg's configurations are very detailed, elaborated, and broadly used by others over the years, which is why they are chosen. To be able to use the configurations for the data analysis, however, they need to be narrowed down to some key aspects and their indicators. The focus of this study is on the formal organization structure. Hence, the key aspects which the configurations are narrowed down to are dimensions of the organization structure. The research literature contains various dimensions of the organization structure, but two dimensions mentioned regularly are formalization and centralization (for example in Chen & Huang, 2007). *Centralization* is often linked with decision-making in the literature. It is argued that the level of *participation in decision-making* determines whether an organization is centralized or not. Additionally, the *autonomy* of workers has been found to have a high impact on centralization, according to Chen and Huang (2007, p. 106). Implicitly, centralization is also dependent on how much *leadership control* is present and how the role of the leadership is defined. This aspect is also of great importance in Mintzberg's framework. Hence, those three indicators a) participation in decision-making; b) autonomy in work; and c) leadership control; are chosen to indicate the level of centralization. *Formalization* is often described with standardization of jobs and explicit procedures in the literature (Chen & Huang, 2007, p. 106). Since Mintzberg distinguishes between the *standardization of goals* and the *standardization of outcomes*, both indicators are taken into the list of key aspects additionally to the *formalization of processes*. Moreover, many researchers mention specialization as a key aspect of the formal organization structure (Pugh et al., 1968, pp. 72–73). For this study *specialization* is seen as one indicator for the *staff composition*. The other indicator of this aspect is *professionalization*. Both indicators are necessary to distinguish between some of Mintzberg's configurations. One last important aspect of the formal organization structure is the overall configuration (Pugh et al., 1968, p. 78). In this study it is labeled as the *overall order* to avoid a confusion of terms. The overall order means the overall shape of the structure, as for example the existence of divisions, technostructure or an operational core. Table 1 (p. 23) shows the configurations of Mintzberg narrowed down to the four key aspects and the indicators.

Table 1. Key aspects of Mintzberg's configurations

		entrepreneurial	machine	diversified		professional		innovative
				between divisions and the headquarter	within single divisions	administrative core	operating core (key part)	
overall order		no middle line	elaborated techno-structure and supporting staff	small technostructure, supporting staff & divisions as operational core		small technostructure & elaborated supporting staff		large middle line
centralization	participation in decision making	low (on one leader)	low	low	low	low	mixed (depending on the topic)	high
	autonomy in work	low	low	high	low	low	high	high
	leadership control	high	high	high	high	high	low	low
formalization	formalization of processes	low	high	low	high	high	high	low
	standardization of goals	low	high	low	high	low	low	low
	standardization of outputs	low	high	high	high	high	high	low
staff composition	professionalization	low	high	low	low	low	high	low
	specialization	low	high	high	high	high	high	high

Source: Mintzberg (1989, pp. 117–220)

2.3 An Institutional Perspective on Organizations

In this section the focus is on organizational theory, which is necessary to answer the second part of the research question. This second part asks if the formal structure of research innovation centers could be explained by resorting to neo or new institutionalism theory and the concept of institutional isomorphism. From the scientific field of organizational theory, the institutional perspective was chosen for several reasons. First, institutionalism is a widely supported and tested perspective in organization theory and institutional isomorphism is a subject in many studies, as pointed out by Greenwood et al. (2008, p. 2). Second, the concept was developed further and growing constantly during the years by taking new insights and developments into account (W. R. Scott, 2014). Third, the institutional perspective is used in diverse studies concerning HEIs, as for example in Pinheiro and Stensaker (2014) or Olsen (2007). Because research innovation centers are part of the HE sector this supports the application of institutionalism for this study as well. In the following sections this perspective is presented rather broadly first, while later it is narrowed down to two more specific aspects. Still, this section cannot present all aspects of institutionalism, which would also not be beneficial for this study, so the concepts and frameworks shown below are only the ones which are of interest for the analysis.

2.3.1 Introduction to Organizational Institutionalism

Already the huge amount of terms like new institutionalism, neo-institutionalism or organizational institutionalism can puzzle oneself. The concept of organizational institutionalism, which is the focus of this paper, originated in the late 1970s and is an broad scientific field in itself. Frumkin and Galaskiewicz (2004, p.284) claim that organizational institutionalism is “more of an orientation than a scientific theory”. One indication for this could be that even though the term *Institution* has a central role in organizational institutionalism, Greenwood et al. (2008, pp. 4–5) claim there is a lack of a common definition for it. Still, in decades of research in this topic, it became more or less clear that something is institutionalized when it becomes similar to a rule, or when “alternatives may be literally unthinkable” (Zucker, 1983, p. 5). Moreover, organizational institutionalism turned in the mid-1990s into a central approach of organization theory. First influential works in the field, as by Meyer and Rowan (1977), DiMaggio and Powell (1983) or Zucker (1977), have “focused on the relationship between an organization and its environment” (Greenwood et al., 2008, p.3). The core idea is that the institutional environment influences organizations. W. R. Scott established the three pillars of institutions and shaped thereby the understanding of an organizational field. His framework is presented in the following section.

Organizations which are rather sensitive about the influence of their environment on their structures and processes are called *Institutionalized Organizations* (Greenwood et al., 2008, p.6; Meyer & Rowan, 1977). In the following decades of research in organizational institutionalism ideas were tested, new aspects joined the perspective and others were challenged. Some new insights were central in the so-called *Scandinavian Institutionalism* which developed somewhat decoupled from the American school. The Scandinavian Institutionalism attributes organizations in an institutional setting a rather active role and strengthens variation and transformation. (Sahlin & Wedlin, 2008, p.219) Hence, it is contradicting the idea of isomorphism and focusing on polymorphism and divergence instead.

2.3.2 The Three Pillars of Institutions

As described, a major importance in institutionalism is lying on the organizational field and institutions as such. A very famous concept to describe an institution are the *three pillars of institutions* by W. R. Scott (2014). In 1995, the framework was published in Scott's book *Institutions and Organizations* for the first time, in 2014 the fourth edition of the book was published. This already shows the importance of this work for organizational theory and institutionalism. According to W. R. Scott (2014, p.56), the three pillars of institutions (regulative, normative, cultural-cognitive) are not meant to compete with each other, but they work together. Further, when one level is analyzed it must be considered that other levels exist and work as well. "Institutions comprise regulative, normative, and cultural-cognitive elements that, together with associated activities and resources, provide stability and meaning to social life", this is how W. R. Scott (2014, p. 56) defines institutions in his book. To get a better understanding of what is really meant, the three pillars, regulative, normative, and cultural-cognitive, are described here.

As can already be seen by the term, the main indicators for the *regulative pillar* are rules, the control of those and the sanctioning if they are not followed. W. R. Scott (2014, pp. 60–64) mentions that there are different perspectives on the regulative pillar depending on the discipline. For some economists, the regulative pillar is the main pillar of institutions. From a rational choice perspective, it is often argued that institutions formulating rules do so based on their self-interest, as stated by the author. The organizations following the rules do so to avoid sanctions. Moreover, the author states that the regulation of rules is rather positive oriented in the private sector, for example by intending higher profits through regulations, and rather negative in the public sector, for example by implementing taxes. According to W. R. Scott (2014, p.61) the mechanism involved in the regulative pillar is coercion, which is described as a isomorphism mechanism by

DiMaggio and Powell (1983). Later in the book, W. R. Scott (2014, p. 96) describes four types of carriers to explain how the institutional elements in all three pillars are conveyed. The four types of carriers are: 1) Symbolic systems; 2) Relational systems; 3) Activities; 4) Artefacts. For the regulative pillar, the author names rules and laws as symbolic carriers, governance or power systems are described as the relational systems. The activities carrying rules and laws are monitoring, sanctioning, and disrupting and the artifacts need to be “objects complying with mandated specifications” (W. R. Scott, 2014, p. 96). Through those carriers, organizations include institutional features in their internal structure.

In the *normative pillar* the central concepts are norms and values. Values are defined as “conceptions of the preferred and desirable together with the construction of standards to which existing structures or behaviors can be compared and assessed” and norms “specify how things can be done” (W. R. Scott, 2014, p. 64). W. R. Scott (2014, pp. 64–67) argues that some norms and values are related to certain roles or groups, as for example to a profession. In professional groups the normative institution usually becomes obvious by certification or accreditation. However, the author also argues that norms and values are internalized by actors to different degrees. Again, Scott mentions that various theorists claim that the normative pillar is the most important one. Some even argue that a stability in the social order is highly dependent on shared norms and values (W. R. Scott, 2014, p.66). Further, the appropriate mechanism by DiMaggio and Powell (1983) for the normative pillar is called normative as well. Symbolic carriers in the normative pillar are values, expectations, or standards, whereby the latter is also an artifact. Regimes and authority systems are, according to W. R. Scott (2014, p. 96), relational systems and carrier activities are roles or a job, habits, routines and repertoires of collective actions.

Following W. R. Scott (2014, p. 67), the *cultural-cognitive pillar* is the “major distinguishing feature of neoinstitutionalism within sociology and organizational studies”. Central elements in the pillar are symbols and meaning making as well as the importance of external frameworks for internal processes and cultural elements. The latter are not equally institutionalized and can occur on every level, states the author. Even though it is said that cultures remain the same regardless of groups and situations, it also holds true that the adaption of beliefs is individual as well as the perception of situations. However, common beliefs and a shared logic of action are considered as the main indicators for the cultural-cognitive pillar, according to W. R. Scott (2014, p. 60). Symbolic carriers are categories, typifications, schemas and frames, relative carriers are identities and strategic isomorphism. Predispositions and scripts are activities carrying the institutional elements of the cultural-cognitive pillar, and carrying artefacts are objects which are possessing a

symbolic value. (W. R. Scott, 2014, p. 96) Hence, the mechanism in this part of the institutional pillars is mimetic isomorphism (W. R. Scott, 2014, pp. 67–70).

Just as the other two mechanisms mentioned above, the mimetic mechanism is explained in the following section. By those mechanisms W. R. Scott's theory is connected with DiMaggio and Powell's institutional isomorphism, which is introduced hereafter. The three pillars together form the institutional environment in institutionalism theory. Later in chapter 5.1 the three pillars are used to define the cases' institutional environment.

2.3.3 Institutional Isomorphism

Since the key concepts of organizational institutionalism and the institutional pillars have been clarified in the previous sections the question remains: What are the mechanisms in the institutional pillars that influence the organizations in the field? The literature to this question is broad, but at the same time many concepts are overlapping or describe even the same phenomenon. Below the focus is on institutional isomorphism mechanisms, as presented by DiMaggio and Powell (1983) and some related concepts. In the end, two more recent concepts are introduced which developed the concept of institutional isomorphism further.

Within the institutional perspective the main concept is institutional isomorphism. The term is mainly shaped by DiMaggio and Powell (1983). They follow Hawley (1968) in their definition of isomorphism, stating that "isomorphism is a constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions" (DiMaggio & Powell, 1983, p.149). The authors claim that there have been two main types of isomorphism: "competitive and institutional isomorphism". Moreover, they argue that competitive isomorphism might be adequate in fields with open competition. However, they search in their paper for an explanation for the, at that time, ongoing bureaucratization, which cannot be fully done by competitive isomorphism. Hence, they focus on institutional isomorphism, which is also the case in this study. (DiMaggio & Powell, 1983, p.149f.)

The main novelty in DiMaggio and Powell's paper, was their identification of three mechanisms of institutional isomorphism. The first one of those is *coercive isomorphism*, which "results from both formal and informal pressures exerted on organizations by other organizations [...] and by cultural expectations" (DiMaggio & Powell, 1983, p.150). These pressures are the rules and laws in the regulative pillar by W. R. Scott (2014). Considering the formal pressures, the concept is quite similar to Abrahamson (1991, p.594). He calls it the *forced-selection perspective* in which

powerful organizations dictate which ideas, or innovations as they are called in Abrahamson's paper, are diffused. The power for those organizations arises for example through their legitimacy as governmental bodies. In this perspective the recipes are diffused regardless of the receiving organization's resistance. (Abrahamson, 1991, p.594)

The second mechanism presented by DiMaggio and Powell (1983, p.152ff.) is called *normative isomorphism*, mainly emerging by professionalization. In this process people from the same occupation search for a common understanding and definition of their work. Hence, they create shared norms and values which the professionals take with them when entering a new workplace. The authors explain that in this process a profession itself might be affected by mimetic and/or coercive isomorphism. People get part of a profession mainly by formal education, which also means that professions are created mainly in universities and other education institutions. Because those people go to different organizations after their graduation, the span of professional networks is not only within one organization but also across, according to DiMaggio and Powell (1983, p.152). Furthermore, to share a profession means to share norms, values, views and structures. DiMaggio and Powell (1983, p.153) even state that the professionals "who make it to the top level are virtually indistinguishable". But organizations not only get similar because of the professional groups which spread their norms, but also because they are in a competition about those professionals. By providing same "benefits and services as their competitors" the organizations get homogeneous in this competition. (DiMaggio & Powell, 1983, pp. 152–154)

The third mechanism is *mimetic isomorphism*. The driver for this isomorphism is uncertainty, which leads to the adoption of existing models, spread by organizations or employees, and the usage of standard responses. (DiMaggio & Powell, 1983, p.151) In Abrahamson (1991, p.595-600) one can find two perspectives which seem to match with the concept of mimetic isomorphism. The first of those concepts is the *fashion perspective*. In this perspective "fashion-setting organizations", as for example consultancy firms, are responsible for the diffusion of organizational models (Abrahamson, 1991, p.595). Christensen (2007, p.66) describes the diffusion process of rationalized myths by using the fashion metaphor. Rationalized myths are defined as "clear recipes for how to design an organization" (Christensen, 2007, p.59), the term was introduced first by Meyer and Rowan (1977). The more organizations conform to a myth, the more it is institutionalized (Boxenbaum & Jonsson, 2008, p.78). Coming back to fashion, Christensen (2007, p.66) labels the organizations, which diffuse myths, as *fashion merchants* and organizations which adopt them are *followers of fashion*. But why are organizations following the fashion-setting organizations? According to Abrahamson (1991, p. 596) those organizations have

the “capacity to inspire organizations to trust their choices of technologies”. He argues that those organizations have an interest in spreading efficient technology only. This finding contrasts with the findings of some other studies which state that fashions only help to diffuse inefficient, useless or only symbolic myths (Abrahamson, 1991, p.588). Another question is if the adopting organizations play an entirely inactive role in this perspective. Abrahamson (1996, p.255) takes into account that environmental changes lead to a need within organizations to tackle those gaps. By adopting new organizational models, managers are part of a learning-process of how to do so. Another point of view is that just as in the fashion sector, there is a certain pressure to go with fashions but nevertheless, organizations have the limited choice which fashions they want to follow (Christensen, 2007, p.66). Hence, both authors attribute the fashion-followers a rather limited active role.

However, mimetic isomorphism is not necessarily based on an external organization which spreads organizational myths. Rather, they can also take similar organizations as a model and follow their structure. Those models are usually characterized by a high level of legitimacy or success (DiMaggio & Powell, 1983, p.152) Similar to that is the *fad perspective* as presented by Abrahamson (1991). In this perspective recipes get spread “when organizations within a group imitate other organizations within that group” (Abrahamson, 1991, p.597). Reasons for this process are divers. Either, the organization gains knowledge to reduce ambiguity through this imitation, or it seeks for legitimacy or it follows economic interests. The last reason fits into *competitive isomorphism*, as described by Hannan and Freeman (1977, p.939ff.). It means that organizations intending to increase their profit and their competitive advantage in order not to lag behind others are imitating their competitors (Abrahamson, 1991, p.597; Hannan & Freeman, 1977, p.340f.). Coming back to the *fad perspective*, organizations imitate the organizations with a higher reputation or the best performers in the fields, in which they are themselves lacking, to gain legitimacy and success as well as access to scarce resources. The adoption of organizational models in the *fad perspective* happens in a situation of uncertainty. In this situation organizations consider the benefits and risks of adopting new models, which means they will not adopt any models if they expect negative effects. (Abrahamson, 1991, p.597f.)

2.3.4 Scandinavian Institutionalism

The presented isomorphism mechanisms are several decades old. Meanwhile research went further. As already mentioned above, models in the institutional environment are not seen as completely unchangeable anymore and the role of organizations got defined in a new way,

especially in Scandinavian institutionalism. This does not mean that the institutional isomorphism mechanisms are not important anymore, rather they are the basis for these new concepts which modify them a bit. Two of the concepts which take those things into account are presented now. Both are mainly modifications of mimetic isomorphism or related theories.

The first one is a further development of the fashion perspective: the “virus-inspired theory”. It is described as the “handling of management ideas analyzed in the light of insights about what viruses are, how they spread and how they function in hosts” (Røvik, 2011, p.633). The author argues that due to the short-term aspect of fashions and their missing core, the fashion perspective needs to be revised (Røvik, 2011, p.633). Furthermore, the active role of fashion setters and the passive role of fashion followers is criticized in the paper. Røvik (2011) describes his theory along six characteristics of viruses: infectiousness, immunity, replication, incubation, dormancy and mutation. Concerning *infectiousness* the author describes that the infection process with a virus is a “complex dynamic interaction between a virus and its host cell” (Røvik, 2011, p.636). This means the receiving organization, in this metaphor the host cell, is attributed with an active role. As presented in the paper, recent studies support this active role. (Røvik, 2011, p.636f.) By using the characteristic *immunity* the author refers to a defense mechanism of the host as a reaction to the virus. Either it is defended already outside the organization, resulting in non-adoption, or it can be defended inside the organization by isolation, the expiration or rejection. (Røvik, 2011, p.638f.) By *replication* the author means the process of virus cells to replicate themselves fast and in high numbers in the host. In the organizational context this means that by bringing an idea into practice it leads to a replication of intended effects. (Røvik, 2011, p.640) When a virus spreads it needs a certain time span until the first symptoms appear, the *incubation* period. Even though in fashion-theory this time span is rather short, it is argued in this theory that the time span is longer and real effects can only be seen in the long run. (Røvik, 2011, p.641) Another characteristic of viruses is that they can become chronic, with active and passive periods. The passive periods are called *dormancy* in the technical jargon. Based on several studies, Røvik (2011, p.644) argues that similar active and passive periods can be found when organizational models are adopted in an organization. Based on the previous insight, that the fashions have a long lifespan, it is almost intuitional that they are not constantly present to the same degree. (Røvik, 2011, p.644) The last characteristic presented in the paper is *mutation*. Viruses mutate when they are in the host, due to mistakes in the replication. For the diffusion of institutional ideas, this means they still mutate when they are adopted in an organization. More common, this process is called “translation” in the organization theory. The reason for this process is the need to implement recipes in their individual structure. (Røvik, 2011, p.642f.) Further, the author presents five examples of how a

translation could look like. The first one is simply copying ideas from one organizational context into another one, but usually there are more changes in this process. For example, those changes could occur through a process of subtraction, addition, or alteration of institutional ideas. The last translation process presented in the paper is re-naming, which might sound minor, but can have huge effects on the diffusion of ideas. (Røvik, 2011, p.643)

Røvik (2011) is not the only one writing about the idea of translation in this context. According to Christensen (2007, p.62) translation means organizations can develop their own version of a myth or recipe, how he calls it, which is also why they are also called “elastic recipes”. Sahlin and Wedlin (2008, p.224) state that the concept of translation “points both to movement and transformation”. The authors differentiate translation from diffusion since diffusion is describing the movement of ideas as a process with passive receiving organizations while they are more active in a process of translation. The importance of local actors and the micro level of institutions is what the Scandinavian Institutionalism emphasized strongly. Due to the focus on local context in Scandinavian Institutionalism studies, researchers identified that translation causes variation among organizations in the same field. (Sahlin & Wedlin, 2008, p. 220) Reasons why organizations translate models are rational calculation (choosing the most useful variant), avoid conflict, or unintentional translations (Christensen, 2007, p.76). Ideas can be translated in different ways. Either they are adopted and reshaped or they “take on new forms and meanings as they flow within and between contexts” (Sahlin & Wedlin, 2008, p.220). Also, a change in the focus or content is possible. Some findings state that during the diffusion of ideas those change continuously. Moreover, Sahlin and Wedlin (2008, pp. 225–227) mention the importance of the local context. Already a recontextualization can be a translation of a recipe. Though, not all aspects of a model or an idea are equally likely to be translated since some are more stable than others.

3 RESEARCH DESIGN & METHODS

In this chapter the research design of this study is presented. First, the method is discussed by having a look at the overall method and then going in more details of the data collection and the data analysis. The second part of this chapter focuses on the cases, which are the main level of analysis. There, the chosen cases are presented first, then the case selection is explained.

3.1 Methods

This is a comparative case study with a bipartite research question. Therefore, the two parts of the research question require different approaches to be answered, as shown in 32Table 2. The chosen methods are presented in this section.

For the first part of the research question, the aim is to describe both cases and compare them based on Mintzberg’s (1989) configurations. Hence, the unit of analysis is known since the beginning of the study, which is characteristic for a descriptive case study (Berg, 2007, p.293). For the second part of the research question the aim is to identify if institutional isomorphism is a valid explanation for the findings of the first part of the research question. Based on the institutional pillars as described by W. R. Scott (2014), it is tried to identify which possible influences could stem from there. Then, it is analyzed if those could explain the previous findings based on a comparison and the possible influences are classified according to institutional isomorphism. The following two sections explain the methodological approach followed, split in the method of data collection and data analysis.

Table 2. Methods Overview

	Research Question Part 1	Research Question Part 2
Greater Classification	descriptive	explanatory
Data Collection	semi-structured interviews, document analysis	previous findings from part one, literature review
Data Analysis	based on Mintzberg (1989) and Table 1 (p. 23) + comparison of the cases	comparing results from part 1 with rules, values, norms and concepts in the cases’ institutional pillars

3.1.1 Methods of Data Collection

Since this thesis is a comparative case-study, the data collection focuses on data from and about the cases. Therefore, interviews were conducted. Staff of each case was interviewed in personal interviews to get personal views and in-depth insights. Table 3 shows the anonymized list of interviewees. In total six interviews were conducted with three participants from each center. All interviewees work for one of the cases, some in a current or former leading position. Right after the conduction of the interviews they were transcribed and anonymized according to the regulation of the Norwegian Center for Research Data (NSD). By anonymizing the collected data, the interviewees are protected and given the opportunity to speak freely. Additionally, it is ensured that this thesis is not causing any advantage or disadvantage for one of the cases in subsequent decisions about funding or research status.

Table 3. List of Interviewees

Interviewees	Case	Code
Expert 1	Center A	E-A1
Expert 2	Center A	E-A2
Expert 3	Center A	E-A3
Expert 4	Center B	E-B1
Expert 5	Center B	E-B2
Expert 6	Center B	E-B3

The interviews are semi-structured. According to Berg (2007, p.95) semi-structured interviews are located between standardized and unstandardized interviews. Questions in a semi-structured interview have no fixed wording and give the interviewer the possibility to dig deeper whenever it is necessary. Further, the language of different interviewees might differ when it comes to specific terms. In semi-structured interviews the interviewer has the possibility to adjust the questions so they fit to the particular situation (Berg, 2007, p.95f.). Hence, the interview guide which is used for this thesis (see p. 80) was the basis for an interview, however, all interviews differ from each other due to the different interview partners and their answers. The aim of the interviews was mainly to gain information about the formal organization structure of each case. For this purpose, the questions are about decision-making processes, roles of the interviewees, their view on the work and the atmosphere, formal rules, goals, processes, and the projects. Besides that, questions about the organization's environment were asked, to be able to understand the environment for the second part of the research question. In addition to the interviews, more data

was collected through document analysis. These documents are mainly websites of the cases, their strategy papers and project descriptions. In one case an additional unpublished document about strategy was given by an expert. All those documents are also anonymized in the references for the reasons stated above.

For the analysis of the second part of the research question some more data is needed to identify the institutional pillars of the cases. For that purpose, each pillar is treated individually since they all require different data. For the regulative pillar requirements, guidelines and rules were collected through the websites of each regulative actor. Four regulative actors were chosen for this study based on information of the expert interviews. The actors considered in the regulative pillar are either providing laws for the cases or are important funding agents. To define the normative pillar, data is collected by a brief literature review about the academic profession and a look into the Norwegian research ethics. Data about the cultural-cognitive pillar is also collected by a brief literature review. The interest is on literature which identifies current trends or models in the cases' sector, which means research centers, innovation labs and the HEIs sector in Norway and/or Europe. The search is limited to some main parts of the literature, which means concepts which are used by several researchers, and to concepts which are relevant for the formal organization structure. All collected data is then analyzed based on specific methods and models, which are explained next.

3.1.2 Methods of Analysis

The method of analysis differs between the two parts of the research question, starting with the first part and the analysis to identify the formal organization structure of the cases. The basis for this analysis is Table 1 (p. 23), which summarizes the configurations presented by Mintzberg (1989) based on three main aspects of a formal organization structure. Those three main aspects, centralization, formalization, and the staff composition, are then divided in some more narrow indicators. Those indicators are extrapolated from the literature and help to classify the level of the cases within the main factors.

Table 4. Operationalization of the formal organization structure

Key aspects of the formal organization structure	Indicators	Operationalization
Overall order	strategic apex, middle line, operating core, technostructure, supporting staff	Present/ not present
Centralization	Participation in decision-making (<i>high = low centralization</i>)	High if people from other than the management levels are involved in decision-making
	Autonomy in work (<i>high = low centralization</i>)	High if people can work independently and if they can take decisions on their own
	Leadership control (<i>high = high centralization</i>)	High if control over all activities is a crucial part of the leader's role
Formalization	Formalization of processes (<i>high = high formalization</i>)	High if processes are clearly defined and written down
	Standardization of goals (<i>high = high formalization</i>)	High if the same goals occur in individual work and if overall goals apply for all activities
	Standardization of outputs (<i>high = high formalization</i>)	High if all direct results of work are of the same type
Staff composition	Professionalization	High if a certain formal educational background is required
	Specialization	High if tasks are divided among the staff

Source: The author's, Based on Chen and Huang (2007), Jansen et al. (2006), Kortmann (2012), Mintzberg (1989) & Pugh et al. (1968)

To give a more detailed insight in the analysis, each indicator is operationalized to provide a decision basis for how to rank the cases for each indicator. First, the focus is on the *overall order* of the cases. This means the basic shape of the structure, as described by Pugh et al. (1968, pp. 78–79) by the word configuration, which is not used in this study to avoid confusion with Mintzberg's framework. The analysis takes the parts of organizations as described by Mintzberg (1979, p. 20) as a basis for the analysis (strategic apex, middle line, operating core, supporting staff, technocracy) since this also allows a classification in his configurations. More specifically, it is analyzed which of those parts are present or not in the cases according to the empirical accounts provided by experts. This short analysis is presented in the beginning for each center since there might be the need to look back on the overall order to analyze some of the presented indicators.

Within *centralization* three indicators are identified, as described in chapter 2.2. The first one is the *participation in decision-making*. A case has a low level of participation in decision-making if main decisions are taken solely by high management levels (Chen & Huang, 2007, p. 106; Jansen et al., 2006, p. 1663). In turn this means if staff from other levels are included in decision-making processes the participation is high. The second indicator for centralization is the level of *autonomy in work*. This indicator is rated as high if people can work independently and if they have the possibility to take work-related decisions on their own within a certain frame (Chen & Huang, 2007, pp. 106–107; Kortmann, 2012, p. 15). If this is not the case, the autonomy in work is rated low. For the last indicator, *leadership control*, the interest is on the role of leaders. If controlling all activities in an organization is one main part of the leader's role, the leadership control is rated high. This indicator is chosen based on Mintzberg's (1989) presentation of the configurations. Thereby, the author strengthened the level of leadership control as an important aspect in various configurations.

Within the aspect *formalization* again three indicators are formulated. The indicator *formalization of processes* is rated as high if the processes for activities are clearly defined and written down (Kortmann, 2012, p. 16). This means it is clear who is responsible for which action within an activity and how this action is done. According to Kortmann (2012, p. 16) this can be done for example in policies, job descriptions, or organization charts. Looking at the second indicator in the aspect of formalization, the *standardization of goals*, it is important to mention that the goals which are meant here are the overall goals of the case as an organization as well as the goals within the case's project work. This indicator is taken because Mintzberg (1989) made this distinction when he described the organizational configurations. According to Pugh et al. (1968, p. 74), something is standardized if it occurs regularly. Hence, goals have a high level of standardization if the same goals occur in different individual work and if overall goals apply for all activities, and thereby occur regularly. This is similar for the *standardization of outputs*. If all outputs, or the direct results of work, in a case are of the same type (e.g. all are scientific papers) the standardization is on a high level (Mintzberg, 1979, p. 5). It must be mentioned that it can be distinguished between "product lines" and "product categories". However, this is less important for the case-analysis since the product category is limited to research-based innovations in both cases.

The last factor is the *staff composition*, which is analyzed through two indicators: professionalization and specialization. The term *professionalization* asks for the level of standardization of skills, as described by Mintzberg (1989, p.175). People become professionals

mainly through formal training and education, provided through universities or other schools. Hence, the level of professionalization is high if the people in a case need a certain formal educational background to work there. *Specialization* focuses not on the background of the people but on the work that they do. To be specialized, an organization must have a clear division of labor, which means different tasks are done by different people, which is one of the principles of classic management. One famous representative was Henri Fayol who wrote about the division of labor in the book *General and Industrial Management* which was translated in English in 1949. According to him, an organization's specialization is low if everyone has the same work and tasks and responsibilities are not divided among people.

The second part of the analysis is in search of an answer to the question to what extent institutional isomorphism can explain the characteristics which are found in the first part. Therefore, the institutional pillars of both cases are presented according to the three pillars of institutions by W. R. Scott (2014), which is shown in chapter 2.3.2. It is necessary to go back to the interviews and documents around the cases as well as to the scientific literature. This is done to identify which laws and rules are part of the center's regulative pillar, which norms and values occur in their normative pillar and which models can be found in the cultural-cognitive pillar. In a next step those theoretical findings are compared with the empirical findings of the cases. Thereof it is derived whether there is a certain type of isomorphism, which one it is exactly, and which part of the institutional pillars causes this phenomenon. If similarities or written guidelines, which are in accordance with the findings in the cases, can be identified, it is considered to be a possible case of isomorphism. That being said, there is no warranty that the similarities really stem from isomorphism. There is the possibility that the similarities might be a coincidence or that another phenomenon might explain them even better, which could be studied in future research.

Based on the case-study design, this study is not able to find a general explanation for the whole phenomenon. Moreover, the case-selection cannot be perfectly controlled, also because the cases are not completely independent. This means, there might be also unobserved connections, contexts, or other aspects, which are not considered in the case-selection. Moreover, case-studies in general are unable to evaluate the representativeness of cases and they are weak in identifying causal explanations. (Bennett, p. 20) Besides that, the observability is a strength of case studies (Gerring, 2017, pp. 202–206). Due to the anonymization of the collected data, the cases cannot be published. However, this issue is minimized by being transparent regarding the choice of the research design, the methods, the case-selection, and all sources. To increase the reliability of the study, the collected data is analyzed and categorized based on the concepts of Mintzberg (1989),

W. R. Scott (2014) and DiMaggio and Powell (1983). Additionally, the interview guide is provided in the appendix of this study (see p. 80). The strength of this study is the in-depth analysis of the two cases. The generalization of the findings towards the literature and theory is possible, due to the literature-based operationalization and case-analysis. This study thus provides a first set of preliminary findings for a more detailed classification of the research innovation center's formal organization structure.

3.2 The Cases

Two cases, center A and center B, are the studied objects in this case-study. Before the analysis starts in chapter four it is important to get to know the cases as much as possible. This is done for both cases in the following chapter. After that, the question why those cases were chosen is answered in chapter 3.2.2. The explanation of the case selection is an essential part of the methods section in a qualitative case-study because it includes the problem of selection-bias, which must be avoided by a detailed explanation (Bennett, p. 19). Here, the case-selection is presented after the presentation of the cases to avoid unnecessary replications.

3.2.1 Getting a closer look

For this thesis, the interest is to get an in-depth insight in two interesting cases to see what they are in an organizational sense and why it is that way. Hence, it is important to get a detailed insight in those two cases, which is given below.

Both cases belong to the same Norwegian university and they are both interdisciplinary research centers with a user centered approach. That means they are collaborating closely with end-users or user organizations outside the university. Moreover, they face complex societal problems in their research. Due to this complexity of the topics, both centers have decided to work not only with researchers from one certain field, but working interdisciplinary with researchers from different faculties, departments, and fields, called cross-faculty research. For organizational reasons, the centers are not single units but belong to one "host faculty". The host faculty from center A is not the same as the one from center B, even though there are some departments which are active in both cases. One aspect the cases have in common is the focus on technology and ICT. Researchers of this field are active in both cases, to find solutions for the main focus areas. Furthermore, both cases have a dedicated working room as a resource, in which they can test, do experiments and co-operations. This does not mean that those places "are" the centers, but they

are part of it. These rooms are the only places one could say the centers are located at, because the members work in different offices, different buildings, and even different campuses.

Center A was established in 2010 and aims to do innovative research on its core topic on a national and international level. The Center cooperates with other research institutes, businesses, public institutions, and municipalities. Representatives from those organizations are members in the steering group of the Center. The leadership of the Center follows a dual leadership model by having a scientific and an administrative leader. In total the Center counts 27 researchers, which participate in Center activities, of those 27 researchers nine researchers are PhD students. Except for the administrative staff, which are two full-time employees, no one is employed directly for work in Center A. All scientific staff is employed by different faculties and departments, their participation in Center activities is based on some special arrangements. The time a researcher spends to work for center A is very individual. Usually researchers want to join a center A project, so it then needs to be discussed with the faculty or department if this is possible. Moreover, each faculty has one representative in the Center, which should bring in the faculties point of view. Those representatives meet regularly with the leadership of the center. The work in Center A is mainly organized in research projects, funded by the EU, the Research Council of Norway or regional research funds. Financially the center is no single budget unit, but it belongs to faculty A. The external funding for projects gives the center some freedom as well as the funding they get for a special status. One expert stated that it would be worse to be a single budget unit for the center since this would decrease the flexibility. The project related work is described as rather independent from the moment the funding has been granted.

Center B is very similar to center A in many ways. The main interest topics of the centers is not mentioned here due to the anonymization. However, it can be said that the centers have topics from similar fields, but they are not congruent. Established in 2011, the center moved from being at one faculty towards being a multidisciplinary research center since the last five years. It also cooperates with public actors, governmental and non-governmental, industry and other research institutions nationally and globally. Center B has more international research collaborations compared to center A. One reason for this is that the research topic is not very common in other Norwegian research institutions. 27 researchers are active in center B, and seven of those are PhD students. The leadership in center B is rather a “classic” leadership team. In total the management of the center (administrative and scientific) consists of four people. None of the persons in center B is directly employed there, but the people are employed by departments. Three people are employed at the departments to work for center B, others must dedicate their research time for the

work in center B-projects. This often needs an agreement of the department and faculty leaders, also because the center is no separate budget unit. Major work of center B is, according to the experts, to write and submit project proposals to receive funding. This leads to a project-based work in the center, which is often funded externally, as by the EU or national research funds.

The university which both cases belong to is a Norwegian university. Collaboration with regional actors is ranked high in the university's strategy. This has not been the case in 2010 and 2011, when the centers were established. Especially Center A was part of the very first movement towards innovative research, close to user-needs and with different co-operations. Now, the university has several research centers at different faculties with different focus areas. Not all of them are working with a user-centered and multidisciplinary approach.

3.2.2 Case selection

According to a most-similar systems design, the two cases need to be similar in most aspects (Bennett, p. 31). Despite the topic and the involved faculties, the key characteristics which can be seen at first glance are very similar in center A and B. The selection of the cases is based on four main aspects. *First*, the cases must be most similar. This design is chosen because this thesis is descriptive in the first part. This means it is tried to identify characteristics of a rather new phenomenon. Therefore, it is good to have a controlled environment, as given through the most-similar systems design (Bennett, pp. 31–32). In order to be most-similar-cases the chosen cases must share most of their characteristics as organizations which are observable from the outside. As already presented above, center A and center B have many things in common. They both belong to the same university, share all the characteristics of research innovation centers, as shown in the following paragraph, they were even established closely after each other (2010 and 2011), which means they are in the same age, and also the size differs only slightly. Even their affiliation to faculties and departments is organized in the same way. Hence, the chosen cases are most similar.

Second, the selected cases must be research innovation centers, according to the six characteristics of research innovation centers presented in chapter 2.1 and in Figure 1 (p. 15). As already mentioned, both cases *collaborate* intensively with external partners. Those can be non-scientific and scientific partners on a local, national, EU or even international level. Most non-scientific partners are locally or nationally. International collaboration is happening mainly with scientific partners (Center B, 2020c, 2020d; University, 2020c). In general, Center B has more national and international collaborations compared to Center A. At the same time, both centers have collaborations with local and regional partners. Non-scientific partners often represent user-groups

or user-needs in the innovative research in both centers. This leads to the second important aspect of innovation labs: the *user-centered approach*. The main focus on the user is fundamental and a main aspect to distinguish the cases from other research centers. In both centers user-groups are directly involved in the research and innovation process, in which way depends on the project (Center B, 2020a; University, 2020a). By having the users in the core of the work, the results, no matter if they are research papers or new practical tools, are co-created with partners. The intended outcome is something which is useful and helpful for the end-user.

One main approach to gain good user-centered outcomes is *interdisciplinarity*. It is strongly believed that the problems they work on in center A and center B are too complex to be solved by a single discipline. Hence, interdisciplinary teams shall widen up the perspective and increase the innovation-capacity. Every single project in both cases needs to be interdisciplinary (University, 2020c, 2020e). The new ideas created in the centers need to be tested repeatedly in order to get a good outcome for the users. Both centers include special facilities for these testing processes, experiments or trials and research capacities. That is why they can be called *experimental*. Of course, the testing facilities are not used by every research team in every project, but nevertheless they are a supportive aspect for projects. Another characteristic of a research innovation center is that they are often *associated with ICT*. Nowadays it is not very surprising that both cases focus, besides other things, also on technical solutions for the issues they are addressing. This is done in countless research projects and innovation labs as well since the need for ICT and technology gained importance in almost every field. Both cases address complex societal problems in their work, that require a *problem-driven* perspective to be solved. And this is what they try to do as research innovation centers with the demonstrated characteristics.

Third, it needs to be explained why and how the cases are defined as organizations, because otherwise the presented organization theories would not be applicable. Since center A and B belong to a single university, they are not completely independent organizations. However, it can be argued that they are in a division-like relation with the university. As Mintzberg (1989, p. 156) describes the diversified organization, the single divisions have a significant autonomy from the headquarters and operate freely. Single divisions are only loosely coupled to each other according to the author. At the same time, they are financially dependent on the larger organization and thus experience partly control. Those aspects are applicable to describe the relation between the university and the cases. The cases are relatively autonomous from the work in other parts of the university and have own leadership structures. As described, the cases are not separate budget units, which also causes a partly control by the departments. Further, they increase their autonomy

by external funding for projects. Hence, the cases can be considered as single units and rather autonomous organizations albeit they are embedded in the university's structure. Moreover, it was described already in the literature review that innovation labs are mostly part of a larger organization (Schuurman & Tõnurist, 2017, p. 11; Tõnurist et al., 2017, p. 1464). Since this case-analysis is in the context of this broader concept it is even necessary to take cases which are not independent or single organizations. Obviously, the affiliation to a larger organization might have a significant impact on the observed cases. Thus, this potential influence must be considered in the analysis and conclusions.

The last and fourth aspect is the practicability. There would have been several centers in Norway which could have been analyzed for this research. Interview requests have been sent to more than the two finally chosen cases, but some never received a respond. Luckily, it was possible in the end to find centers and three interview partners within each center who contributed to this study and matched into the other aspects of the case-selection. According to these four aspects center A and center B are appropriate cases for this case-study. In the following chapter the cases are analyzed by using the collected data. Thereby, the formal organization structure of the centers is more and more uncovered, and the two cases are compared to each other.

4 ANALYZING THE CENTERS' FORMAL ORGANIZATION STRUCTURE

In this thesis the main focus is on identifying the organization structure of the two cases. To classify the cases the different types of organizations by Mintzberg have been presented in chapter two (see Table 1, p. 23). In the following the collected data is analyzed along different characteristics and indicators of formal organization structure, which are also summarized in Table 4 (p. 35).

4.1 The Formal Structure of Center A

4.1.1 Overall order

Mintzberg's (1979, p. 20, 1989, pp. 117–220) configurations have already very different orders depending on which basic parts are present (strategic apex, middle line, operating core, supporting staff, technostructure) and in which way. Center A, as described in chapter 3.1.1, is part of a university, belongs formally to one faculty, but works across faculties and departments. The atmosphere between center A and some faculties is described as a “[...] atmosphere of ‘we do this together’ [...] but then in addition there is this, how should I call this, this atmosphere of mistrust.” (E-A1). This shows that this relation is not always easy. What is more interesting for this part is how the center is ordered besides the external relation to the university. Expert A3 explained the leadership in center A as it follows: “[we have] a leadership which is one administrative and one scientific leader. So, it is a double structure.” This means that two people form the leading team of the center, one for science and one for the administration, a double leadership structure. On the administrative side there is one more person working for the center. According to the basic parts of organizations these two build the supporting staff. On the scientific side there are currently 27 people, which form the operating core, while their leadership is the strategic apex in terms of Mintzberg's (1979, p. 20) basic parts of organizations. Moreover, most of the work is structured in single projects, which are not connected with each other usually (University, 2020c). Within those projects, there is the “regular project management” in which one of the involved researchers is “the head of the project”, as described by Expert A1.

It can be argued that the double leadership structure is a sign for a professional organization, since this evokes the two lines of hierarchy which are explained by Mintzberg (1989, p. 179). Also the university, to which the cases belong, shows this leadership structure, as most universities do. Further, there is no middle line identified in center A, which is another indication for the

professional organization. The missing middle line is a strong indication for a highly independent and bottom-up working style, which is characteristic for a professional organization (Mintzberg, 1989, pp. 174–179). Due to the project structure the center also evokes the diversified organization. As described by Expert A1, the projects have a particular management and leadership structure, just as the divisions in the diversified organization (Mintzberg, 1989, pp. 157–158). So far, it cannot be said how autonomous these project structures are from the center's leadership. This would be another important aspect to see if it fits into a diversified organization structure. So far, the overall order of center A points partly to the professional and the diversified organization. Hence, based solely on the basic parts of the center it can be argued that center A is a hybrid of a professional and a diversified organization. For a final clarification the other aspects need to be analyzed.

4.1.2 Centralization

The first one of those aspects is the degree of centralization. When Mintzberg's organizational configurations were summarized in chapter 2.2, three dimensions of centralization were identified: a) participation in decision-making; b) autonomy in work; and c) leadership control. Each of those aspects is described in detail below.

First, participation in decision making is a complex aspect. In center A the decision-making process is dependent on the topic. Concerning staff decisions one expert said: "We have to go and ask the institute leader if we can use this researcher. There is another several layers we have to go to, there is a lot of people we have to talk to." (E-A3) According to this quote, and other experts said that as well, staff-decisions in center A are rather participatory and often not even made by the center itself. Based on the interviews it can be said that actors from outside of the center are involved in decisions concerning resources and staff. For content related decisions, center A has four different boards or bodies, which are involved in different ways. There is the core group, consisting of the center's leadership and the representatives from each faculty. The faculties' representatives are chosen by the faculty. This group is the core decision-making body in center A. It decides in monthly meetings about projects, current statuses and more. In this group decisions are taken by consensus: "basically, it is very simple, it is consensus. So, we have a contact person from all the faculties, we come together, and we agree." (E-A1). Another decision-making body is the center meeting. In this meeting everyone engaged in center A activities can join twice a year to discuss and agree on the greater strategy of the center (for example applying for a special status).

In the so called advisory-board representatives from partner organizations meet three or four times a year with the leadership of the center to give advice for directions and strategies:

“they [the advisory-board] have a meeting like three or four times a year, and they give [the center A leadership] advice and answers where to go. But I think they have never said no, so they are more trying to tell [the center A leadership] which direction they think we [center A] should go.” (E-A3)

Maybe the most important decision-making body related to center A are the faculty deans: “it is more the deans that can say: ‘No, you are not doing this’. They are the ones who really decide if there is a ‘no’ [...]” (E-A3). All in all, this shows that decisions in center A are first discussed with many different people and are taken with a high level of participation, on different levels with several people involved. As an expert said: “And then, in the Centre itself it is not the leader who decides. It is a group process.” (E-A1) Still, there is a hierarchy in the decision-making processes. Especially resource- or staff-related decisions which require the involvement of deans are less participatory.

The second aspect, autonomy of work, is highly related to the project-based structure of center A, which was already described earlier (University, 2020a). In those projects researchers from different fields come together to do their work. One expert described the distribution of work within a project as follows: “So, if you are in the same project as me one of us would be the head of the project and that means my faculty would run all those administrative things.” (E-A1) That means the projects run quite autonomous from the center’s leadership, but they create their own leadership within. Nevertheless, the work in the projects is according to the interviewees characterized by a rather high level of autonomy in everyone’s work. The administrative part of the center is working closely with the scientific lead, and its responsibilities are basically to serve whatever is needed. Thus, their autonomy is lower than the one of the researchers.

The leadership of center A is double structured, there is an administrative and a scientific leader. Their main tasks are to network with partners and researchers, one expert said: “the whole networking is more meeting, bringing people together, being sure what is going on [...]” (E-A3). For the administrative side, it was additionally described that the activities are mainly organizing meetings, events and other things, the scientific lead has more to do when it comes to co-ordination of projects and people. Hence, the role of leadership in the center is networking and coordinating. Therefore, the leaders need to have an insight in the activities, but they do not control them, which indicates a low level of leadership control in center A.

The combination of all three indicators shows that center A has a low level of centralization. The decision-making procedures inside the center are participative, even though a hierarchy exists. The decisions which need to be taken with actors outside of the center have a rather low participation, but this affects the formal organization structure inside center A only peripheral. The academic staff has a high level of autonomy in their work and the role of the center's leadership is mainly co-ordination and networking, but the leadership control is low. Similarly described is centralization in the innovative and the professional organization by Mintzberg (1989, pp. 174–203). In innovative organizations the level of autonomy in work is high and the leadership control is low, just as in center A. Since power is dependent on expertise in the innovative organization, as the author describes, the participation in decision making is high, which also correlates with the findings in center A. In the professional organization decision-making is depending on the topic, but it is mainly a group process and only seldom a centralization on one person. Moreover, Mintzberg (1989, pp. 174–176) claims that the autonomy in work is also high in the operating core of a professional organization. Due to the bottom-up structure which the author describes for the professional organization it can also be argued that its leadership control is rather low, just as in center A. As a result, those two configurations, the professional and the innovative organization, fit both to the degree of centralization found in center A.

4.1.3 Formalization

Just as for centralization there are also three indicators of formalization, which are studied for center A. Those three indicators are: a) formalization of processes; b) standardization of goals; c) standardization of outputs. First, the focus is on the formalization of processes. This includes for example a formal process in decision-making as well as a clear process for projects and responsibilities. According to Kortmann (2012, p. 16) and other researchers those processes need to be written down in order to be formalized. As already described, decision-making processes in center A involve various actors in different bodies, which meet on a regular basis; the core group meets monthly, the whole center twice a year and the advisory board three or four times a year. Moreover, it is clear which body takes which decisions, or gives only advice. In the core group it is also clearly defined that decisions are taken with consensus. Even though these processes are clear, they are not written down, which leads to the conclusion that they are not formalized. It was also tried to create an organization chart of the center; however, this process was not finished so far according to Expert A3. Within the center's projects it already varies who and how many people are involved. The processes within a project are quite flexible, even though it was stated in the interview with Expert A1 that most projects follow a project management structure. This leaves a

lot of things undefined and is lacking a clear formalization. Furthermore, the responsibilities for the employed administration and the scientific lead are rather clear, as described above, but everything else remains undefined. Even things which appear as formalized, for example the fact that center A belongs formally to faculty A, are in practice not that easy, because single projects can be under the responsibility of a researcher from another faculty, and thus it is part of his/her faculty. Still, all experts stated that they have tried to formalize processes and structures during the last years, but still many are not formalized yet.

Another aspect is the standardization of goals. The decisions about goals are part of the quite formalized decision-making processes. For the long-term goals of center A, there is a strategy paper available on the Website (University, 2020c). In this strategy paper, which is in place for five years, center A developed targets and operational goals for three focus areas. For short-time and project related goals the core group decides by considering the long-term strategy. For example when a researcher wants to join a project, and thereby brings in new point of views and expertise, which might influence the project's goal setting, the process is as follows: "we have a strategy, and when we are asked if they want to participate in projects we try to be align with our strategy and we also try to have time to discuss it in the core group." (E-A3) However, the decision on which projects the center applies for is "not a very streamlined process" (E-A2). This means the short-term or project-related goals are not standardized but they are set in line with the very much formalized and standardized overall strategy and the goals mentioned there. Hence, the standardization of goals is mixed, the long-term goals are standardized, but the project related ones are not.

Even though there is a clear goal setting for center A, which the projects follow as well, the outputs of center A are not standardized. Neither the single projects, nor the center as a whole are restricted to produce a certain type of outputs. It can be prototypes of products, new scientific knowledge in form of scientific papers or an idea for new services or processes for users. In that sense it was said by experts that it "is individual" (E-A2) and hence not standardized what a project's and the center's output is.

Therefore, the overall level of formalization is rather low, even though two of the indicators point partly to a high level of formalization. Firstly, the standardization of goals is mixed due to the difference among the long-term goals for the whole center and the goals for single projects. Secondly, the decision-making processes are clearly defined, albeit not written down. Through the lack of formalization in all other processes, this aspect can be neglected here. One expert put the formalization processes in a nutshell by saying:

“It [the work] is a bit chaotic practically. It is very difficult to say that there is a very structure, we are trying to have actually a structure, we [Center A] made a map of the organization, but by the end of the day it is not really that easy.” (E-A3)

In the innovative and the entrepreneurial organization as described by Mintzberg (1989) the formalization is low as it is in center A for two of the indicators. Only the mixed findings for the standardization of goals do not fit to those configurations. This means, there is no single configuration which fits perfectly to the findings in this part. Hence, center A is a hybrid with features mainly from the innovative, entrepreneurial organization.

4.1.4 Staff Composition

Under the heading staff two aspects are of interest, namely: a) the professionalization, and b) the specialization of staff working in the organization. In center A, there is a twofold picture of professionalization. On the one hand, center A is an interdisciplinary research center, which means the people which come together for the projects have different backgrounds. For example, there are engineers, social scientists, health scientists or others. The experts in the interviews explained that this leads to difficult situations:

“[...] it [the work in center A] is also different from the way that people work together, because they [the researchers] come all from different faculties, they all have different backgrounds, they have a different idea of how science works out, how the research works out, all these kind of things. And then you [all people in center A] are put together at the same table and you have to sort out. Very tricky.” (E-A1)

And another expert said: “manage to find coherence in a group of so many differently orientated people. I mean it is not a trivial thing to be cross-disciplinary.” (E-A3) On the other hand, the people working in projects are all academics or researchers, professionals in their field of research and often specialists in the center's focus areas. In order to work as a researcher in center A, it is required to have a formal academic education. Hence, even though the center works interdisciplinary it has a high level of professionalization.

While the professionalization is about values and norms connected to a certain educational background, specialization is oriented towards the tasks or better said the division of labor. The people working in center A-projects are all researchers, working to get scientific results. However, they all stem from different disciplines, as described already, which means they all have different priorities which are also used within the projects. An example would be that the engineer is working mainly on a technical solution, while the social scientist is rather responsible for the social

impact of this new technique. So, although they are both working scientifically, they have a clear division of labor and are thereby rather specialized.

It is described that the staff in center A is highly professional. Simultaneous, the interdisciplinarity leads to a high level of specialization, despite the fact that all persons in center A are academics. The same levels of professionalization and specialization can be found in the professional organization's operating core. Mintzberg (1989, pp. 174–176) took in his book universities as an example for the professional organization and argued for a high level of professionalization also by considering academia as a profession. At the same time the author stated that the specialization in professional organizations is also high, just as in center A. Also the machine organization is characterized by a high level of professionalization and specialization, albeit the profession in this configuration is usually not an academic one (Mintzberg, 1989, p. 134).

Based on all the aspects of center A shown in this section it can be said that it is not fitting exactly to any of Mintzberg's configurations. Rather, it is a hybrid of features from different configurations. While the overall order is classified partly by the diversified and the professional organization, the low level of centralization fits into the innovative and the professional organization. The low level of formalization is classified into the entrepreneurial and the innovative organization and the staff composition fits to the machine and the professional organization. However, the configuration it has the most similarities with is the professional organization. Table 5 (p. 55) summarizes all indicators and their levels of center A.

4.2 The Formal Structure of Center B

4.2.1 Overall order

First, it must be indicated again that center B formally belongs to one faculty, which is rather important when it comes to budget, but as such it works across disciplinary, departmental and faculty borders. Center B has a management which consists of one director, one deputy leader, one associate professor and one administrative manager. A clear division between the administrative and the scientific side is not noticeable. Hence, this management team can be called the strategic apex of center B. The other people working for center B are researchers from different disciplines, which participate in center B projects. Those researchers build the operating core of center B. The single projects are all related to the main topic of center B, but they are independent from each other. Expert B1 explained teamwork as “[...] a common interest or common commitment among different researchers of what they want to pursue in this topic B area.” (E-B1)

The diversified organization by Mintzberg (1989, pp. 156–172) can classify to the described overall order partly. In center B the management team appears just as a headquarter which is coordinating the activities in the single projects. Those could be seen as a kind of single divisions. The existence of a strategic apex, a large operating core and the lack of a middle line reminds also of the simple structure in the entrepreneurial organization (Mintzberg, 1989, pp. 117–129). Though, the strategic apex, in an entrepreneurial organization is, according to the author, represented by one strong leader, which does not fit to the management team in center B. Hence, there are features in center B reminding of two configurations, the diversified and the entrepreneurial organization, but each of them can only explain a part of the structure.

4.2.2 Centralization

The management structure described in the overall order has a high influence on the participation in decision-making in the center. Expert B2 answered the following to the question of who is taking decisions:

“It is depending on the kind of decisions. If it is many of the sort of the smaller operational tasks, we just decide it by the administrative leader and the director, sort of the day to day business. [...] But, typically, when you ask about strategy, that would be more of a task for the center B leader team in that sense.” (E-B2)

The center B leader team which is mentioned by this expert is the management team, consisting of three academics from two faculties and one administrator. This means most of the decisions are taken within this team or even just parts of the team. According to Expert B3 larger (strategic) issues are discussed in an advisory board consisting

“of the dean of faculty B and the dean of faculty C and the head of department of three departments involved, [...] and also, the leader [of Center B], the deputy leader and the administrative manager. So, they have a meeting twice a year [...]” (E-B3)

Within this advisory board most strategic and operational decisions are taken. But then there is also a body with all the researchers involved in the center: “It consists of 20, or so, researchers from different departments and we meet regularly and try to kind of facilitate activities in the field that we have as a focus area.” (E-B3). So, even though at first it appears as a rather low participation in decision-making it is tried to involve all participants in the process. So, since it is “never someone alone” (E-B1) who is taking decisions, there is participation in decision-making.

In addition, the decisions taken within the single projects are very individual by the researchers in those projects.

This leads directly to the second aspect of centralization: work autonomy. According to expert B3, “the director is not that much involved in projects unless he has a role in it.” (E-B3). And Expert B1 explains the structure within projects as follows: “[...] if you do a project you try to divide the work into work packages. And then in each work package there is one responsible [...]” (E-B1). Hence, the researchers working in projects have a quite high level of autonomy. As mentioned in the description of the case, the researchers are employed by departments and not by center B itself. This causes some limitations of the autonomy, because the head of department needs to accept that researchers dedicate their time to the center, which is not always the case according to Expert B3:

“In our view there are a lot of people who are interested in working that way, but they have to be given the opportunity to do so, and they have to be encouraged. Of course, if the head of department is not so positive towards getting involved in cross-faculty work, it is difficult.” (E-B3)

However, this does not directly affect the autonomy of work within the center but rather the autonomy of the researchers in the department they are employed in.

The last aspect which needs to be analyzed to identify the level of centralization in center B is the level of leadership control. As already described above, the director of the center is not involved in projects usually. But what else is the leadership's task? In the interview it was clearly described that the leadership is mainly there to keep the overview about all activities of center B and coordinate them. Expert B2 said for example: “That is also part of the job for the administrative leader and the director, to have more of this total view of the activities.” (E-B2). Moreover, the leadership is:

“quite active in developing proposals for new grant calls, so that is sort of an ongoing activity, involving quite a few of the researchers. And then apart from that it is typical publishing, attending conferences and trying to be active in scientific community dedicated to this area.” (E-B2)

To sum it up, the leadership is mainly coordinating and keeping the overview and otherwise the leadership is engaged in the same tasks as other researchers in the center. Control is not a basic task of the leadership, which indicates a low level of leadership control in center B.

The centralization in center B is overall quite low. The autonomy in work as well as the low level of leadership control leads clearly to this conclusion. In decision-making it is tried to involve many

people from different levels. Depending on the topic some decisions are centralized on a small team or include faculty deans from outside of center B. However, for decision-making processes within center B there is a high level of participation.

Within Mintzberg's configurations the innovative organization has a similarly low level of centralization as center B. Not only the participation in decision-making is seen as high, also the autonomy in work is high and the leadership control is low, since it's role is mainly to co-ordinate and keep the oversight (Mintzberg, 1989, pp. 199–220). The characteristics identified for center B are also like the ones in a professional organization. In professional organizations professionals are also involved in decisions depending on the topic. Even though the decision-making is participative in center B, there are also some decisions taken centralized. Further, the leadership control in professional organizations is low and the professionals have a high level of autonomy. (Mintzberg, 1989, pp. 174–179) Therefore, center B is also like the professional organization in the level of centralization. According to those findings center B has similarities to both the innovative- and the professional- organizations in terms of centralization.

4.2.3 Formalization

How formalized is center B? To answer this question the formalization of processes is analyzed first. As described, center B has a management team which meets weekly, the advisory board which meets twice a year and a meeting with everyone involved in center activities is happening regularly. Hence, center B has a process of when to meet with whom, but those are not written down. Other decisions are either not in the responsibility of center B (as the staff decisions) or there is no clearly described procedure for those. Since most activities in center B are nor clearly defined neither written down, it can be said that the level of formalization of processes is low. Expert B2 described the processes as “fairly informal” and Expert B3 answered that they “follow some rules that are developed by the administration of the university [...]. But it is in general not as developed as I would like.” (E-B3) and “[...] within research and external funding and how to organize projects it could be more professional.” (E-B3) So, following the statements of the experts, the processes have a low level of formalization.

Concerning the standardization of goals, it is necessary to have a look at the center's strategy for the period 2017-2020. In this document, center B defined seven main research fields which should be in the focus during this period. Moreover, and more interesting for this part, the center has defined several operational goals. Those include goals in six different areas: recruitment and staff development, research collaboration, project acquisition, goals for center B-lab, educational

offerings and dissemination (Center B, 2020b). Those goals are formulated very generally, as for example: “The center will continue to give high priority to developing strong applications for project calls from national and international funding bodies.” (Center B, 2020b, p. 4) Furthermore, they need to be considered in all activities and decisions made by center B, which shows that those long-term goals in center B are highly standardized. When looking at the different projects of center B, one can easily see that their goals are not standardized. While the goal of one project is to “elaborate recommendations” (University, 2020b) the goal of other ones are to “improve capabilities” (Center B, 2020c) or to “improve data analytics” (Center B, 2020d). So, the goals in projects are open and not standardized, which is the opposite from the overall goals.

Within the center’s projects the outputs are as diverse as the goals. In one completed project for example the output is a digital platform for user-organizations which is currently in use (Project B4, 2020). In another project the output was a set of guidelines and tools for user-organizations (ICLEI European Secretariat GmbH, 2020). Further, the outputs of a project are not always clear from the beginning and the center does not require a special type of output except that it must be scientific. Hence, the standardization of outputs is low in center B.

In general, this analysis shows that the formalization within center B is rather low, because all the single indicators, except the standardization of long-term goals, are rated as low. This is also the case in an entrepreneurial and an innovative organization according to Mintzberg (1989, pp. 117-120/ 199-107). Both configurations show a very low level of formalization for different reasons. According to the author this is the case because flexibility is considered as important in both configurations. Why center B has such a low level of formalization is analyzed in chapter five.

4.2.4 Staff composition

The first indicator discussed in this section is professionalization. Center B “involves researchers in, all together, four departments at two faculties.” (E-B2) to come together for applied research. Hence, the researchers come from different disciplines. For example, Expert B2 said: “I think it can be a bit challenging, if you have a very technical presentation not all of this is as easily comprehensible for faculty C part and vice versa.” (E-B2) Nevertheless, to work as a researcher in center B, it is required to have a formal educational background in academics, so they need to be academic professionals. This requirement indicates a high level of professionalization regardless of the center’s interdisciplinarity.

The key concept and main purpose of center B is, as already explained earlier, “to solve problems where it was needed to blend different disciplines together.” (E-B3). For that purpose, the people in center B give their special knowledge from different disciplines as an input for their work. This means also that they distribute tasks according to their background and skills. Still, they work on the problems together, but from different perspectives. “[...] if you do a project you try to divide the work into work packages. And then in each work package there is one responsible [...]” (E-B1) This shows that there is a division of labor in center B activities, which leads to a high level of specialization.

A high level of professionalization and specialization, as found in center B, is described also for the machine organization by Mintzberg (1989, pp. 133–151). Further, the professional organization shares these characteristics as well (Mintzberg, 1989, pp. 174–177). Moreover, the author took the academic profession as an example to explain the high professionalization in a professional organization. Still, the staff composition found in center B cannot be assigned clearly to one of the configurations, because the findings fit to both.

All four key aspects of the formal organization structure in center B are rather a mixture of different configurations by Mintzberg (1989). There is no configuration which could classify the whole center or even one aspect completely. Either, there are two configurations fitting to the findings, or single indicators need to be explained by different ones. The overall order can be categorized partly in the diversified and the entrepreneurial organization. For the low level of centralization in center B the innovative and the professional organization are appropriate classifications. Further, the low level of formalization is classified into the innovative and the entrepreneurial organization, whereas the staff composition is categorized into the machine and the professional organization. The configurations fitting most commonly are the professional, the innovative and the entrepreneurial organization, as shown in Table 5 below. Hence, it could be said that center B is a hybrid of all configurations, but mainly of those three.

Table 5. Findings and classification of Center A & B

		Center A		Center B	
		findings	similar to...	findings	similar to...
overall order		strategic apex, operating core, supporting staff	professional & diversified organization	strategic apex, operating core	entrepreneurial & diversified organization
centra- lization	participati on in decision making	high	innovative & professional organization	high	innovative & professional organization
	autonomy in work	high		high	
	leadership control	low		low	
forma- lization	forma- lization of processes	low	innovative & entrepreneurial organization	low	innovative & entrepreneurial organization
	standar- dization of goals	mixed		mixed	
	standar- dization of outputs	low		low	
staff comp- osition	professio- nalization	high	machine & professional organization	high	machine & professional organization
	specia- lization	high		high	

Source: The author's, Based on Mintzberg (1989, pp.117-220)

4.3 Comparing the Findings

In this section, the findings of the case analysis of center A and center B are compared and discussed along the indicators which have also been used for the analysis itself. Table 5 (p. 55) presents the results and helps to follow the comparison. One outstanding result which can easily be noticed in Table 5 is that the centers are very similar. Indeed, all the indicators, except for the overall order, are rated on the same level. This does not necessarily mean that everything is the same which is why a more detailed comparison is important.

A major difference is found in the overall order of the centers. While center A has a double structure with an administrative and a scientific lead, center B's leadership is characterized by a management team. The finding in center A is not only close to the professional organization according to Mintzberg (1989, p. 179), but also to the structure of the university the center belongs to. This similarity might gain importance in the second part of the analysis later in this study. At the same time, both centers are characterized through a project structure conducted by multi-disciplinary researchers. This finding evokes the diversified organization in both centers. Further, none of the centers has a middle line or a technocracy. For center B this means it only consists of a strategic apex and an operating core, just as the entrepreneurial organization by Mintzberg (1989, pp. 117–129). So, while center A has similarities to the professional organization, center B shares characteristics with the entrepreneurial organizations. This difference shows in a way that the university, which both centers belong to, does not demand a specific order of their research innovation centers. However, the project-structure is present in both centers and reminds of Mintzberg's diversified organization (Mintzberg, 1989, pp. 156–158).

Regarding the centralization in decision making, both centers are rated as low centralized. Still, the structures of how the decisions are made differ between the centers. One main difference is the core decision-making body, which is the core group in center A, consisting of the administrative and scientific lead plus representatives from the faculties, whereas decisions in center B are mainly made in the management team, consisting of four people. Hence, the decision-making body in center B is much smaller than in center A and people from faculties and departments are only involved when they come together with their heads and deans. Based on this finding it can be stated that the university is involved differently in decision-making processes of their research innovation centers. This could be used as an argument which strengthens the autonomy of the centers from the university and shows further, that the centers have a scope of action to determine the decision-making processes with the university. Another similarity is that both centers host regular meetings with all researchers of the centers and in both centers the decisions are a group

process. Hence, in both centers the participation in decision-making is rated as high. Same is the case for the autonomy of work, which indicates a low level of centralization. The project management structure is present in both cases, which leads also to new responsibilities within the projects. Moreover, the center leaders are not involved in the single projects, except if they participate as a researcher. This leads directly to the role of the leader. The option that the leader in center B is part of a project leads to the fact that the leader has, to a degree, a dual role. This option is less, but also present in center A. Tasks as coordinating center activities, networking with people inside and outside the centers and keeping the overview are the main ones for the leaders in both centers. Control is not part of the leaders' tasks which indicates a low level of centralization.

Moving over to the next factor, which is formalization, one can see that the centers are very similar in this respect too. In both centers it is defined which decision bodies meet when, how often, and which decisions they take. Hence, it appears as a rather formalized process of decision-making. But then again, slight differences are detected at the project level. Due to the high level of autonomy and the variation of projects, procedures are not formalized for projects. Besides the projects, experts in center A mentioned that procedures concerning the whole center have also a low level of formalization. For example, the processes and actual responsibilities among departments and faculties remain somewhat undefined due to the cross-disciplinarity of center A: "[...] you have trouble to guide things. So, because you will always have to ask. And this is also the main thing because it is somehow between all the chairs." (E-A1) This issue was also mentioned in the interviews with experts from center B: "I see the point to a certain extent that for these faculties we challenge the system, because we don't belong in the permit." (E-B3).

In both centers experts see that processes got clearer during the last years, but they still hope for more formalization in processes, especially between the centers and the departments and faculties. Despite the clearly defined processes of decision-making at the center level there are too many unformalized processes, which outweigh. Hence, the level of formalization of processes is rated low in both cases. For the standardization of goals there is a distinction between the project goals and the long-term goals of the center. While the overall goals for the centers, mainly strategic goals, are highly standardized, the project goals differ a lot among the different projects and are therefore not standardized. However, the projects and their goals need to be in line with the overall project goals, which is why the standardization of goals is rated as mixed at both centers. This is different for the standardization of outputs. Since the outputs are closely connected to the projects,

which are quite individual, there are various options for how an output can be like. According to that, the standardization of outputs is rated low in both cases.

In the last factor, which is the staff composition, the cases are again very alike. Both have in principle the same type of people working there: researchers, coming from different disciplines. As already described, they are all academic professionals and consequently the level of professionalization is high. This applies also for the operating core in the other parts of the university. Because the researchers in center A and B are mainly employed by the faculties, it is hardly surprising that the level of professionalization in the centers is high as well. Both cases are interdisciplinary, albeit the disciplines in center A are not the same as in center B. Hence, the researchers bring their special knowledge and skills to their work in the centers, which determines the distribution of tasks. Therefore, the level of specialization at both centers is rated high. According to Batt and Doellgast (2005, p. 6), several studies have shown that the high specialization is common in interdisciplinary teams and leads to a higher level of efficiency in team work because everyone knows whom to ask for what.

In general, it must be said that the cases were chosen to be analyzed also due to their similarities, as described in the case-selection (chapter 3.2). It was already assumed that due to those similarities the centers' formal structure might be similar as well. According to the previously made analysis, this assumption has been proven to be true.

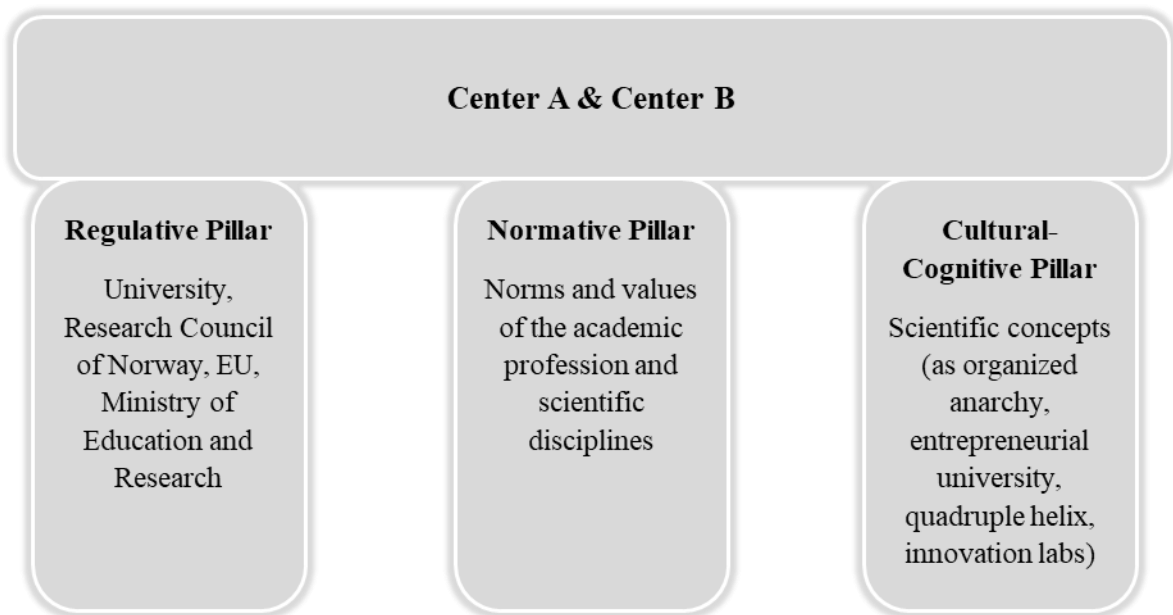
Now that it is clear how the centers can be described and which characteristics they have, the question remains: where do these structural features come from? A possible explanation within institutional isomorphism theory is analyzed systematically in the following chapter.

5 EXPLAINING STRUCTURAL SIMILARITIES

5.1 The Centers' Institutional Pillars

Since the previous chapter has clarified which characteristics the cases have in terms of their formal organization structure, this chapter goes one step further, trying to answer where those characteristics stem from. More precisely, this chapter identifies if institutional isomorphism, as explained in chapter 2.3.3, is a possible explanation for the characteristics found in the cases. For that purpose, the institutional pillars of the centers are presented first, based on W. R. Scott's (2014) framework of three pillars of institutions. Rules, laws, norms, values, and models which the three pillars provide in terms of formal organization structure are presented based on information collected in the interviews and findings in the literature. As described already above, the theory of institutional isomorphism by DiMaggio and Powell (1983) is closely linked to the three pillars by W. R. Scott (2014). Hence, it is identified in a second step, if the three pillars fit to the previously identified characteristics of the cases. By doing so it is tested which isomorphism mechanisms could explain the characteristics in the cases.

Figure 3. The three institutional pillars of Center A & B



Source: The author's, Based on W. R. Scott (2014, pp. 55–75)

5.1.1 The Regulative Pillar

The institutional pillars of the centers are presented in Figure 3. As shown, the regulative pillar is represented by actors as the EU, the Research Council of Norway, and the university itself. Those actors are identified as parts of center A and center B's regulative pillar based on insights gained through the interviews and project documents. When analyzing the actors in this pillar the focus is on the rules, laws and funding requirements they set for center A and B, since this is, according to DiMaggio and Powell (1983, p.150f.), the core factor of coercive isomorphism. It is important to notice that not all partners are regulative actors. Even though the centers cooperate with the industry or regional public sector agents, those are not able to monitor or sanction the centers for not following rules or laws, which is an important aspect of regulative actors according to W. R. Scott (2014, p. 96).

One reason why the university is listed as a regulative actor, besides the obvious dependency on its rules and laws, is that they have a special status for certain research fields and research groups, which comes along with funding of some million NOK for a five-year period (University, 2020f). For awarding research groups with this special status and funding the university has an even higher power over the centers. Moreover, the university management is overall responsible for the strategic orientation of the university's focus areas and has a high impact on long-term maintenance of research centers. In the values of the university, a flat organization structure is anchored, which should lead to open interaction among the different actors in the university (University, 2020g). Among others, co-creation, innovation, co-operation and interdisciplinarity are part of the university's vision and strategy (University, 2020e).

The Research Council of Norway is next to the EU the biggest external funding agent for center A and B. It must be mentioned that the EU affects the Research Council of Norway to a certain degree due to some requirements the Horizon 2020 program set for national applications. Nevertheless, the Research Council still has own projects and regulations, so it is presented as an independent regulative actor for the cases. In project proposals, the Research Council of Norway expects a clear ownership of the project as well as a project administrator. This person is responsible for all the project related administration including the reporting. If there are several research partners coming together in a project, the project administrator is responsible to coordinate information between them. Another person required is the project manager, who is responsible for the scientific work. (The Research Council of Norway, 2019) These given requirements remind of the overall structure of a professional organization, due to the separation of an administrative and scientific part (Mintzberg, 1989, p. 179). Overall, the Research Council

of Norway presents in its current strategy from 2015-2020 a detailed plan of how they want to reach their predominant aim: expanding the innovation capacity in the Norwegian society, in public and private sector and enhancing sustainability everywhere (Forskningsrådet, 2015).

In the EU project proposals, Horizon 2020 is the biggest EU research and innovation program, the requirements are less detailed. It is stated that a contact person from the coordinating organization needs to submit the proposal, but everything else is dependent on the program and the topic of the project proposal (European Union, 2020). Something the Horizon 2020 program, as well as Research Council, requires for is a clear goal setting in a research proposal. This requirement stems from the need to be able to decide if funding is provided or not and to evaluate projects. One last actor in the regulative pillar is the Norwegian Ministry for Education and Research, which in a way also influences the research council and the university, but through them also the cases. Some key goals of the ministry can be summarized as the strengthening of internationalization and excellence in research. By implementing funding systems like the Centers for research-based innovation, the ministry also fosters innovation and co-creation in HE (Norwegian Ministry of Education and Research, 2013). The projects themselves are usually conducted through the Research Council, which is why the ministry is not giving more detailed requirements for innovative research centers as center A and B.

5.1.2 The Normative Pillar

The normative pillar is mainly dependent on the people working in the centers. As already described earlier, the people themselves are not employed by the centers but by the departments and faculties. Further, they are all professionals, even though they do not all belong to the same discipline. In comparative analysis of academic professionals all over the world it was shown that the identification with the discipline is high among academics (Teichler et al., 2013, p. 109). This means they all have certain ways of working, special norms and values due to their disciplines and share basic academic values. In the normative pillar it is of interest to see how those norms and values are, where they correspond to each other and where they differ. As the focus of this paper is on the formal organization structure, norms and values related to this are discussed here. Some of those norms are related to the fact that the people working in center A and B are academics. For example, the academic freedom is such a norm which stems from the people's background as academics and is one of the most important principles besides the quest for the truth (The Norwegian National Committees for Research Ethics, 2014). Clark (1987, p. 106) describes in his book that the academic profession has three central concepts: commitment, belief, and interest.

Comparative studies showed that academics are mainly committed to their profession and the values of autonomy and academic freedom. Further, it is argued that most academics want to contribute with their work to address societal issues. (Teichler et al., 2013, pp. 4–5) In the model “*University as a Rule-Governed Community of Scholars*” presented by Olsen (2007, pp. 29–30) and in the *research university model*, mentioned by Pinheiro and Stensaker (2014, p. 500), the researcher’s shared commitment is described as a major factor for the organizing principles in an university. Further, Mintzberg (1989, p. 177) strengthens the importance of norms and values of an professional group in the description of the professional organization as well.

However, the interviews also showed that the researchers in the centers have different views on several processes and research in general due to their disciplines. It was stated in an interview that depending on the discipline people have different opinions on how decisions are made. Moreover, several experts mentioned that the different disciplines lead to unequal understandings of hierarchy. Expert A3 said that “[n]ot everyone accepts that kind of leadership” and Expert A1 explained that “they have all different backgrounds, they have a different idea of how science works out, how the research works out.” For center B Expert B3 stated that “many faculty C scientists are very conservative when it comes to how they view their profession and being open to new things and they want to keep it as it is [...]” Those statements describe that interdisciplinarity leads to disagreements regarding goal setting, outcomes and in the question how research works in both cases. It must be mentioned, that since the centers have a different mix of disciplines, their context is different at that point. According to Becher (1981, pp. 113–114), language is one example to illustrate how disciplines differ from each other. Even when it comes to academic terms, as for example being biased, this could be understood differently based on the discipline. Further, the author states that people from different disciplines have different character traits and that there can be major differences within disciplines. (Becher, 1981, p. 111/116) This identification with a certain discipline is also part of the characteristics of academia as a profession, according to Clark (1987, p. 109). At the same time, Becher (1981, pp. 118–119) found out that researchers from disciplines have a similar view on their job as a professional academic, since they like and dislike the same parts of their jobs.

5.1.3 The Cultural-Cognitive Pillar

The third pillar is, according to W. R. Scott (2014, pp. 67–70), about the local context. Thereby, norms, values and identities derived from the surrounding region or other organizations to which a dependency or close relations exist. In the case of center A and center B, this is first and foremost

the host university including the faculties and departments. But other research groups or innovation labs in the field belong to this context as well. Then, in the search for an identity, organizations imitate the leading actors, like flagship universities, thus becoming more alike. The mimetic isomorphism, which matches to the cultural-cognitive pillar, is mainly interested in models and what was earlier described as recipe.

By a closer look on research groups, it becomes clear that they are the main body of most universities. Hence, the focus is first on P. Scott (2001) who presents three models of universities. The first one is called *organized anarchy*. The term originates from the famous *garbage can model* by Cohen, March and Olsen (1972). According to the authors, the organized anarchy has three main properties: problematic preferences, unclear technologies and fluid participation. The authors present the university as a typical organized hierarchy in their paper. For both cases those properties seem to be relevant too. Difficulties in decision-making were described in both cases, albeit they also have standardized long-term goals, so the preference do not seem to be completely unclear but sometimes problematic. Processes in both cases are rather undefined, also for the members. Expert A3 even called it “chaotic”, which shows the unclear technologies. Additionally, since the main work is based on projects with differing duration and focuses, the participation is also fluid, according to the description of Cohen et al. (1972, p. 1). P. Scott (2001) describes that the academic staff in this model has discretion over their tasks, the organizational goals are unclear or even irrelevant and mainly only aspirations. Furthermore, there is a high level of participation in decision-making in the organized anarchy model (P. Scott, 2001, pp. 132–133).

A similar focus takes the *university as a representative democracy* by Olsen (2007, p. 32), in which democratic processes, as elections and bargaining, change the hierarchic system. A tendency towards the establishment of a representative democracy structure can neither be observed in center A, nor in center B. Nevertheless, both centers try to include many people in their decision-making processes, as described in the previous chapter. The second model presented by P. Scott (2001, p. 133) is the *cybernetic system*. Here the university is described as a flexible, adaptive and resilient organization. When facing changes, a university in this model is able to self-organize based on self-evaluation and self-correction. Processes, structures and systems are described to have a great importance for a university (P. Scott, 2001, p.133). Even though both centers have a low level of formalization, several interviewees highlighted the wish for more structure in center A and B. The last model is the *entrepreneurial university*. This concept is chosen because universities in this model are in constant exchange with external actors, just as the cases are. According to P. Scott (2001, p.134), this can lead to tensions with the academia and the

administrative bureaucracy. The tensions occur, since the focus is on managers and lay members, whereas academics are seen in the role of the opposition. Nowadays universities contain, according to P. Scott (2001) aspects of all three models he presented (organized anarchy, cybernetic system, entrepreneurial university). However, the author argues that elite universities still tend to be more like the organized anarchy while newer universities tend to go more towards the entrepreneurial university.

The entrepreneurial university model is discussed in various other papers as well. Those papers have in common that they all strengthen the importance of collaboration, externally (e.g. with industry) and internally (e.g. among disciplines) as the most important part of the entrepreneurial university model (Etzkowitz, 2016, p. 84; Pinheiro & Stensaker, 2014, p. 151). According to Etzkowitz (2016, p. 84) an entrepreneurial university should even be able to create firms in their frame. The entrepreneurial university fits into a development which Etzkowitz (2003, p.110) calls the *second academic revolution*. In this development, research groups got a third mission besides teaching and research: the economic and social development. In this new research groups “professors are meant to be team leaders and team members”, working less in research but being mainly organizers (Etzkowitz, 2003, p.111). This double role of the leader has been identified for both cases as well. Partly, the move towards entrepreneurial universities goes in line with the triple- or quadruple-helix. Those are models of innovation research to establish a university-industry-government-community collaboration (Kolehmainen et al., 2016, p. 28). Expert A3 stated even in the interview that center A is part of a quadruple helix. Center B is part of a quadruple helix as well, which is indicated by the colorful mixture of partners in several projects. Further, it is mentioned that research groups tend to be more “firm-like” if the competition for funding is high among research groups, which it is, according to the statements in the interviews.

As already described earlier, the problem with *innovation labs* is, that there is not one single definition, which describes the phenomenon. In the research literature, the authors create their own terms, definitions, and characteristics, so that one lab is classified with several different terms. For example, the former MindLab in Denmark is labeled as innovation unite, i-team, i-lab, public policy lab, governmental innovation lab, change lab, design lab and social innovation lab by different authors (McGann et al., 2018, p. 253). Furthermore, they identify that different authors connect different descriptions to innovation labs. In the case studies of Tönurist et al. (2015, p. 16, 2017, p. 1469), the authors strengthen the importance of a high level of autonomy for public innovation labs. A high level of autonomy would lead to a high level of freedom, which is needed in order to do their things *ad hoc* (Tönurist et al., 2015, p. 12).

After the presentation of the cases' institutional environment, by applying W. R. Scott's (2014) three pillars of institutions on the cases, the next section identifies if and in which way this institutional environment influences the cases' formal organization structure.

5.2 Comparing the Institutional Pillars and the Centers' Structure

The basis for this section is the theory of institutional isomorphism by DiMaggio and Powell (1983) as well as other theories closely related to it, as for example the translation or virus theories, which are described in chapter 2.3.3. The following analysis goes through every aspect of the cases formal structure after one another. Further, this analysis follows the three isomorphism mechanisms (coercive, normative and mimetic isomorphism) as described by DiMaggio and Powell (1983) but it also allows the centers to be active by considering the translation or virus theory in the Scandinavian institutionalism. It must be mentioned here that this analysis is based on observations and comparisons from the institutional environment and the cases. Hence, this analysis does not present an explicit and proven causal relation, just as well the presented isomorphism mechanisms could be a coincidence or due to confounding variables.

According to the findings in the previous analysis, both cases have a low level of centralization. Overall, the normative pillar has an essential influence on this finding for several reasons. Based on their profession as academics, the researchers in center A and center B share many norms and values. Academic freedom and commitment are essential parts of the academics' self-image (Clark, 1987, p. 106; Teichler et al., 2013, pp. 4–5). Furthermore, it is argued that in a professional organization, as a university, leadership is organized bottom-up among the operating core, it is even called a professionals oligarchy (Mintzberg, 1989, p. 179). This basis is an explanation for all three indicators of centralization. The bottom-up leadership in connection to the academic values increase the probability for a high level of participation in decision-making, as found in the case analysis. Further, the commitment to academic values contains also the importance of a high level of autonomy in the academics' work (Teichler et al., 2013, pp. 4–5) . The low level of leadership control could be explained by the organized anarchy model. The model, presented in the cultural-cognitive pillar, argues that the formal leader in this model is rather symbolic (Cohen et al., 1972). This does not fit to the low level of leadership control found in this case-analysis. Even though the leadership control is rated low, it was described in the interviews that the leaders in both centers have considerable responsibility in coordinating activities and keeping an oversight. This role is described by Etzkowitz (2003, p. 111) as the new role of professors in the entrepreneurial university. The dual role of being a team-member and the leader at the same time,

described by the author in this context, can also be found in both cases. The role of a controller is not part of this concept.

Within the regulative pillar, the host university as a regulative agent might be a considerable explanation. The host university stated that a flat structure is part of their values (University, 2020g). It can be argued that a flat structure encourages participation in decision-making and a low level of leadership control (Ghiselli & Siegel, 1972, p. 621). Albeit the participation in decision-making was rated high in both cases, it is also a finding that the processes and bodies in this area differ from one case to the other. This points to the fact that the university did not clearly regulate the decision-making processes. The impact of the university's regulative role on the high level of participation in decision-making is thereby weakened. In which way the value of a flat structure in the host university influences the low level of leadership control in the centers remains unclear, due to the lack of significant data. Further, the leadership role described by Etzkowitz (2003) for the entrepreneurial university is a possible explanation for the low level of leadership control identified in both centers. The reason for this is that the author contends that the leader's role in the entrepreneurial university is rather a moderating team member instead of a leader with a high level of control, as in firms.

The overall low level of centralization is, based on this analysis, explained best by academic norms and values in the normative pillar. Hence, the primary mechanism is the normative isomorphism. Further, the differences described between the project work in the centers and "normal" research work might be an indicator that the academic values and norms mutated or were translated, according to Røvik (2011) and the Scandinavian institutionalism, in center A and center B. The high level of participation in decision-making might also be caused by a mimetic mechanism, based on the entrepreneurial university model and its description of the leader's role. Mimetic isomorphism is the mechanism related to the cultural-cognitive pillar (W. R. Scott, 2014, pp. 67–70).

For the low level of formalization in center A and center B, it is worth considering possible explanations individually for each indicator. According to the previous analysis, the level of formalization of processes is low in both cases. Explanations for this finding are neither found in the regulative nor in the normative pillar. In the cultural-cognitive pillar the organized anarchy model was presented earlier. One of the model's three main properties, explained by Cohen et al. (1972, p. 1), is the unclear technology. The authors describe that in an organized anarchy not even members know or understand the processes, if there are any. Hence, the formalization in an organized anarchy is low, just as in the cases. Although not all aspects of the model match with

the findings in the cases, as for example the symbolic leader, some aspects fit well. Besides the unclear technology, the problematic preferences and the fluid participation are aspects which are present in the cases as well. At the same time, a low level of formalization of processes is also mentioned in the cybernetic system model, presented by P. Scott (2001, p. 133). The author describes that the flexibility in the cybernetic system is relevant to be prepared for change. However, the cases do not appear as organizations oriented towards change, and all experts stated that they would favor clearer processes. This argument also weakens the innovation-lab model as a possible explanation since their processes are also little formalized to remain flexible. According to that, the organized anarchy model appears as the best fitting model in terms of the formalization of processes. The partly adoption of this model indicates to mimetic isomorphism. That the model is only adapted partly leads further to the conclusion that it was translated or mutated somewhere in the adoption process (Sahlin & Wedlin, 2008, p. 220). Possible explanations for this finding besides isomorphism could lay in the personal character of a leader or the personal relationships of members, since those contain some tensions, as described earlier. Analyzing this or similar possible explanations requires further research.

Even though the formalization is overall rated as rather low in the centers, the standardization of goals is mixed due to a high standardization of goals for the whole center and a low standardization of project goals. On the one hand, a possible explanation for this finding could be, that the projects are mainly financed by funding institutions as the Research Council or the EU, which both require specific project goals. Therefore, a standardization of all project goals in the centers is unlikely because every project needs individual ones. On the other hand, the high standardization of goals for the whole center might be caused by funding systems as the “centers for research-based innovation”, which then require specific goals for the funded centers. In this case, coercive isomorphism is a possible explanation here.

Further, the previous analysis showed that the standardization of outputs in the cases is low. Organizations in the entrepreneurial university model are involved in many collaborations with external actors, as the industry or the public sector (Etzkowitz, 2016, p. 84; Pinheiro & Stensaker, 2014, p. 151). Thereby, the organization gets in contact with societal and economic problems and tries to find solutions in collaboration with several actors. This problem-solving and collaborating character is key in research innovation centers and in the cases as well. Standardized outputs do not fit into this system since complex problems require individual solutions if a solution can overcome all barriers at all. This applies for all so-called *wicked problems*, as described by Head (2008, pp. 105–106). Further, a research innovation lab is characterized as interdisciplinary

(Boardman & Bozeman, 2007, pp. 430–432). Since every discipline has a different understanding of science, there are also differing opinions on what a scientific output is. This was also described by experts in each center, as described above. These differences based on interdisciplinarity are also a possible explanation for the low level of standardization of outputs. Hence, this finding can be explained by mimetic and/or normative isomorphism.

The professionalization in center A and B is rated high. Because the employment of researchers in both cases is in the faculties' area of responsibility, this indicator is closely related to the host university. Moreover, the center itself has no or only little influence on the level of professionalization due to this allocation of responsibilities. Still, it is interesting to analyze where the finding can stem from. The host university requires, as all universities worldwide, a formal educational background for scientific positions. Depending on the position (PhD student, postdoc, professor), the requirements differ in the level of the formal degree (master's degree, PhD, postdoctoral qualification) but they are usually all academic degrees (Teichler et al., 2013, pp. 80–81). This is based on two pillars. First, the university is, as a regulative actor, responsible to set the formal requirements of different positions. Second, the academic profession is self-regulating in a way, so professionals regardless of the discipline value high importance on reputation and the formal educational background is part of this reputation (Becher, 1981, p. 118). Hence, coercive and normative mechanisms can explain the high level of formalization.

Discipline-related skills and knowledge determine the division of labor in the cases. Due to the interdisciplinary character, the division of labor is clear, which leads, according to the previous analysis, to a high level of specialization. Batt and Doellgast (2005, p. 6) explain that this is common in interdisciplinary teams, and it increases their efficiency. Hence, by fostering interdisciplinarity, all three pillars can explain this finding. The agents in the regulative pillar all enhance interdisciplinarity, innovation and high-level research, as shown earlier (Forskningsrådet, 2015; University, 2020f). Especially the entrepreneurial university model, but also innovation lab concepts in the cultural-cognitive pillar strengthen the need of innovation through collaboration, internally and externally (Etzkowitz, 2016, p. 84; Pinheiro & Stensaker, 2014, p. 151; Schuurman & Tönurist, 2017, p. 10). And finally, it got clear in the interviews that this interdisciplinary approach is grounded in the values of the people working there, otherwise they would not work with center A or center B. According to this finding, there is influence from the normative pillar as well. This means the high level of specialization is supported from all pillars and can be explained through coercive, normative, and mimetic mechanisms.

The last aspect which is analyzed here is the overall order. For this aspect, the centers are analyzed separately since the finding of the previous analysis showed major differences here. Center A has a double structure in the leadership with one administrative and one scientific leader. The rest of the work is organized based on projects mainly. This structure is enhanced by the Research Council of Norway. The council requires an administrative and a scientific lead in their project proposals (The Research Council of Norway, 2019). Also, the host university works with this dual structure of leadership (University, 2020d). Since center B has the same influence by the regulative actors, but not the same order, it is questionable, if the described similarities are a possible explanation. It could also be that the centers have differing adoption processes, as explained in the virus theory by Røvik (2011) or in the Scandinavian institutionalism (Sahlin & Wedlin, 2008), which might explain the differences among the cases. However, this is not empirically tested in this case-analysis. It might also be that the order is influenced by the normative pillar if the leadership structure is part of the researchers' norms and values. This needs to be formulated carefully, because this is neither supported by the literature, nor by the interviews. Conversely, Expert A3 stated that this form of leadership is not accepted by everyone, as presented earlier already, which makes this option rather unlikely. Center B does not have this dual structure. Instead, the leadership is formed through a management team, consisting of four people including one formal leader and one responsible for the administrative work. The existence of the distinction between scientific and administrative work in the management team could be an indication for the assumption that the centers have adopted the same rules in different ways. This finding was identified also in other studies, as for example in Radaelli and Sitton-Kent (2016). Based on this assumption, it could be that the overall order of the leadership in the centers is determined by a coercive mechanism. Moreover, it could be assumed that the leadership in the centers is as it is for practical reasons, but this cannot be properly analyzed here since the necessary data for this question was not collected.

In one part of the overall order the cases are similar again: the project-structure. Most projects in both centers are funded externally, for example by the EU Horizon 2020 program or the Research Council of Norway. Both actors provide funding earmarked for a specific project. This explains the project-based structure in both cases with coercive mechanism. Models in the cultural-cognitive pillar, foremost the entrepreneurial university model, enhance collaborations, interdisciplinarity and teamwork, however, the model does not specify if the teamwork should be project-based. Hence, the regulative pillar provides the best explanation for the overall order in center A and in center B, even though the assumption that the same rules were adopted in different ways needs to be tested further. All findings are summarized below in Table 6. For the first nine

indicators no distinction is made between the two cases, based on their similarity. Only the aspect overall order is presented separate for each case.

Table 6. Summary of the mechanisms in Center A & B

Finding	Coercive Isomorphism	Normative Isomorphism	Mimetic Isomorphism
High level of participation in decision-making	No	Yes – academia as profession	No
High level of autonomy in work	No	Yes – academia as profession	No
Low level of leadership control	No	Yes – academia as profession	Yes – entrepreneurial university model (leader role)
Low level of formalization of processes	No	No	Yes – organized anarchy model (unclear technology)
Mixed level of standardization of goals	Yes – Research Council of Norway, EU (project goals) & the Ministry (long-term goals)	No	No
Low level of standardization of outputs	No	Yes – different disciplines	Yes – entrepreneurial university model (enhances collaborations)
High level of professionalization	Yes – host university (requires professionals)	Yes – academia as profession (self-control)	No
High level of specialization	Yes – all (enhance interdisciplinarity)	Yes – center members (support interdisciplinarity)	Yes – innovation lab model, entrepreneurial university model (enhance interdisciplinarity)
Overall project-based order	Yes – EU, Research Council of Norway (project-based funding)	No	No
Center A overall order = dual leadership & projects	Yes – host university, Research Council of Norway (dual structure)	No	No
Center B overall order = management team & projects	Partly – host university, Research Council of Norway (dual structure translated)	No	No
Total number of confirmed explanations ('Yes')	4.5	6	4

None of the three pillars can explain all findings of the formal organization structure in both cases. That means, every indicator of the formal organization structure needs to be analyzed individually to identify which mechanisms could explain the finding. At the same time, most indicators can be

explained by more than one pillar, which means that it cannot be stated clearly which mechanism is the right explanation, as summarized in Table 6. Anyway, W. R. Scott (2014, p. 56) stated in his book that the three pillars of institutions do not compete with each other. Instead, the author states that the pillars are meant to work together. Further, each single pillar (regulative, normative, cultural-cognitive) consists of different parts (e.g. the Research Council of Norway or the host university). Depending on the analyzed indicator different parts might fit. Moreover, this analysis focuses on institutional isomorphism mechanisms as possible explanations for the findings. Other concepts besides institutional isomorphism might also provide valuable explanations for the findings in the cases. For example, the perspective might be changed to the instrumental one, or cultural aspects could be taken into the center of new analysis.

From all three pillars, the normative one provides most suitable explanations for the characteristics. This means that normative isomorphism is the predominant mechanism according to this analysis. Thereby, the academic profession is as important as a carrier of norms and values as the diversity of disciplines in the cases. Also, the regulative pillar explains four and a half of the characteristics. Third most characteristics are explained by the cultural-cognitive pillar, especially by the entrepreneurial university model. At several points in the analysis it is mentioned that the adopted rules, values or models seem to be translated or mutated according to the virus theory by Røvik (2011) and the Scandinavian institutionalism as explained by Sahlin and Wedlin (2008). An active role of the cases, as described in those theories, seems also reasonable by looking at all aspects of the formal organization structure at the same time. The mix of mechanisms and different parts of the pillars shows that the cases have not adopted one model throughout. Still, the host university seems to be important from different perspectives, not only as regulative actor, but also as a place of specific rules and values and as an organization in a controversial scientific field.

6 CONCLUSION

The aim of this study is to describe and explore the formal organization structure of research innovation centers guided by this research question:

What are the core characteristics of research innovation centers' formal organization structure in two concrete cases and can those findings be explained by means of institutional isomorphism?

Two research innovation centers were analyzed and compared as cases in this qualitative case-study. Based on the empirical analysis of the two similar cases, case A and case B, the study results as follows:

1) Both cases show rather similar core characteristics, a main difference is the overall order since the leadership in center A has a dual structure (scientific and administrative leader) and center B has a management team. The core characteristics are: a) a low level of centralization; b) a low level of formalization; c) a high level of the indicator's professionalization and specialization (belong to the key aspect "staff composition").

2) All three isomorphism mechanisms presented by DiMaggio and Powell (1983), coercive, normative and mimetic, explain parts of the findings, albeit some findings can only be explained by one mechanism, others can be explained by several. The one suitable for most indicators is the normative isomorphism.

These findings need to be discussed further, starting with the first part of the research question. Besides the analysis of the formal organization structure along four key aspects (overall order, centralization, formalization, staff composition), the findings are classified into five configurations presented by Mintzberg (1989, pp. 117–220) (entrepreneurial, machine, diversified, professional, innovative). The indicators were assigned to different configurations, which means that the findings in none of the cases fit entirely into one ideal configuration. Since the overall order in center A fits into the professional organization, this is the composition it can be assigned to the most. In center B, the indicators can as often be assigned to the innovative and the diversified organization, as to the professional one (see Table 5, p. 55). Further, some inconsistencies were identified in the analysis. Even though it was argued in the case selection that the cases are organizations, they still belong to their host university. In the case analysis of the formal processes it got clear that many processes between the faculties or the departments and the cases are still unclear, which causes tensions. Experts of both cases stated this in the interviews. This is an issue which has not been considered by Mintzberg (1989) even though he studied diversified

organizations, which might be confronted with similar issues. Hence, the lack of this perspective in the concept is also a limitation for this study. Additionally, the experts stated that the processes are only little formalized, although they would like to have more formalized processes. Here the question remains why this is not changed even though everyone seems to have an interest in it. According to the findings in the second analysis, the formalization of processes can be explained by a mimetic isomorphism mechanism, based on the organized anarchy model by Cohen et al. (1972). This model states that there is a fluid participation in an organized anarchy, which is also the case in the centers, as presented above. It might be that this is a reason for the missing formalization as well. At this point one can see the limits of the isomorphism concept. The mechanism might be appropriate to explain the current status, however, it does not explain under which circumstances organizations change. For that purpose, it would be necessary to take other theories or perspectives, for example change management theories as by Van de Ven, A. H. and Poole (1995), into account.

For the second part of the analysis, W. R. Scott's (2014) concept of the three pillars of institutions was used to identify the institutional pillars for the two cases. Based on the interviews and research literature it got clear to which institutional environment the cases belong. It was tried to get a full picture of the three pillars. Still, there is no guarantee that the presented pillars contain all aspects of the institutional environment because the scientific field is large, and the interviews might have not given the full picture. Nevertheless, the analysis provides some interesting insights. The findings strengthen the importance of norms and values carried by professionals in the centers. Moreover, the findings support that the three pillars by Scott work together instead of competing. It becomes clear that every pillar could be an explanation for a certain characteristic. Moreover, the active role of organizations, as in the virus theory by Røvik (2011) or in Scandinavian institutionalism as presented by Sahlin and Wedlin (2008), seems likely in parts of the analysis.

Furthermore, the analysis shows the limits of W. R. Scott's (2014) three pillars by its very nature. In some parts it is already stated that other explanations than institutional isomorphism might be more suitable explanations. Future research could take for example cultural or instrumental perspectives (e.g. Martin, 1994) into account. Additionally, quantitative methods could be used to provide a broader overview of research innovation centers and their characteristics. Limitations of this study raise from several points. The main method for data collection were semi-structured interviews. The data collected through the interviews might be biased and/or incomplete. This issue is addressed by interviewing people in different positions and of different gender and by having the similar structure of interviewees in both centers. Further, the operationalization of the

formal organization structure might have also been considered in another way. This issue was tried to be reduced by doing the operationalization close to the scientific literature.

This study is a starting point for organizational research on research innovation centers. It shows the large field and background in which research innovation centers belong as well as the complexity of such a type of organization. Hence, further research can shed light on the issue from various perspectives.

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8 APPENDIX

Interview Guide

Introduction:

- Organization/ Position (anonymized)
- What is currently happening in the center?
- When and why has the center been established?
- Where does the center formally belong to?

Topic 1: Centralization

- How are the tasks divided (in general)?
- How are the tasks divided within a project?
- What are the procedures in a project?
- Who decides which projects are taken?
- Who decides about the procedures within the projects?
- Who decides about personal?
- Which decision-bodies are relevant for the center's work?
- How can one become a member of the center?
- How does your teamwork look like?
- How is the co-operation with team members of other projects?
- Who is responsible for setting boundaries in projects?
- Who has control over all the projects?
- Can you use synergies from the projects?
- Are the partners involved in the work? If yes, how?
- Would you say you have freedom in your work?

Topic 2: Formalization

- Which are the important rules when you work here in the lab, if there are any?
- Do those rules vary from the ones in other research groups?
- Are the processes and responsibilities defined? If yes, are they written down?
- What are the goals of the center and are they present in the work?
- Are there certain standards of what a project result should be?
- How important is it to follow pre-built plans?

Topic 3: Professionalization

- What are the requirements to work in the center?
- Do you have specialists for every topic in the center?

Topic 4: Atmosphere

- How would you describe the atmosphere in the center, and does it differ from other research groups?
- What are your overall experiences of working in the center?
- Is the interdisciplinarity recognizable in the center's atmosphere?
- Which main challenges do you identify for the center?

Topic 5: Environment

- Which are the most important partners of the center?
- How is the relationship to the host university?