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Organizational Change within Medical Research in Sweden: On the Role of the Individuals and Institutions

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ABSTRACT

The focus of this paper is on how organizational change within medical research evolves and is influenced by different types of institutions at different geographical levels, as well as what characteristics of the key individuals are important in enacting institutional opportunities and overcoming hindrances. The paper reveals the complexity of institutions influencing change processes. First, the relations between institutions can be complementary, reinforcing or contradicting, suggesting that individuals initiating change should consider possible responses to institutions contradictory to the initial opportunities, as well as take advantage of reinforcing and complementary norms, rules and procedures. Second, although different types and levels of institutions have a joint impact on change processes, some institutions are more prominent than others in different phases of the process. Individuals can take advantage of institutional opportunities and overcome hindrances due to their personal qualities and position in the organization

JEL Code: D23, D73, I29, 031

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Abstract

The focus of this paper is on how organizational change within medical research evolves and is influenced by different types of institutions at different geographical levels, as well as what characteristics of the key individuals are important in enacting institutional opportunities and overcoming hindrances. The paper reveals the complexity of institutions influencing change processes. First, the relations between institutions can be complementary, reinforcing or contradicting, suggesting that individuals initiating change should consider possible responses to institutions contradictory to the initial opportunities, as well as take advantage of reinforcing and complementary norms, rules and procedures. Second, although different types and levels of institutions have a joint impact on change processes, some institutions are more prominent than others in different phases of the process. Individuals can take advantage of institutional opportunities and overcome hindrances due to their personal qualities and position in the organization.

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Introduction

The assumption that innovation processes are affected by the institutional framework consisting of different types of institutions at various geographical levels has been emphasized in many studies within the geography of innovation (e.g. Asheim et al., 2011; Gertler and Wolfe, 2002). Further, it is highlighted that, although being influential, institutions alone cannot predetermine innovation processes. Individual actors are considered to be boundedly rational – making choices and decisions which in turn have an impact on innovation processes (Atherton and Smallbone, 2013; Freeman, 2010; Gertler, 2010; Sotarauta and Pulkkinen, 2010). However, although institutional diversity is mentioned in the literature, how that diversity can be conceptualized, while analyzing the actions by innovating actors, is seldom specified.

This paper aims to contribute to filling this gap by analyzing the process of organizational change within medical research[i]. The focus is on the institutional diversity which creates hindrances and possibilities for change, as well as on the personal and professional characteristics of innovating individuals. The empirical case for analysis is a novel cancer research centre, at Lund University (LU) (Southern Sweden), of translational medicine integrating basic research and clinical practices. The center is considered to be a success when taking into account scientific publications, attracted funding, and, most importantly, the efficient development of novel technology for cancer diagnostics. However, the focus of this paper is not on a new technology, but on the initiation and establishment of organizational preconditions which have been crucial for the success and innovativeness of the center. Therefore, the object of analysis is the organizational change – the process of initiation, establishment and development of a novel organizational form of research unit at a university.

More concretely, the focus is on how organizational change evolves and is influenced by the different types of institutions at different geographical levels, as well as what characteristics of the key individuals are important in enacting institutional opportunities and overcoming hindrances.

A theoretical framework is developed in order to reach the aim. Scott's (2008) conceptualization of institutional analysis and insights from the studies in the geography of innovation are applied and further developed in the data selection and analysis process. Scott's (2008) conceptualization is chosen since it combines different institutional schools and therefore is compatible with the interdisciplinary nature of innovation studies. In addition, his framework of regulative, normative and cognitive institutions provides detailed characteristics of both formal and informal institutions and, thus, fits with the geography of innovation where a variety of institutions in emphasized. The studies on the geography of innovation (e.g. Asheim and Gertler, 2005; Gertler, 2004, 2010; Storper, 1997; Strambach, 2010) add a geographical dimension to the discussion on institutions.

The paper is structured as follows. The theoretical framework relating the geography of innovation literature and institutional theory (mainly using the framework by Scott, 2008) is developed in the first part. The main methods for data collection and analysis are discussed in the research design part. The main findings and data analysis are presented in the third part. The results are summarized and recommendations for future research are made in the final part of the paper.

Conceptual framework

Institutions as hinderers and enablers of change

Institutions comprise regulative, normative and cultural-cognitive elements that provide stability and meaning to social life (Scott, 2008:48). Although it is possible to identify a

situation in which one or another aspect of institutions is predominant in defining behavior, different types of institutions are most often experienced in a combined manner and have a collective impact on the social and economic order (see also Scott, 2010). In other words, the process of organizational change is influenced by regulations, norms, traditions and routines in a combined way. However, although experienced in a joint manner, the functions of institutions differ. Regulatory frameworks set rules, monitor and sanction activities. Norms and values introduce prescriptive, evaluative, and obligatory dimensions into social life. They prescribe how things should be done and might be applicable to all members or just specific individuals of a certain collectivity (society, community, organization etc). Routines combine normative and regulative dimensions of institutions at organization and/or industry level. Routines are carried by protocols, standard operating procedures (regulative dimension) and jobs, roles which define appropriate goals and activities for individuals (normative dimension) and jointly provide stability/guidelines for organization or industry specific practices (Scott, 2008).

On a more general level, all types of institutions provide incentives to which individual actors respond by performing certain activities (Edquist and Johnson, 1997; North, 1990). According to Edquist and Johnson (1997), institutions may provide both negative and positive incentives to innovate. For example, well-functioning protection of property rights, which enables temporary monopolization of knowledge, creates a positive incentive to innovate, while negative attitudes to people that fail in innovation processes, and skepticism about the value of innovation, create negative incentives. Relating the arguments by Scott (2008) and Edquist and Johnson (1997), three types of relations can be identified between institutions influencing change processes – contradicting, reinforcing and complementary. Institutions are *contradicting* when they have opposing incentives (i.e. encourage innovation via protecting intellectual property vs discourage innovation via norms leading to skepticism of innovation).

They are *reinforcing* each other when they create similar incentives (i.e. encourage to innovate) via similar functions (i.e. regulating the distribution of resources for innovation). Finally, they are *complementary* when they create similar incentives (i.e. encourage to innovate) via different functions (i.e. one regulates the distribution of resources, while the other encourages positive attitudes towards innovation).

Geography of innovation studies are usually interested in national/global regulatory frameworks, soft institutions in the form of norms, values, beliefs and organizational routines and procedures (Asheim and Gertler, 2005; Freeman, 2010; Gertler, 2004; Lundvall, 2010; Lundvall and Maskell, 2000; Storper, 1997). In these studies institutions at the national level often refer to rules – regulations, standards and funding guidelines for innovation. They highlight that innovation activities differ depending on how markets, education systems, and labor are organized, how much is invested in R&D and how well property rights are protected (Edquist and Johnson, 1997; Gertler, 2004; Strambach, 2010).

Cognitive and normative aspects rather than regulations are addressed in many regional studies. Storper (1997) argues that regional specific assets such as conventions, informal rules and habits, which coordinate economic actors under conditions of uncertainty, are central forms of scarcity in contemporary capitalism and therefore create competitive advantage. Innovations activities differ depending on some kind of local institutional framework which influences knowledge creation, exchange and learning capabilities (Asheim, 2012; Bathelt et al., 2004; Swyngedouw, 2000). Regions are considered as places where different networking arrangements are taking place (Fuller et al., 2004). In addition, to these two levels, there are organizational institutions – specific routines, habitual practices (procedures) – guiding the organizational behavior (Boschma and Frenken, 2009), as well as supranational or global institutions such as EU regulations and international standards (Cooke and Propris, 2011).

Similarly to different types of institutions, institutions at different geographical levels do not function in isolation but are closely interrelated and have an impact on innovation in an interactive manner (Gertler, 2010). Procedures (habitual organizational practices) might be influenced by education system and labor market at the national level (Gertler, 2004), while at the same time benefit from the regional culture of civic participation encouraging knowledge sharing (Scott, 1998), and be guided by the funding requirements for innovation activities at the EU level. Changed EU regulations might lead to reconfiguration of state capacities in the regions as well as changes in regional institutional structure in order to implement new types of activities (Clark, 2006). It follows that the process of organizational change is embedded in this complex institutional framework. However, it is also possible that one or another institution is more important during some periods than others (Scott, 2010). Therefore, it is important to analyze the sub-processes and their characteristics in the process of organizational change.

Furthermore, Edquist and Johnson (1997) highlight that, as mentioned above, the institutions at different geographical levels create positive and negative incentives for individuals to engage in change process. Therefore, individuals make use of opportunities (created by positive incentives) and have to find the ways to cope with/overcome negative incentives for innovation. Individuals' characteristics that are relevant in change processes are discussed in the next section.

Motivation and capabilities of individuals

The basic premise for this paper is that individuals who initiate and implement change are influenced by institutions since those hinder or enable certain activities (Scott, 2008). However, this does not mean that actions by individuals are predetermined by the environment. When perceiving new opportunities or reacting to new threats affecting their

well-being, individuals initiate change. Moreover, most often they undertake the activities leading to change only if it provides benefits that exceed the costs (Scott, 2008). This does not necessarily mean monetary benefits, but can come in a form of self-realization, preservation of certain values etc. In the presence of opportunities and/or threats, individuals need resources and ideas to put into practice (Freeman, 2010; Scott, 2008). Therefore, while individuals are the actors who initiate the change, their capabilities to do so often depend on the position in the organization.

Individuals who have ideas and (access to) resources initiate change. However, further development depends on the response by other stakeholders in the field, and is an outcome of a variety of roles and functions distributed across diverse players (Scott, 2008). Van de Ven, Polley, Garud and Venkataraman (2008) also support the idea that implementation of change exceeds the efforts of a single individual and includes diverse stakeholders who apply their different skills, energy levels, and frames of reference to innovation ideas. According to the authors, in change processes individuals perform a variety of roles such as entrepreneurs/champions, sponsors, mentors, critics, institutional leaders, followers and opponents. Although those roles are more applicable when the focus of the analysis is the creation of new technologies in the private sector and when real time data collection is possible, an important implication for any change process is that it requires the interaction of various individuals who perform different functions due to their expertise and capabilities.

In the geography of innovation, the relations with diverse players in innovation processes often refer to the duality of local-global relation. These relations can refer to a global epistemic community of practice which is united by functional proximity in the form of a profession or organizational field (Moodysson et al., 2008). On the other hand, not only functional, but also spatial myopia is of high importance (Maskell and Malmberg, 2007). Individuals search for partners for knowledge exchange and monitor existing solutions which

are close to their own environment: these processes are facilitated by the common norms embedded in a certain space. However, innovative ideas most often come via global relations and interactions with other fields and communities (Bathelt et al., 2004; Scott, 2008).

Next to formal characteristics of individuals, such as a position in the organization or access to the other actors, several innovation studies highlight the personal qualities of innovating actors, such as cosmopolitism, an unconventional, cooperative and visionary nature, openness to alternative viewpoints, implying a wish to learn from others (see e.g. Kimberly and Evanisko, 1981; Steiner, 1995).

Organizational change – between individuals and institutions

There are several reasons why organizational change takes place. New types of organizational structures emerge when there is a tension between the expectations stemming from the institutional environment (e.g. traditions as well as regulations requiring the organization of activities at universities into faculties and disciplines), and the most optimal structure for the best performance of an organization (delivery of high quality research having impact on medical practices in multidisciplinary settings) (Meyer and Rowan, 1977). In other words, new types of organizational structures emerge when existing organizational forms cannot respond to the new challenges and possibilities in the society. However, it takes innovative and resourceful individuals to identify tensions, opportunities, create alternatives and start enacting change processes (Freeman, 2010; Meyer, 1994). As summarized in Table 1, in the process of enacting change, individuals are embedded in the diverse institutional environment. Some institutions create positive incentives to innovate while others aim to prevent innovation and preserve existing structures (Edquist and Johnson, 1997). Furthermore, the relations between institutions influencing a change process can be reinforcing, complementary or contradicting. Individuals involved in enacting change draw on their professional and

personal characteristics, as well as relations to different local and global communities, to use positive incentives to their advantage and to overcome negative ones (see Table 1).

Table1. The summary of the conceptual framework

Institutions	Organizational change	Individuals
Creates positive or negative incentives for action (North, 1990). Embedded in different geographical levels (Gertler, 2010). Related in reinforcing, complementary or contradicting manner (Edquist and Johnson, 1997; Scott, 2008)	Emerge in a tension between expectations stemming from institutional environment and optimal structure (Meyer and Rowan, 1977). Enacted by individuals (Freeman, 2010).	Diverse stakeholders with different skills (Scott, 2008). Draw on professional and personal characteristics, as well as relations to global and local communities (Bathelt et al., 2004; Scott, 2008; Steiner, 1995).

Source: own draft

Research design

The main method for data collection is semi-structured interviews with representatives of the center, and funding organizations that provide financial support for its establishment. The selection of respondents consisted of several phases. In the first phase 7 founders, as the initiators for this new organizational structure, were contacted with an interview request. During these interviews the respondents mentioned other people that could provide important insights into the development and functioning of the center. 4 such interviews were conducted with a research officer, former and present PhD students and moral and scientific supporters of the center. Finally, as the call for the strategic research centers was initiated by the Swedish foundation for strategic research (SSF), it was crucial for the study to interview SSF representatives in order to get the information about initiation of the call. Four such interviews were conducted with two research secretaries and former and present managing directors of SSF. A total of 15 interviews were conducted.

The focus of this paper is on how organizational change within medical research evolves and is influenced by different types of institutions at different geographical levels, as well as what characteristics of the key individuals are important in enacting institutional opportunities and overcoming hindrances. The interview method enables the analysis of actors in their institutional contexts (Schoenberger, 1991). Furthermore, it gives access to the opinions and events that cannot be accessed otherwise (Rapley, 2004). Therefore, interview method was an appropriate way to find out how individuals realized the need for change, what obstacles they faced and what forces were beneficial in the process. Second, in order to avoid possible respondent-bias, most of the open-ended questions were asked in 'courtroom questioning' manner – those focused on facts rather than opinions (e.g. individuals involved in the creation process, infrastructure, resources etc). Following Denzin's (1970) typology of data triangulation, interviews were carried out with different stakeholders in the process, allowing triangulating the data in respect to the person. Additionally, use was made of extensive secondary sources such as the center's publications, SSF annual reports, statutes, calls, and minutes of the preparation committee for strategic research centers in order to get as balanced and full a view of the process as possible.

Short overview of the case

The center under study was established in 2006 after a SSF call for strategic research centers in 2004. To become a strategic research center financed by SSF, the center had to fulfill certain requirements which included the ability to address larger and more complex issues with different time perspectives and with the participation of complementary scientific and technical competence (SSF, 2004 April 16). The center addresses the problem of slow and expensive transfers of basic discoveries to the clinics. It also seeks individually-based cancer treatment and aims to develop novel diagnostics and therapeutics.

There are seven research groups and about 100 employees at the center. It unites researchers from three faculties: Medicine, Natural Science and Engineering. However, at LU organizational structure it is a part of the Faculty of Engineering.

The center has generated several world-wide patents ranging from basic research to applied biomedical inventions. Some of them have been transferred to the center's newest spin-off and hopefully will be commercialized and applied in wider practice in the future. Scientifically the center is also considered to be a success model. Following its example, similar centers are being created in other European and USA universities.

The center can be considered as a continuation of previous resource center Swegene, which was established in 2000 and financed by the private Wallenberg foundation. It was a resource center with heavy expensive machinery that provided a lab service and consultation in functional genomics for researchers from different faculties.

The center is located in southern Sweden in the Scania region. The region has a growing life science cluster with 7000 employees in 2007. A majority of the firms are located around LU and the Ideon and Medeon science parks. The regional governmental body Region Skåne considers this sector to be of considerable importance for regional development (Henning et al., 2010). In addition, LU, in cooperation with other partners, has opened a large biomedical centre, BMC, to ensure that research and development achieve close contact with health-care activities. The center under study is located in the BMC building.

Medicon Village, established in 2012, represents a new constellation uniting research, innovation and entrepreneurship in the region. It was established by LU in order to unite health care practitioners, researchers and entrepreneurs. The difference between the center under study and other organizations uniting researchers and practitioners lies in the basic rationale for the establishment. Medicon Village and BMC are meta-organizations uniting a

variety of other organizations (research units, health-care firms, public sector) under one roof in order to facilitate the interaction. In the case analyzed in this paper, individuals from three faculties, together with health-care practitioners, form one organization which is located in the meta-organization of BMC.

The center was chosen for this analysis for both practical and theoretical reasons. Although each place or field has a unique institutional constellation, and identical replication of organizational structures in different environments is not possible, this does not contradict the idea of learning from success. Therefore, identification of the mechanisms behind the success of the center would facilitate the translation and adaptation of the organizational structure into a different field or place. From a theoretical point of view, this case is an interesting one since its institutional environment is very complex. On the one hand, as discussed above, Skåne is considered an innovative region and, therefore, it is expected that there are institutions providing positive incentives for change. On the other hand, LU is one of oldest universities in Sweden, with deep traditions in research in general and medical research in particular. Therefore, there might be institutions aiming at the preservation of traditionally developed structures and hindering (organizational) change processes. This institutionally rich and complex environment enables the development and application of the theoretical framework where relations between different institutions are conceptualized. Therefore, the analysis of the case enables a theoretical abstraction which is relevant for other studies in different institutional contexts.

Analysis

The process of organizational change stretches over time. As suggested by Scott (2008, 2010), what types/levels of institutions and individuals have an impact might vary throughout the process. Based on the collected data, the process of organizational change is divided into four

phases (sub-processes) – preconditions, initiation, establishment and development. Table 2 below provides an overview of each phase and the main events that take place.

Table2. Institutions, individuals and main events

Phase	Description	Event	Institutions (Geography: type)	Responsible Individuals
Preconditions 1990-2004	Center does not exist even at the idea level Important foundations laid for the establishment	Development of functional genomics Swegene Support for life science	Global: Norms and values National: Regulations Regional: Regulations and traditions	Initiators of Swegene Managing director SSF
Initiation 2004-2006	The need for change realized Purposive action begins	SSF call Mobilization of initial group Defining problems and opportunities	National: Regulations	7 founders Research officer Faculty deans Mentors
Establishment 2006-2008	Center starts its activities	Administration Creation of joint projects Employment/mobilization of other staff	Organization (university): Routines Organization (center): Routines/ procedures	Research Officer 7 founders Junior staff
Development 2009-	The outcomes of previous activities become visible	Efficient research Granted patents Spin-off Diffusion of organizational form	Global: Regulations Regional: Traditions and culture Organization (center): Routines/ procedures	Head of the center Other staff

Source: Own data

In the preconditions phase the center did not exist even at the idea level. However, in retrospect, it is possible to identify the events which laid important foundations for the establishment of the center. Such events were the establishment of the resource center which provided human and technological infrastructure and facilitated the mobilization of the initial

group of founders, initiation of the SSF call for strategic research centers, the development of support for life science at national and regional levels, and the development of functional genomics in other countries. In the initiation phase the need for organizational change was realized, and the initial group of actors was mobilized. Learning about problems (cancer, traditional organization of research activities), opportunities (a new call for funding), resources and capabilities then started. The center started its activities in the establishment phase: execution of the ideas took place, and joint projects and events were created. In addition, mobilization of other researchers and physicians took place. Administrational aspects of the center were attended to. In this paper the development phase reveals the performance of a new organizational structure. It includes such events as patenting of the technologies developed in the projects, establishment of the spin-off, and, as a result of those signs of success, the diffusion of the organizational form to other places. In the rest of the analysis the events in each phase are discussed in more detail, addressing the relations between institutions which create opportunities or hindrances for individuals initiating change.

Preconditions phase – resources, institutions, and networks

As summarized in Table 2, institutions at global, national and regional levels play a role in the preconditions phase. Regulative institutions (funding structures) at national and regional levels facilitate the creation of needed physical (location) infrastructure and provide access to financial resources. At the national level, from about 1990, SSF has supported graduate biotechnology schools, providing the work force for life science research. Around 2000 the focus was redirected to life science research (as opposed to education), resulting in two calls for strategic research centers, recommended by the managing director of SSF. The second one leads to the needed financial support for the establishment of the center. At the regional level, as the outcome of regional support for life science, BMC was opened in 2001 by LU in

cooperation with Region Skåne. It provided a space where scientists from different faculties as well as practitioners could meet. Later, it became the location for the center. Institutions at regional and national level have a reinforcing impact on the change process under study, since these institutions provide similar incentives (engage in the innovative activities through interdisciplinary collaborations) via similar functions (providing the guidelines for investment and distribution of resources).

The development of functional genomics at the global level is changing the perceptions (norms) of what is considered to be good quality research: it has to be performed in an interdisciplinary environment including researchers with different competences, and use the possibilities that have opened up with the emergence of technologies in genetics. It started around 1990 in such countries as the USA and Germany and inspired scientists in Sweden working in the fields of biotechnology and medical research to introduce this type of development due to its social implications (for the patients) and scientific importance (a must for those who want to be in the front line of research). These global normative changes are complementary to regional and national regulations since they also promote interdisciplinary collaborations by creating a new perception (prescriptive dimension) of what good research is.

Interaction among the individuals mobilized in the initiation and establishment phases was facilitated by the resource center Swegene (in function 2000-2005). Five of the seven founders of the center started their collaboration in it. In addition, it opened up scientific possibilities for a new type of research. However, to be implemented, it requires different kinds of financial resources. Furthermore, the funding for Swegene expired in 2005. Therefore, if the individuals within the organization wanted to preserve the technologies and continue their work, they needed an alternative source of funding. In other words, the motivation for the action was a reaction to new threats (expiring funding), new institutional opportunities (a new call by SSF) and scientific possibilities (the chance to perform a new

type of research). To sum up, institutional development creates a structure of opportunities which is realized by the actors in the region as a response to new threats and possibilities.

The initiation and establishment phases – realization of opportunities

The start of the initiation phase means that the purposive actions, geared toward the establishment of the center, begin. Institutional changes in the preconditions phase create opportunities that are realized by individuals in the initiation and establishment phases. Since institutional change is a gradual process, there is a time lag between changes in the institutional environment and actual realization of the opportunities. The role of individuals becomes more visible in these phases, since their purposive actions lead to the establishment of organizational innovation. The focus is on who are doing what and why they are capable of doing it.

As pointed out in the conceptual framework, a change process is initiated and implemented by a group of individuals performing different roles according to their capabilities, which depend on their positions in the organizations, networks they have access to and personal characteristics. Table 3 (Appendix A) provides an overview of the main individuals (or groups of individuals) involved in the initiation and establishment of the center.

In the majority of the interviews, the future head of the center is identified as the key initiator of the initial group of founders who took advantage of the opportunities. He performed the roles of champion and institutional leader, setting the structures for activities and promoting and managing the new unit. Being a professor in immunotechnology, the head of the center has great competence in research. This competence is complemented by expertise in university administration and industry. Therefore, he serves as a bridge between different fields (industry and university research). Due to his different positions in various organizations, he has knowledge needed to identify application possibilities for research

outcomes as well as administration practices. Other founders are invited to participate in the initiation of change because they are known as ‘being the best people in the field’ for planned interdisciplinary research and because of their personal qualities (such as willingness to learn and adapt).

Next to the founders of the center, the research officer plays a role in the initiation and establishment process. She has a PhD degree in molecular biology (therefore research-related knowledge) and was also responsible for the organization of activities in Swegene (knowledge of research administration). In the initiation process her function is to put the application for funding together. In the establishment of the center she contributes to keeping the involved individuals together by organizing common lunches, seminars, and workshops which in turn add to the creation of common norms and routines.

PhD students and post-doctoral researchers perform similar roles, but in a different way. Since the research projects relate to several research groups within the center, they add to strengthening the unity of the organization. In addition, the values represented by the organization (interdisciplinary research within life science in relation to clinical practices) are passed to junior researchers. They become followers of this new organizational form.

Future strategic research centers can obtain the grant only if the establishment of such a center is in line with overall university strategy. Therefore, support from a university and faculty administration (the deans of three faculties) is very important. Their role resembles that of sponsors who support the idea of the center when funding decisions have to be made. Finally, the center has what can be called ‘fans’ or moral supporters – experienced old and influential researchers who are not involved directly in the activities of the center. They were in the front lines of Swegene and admire this new constellation of research. They act as mentors and add

to the opinion building about the center at the university and among the broader community of scientists and funding structures.

This case is interesting for the analysis not only due to the interdisciplinary nature of the research, but because of the connection to clinical practices as well. A clinical connector plays a major role in the creation and development of the center and, together with the head of the center, performs the roles of champion and institutional leader.

Other applicants value the clinical connector for his personal qualities (open minded, visionary) and for his position in the organization (the head of the Oncology department when the center was established and of the Oncology division at the time of the interview) where he has authority to influence other clinicians. Similarly to the head of the center, he is a bridge between different fields – administration at the hospital, clinical practices and research (Professor in Oncology). He also connects the group of researchers within the center with clinical practitioners and patients. This connection is especially valued since clinical practices in general (on a larger scale) are perceived as hardest to change and influence:

> Inertia, slavishness of the whole enormous health-care system: change attitudes of doctors, change principles of hospitals, way of looking at new techniques, it takes such a long time. This new way of looking is not taught to medical students today. (Informant7)

The possibility of renewal is identified through the change of generations and the networks of the key individuals who appreciate and know how to use new types of techniques and collaborations. Therefore, the relations with the clinical side are of such high importance. The center under study does not change the norms and regulations guiding health-care practices as a whole. However, it is a step in that direction through the establishment of networks with key individuals, who in turn are able to diffuse new practices through these networks.

The center also has to comply with the formal rules for the units at the university. Nonetheless, the university is traditionally divided into faculties, while the center unites researchers from different faculties. PhD students cannot be employed at several faculties, although the fulfillment of the projects requires diverse competences. Since one unit within the university cannot reform the whole administrational structure, the organization is adapted to the university requirements. The center is officially placed under the Faculty of Engineering. PhD students are employed at one faculty, but have supervisors and consultants from other faculties as well. A bigger institutional challenge is the creation of common norms and procedures (i.e. joint expectations regarding the length and outcomes of the projects) among the researchers with diverse backgrounds. Partly, this is achieved by drawing on the personal characteristics of individuals: open-mindedness, eagerness to learn from each other and adapt. The creation of common norms and procedures is also facilitated by joint projects, face-to-face meetings, common PhD students (having supervisors from several faculties), PhD lunches, seminars and other events.

To sum up, individuals play a role in both institutional fields – university research and clinical practices – that influenced the initiation and establishment process of the center. Due to their positions in organizations and personal characteristics, they have the power, resources and ideas to establish a novel research environment within the field of health-care. Interestingly, all the main individuals come from Lund-Malmö region, supporting the idea that although inspired by changes in the epistemic community of scientists, individuals searching for knowledge exchange seek those who are close to their own environment. The impact of institutions is complex at this stage. Regulatory and normative aspects of routines within the fields of university research and clinical practices create incentives to preserve traditional organizational structures. This contradicts the SSF guidelines for funding and routines of the

center under study, where the value of interdisciplinary organization at the interface of clinical practices and university research is highlighted.

The development phase – the individual capabilities and institutional support

The last phase of the center, stemming from the collected data, is related to the outcomes of its activities and first signs of diffusion. As summarized in Table 2, there are signs of both scientific and commercial success. The research practices emerging from a new organizational form led to faster development of innovative cancer diagnostics. The things that were planned to be accomplished in five years were accomplished in three. The scientists are also successful in attracting additional funding and publishing in top-ranked journals. In-between scientific and commercial success is the fact that the center has generated several world-wide patents. Finally, the spin-off from the research activities supports the notion that the center is successful in turning the scientific ideas into applied solutions. As a result of all these successes, the structure of the center is being copied by several universities around the world.

These signs of efficient work practices suggest that the individuals involved in the creation of the center have been able to develop procedures and norms within the organization which enable the use of wide individual competences. However, institutions at other geographical levels have also played a role. Commercialization of the scientific invention seems to benefit from the regional supportive infrastructure for life science and entrepreneurial culture, as the spin-off is established within the biotechnology cluster in Lund. Patenting process is enabled by global-level regulations regarding intellectual property rights. Norms and procedures within the center, regional tradition in life science and entrepreneurship in general, as well as global regulations regarding property rights, complement each other and allow the individuals to benefit from the organizational change process. However, the ability to benefit from the

framework is also dependent on the professional and personal characteristics of the actors who initiate change. As indicated in several interviews, the decisions on what to patent and commercialize are highly influenced by the head of the center due to his experience in the life science industry. This supports the idea that a change process requires both enabling institutions and individuals who actually perform the activity.

Summing up – institutional complexity and characteristics of individuals

The actions of the individuals initiating organizational change are influenced by diverse institutions. Specifying diversity in respect to level and type as well as incentive and function allow identifying different kinds of relations between institutions: contradictory, reinforcing and complementary. As summarized in the Table 4 (Appendix B), most of the influential institutions have created positive incentives to initiate and enact organizational change. Those institutions perform different functions and therefore are related in a complementary manner. National and regional regulations which reinforce each other, while providing guidelines for access to the necessary financial resources and physical infrastructure (building), are complemented by the global norms of the epistemic research community, encouraging and inspiring activities in the interface between clinical practices and university research. These are further complemented by global intellectual property regulations which allow benefiting from research results as well as organizational routines of the center that provide guidelines for daily practices and joint conventions regarding expectations stemming from activities. Routines in the university and clinical fields perform a function of preserving traditionally established structures of daily activities and administrational rules. Therefore, they discourage change and are contradictory to the enabling institutions discussed above.

Nevertheless, it is important to differentiate between the administrational rules of university and clinical practices and the role of the university and university hospital in the region.

Administrational rules with strict division into faculties and routine-based clinical practices are contradicting institutions that create positive incentives for the creation of an interdisciplinary center uniting researchers from different faculties and clinicians under one roof. However, the presence of one of the oldest and most prestigious universities in Scandinavia, with its long tradition of medical research, combined with a high-class university hospital, has contributed to regional norms supporting innovation as well as an emergence of a thriving biotechnology cluster. In this way, regional norms and traditions also create positive incentives for change and are complementary to other institutions with similar incentives.

The capabilities of individuals to enact institutional opportunities depend on their professional and personal characteristics. Professional characteristics refer to position in the organization and work experience. A clinical connector could get access to other clinicians and patients due to his position at the Oncology division. The head of the center had the necessary expertise due to his position in the university administration, industry and research field. Other founders have become part of the center due to their experience as researchers, which in turn is influenced by their position as researchers at the university. In addition, personal characteristics such as open-mindedness, willingness to learn and collaborate are also important, supporting the idea of previous studies that the personal qualities of innovating actors are important.

Discussion and Conclusions

The focus of this paper is on how organizational change evolves and is influenced by different types of institutions at different geographical levels, as well as what characteristics of the key individuals are important in enacting institutional opportunities and overcoming hindrances. Three types of factors can be identified behind the emergence and development of

organizational change. First, there are problems in society, such as cancer and slow technology transfer from university to clinic, which are not solved efficiently in a traditional way. Therefore, there is a need for new types of organizational structures. This is in line with the Meyer and Rowan (1977) argument that if the organizational structure is not optimal anymore for its best performance, deviations from the institutionalized forms emerge. Second, the findings also support Scott's (2008) observation that individuals react to the tension between institutionalized and optimal organizational forms, and initiate change only when they perceive new opportunities and when their well-being threatened; in this case, an opportunity to perform novel research (opportunity for improved self-realization) and the threat of expiring funding. Third, opportunities to perform novel research take place partly due to the changes in institutional framework (e.g. new funding possibilities, changing norms in global communities of practice). Therefore, the findings of this paper support the enabling aspect of institutions emphasized by Scott (2008).

Developing the idea further, the conclusion can be drawn that, although different types and levels of institutions have a joint impact on organizational change, some institutions are more prominent than others in different phases of the process. In the precondition phase, as mentioned above, the most prominent are those institutions that create opportunities for change at later stages, since individuals would not be able to start their actions without some enabling conditions (such as national and regional regulations providing funding and global norms of the epistemic community in this case). In the initiation and establishment phases, the institutions that hinder change processes (such as rigid administrative rules at university) become most visible. Although administrative rules at university are present during the whole process of organizational change, they become most prominent during the establishment phase, since all the decisions related to the formalities of the unit then have to be made. After the actors decide how to respond (in this case through formal adaptation), the contradictory

aspect of institutions does not interfere with their daily practices. In the development phase, the institutions that are related to benefiting from the results of a change process start playing an important role. In the case of the center under analysis, the actors are aware of the existence of the global protection of intellectual property rights throughout the process, but they are only influenced directly by such institutions when they have technology to patent[ii].

This paper reveals the complexity of institutional diversity. First, it emphasizes that enabling and hindering forces of institutions can be in action simultaneously. Rigid clinical practices and administrative rules for units at a university are in action at the same time as funding guidelines for research at the national level requiring interdisciplinary structures. Second, enabling institutions (the ones creating positive incentives) can be complementary to each other (if they have different functions) or reinforcing (if they have the same/similar function). It follows that when reacting to institutional opportunities, innovating individuals should consider the contradictory, complementary and reinforcing aspects of an institutional framework as a whole. More concretely, they should consider possible responses to institutions contradictory to the initial opportunities, as well as identify reinforcing and complementary norms, rules and procedures. Therefore, identification of the complexity behind institutional diversity is not just a theoretical exercise, but has a practical value since it facilitates learning from success stories.

The findings of this paper are in line with the proposition in the literature that individuals look for partners for knowledge exchange who are close to their environment, but are inspired by changes at the global level (Maskell and Malmberg, 2007). The founders were inspired by and inspired changes in the research organization in other countries. However, the process of initiation and establishment of the center is on a local scale. All the seven founders of the center were working in Lund-Malmö region at the time when the center was initiated. Furthermore, the ‘fans’ of the center – moral supporters – as well as a research officer were

also present in the Lund-Malmö region. However, physical proximity alone is not a sufficient condition for interaction between actors. Position in the organization or research field as well as personal qualities are of crucial importance when identifying possible collaboration partners.

An organizational form can be a manifestation of certain values and norms in societies and communities (Meyer and Rowan, 1977; Scott, 2008). The organizational form of the center under study represents the value of interdisciplinary research within life science related to clinical practices. In this way it unites two different fields – university research and clinical practices. Both fields are highly institutionalized and resistant to change. Traditionally universities are divided into faculties and disciplines and this is how the activities are administrated, hindering the full development of interdisciplinary centers. However, the field of university research seems to be less resistant to change than the field of clinical practices. The center is considered a success story (generating patents, spin-offs and high level publications) and its organizational structure has been copied by other universities. In addition, LU is an initiator of Medicon Village, taking the idea of uniting different types of expertise under one roof further. On the other hand, clinical practices, as mentioned several times, are very difficult to change. A change requires renewed education curricula and a new generation of practitioners. Future research could apply the framework developed in this paper to large scale processes changing whole organizational fields or sectors, not just a small-scale local deviation from mainstream institutional practices.

Some policy implications can be drawn from this analysis. Novel organizational forms allowing for interfaces between different fields of activities might be an important precondition for ground-breaking technologies to emerge. Therefore, while announcing and evaluating funding applications, it is important to asses (as well as provide support for) the structures (organizational forms) in which research takes place. In addition, the personal

characteristics of key individuals involved in application matter, and should be assessed next to their professional and leadership experience.

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Appendix A.

Table3. Individuals and their roles in the creation and development process

Individual	Functions/Characteristics	Field
The Head of the center	Initiation of the process; Mobilization of other actors; Expertise in science, industry and administration	Research/University
Clinical connector	Expertise in clinical practice, research and administration; Authority in mobilization of other practitioners	Health care practice/Hospital
Research officer	'Glue' helping to keep group together; Expertise in science and administration	Research administration/University
Applicant1	Expertise in cancer genetics	Research/University/Medical Faculty
Applicant2	Expertise in nanotechnology	Research/University/LTH
Applicant3	Expertise in bioinformatics	Research/University/Faculty of Science
Applicant4	Expertise in tumor biology	Research/University/Medical faculty
Applicant5	Expertise in proteomics	Research/University/LTH
Deans of the three faculties	Authority to support application	Research administration/University
Junior staff (PhD students, post-docs, physicians)	Strengthening the development as one unit; Continuation of ideas	Research/University
'Fans' – experienced researchers	Expertise in research and administration; Opinion building through social networks	Research/University
The Managing director of SSF	Initiation of the call for strategic research centers	Funding structures/SSF

Source: Own data

Appendix B

Table 4. Incentives, functions and relations of institutions

	(1) Routines at university and clinics	(2) Global regulations	(3) National regulations	(4) Regional regulations	(5) Global norms	(6)) Regional norms	(7) Organizational routines/ procedures at the center
Incentive	Preserve the functioning of existing structures/administration	Engage in innovation activities	Establish interdisciplinary research centers, engage in biotech	Engage in interdisciplinary innovation and research	Engage in interdisciplinary research	Engage in innovation	Engage in interdisciplinary research and innovation
Function	Provide regulative guidelines for daily activities	Provide regulations for protecting IPR	Provide guidelines for funding possibilities	Provide guidelines for establishing physical infrastructure	Setting the agenda for new research techniques and constellations	Encourage positive attitudes towards innovation, creating tradition of thriving biotech cluster	Provide guidelines for daily practices and joint conventions regarding expectations of research results
Contradictory	2,3,4,5,6,7	1	1	1	1	1	1
Reinforcing	-	-	4	3	-	-	-
Complementary	-	3,4,5,6,7	2,5,6,7	2,5,6,7	2,3,4,6,7	2,3,4,5,7	2,3,4,5,6

Source: own draft

[i] Although this paper addresses organizational change, it does not aim to contribute to the organizational studies literature. On the contrary, it brings some of the insights from Scott's (2008) study in order to better understand change processes within the geography of innovation literature. Since innovation by definition is change, it would add to a better understanding of innovation processes. In addition, the author is aware that the topic of organizational change can be addressed through different perspectives – i.e. the interrelations of organizational change and institutional change, organizational change (innovation) and other types of innovations. Although these are interesting topics, they are not addressed here.

[ii] In the case analyzed in this paper, the institutions created positive incentives for change and allowed benefiting from the results. However, it might be that, in some other cases, the institutions hinder possibilities of benefitting (i.e. complicated rules for commercialization of research results developed in a new unit). Thus, the issue of whether institutions are hinderers or enablers at this phase has to be addressed empirically in each case.