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# THE ROLE OF COMMUNICATORS IN INNOVATION CLUSTERS

## A QUALITATIVE STUDY OF THE MUNICH AND CAMBRIDGE INNOVATION CLUSTERS

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# The Role of Communicators in Innovation Clusters: A Qualitative Study of the Munich and Cambridge Innovation Clusters

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## Abstract

This paper analyses the role of communicators in innovation clusters in order to provide a new perspective on clustering dynamics. While previous research included knowledge gathering and information sharing as critical element in the cluster's successful development, communicative activities have not been analysed empirically. To address this interdisciplinary research interest, the literature review brings together the research fields cluster theories and innovation communication to make interrelations and complementation visible. To operationalize the research interest, a conceptual model has been created, suggesting an *Individual Level*, an *Organizational Level*, a *Cluster Level* and a *Context*. Based on the model 23 in-depth interviews have been conducted with key communicators of the two innovation clusters Munich and Cambridge. The findings suggest significant differences between the case studies, as Munich communicators don't agree upon a cluster identity whereas Cambridge communicators share a common understanding, influencing professional positions and practices, self-perceptions and aims, network dynamics and structures. The results contribute theoretical insight to cluster theories by revealing the communicators' influence on the creation of knowledge and network externalities and to the new research field innovation communication by discussing the communicators' capacity in terms of open innovation and dynamic capabilities. Furthermore the study provides practical implications to the currently relevant issues of cluster communication and policies addressing research and innovation.

## 1 Introduction

Agglomeration economics and the economics of industrial clustering have emerged over the last two decades as a central issue of research into economic growth and performance (McCann 2008: 23). Especially the relationship between clustering and innovation is a topic which has received widespread interest over recent years (Breschi 2008: 167). According to Asheim and Gertler (2006), the innovative capability of a global economy is not uniformly or randomly distributed, but geographically clustered. The more knowledge-intensive the economic activity, the more concentrated it tends to be (Asheim & Gertler 2006: 291). Leading innovation clusters demonstrate that regional agglomeration strengthens the innovative capability and promotes successful competitiveness on a global level. The development of innovation clusters has therefore received much attention by policymakers, who have sought similar developments through implementing cluster programmes (Uyarra & Ramlogan 2012, Peck & Lloyd 2008, European Commission 2008, OECD Science, Technology and Industry Outlook 2012). However the successful creation of clusters still presents "a unique challenge" as efforts to do so regularly fail (Clark 2013: 6).

Clusters have been defined as "geographic concentration of interconnected companies and institutions in a particular field" (Porter 1998), "a large group of firms in related industries in a particular location" (Swann, Prevezer & Stout 1998), or a "spatial and sectoral concentration of firms" (Breshnahan, Gambardella & Saxenian 2001), (Maggioni & Riggi 2008: 54). A broad range of academic papers discusses various dynamics underlying clustering processes (Karlsson 2008a, Karlsson 2008b, Clark, Feldman & Gertler 2000, Fagerberg, Mowery & Nelson 2006) and identified a set of influential factors on the demand and supply side that supports the successful development. On the demand side, the reduction of transaction costs and lower costs on searching information about customers' needs can be regarded as drivers for clustering effects. On the supply side the benefits are related to the availability of the localized pool of skilled workers, infrastructure and transport networks and the access to industry-specific intermediate inputs and services, such as training or education (Breschi 2008: 167). Over the last decade the new research field innovation communication complemented this set of factors underlying clustering effects by highlighting communication as critical driver for a cluster's competitiveness (Nordfors 2004a, Nordfors 2004b, Zerfass 2005, Pfeffermann 2011). This theoretical perspective is strengthened by the current example of the new innovation cluster London Tech City, which implemented an official communication strategy in order to support the cluster's position in the public. While previous work shed light on the importance of knowledge gathering and information sharing in innovation clusters, the actual communicative activities underlying clustering processes have not been analysed empirically. To understand the interrelations comprehensively, this research pursues an empirical investigation of communicators in innovation clusters and examines the research question: *What is*

*the role of communicators in innovation clusters?* The qualitative empirical insights derive from the innovation clusters Munich (Germany) and Cambridge (UK), two mature European clusters that evolved over the last 50 years and developed unique communicative dynamics relevant for the research. The study is positioned in the field of cluster theories and aims to provide theoretical insight to both cluster and communication studies and practical insight to the current issue of cluster communication.

## 2 Literature Review

The literature review establishes the theoretical foundation for the interdisciplinary study on the communicator's role in innovation clusters by bringing together the two research fields cluster theories and innovation communication. Section 2.1 introduces economic and sociological cluster theories and aims to reveal the implicitly included communicative activities underlying clustering effects. To complement this perspective, section 2.2 presents the new research field innovation communication that discusses communication studies in the context of innovation.

### 2.1 Cluster Theories

#### *Economic Cluster Theories*

By introducing the notion of "industrial districts", Marshall establishes the basis of contemporary economic cluster theories (Marshall 1890, 1920). The term refers to geographical concentrations of firms operating in the same field and define economies that are external to the firm but internal to the area. According to Marshall such "external economies", emerging on a regional basis, offer a competitive advantage to "internal economies", which focus on a single firm's resources (Marshall 1890: IV.IX.25). The advantage lies in the "industrial atmosphere" that Marshall claims to derive from the benefits of spatial proximity (Marshall 1920: 271). The basic assumption of spatial proximity evolves from the division of labour between firms engaging in complementary activities with advanced specialisation and specialized labour force, ensuring both a lower probability of unemployment and labour shortage. Furthermore Marshall stresses that through local collaborations, observations and experiences, knowledge spills over and strengthens innovative capability (Marshall 1920: 225). "If one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further ideas" (Marshall 1920: 271). The understanding of knowledge spillover highlights the significance of knowledge flows in clusters. While gathering and sharing of information indicates communication, Marshall understands the dissemination of knowledge as an unconscious process (Marshall 1920: 271). Though knowledge dissemination stays implicit, the notion of spillover influenced further cluster studies and strengthens the demand to understand communicative processes in clusters.

The significance of strategic information sharing in clusters becomes more apparent when innovation is taken into account. Porter analyses the concept of clusters against the background of competitiveness, which "rests on innovation" (Porter 2000: 256). Thereby Porter highlights the external environment as "much of competitive advantage lies outside a given company or even outside its industry, residing instead in the location of its business units" (Porter 2000: 254). To offer an analytical approach to the external influences, Porter introduces the diamond model, which conceptualizes contextual conditions and their interrelations. The factors "supporting industries" and "domestic rivalry" are emphasized as firms within a cluster perceive more clearly and rapidly collaborative and competitive forces, which are critical drivers for innovation. This is mainly due to the access to information and knowledge of current developments. According to Porter "specialized knowledge, both explicit and implicit accumulates in firms and local institutions. This can be accessed better or at lower cost from within the cluster" (Porter 2000: 260). Though communication is not explained in detail, Porter (2000) acknowledges the access to knowledge and information as an important premise of innovative capability.

The unconscious knowledge spillover processes described by Marshall (1890, 1920) and the strategic access to information introduced by Porter (1990, 2000) can be observed in Krugman's concept of clusters. His two-region model (1991) analyses the economic landscape in terms of mobile and immobile goods: the immobile constant-returns agriculture sector and the mobile increasing-returns manufacturing sector. Investigating regional divergence between the geographical "core" and "periphery", Krugman refers to the notion of Marshall's external economies by pointing to the increasing returns arising from a skilled labour market, provision of non-tradable specialized inputs and information or technological spillovers (Krugman 1991: 53). To analyse why and where industries locate and concentrate, Krugman discusses external economies against the background of transportation costs. Whether or not transportation is costly, industries agglomerate in areas defined by immobile goods. In this context Krugman highlights knowledge and information flows that emerge from spatially close relationships (Krugman 1991: 53).

### *Sociological Cluster Theories*

Knowledge-Based View

To understand the potential of knowledge flows in innovation clusters, the knowledge-based view provides valuable insight. Investigating the intangible nature of knowledge, Polanyi (1958) introduces the notion of tacit knowledge. According to Polanyi the term implies that "we know more than we can tell" and points to a not articulated knowledge that complements conscious cognitive processes (Polanyi 1958: 4). Von Hippel discusses tacit knowledge as "sticky" knowledge – knowledge that sticks to a specific location (Von Hippel 1998). Emerging from a institutional context, tacit or sticky

knowledge depends on shared conventions and norms that rely on mutual communication codes. Imbued with meaning arising from specific social conditions, this knowledge is context-laden and cannot be exchanged over long spatial distances (Asheim & Gertler 2006: 293). The regional boundedness of tacit knowledge highlights the significance of knowledge flows within clusters and sheds light on the unconscious knowledge spillovers due to proximity as described by Marshall (1890, 1920).

The regional premise of knowledge spillovers highlights the geography of innovation. Audretsch and Keilbach (2007) discuss knowledge spillovers as drivers for innovation. According to the knowledge spillover theory of entrepreneurship, ideas and knowledge created in one organizational context but left uncommercialized, serve as a valuable source of knowledge generating entrepreneurial opportunities (Audretsch & Keilbach 2007: 1246). The knowledge about entrepreneurial ideas and the awareness of entrepreneurial opportunities are disseminated due to spatial proximity. Knowledge as resource for entrepreneurial activity differs significantly from other resources available for economic activity, as knowledge cannot be limited or controlled(Audretsch & Keilbach 2007: 1246). The strategic use of knowledge spillover is referred to by Porter who discusses knowledge externalities in terms of the opportunity to detect and react to opportunities and threats (Porter 2000: 253). To the extent that regional proximity promotes timely knowledge exchange, innovative capability is strengthened

While knowledge disseminates due to spatial proximity through social interactions and observations, previous research suggests that tacit knowledge has to be defined, combined and processed before it is economically relevant (Acs, Audretsch, Braunerhjelm & Carlsson 2004). Acs et al. describe a filter of absorptive capacity between the stock of knowledge and its commercial exploitation (Acs, Audretsch, Braunerhjelm & Carlsson 2004: 5). In particular tacit knowledge, which can't be coded, has to be clearly identified before it can become an opportunity. This absorptive capacity highlights the role of knowledge gatekeepers. According to Allen, knowledge gatekeepers are "a small number of key people to whom others frequently turned for information" (Allen 1977: 145). Investigating the role of knowledge gatekeepers, Lezaric, Longhi and Thomas (2008) identify three functions: due to a strong social network, knowledge gatekeepers may identify and capture external sources of knowledge, which provide new insight. Assuming that this knowledge is tacit and not coded, knowledge gatekeepers may identify the meaning and transcode the knowledge into information. Subsequently knowledge gatekeepers transfer and share the information within their social network (Lezaric, Longhi & Thomas 2008: 840). The understanding of gatekeeper thus emphasize the conscious process of knowledge gathering and dissemination in networks, which is discussed further by Network Theory.

Network Theory

Highlighting networks in clusters as infrastructure of information dissemination, it is valuable to introduce network theory to understand communicative processes comprehensively. The social network allows exchange and interaction and hence creates network externalities that promote collaborations and entrepreneurial opportunities. Previous research on networks identified differences between the scope of social interactions. Granovetter (1973) introduced the analysis of a tie's strength and identified strong ties, weak ties and absent ties. Strong ties describe close relationships, which are based on frequent contact creating common knowledge and trust. In terms of information exchange, strong ties promote the exchange of complex and sensitive information, as they allow greater depth than weak ties (Reagans & McEvily 2003: 244). Weak ties refer to acquaintances and loose connections that are based on infrequent contacts. Weak ties emerge from bridges, points of connection between parties that lack ties (Powell & Grodal 2006: 62). Linking a multitude of diverse backgrounds, weak ties provide new insight by combining different perspectives. In terms of information exchange, new, non-redundant information emerges through weak ties. Burt (1992) strengthens this perspective by introducing the notion of structural holes, which define potential connections between units that are not connected. Similar to weak ties, structural holes provide additive rather than overlapping insight (Burt 2001: 208). Analysing network theory with respect to innovation clusters, Burt argues that structural holes foster innovative capability (Burt 2001: 208). Research on small world networks point out that both kinds of ties strengthen the innovative capability of clusters: the dense and close relationships enable trust and close collaboration, while distant ties bring fresh and non-redundant information to the cluster (Fleming, King & Juda 2007: 938).

To analyse the properties of the social network as a whole, Granovetter (1973) introduced the notion of structural embeddedness. The term describes the impersonal configuration of linkages between people or units and thus offers a broader view on social networks (Nahapiet & Ghoshal 1998: 244). Nahapiet and Ghoshal (1998) discuss the significance of structural embeddedness with respect to social capital. The notion of social capital stems from sociology studies and has been defined by Bourdieu as the value deriving from current and potential resources that is engendered through an actor's relationships in a social network (Bourdieu 1998: 25). Social capital thus becomes critical in terms of access to knowledge and information. By defining three dimensions of social capital – social integration, trustworthiness and shared vision – Tsai and Ghoshal (1998) highlight the capital's influence on value creation through resource exchange and combination (Tsai & Ghoshal 1998: 244). Garnsey and Heffernan (2005) argue that social capital formation supports the processes

and capabilities necessary for spin-outs and attraction and enhances the sustainability and growth of innovation clusters (Garnsey & Heffernan 2005: 1133).

Economic and sociological cluster theories highlight knowledge gathering, information sharing and social interaction and identify dynamics that underlie communication: Through sharing existing information in a network, complementation and re-combination of knowledge promote innovative capability and thus strengthen the spatial clustering effects. While information sharing has been primarily understood as non-codified knowledge, Karlsson et al. (2014) argue that "knowledge in the form of codified knowledge has become relatively more important than tacit knowledge" (Karlsson, Johansson, Kobayashi & Stough 2014: 3). To understand codified knowledge – or communication – the following section introduces the research field innovation communication.

**2.2 Innovation Communication**

Communication studies refer to research on different fields of public communication encompassing journalism, public relations and marketing. Journalism can be understood as mass communication that targets a broad and heterogeneous audience in order to inform (Pürer 2003: 75). Public relations are a persuasive form of communication to evoke publicity by both functioning as a source for journalism and targeting stakeholders directly (Fröhlich 2008: 96). Marketing addresses the market in order to create a successful and competitive position (Meyer & Davidson 2001: 21). Based on the insights deriving from communication study, the new research field innovation communication integrates communication into the context of innovation.

Nordfors focuses on journalism and introduced the concept of innovation journalism, which initiated the analysis on how communication might affect innovations (Nordfors 2004a, Nordfors 2004b, Nordfors & Ventresca 2006, Nordfors 2009, Uskali & Nordfors 2014). Nordfors regards journalism as the "infrastructure" of successful innovation (Nordfors 2009: 5). Innovations are characterized by an inherent newness, as they can be defined as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organisations or external relations" (OECD Oslo Manual 2005: 46). Due to the newness, journalists introduce innovations to a broad audience and create public awareness (Nordfors 2004a: 4). Nordfors emphasizes the agenda setting function of journalism, which describes the potential impact on the public perception. While early agenda setting research anticipated a strong influence of media, recent research stress that news influence what recipients think is important rather than think is true (McQuail 2010: 473). Nordfors discusses the importance of journalism in terms of creating meaning for innovations as journalism offers a common language for innovations and thus builds new knowledge-schemata (Nordfors 2004a: 4). Communication studies discuss the creation of knowledge-schemata in regard to framing. According

to Entman (1993) “to frame is to select some aspects of a perceived reality and make them more salient in a communication text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation and/or treatment recommendation for the item described” (Entman 1993: 52). By structuring information, reducing complexity and selecting the focus, frames may support the introduction of innovations to a broad audience. Furthermore, innovations are challenged by a high level of abstractedness leading to uncertainty. Storytelling, a cognitive transmission technique, may draw upon examples, visualizations and personifications to create an access to complex innovations (Silverman 2004: 43). According to Nordfors “innovation journalism enhances the public debate by improving common knowledge and understanding of innovation issues, essential for society” (Nordfors 2004a: 3).

Based on the research by Nordfors (2004a, 2004b), Zerfass (2005) extends the concept of innovation communication by taking corporate communication and interpersonal communication into account. Zerfass discusses corporate and interpersonal communication as a central element in the context of open innovation (Zerfass 2005: 10). Open innovation is defined as “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively” (Chesbrough & Crowther 2006: 230). Inbound open innovation is an outside-in process and involves opening up the innovation process to knowledge exploration, whereas outbound open innovation is an inside-out process and includes opening up the innovation process to knowledge exploitation (Lichtenthaler 2011: 76). According to Zerfass (2005) the participation of different stakeholders and partners in open innovation processes requests strategic communication in terms of public relations and marketing. Zerfass points to the significance of managing the different interests and aligning the outside-in and inside-out processes (Zerfass 2005: 8). Corporate communication may thus systematically plan, implement, and evaluate communication strategies in order to strengthen innovative capability. In terms of interpersonal communication, Zerfass stresses the importance of innovation-related leadership communication, which aims to influence attitudes towards innovations by mediating meaning in social relations (Zerfass 2005: 12). Communication studies offer insight to interpersonal communication by introducing opinion leaders, which are defined as individuals who act as information source for further individuals (McQuail 2010: 473). The two-step-flow of communication emphasizes the significance of opinion leaders by integrating their role in the transmission process of information: The first step describes the information transfer from media to opinion leaders, the second step refers to the opinion leader’s information distribution within their social network (McQuail 2010: 473). Including opinions and evaluation, interpersonal communication is regarded as influential yet has to be understood as complementary rather than replacing public communication. With respect

to innovation, both corporate and interpersonal communication thus play an important role in the field of innovation communication.

Pfeffermann (2011) contributes to the analysis of innovation communication by discussing communication in terms of corporate strategy. According to Pfeffermann (2011), corporate innovation communication, such as public relations and marketing, performs as a cross-functional dynamic capability throughout the innovation process (Pfeffermann 2011: 261). As defined by Teece, Pisano and Shuen (1997) dynamic capabilities are the firm's capacity to integrate, build and reconfigure internal and external resources and competences to address and shape rapidly changing business environments (Teece, Pisano & Shuen 1997: 516). Taking the complex open innovation process into account Pfeffermann argues that during the *Fuzzy Front-End Phase* communication may support information exchange to understand needs and opportunities as well as to identify stakeholder's knowledge and issues' demands. The *Idea Realization and R&D Phase* is supported by the exchange of information to refine the concept and to optimize the innovation's characteristics, establish feasibility and demonstrate technological readiness. During the *Commercialization Phase* communication demonstrates the innovation's readiness and positions the innovation in the public domain (Pfeffermann 2011: 261). Based on the supportive force of communication, Pfeffermann suggests that innovation communication performs as a dynamic capability by:

- creating ideas and re-configuring innovations due to systematic planned, future-orientated dialogues between an organization and its stakeholder throughout the innovation process,
- reshaping collaborative innovation networks through communication,
- creating or extending the innovation reputation of a company,
- reconfiguring new business models as an enterprise's resource through issue management and agenda setting,
- activating new knowledge schemata and extending knowledge schemata of stakeholders,
- extending other related organizational capabilities such as knowledge management to seize opportunities in the entrepreneurial view (Pfeffermann 2011: 261).

Though Pfeffermann's analysis focuses on corporate strategy and thus can't be applied to journalism, it contributes valuable insight to the discussion of innovation communication. Stressing the strategic component of innovation communication, which can be understood as public relations and marketing, Pfeffermann (2011) complements the analysis of innovation communication.

Discussing cluster theories and innovation communication, the literature review highlights the interrelations of the two research fields: Cluster theories implicitly include communicative activities, which are emphasized and complemented by the new research area innovation communication. The theoretical foundation strengthens the demand for an empirical study of the research question:

*What is the role of communicators in innovation clusters?* To operationalize the research interest, the following chapter introduces the conceptual framework of the study.

## 3 Conceptual Framework

Communication studies define communicator research as "control analysis" that strives to investigate who controls and influences the communication process (Arens 2008: 198). In the context of mass communication, the term communicator has to be understood as a collective term for individuals participating in the creation of public communication (Pürer 2003:108). To conceptualize the communicator's role in innovation clusters, established communication studies provide valuable insight on influence factors creating the "role". Despite diverging research interests, the *Hierarchy of Influences* approach by Shoemaker and Reese (1991), the *Zwiebelmodell* by Weischenberg (1992), the *Integrative Multi-Level Model* by Esser (1998) and the *Clusters of Influences* by Preston (2009) create an overview of influence factors and their structures, which is summarized in exhibit 3.1 and serves as conceptual foundation.

| **Levels of Influence** | **Shoemaker & Reese Hierarchy of Influences (1991)** | **Weischenberg Zwiebelmodell (1992)** | **Esser Integrated Multilevel-Model (1998)** | **Preston Five-Clusters of Influences (2009)** |
|---|---|---|---|---|
| **Individual Level** | Professional backgrounds and experiences<br>Professional roles<br>Ethics<br>Personal attitudes<br>Values and beliefs<br>Power within the organization | Demographic data<br>Social and political opinions<br>Perception of the role<br>Image of recipient<br>Professionalism<br>Socialization | Subjective values<br>Political attitudes<br>Work motivation<br>Self-perception<br>Professionalism<br>Demographic data | Personal characteristics<br>Background, Ethics and Values<br>Definitions and perception of professional roles |
| **Media Routines Level** | Routinized and repeated practises | Origin of information<br>Reference groups<br>Patterns of presentation<br>Construction of reality effects and retroactive effects | | Institutional practices and norms |
| **Organizational Level** | Organizational Role<br>Organizational | Economic imperatives | Job profiles Practices<br>Organisational | Organizational values<br>Strategic goals |

| | | | | |
|---|---|---|---|---|
| | Structure<br>Organizational policies | Political imperatives<br>Organisational imperatives<br>Technological imperatives | structure<br>Structure of competences, Work processes Control Technology | Policies<br>Power structures of the organization |
| **Political & Economic Level** | Institutions in society<br>Government<br>Advertisers<br>Public relations<br>Influential news sources<br>Interest groups<br>Media organizations | Societal conditions<br>Historical and legal foundations<br>Communication policy<br>Professional and ethical standards | Economic conditions of the media market<br>Press law<br>Self-control of media<br>Ethic foundation<br>Trade unions and associations<br>Education of journalists | Political and economic culture<br>Distribution of power in society |

*Exhibit 3.1: Influence Factors*

*(Shoemaker and Reese 1991, Weischenberg 1992, Esser 1998, Preston 2009)*

Based on the theoretical insight a new conceptual model is created in order to address the specific research interest of the communicators' role in innovation clusters by identifying, visualizing and structuring influence factors (exhibit 3.2). In reference to the established approaches, four aspects of influence are classified: An *Individual Level*, an *Organizational Level*, a *Cluster Level* and a *Context.* The centre of the model shows the research interest: the role of communicators. The role is influenced by the surrounding *Individual*, *Organizational* and *Cluster Level*, which are graphically structured in a tetrahedron to overcome hierarchy as the influence levels take place on the same rank. The *Individual Level* deals with personal attributes of the communicators and encompasses the categories *Socialization* focusing on the communicator's education and career and *Self-Perception*, a factor which became popular over the last decade and analyses the communicator's motivations, aims, contentedness and understanding of communication. The *Organizational Level* examines the surrounding professional environment in terms of the categories *Organizational Structures*, which includes the professional position, practices and references and *Work Conditions,* which focuses on potential control and values. The *Cluster Level* provides insight to the innovation cluster and analyses the cluster's *Network* regarding the position, the collaborations and stakeholders and its *Representation* in terms of the perceived image, distinctiveness and evaluation. The influence factors serve as direct foundation for the creation of the interview guideline and the deductive codes of the data analysis. The three levels are embedded in a *Context*, which is defined as the *cultural* and *historical* development of the cluster and the *policies* that addressed innovation and research. The

*Context* is not based on primary data but offers an explanatory and reflective background deriving from secondary data.

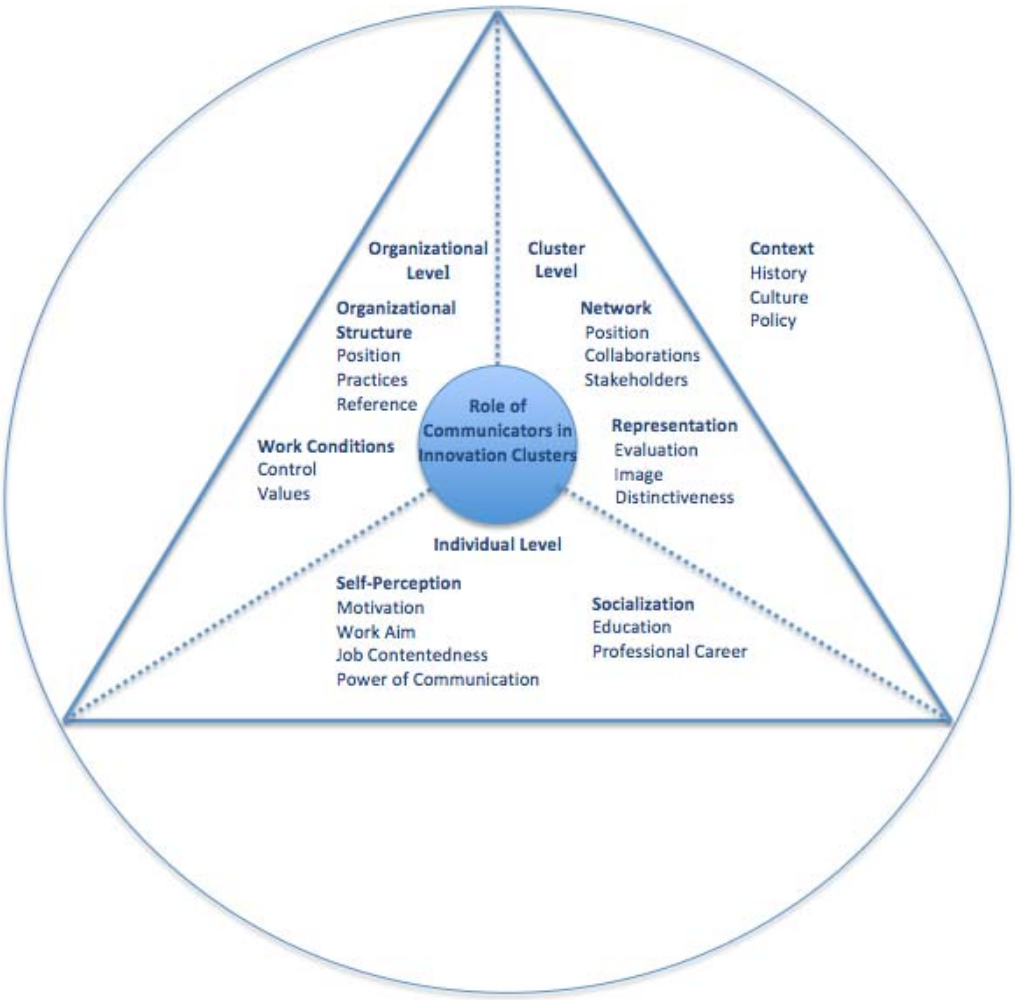


*Exhibit 3.2: Conceptual Model of the Role of Communicators in Innovation Clusters*

## 4 Methodology

Based on the interdisciplinary and exploratory nature of this study, the research underlies a social constructionist perspective to allow an open approach to the research interest (Easterby-Smith, Thorpe & Jackson 2008: 57). The empirical investigation draws upon a multiple case study design (Yin 2009: 52) in order to strengthen the generalizability of the emerging theory (Eisenhardt & Graebner 2007: 25). The following sections introduce the two case studies Munich and Cambridge and the data gathering and data analysis procedures.

### 4.1 The Case Studies Munich and Cambridge

Drawing on two case studies, the empirical research is based on the innovation clusters Munich and Cambridge. The two innovation clusters have been chosen in order to analyse two mature European clusters that evolved over the last 50 years and thus developed unique dynamics relevant for the research interest. As discussed in the conceptual framework section (chapter 3), the *Context* of the innovation clusters in terms of historical and cultural development and policies plays a significant role to understand the cases comprehensively. Exhibit 4.1 thus introduces the two regions by presenting their status, their evolution and the political involvement (exhibit 4.1).

| **The Munich Innovation Region** | **The Cambridge Innovation Region** |
|---|---|
| The innovation region is located in Bavaria and encompasses the city of Munich and its greater area. The city of Munich locates 1.4 million inhabitants. Universities relevant to the innovation region are Technical University Munich (TU Munich), Ludwig-Maximilians University Munich (LMU Munich), which have both been awarded the title "University of Excellence" and the Munich University of Applied Sciences. Munich is the location for 6 of the 30 biggest DAX enterprises: BMW, Siemens, Allianz, Linde, Munich RE, Infineon Technologies[1]. | The innovation cluster is located in the East of England and encompasses the city of Cambridge and its greater area. The city of Cambridge has 122,700 inhabitants with a working population of approximately 356,000 people (Minshall 2013: 1). Cambridge locates three universities, the University of Cambridge, Anglia Ruskin University and the Open University. The University of Cambridge is continuously ranked as one of the best universities worldwide[2]. 12 companies evolving from the cluster have been valued at over US$1bn in the past 15 years: Abcam, ARM, Autonomy, AVEVA, CAT, Chiroscience, CSR, Domino, Ionica, Marshall, Solexa, Virata. Furthermore Cambridge attracted international companies to locate in the cluster, such as Microsoft, Rolls Royce, Philips, Unilever and BP (Minshall 2013: 3). |
| **Historical Development** | **Historical Development** |
| The origins of the Munich innovation region go back to the end of the 2nd World War. The late 1940s and early 1950s are associated with the Wirtschaftswunder (economic miracle), which was based on significant changes in West Germany: the | The historical origins of the Cambridge cluster can be traced back to the foundation of Cambridge University in 1209 when scholars from Oxford settled in Cambridge. Despite the relevance of the University's discoveries, inventions were not |

[1] Landeshauptstadt München. Referat für Arbeit und Wirtschaft. München Wirtschaftsstandort. Online: http://www.muenchen.de/rathaus/Stadtinfos/Statistik/Wirtschaft.html (25.03.2014)

[2] Shanghai Ranking. Academic Ranking of World Universities. Online: http://www.shanghairanking.com/ARWU2013.html (27.06.2013)

| | |
|---|---|
| Marshall Plan, a recovery programme by the USA provided the basis of an economic rise, the currency reform to Deutsche Mark led to financial stability and the development of a liberal market economy created a sustainable increase in prosperity [3]. Furthermore influential companies, such as Siemens and BMW and research institutions such as Fraunhofer Gesellschaft founded or moved their headquarters to Munich due to the due to the political instability in Berlin and strengthened the position of Munich. | commercially exploited in the past as science was separated from industrial application. The commercial exploitation of discoveries began in the mid-20th century. The birth of the modern cluster is often described as having occurred with the foundation of Cambridge Consultants in 1960, a company that sought to "put the brains of Cambridge University at the disposal of the problems of British industry" (Kirk & Cotton 2012: 17). The early stages of the cluster's development show strong links to the University, as high-tech firms were formed in response to the rise of the scientific departments in Cambridge (Garnsey & Heffernan 2007: 32). |

| **Governmental Support** | **Governmental Support** |
|---|---|
| ***Cluster Offensive**:* The *Cluster Offensive* developed from the two initiatives *Offensive Zukunft Bayern* (starting 1994) and *High-Tech-Offensive* (starting 2000). The policy initiated by the Bavarian Ministry of Economic Affairs and Media, Energy and Technology invested 38 million Euro to 19 key technology sectors in Bavaria structured as mobility, material engineering, human beings and the environment, information technologies, electronics, service and the media (Bavaria's Cluster Campaign 2009: 6).<br><br>***Excellence Initiative*:** In 2005 the Federal Ministry for Education and Research and the Bavarian Ministry for Education, Science and the Arts introduced the *Excellence Initiative* as a collaborative project of the Nation and the States. The initiative is based on a competition between German universities, which was evaluated by the Deutsche Forschungsgemeinschaft, the German Wissenschaftsrat and an international jury of experts (Spross 2013: 16). The aim of the | ***Direct Support:*** Cambridge companies benefited from the Small Firms Merit Award for Research and Technology (SMART) which was introduced by the UK Department of Trade and Industry in 1988 (Gill & Parnell 2014: 9). Since 2009, the Small Business Research Initiative (SBRI) has helped small innovative firms not by way of grants but through contracts to develop defined new products to fill needs in the public procurement area (Gill & Parnell 2014: 10). Furthermore, government support strengthened the translation of science by focusing on the 'third mission' of universities (Minshall, Druilhe & Probert 2004: 1), such as the Knowledge Transfer Partnerships (KTPs) (Gill & Parnell 2014: 9), the University Challenge Fund (UCF) (Minshall, Druilhe & Probert 2004: 5) and the the Cambridge-MIT (CIM) Institute to strengthen the collaborations between academia and industry [5].<br><br>***Indirect Support:*** Besides direct financial support, the |

[3] Bundeszentrale für politische Bildung. Wirtschaftswunder. Online: http://www.bpb.de/nachschlagen/lexika/lexikon-der-wirtschaft/21146/wirtschaftswunder (25.03.2014)

[5] The University of Cambridge: The Cambridge-MIT Institute. Online: http://www.cmi.cam.ac.uk (05.04. 2014)

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|---|---|
| *Excellence Initiative* is to strengthen the competitive position of Germany's research centres on an international level by means of the three projects to support Graduate Schools, Excellence Clusters and Future Concepts. Both Technical University Munich and Ludwig-Maximilians-University Munich have been awarded the title "University of Excellence".<br><br>***Spitzencluster Competition*:** In 2007 the Federal Ministry for Education and Research launched the *Spitzencluster Competition* in order to foster the successful development of German leading-edge clusters. This competitive initiative addressed existing clusters and awarded successful applicants with 40 million Euro of funding for a period of five years (Germany's Leading Edge Clusters 2014: 3). The Munich Biotechnology cluster was awarded the title "Spitzencluster"[4]. | UK government also provided indirect funding assistance through tax incentives in order to encourage the development of informal investment such as the Business Expansion Scheme (BES), the Enterprise Investment Scheme (EIS) and the Seed Enterprise Investment Scheme (SEIS) (Gill & Parnell 2014: 6). Venture Capital Trusts (VCTs) were initiated in 1995 to encourage private investors into the early stage SME market.<br><br>***Political Involvement*:** In 2010 Prime Minister David Cameron introduced a Budget Plan (Budget 2010: 2) leading to significant cuts in direct financial support for innovation (Minshall 2013: 4). Moreover the governmental interventions led to the abolishment of Regional Development Agencies (RDAs) in England in 2012 cutting off the major source of regionally focused funding for innovation support (Minshall, Kouris, Mortara, Schmithausen & Weiss 2014: 18). In November 2010, Prime Minister David Cameron announced the government's support to accelerate the establishment of the technology cluster East London Tech City in order to strengthen the innovative capability of the UK and meet the standards of Silicon Valley[6] |

*Exhibit 4.1: The Case Studies Munich and Cambridge*

### 4.2 Data Gathering

To meet the diversity and heterogeneity of innovation clusters, this study expands the usual approach of communicator studies by including various professions to the sample of key communicators. Facing an unexplored broad basic population, the identification of relevant communicators in innovation clusters requires a strong and multi-levelled process in order to identify key communicators. This study thus includes a Google research, close reading of the publications and a snowball method derived from the interviews. The three steps allow a systematic approach, an

[4] Munich Biology Cluster. Online: http://www.bio-m.org (05.04.2014)

[6] Government UK: PM Announces East London Tech City. Online: https://www.gov.uk/government/news/pm-announces-east-london-tech-city (07.04.2014)

interpretative evaluation and an insider perspective and have to be understood as consecutive and complementing, pursuing a theoretical saturation. The following exhibit (exhibit 4.2) introduces each step:

| | |
|---|---|
| **Google Research** | The systematic Google research analyses potential names and terms affiliated with the clusters in order to reveal who engages in the public communication. To allow an extensive understanding, the search terms were applied with different spellings, with and without hyphens and with and without quotation marks. Moreover, the research of the Munich cluster encompassed both German and English terms to meet the standards of an international investigation and broaden the range of results. The list of search terms is presented in appendix I. Each first Google result page was analysed and analysed in terms of the communicators. All results arising from the respective cluster and referring to the respective cluster were calculated. The Google research was repeated until a saturation of results was reached and constant results were shown. |
| **Close Reading** | Building on the results of the Google research, the identified publications were read and analysed. Reporting about the innovation clusters, the publications offer a valuable source for further insight into relevant communicators. |
| **Snowball Method** | As a final step in the selection process of the key communicators, all interviewees have been asked to name three influential communicators in the respective cluster for further research. This reference ensured that also knowledge from inside the cluster could be accessed. To select the relevant communicators from the broad field of recommendation, two criteria characterized the process: either the person has been named often or the theoretical information deriving from the close reading supported the relevance of the communicator. |

*Exhibit 4.2: Selection of Key Communicators*

### 4.3 Data Analysis

Based on the three selection steps (exhibit 4.2) 23 relevant communicators could be identified, 11 in Munich and 12 in Cambridge. A semi-structured interview guideline deriving from the conceptual model (exhibit 3.2) served as foundation for the in-depth interviews, which took place between March and October 2013. The interviews with Munich communicators were held in German and the interviews with Cambridge communicators in English to allow an un-biased conversation in the native language of the communicators. All interviews were recorded and subsequently transcribed word-by-word. To analyse the data a combination of Grounded Theory (Glaser & Strauss 1967, Glaser 1978, Strauss 1987, Strauss and Corbin 1990) and Qualitative Content Analysis (Mayring 2008) was applied to offer both an open and structured approach to the explorative research interest. Following steps created the data analysis (exhibit 4.3):

***Step 1: Reflection of the Theoretical Background***

The first step of the analysis is the reflection of the theoretical background. According to Mayring (2008), the theoretical background provides valuable insight to the broad data and highlights relevant themes offering a structured approach. This study's data is based on the conceptual model which defines deductive influence factors on an *Individual*, *Organizational* and *Cluster Level* that created the basis for the interview guideline and thus should be taken into account.

***Step 2: Close Reading***

While the reflection of the theoretical background reviews the data from a deductive perspective, the close reading focuses on the pure data and thereby takes inductive themes into account. According to Strauss and Corbin (1990) the close reading leads to a cognitive and affective appreciation of the data, including active understanding, the identification of themes and the definition of relevant passages (Strauss & Corbin 1990: 82).

***Step 3: Paraphrasing***

Paraphrasing reduces the material to its relevant essence. This step refers to Mayring's technique of data reduction. While Mayring (2008) suggests paraphrasing as a first step, this analysis only paraphrases the material after understanding and appreciating the data in its original version to not eliminate text passages at a too early stage. Furthermore paraphrasing serves as process of understanding by summarizing the broad data. Finally paraphrasing creates a new level of abstraction, which leads to an overall understanding of the data (Mayring 2008: 37).

***Step 4: Thematic Structuring***

Both approaches by Strauss and Corbin (1990) and Mayring (2008) refer to the thematic structuring technique as the most important step in the data analysis. While Mayring (2008) highlights the importance of deductive themes deriving from the theoretical background (Mayring 2008: 42), Strauss and Corbin refer to axial and selective coding to identify inductive themes (Strauss & Corbin 1990: 74). Both methods lead to the creation of an interpretative pattern, which presents the text not in its chronological arrangement but in terms of a thematic structure. To offer a systematic approach to the thematic structuring process, this study draws on the qualitative data analysis software Max QDA. All transcripts were entered into the software and investigated with respect to deductive codes (deriving from the conceptual model) and inductive codes (evolving from the data). Based on the software Max QDA, the thematic structuring identified 21 codes in total.

***Step 5: Contextualization***

The contextualization identifies interrelations in the data. This step evolves throughout the analysis and allows a comprehensive understanding of the data on different levels: Firstly, the interviews within a case study provide a contextual understanding of themes (section 5.1 and 5.2). Secondly, the cross-cases analysis offers a broad comparative examination (section 5.3). Thirdly, the analysis takes the contextual environment of the case studies into account (section 4.1), as defined by the conceptual model's *Context* level.

*Exhibit 4.3: Data Analysis*

# 5 Analysis

The previous chapters established the theoretical foundation of this study by discussing the relevant literature (chapter 2), conceptualizing the role of communicators in innovation clusters by means of a model (chapter 3) and presenting the methodology of the empirical research (chapter 4). Based on this insight, this chapter focuses on the primary data, 23 interviews with communicators from the innovation clusters Munich and Cambridge and provides an in-depth analysis of the communicators' role. The analysis pursues the investigation of the deductive codes deriving from the conceptual model (exhibit 3.2) and the identification of inductive codes evolving from the data. To allow for a coherent analysis of the deductive codes, these will be analysed following the thematic structure of the interview guideline encompassing three thematic sections: *Professional Career and Current Status*, *Organizational Structure and Professional Practices* and *The Cluster Network*. The inductive codes will be integrated thematically. As the primary data is anonymised, the analysis of each case starts with summarized profiles of the communicators.

## 5.1 The Munich Case

| |
|---|
| **M1** is a coordinator at a Munich university, positioned at the contact point between the university and governmental stakeholders |
| **M2** is the head of communication at a research institution and is responsible for its public relations |
| **M3** is an editor of a research institution's corporate magazine |
| **M4** is a communication consultant of a Munich university, managing its public relations |
| **M5** is a coordinator at a Munich university and is responsible for the contact with political stakeholders and the application of policies addressing research |
| **M6** works in a Bavarian Ministry coordinating the political initiatives addressing research and innovation |
| **M7** is the vice head of a research institution's communication department, organizing its public communication |
| **M8** works in a Bavarian Ministry and is responsible for the coordination of initiatives addressing research and innovation |
| **M9** is the head of communication at a Science Park and is responsible for its communication and marketing |
| **M10** is the head of communication of a Bavarian network organization, pursuing network-internal connection and network-external representation |
| **M11** is the head of communication of a Munich cluster, which aims to link academia and industry |

*Exhibit 5.1: Profiles of the Munich Communicators*

Professional Career and Current Status

The in-depth analysis of the Munich case study provides comprehensive insight to the role of communicators. The first part *Professional Career and Current Status* highlights personal aspects of the communicators. To introduce their current status, the data shows that all Munich communicators are positioned in the corporate communication sector, including public relations (M2, M7, M10), corporate editorial (M3), communication and marketing (M9, M11) and coordination (M1, M4-M6, M8). The communicator's position is the interface between their organization and the public and also perceived as such (M1, M2, M4-M9, M11). M2 perceives her role as "*intermediary*" (M2) between the research institution and the public, M1 describes her position as "*contact person to the public*" (M1) and M6 perceives her role as "*contact point that also guides to further contact points*" (M6). The communicators are very well educated, holding a PhD (M1, M2, M5, M8, M11) or a university degree (M3, M4, M6, M7, M9) in the subject thematically linked to their current professional field. "*I have a PhD in biology and I am very lucky to work in my original field of interest, the field of biology*", explains M2 (M2). Their study interest influenced the selection of their profession and is regarded as significant step in their careers (M1-M11). "*I am a person who strongly identifies with the topics in communication. My career reflects that, I decided at some point that I would by no means continue communication in the commercial sector, because you are so close to the topics in communication. (…) So in the beginning of my career it quickly became clear to me that I want to work in the non-profit sector*" (M9). This understanding can be seen in their job motivation as the majority of communicators reveal a personal interest and excitement for their scientific area (M1-M4, M7-M10). "*It is so interesting! You can really show society what scientists are doing, why it is important and what the sense and purpose of their work is*" (M3).

Organizational Structures and Professional Practices

The second part, *Organizational Structures and Professional Practices*, provides insight to the communicators' corporate environment. The data shows that the organizations of the communicators are rather huge, hierarchically structured institutions (M1-M8) and demand a focus on internal communication (M1, M2, M4-M9, M11). "*You have a lot of freedom in your work, but a huge ministry is also very hierarchical. (…) There are two levels above me, which select and evaluate my reports. It's a very hierarchically structured institution. But with a huge amount of self-responsibility*", explains M8 (M8). In terms of external communication, the communicators draw on classic corporate communication tools (M1-M11) and highlight their effort in direct communication such as events and open days (M2, M4, M7-M9, M11). "*We are the point of transfer*", explains M2, "*and we communicate the small and big developments to the public. We inform about research successes and research results*" (M2). The data shows that the communicators' working aims evolve around three goals: explanation of scientific discoveries, justification for public funding and the

successful representation of their affiliated organization (M1-M11). "*Our institution is publicly supported and thus partly funded by the taxpayer. I have a duty to inform the public about what we are actually doing. I want to create transparency. That's the point here*" explains M7 and continues "*we are the best in applied research and that's what we aim to communicate. The aim is an exact positioning of our organization that is linked to the applied research, the innovation engine, and the securing of the future for the business location by collaborating with industry, that's our aim*" (M7). Perceived challenges in reaching those aims can be seen in the securing of funding for basic research (M2, M8, M11), getting published by the media (M2, M8, M9) and translating the complex discoveries to offer an access to the scientific fields (M3, M4, M9). "*To get published by current media is very difficult. Media has a strict selection filter (…) So you have to position these topics right then, when some occurrences create agendas in these fields. For example Fukushima. That offered a wide range of possibilities to publish the whole science of chemistry in the context of storage and energy technology*. (…) *We are not agenda setters. We are dependent on the practice of agenda surfing*" (M2). The data shows that the communicators don't perceive significant control on their work (M1, M2, M4, M8, M10) and describe the creation of transparency as their value underlying their professional work (M2-M4, M7, M9). The communicators acknowledge strong power to communication as they regard it as valuable tool in terms of coordinating and creating a positive image in the public (M1-M6, M8-M11). "*Here is the decisive point: the picture that you perceive publicly of an innovation region is strongly influenced by the way us communicators show it to the outside. (…) Not only in the sense of direct communication but also through indirect communication, by creating an image of a region. (…) And if you are really good in what you are doing and if you have a certain aggregation, then you can strengthen this power. In that case communication becomes a driver*" (M2).

Cluster Network

The third part of the in-depth analysis investigates the *Cluster Network* and reveals diverging understandings of the term "cluster" as the communicators associate the term with specific policies introduced by the Federal and State government (M1-M11). The *Cluster Offensive*, the *Excellence Initiative* and *Spitzencluster Competition* (section 4.1) coined specific meanings of the term "cluster" which do not reflect its economic-geographic definition. To describe the meaning of clusters in its original sense, the communicators draw upon the term "*innovation region*" (M1-M11), which is applied in the following analysis. The communicators, who are directly affiliated with the policies know about the subtle differences (M1, M4-M6, M8) and explain that the *Cluster Offensive* supports 19 technological key areas which are understood "*in terms of a network, a Bavarian-wide network but not in an economic-geographic sense"* (M6) and that *Excellence Clusters* refer to "*absolutely*

*research-focused clusters, which concentrate on one topic (…) and collaborations with industry don't have priority*" (M1). The diverging associations of the term "cluster" lead to the fact that the communicators don't agree upon one Munich cluster and don't identify with a regional community (M2-M10). "*It doesn't exist. The idea of a Munich cluster is not present" (M8).* One reason can be found in the historical development of the region according to M7. "*The city grew enormously. The two big research institutions have been located here since 1949 and the universities always had the best reputation. And there have always been so many innovative companies in Munich – starting with Siemens, BMW and Infineon (…). The region grew and at some point it seemed like an innovation cluster, and in some ways this is also true but only due to the work of the individual big players*" (M7). A further reason can be seen in the economic situation of the area, which is explained by M4. *"Munich has a special position on a national and international level as its position is economically and scientifically very good and there is much focus on the city anyway. The necessity to join up and cooperate is dependent on that." (M4).* Very influential is also the perceived competition within the Munich innovation region described by M1, M2, M4, M5, M7, M8, M10. "*The Munich innovation region is much more characterized by competition and profiling than by integration and "we-are-Munich"-spirit. The players are so successful because they are fierce competitors*" (M8). While the data also reveals local collaborations, the communicators emphasize national and international connections. (M1-M11). "*Collaborations don't arise only because of regional proximity. We have many collaborations going on that are locally distant. It is very much dependent on the people who work with each other*" (M2). The analysis of the communicators' stakeholders and recipients adds further insight to the collaboration network and identifies stakeholder groups in terms of financial support (M1-M5, M7), potential members and collaboration partners (M1, M2, M4, M5, M7, M9-M11) and media (M2-M5, M7-M9) both local and regional distant. Due to the heterogeneity of the innovation region, the data shows that there is no common publication informing about the Munich region (M1-M11). *"No, there is no common communication. Maybe Munich is too big and too diverse and there are too many partial interests*", explains M4. The communicators draw upon diverse corporate publications and regard a common communication as unsuitable (M3, M4, M7, M8, M10). *"In my opinion a common communication could easily turn into a disadvantage, as the credibility and diversity of voices, all the different aspects, can be a big, big advantage. (…) A communication monopoly could be damaging",* explains M10 (M10). Despite the innovation region's heterogeneity, the majority of the communicators describe their perceived role in the innovation region as central (M1-M4, M7, M9) and present a positive image of the Munich region (M1-M5, M8). *"The diversity is so exciting, there are two universities which are very technology oriented, there are many research institutions which locate their headquarters in Munich, such as Max-Planck-Gesellschaft and Fraunhofer-Gesellschaft and then there are Siemens, General Electric moved here, BMW, which is*

*also very research driven, this is such a great environment and such a broad range of players who participate. You can't find that everywhere" (M3).*

### 5.2 The Cambridge Case

| |
|---|
| **C1** is a lecturer at the University and publishes a report and blog about the Cambridge cluster |
| **C2** is the editor in chief of a daily newspaper featuring news about the Cambridge cluster |
| **C3** is the managing director of an innovation centre and publishes cluster reports in collaboration with C1 |
| **C4** is the founder and chairman of a representation institution of the Cambridge cluster and published a book about the Cambridge cluster |
| **C5** is the head of marketing of a commercialization centre of the University and is responsible for its communication and marketing |
| **C6** is the communication manager at the commercialization centre working in C5's team and is responsible for public relations |
| **C7** is a journalist at a daily Cambridge newspaper and is responsible for the business section of the newspaper and its business supplement |
| **C8** is a freelance editor for a network organization in Cambridge and publishes news about the Cambridge cluster |
| **C9** is a serial entrepreneur and investment angel and sits on the board of several Cambridge institutions. She co-chairs a yearly conference to foster international collaborations and started and online map to represent the Cambridge cluster. Furthermore she is on the advisory board of the cluster East London Tech City. |
| **C10** is journalist who founded an online magazine in 2011 and publishes daily news on activities in the Cambridge cluster |
| **C11** is a serial entrepreneur and investment angel. He co-founded influential collaboration institutions in the Cambridge cluster with C12 and actively engages in governmental consultancy and advisory with respect to the Cambridge cluster |
| **C12** is a serial entrepreneur and investment angel who co-founded influential collaboration institutions with C11 in order to strengthen the collaborations inside the cluster and its representation to the outside. Furthermore he engages in governmental consultancy and advisory with C9 and C11 in order to support the Cambridge cluster |

*Exhibit 5.2: Profiles of the Cambridge Communicators*

Professional Career and Current Status

The in-depth analysis of the Cambridge case study contributes valuable insight to the investigation of the role of communicators. Starting by examining the *Professional Career and Current Status*, the data shows that the communicators work in diverse professional fields such as academics (C1), managing directors (C3), public relations consultants (C5, C6, C8), journalists (C2, C7, C10), writers

(C3) and entrepreneurs (C4, C9, C11, C12). The entrepreneurial spirit is also strengthened by the fact that the majority of Cambridge communicators participate in different professional activities besides their job (C1, C3, C4, C8, C9, C11, C12). "*There's a long list of things that I do. Let's take the first group, which is start-up companies. I have probably about six start-up companies that I am involved in, that I am an investor, or I am on the board, or I am a chairman. (…) Then another group is investment, just straight investment, where I'm the member of investment group. (…) Then there's the University, where I am the founding director of a policy centre. Then there are the networking organisations that I am involved in. (…) The other bits and pieces I do are all pro bono stuff, promoting Cambridge and doing things, working with the government and so on, but in an amateur capacity*" (C11). The communicators emphasize the importance of their previous professional careers and reveal past and current collaborations among each other (C1-C4, C8-C12). Their professional motivation can be understood as creating an access to the cluster "*I think a large part of the motivation is clarification, that often particularly when we have overseas visitors, I have noticed that a lot of what they think they know about Cambridge is not right. So there is that aspect of, let us make sure we are all on the right page, if you like*" (C3). The motivation also includes a personal component as C1, C3, C11 and C12 studied at the University of Cambridge, C10 grew up as a political refugee in Cambridge and C4, C9, C11 and C12 achieved their entrepreneurial successes here. C9 summarizes that "*Cambridge is very near and dear to my heart*" (C9).

Organizational Structure and Professional Practices

The second part, *Organizational Structure and Professional Practices* shows that the surrounding structures are characterized by the entrepreneurial and self-employed status of the communicators and present a dynamic and flexible environment (C1, C3, C4, C9-C12). The professional practices thus reflect a broad range of activities. C2, C5, C6, C7, C10 refer to classic communication tasks and describe communicating innovation as "translation". "*This is translation*. *The message, what C6 will get in, in so far as the raw material, or in speaking to the inventors, compared to what is then written, she has to translate what can be something quite complex, and put it into language, because that's where the communication is, it's getting that language right, that you're not dumbing down the technology or the invention, whatever it is, this is why you should care*" (C5). The communicators also refer to practices extending the communication repertoire, such as consultancy and advisory with respect to representing the cluster (C3, C9, C11, C12). "*C12, C11 and those lot, they are – or should I say we are – called upon continually to speak about in a Vice Chancellor's role what's going on in Cambridge. The difference is that we do it for free in our spare time*" (C9). The data shows that the communicators don't feel controlled in their professions (C1-C6, C8, C9, C11, C12) and pursue the separation of promotional communication and neutral information (C1-C3, C7, C8, C10). Their

working aim can be understood as offering clarification about the cluster, its members and activities (C1-C12) and the cluster's representation to secure a successful position (C1-C12). "*I think we recognise here that a large part of what we do is dependent on the health of the rest of the cluster. So we feel a sense of duty to try to make the cluster work properly*" (C3). It is noticeable that the communicators perceive public communication as very powerful to reach those aims (C1-C7, C10-C12). "*If it wasn't for the communication element, the cluster wouldn't exist*" (C8). C11 describes communication as "*self-fulfilling*" and identifies a momentum in the process of communication. "*If you say that the cluster is really successful, and you generate a lot of excitement, then you do several things. Firstly, you attract investment. Secondly, you attract people. Then, you get a big self-reinforcing business which says, 'we're very successful. We're going to get investment. Therefore, we can employ people. Therefore we can build companies. Therefore, we're very successful. Therefore, we can attract investment, therefore we can attract people.' Off you go*" (C11).

Cluster Network

The third part investigates the *Cluster Network* and shows that the communicators perceive the cluster as complex structured. *"It's a very, very complicated place, with people doing a lot of different things. Everybody is connected to everybody else. You can't understand Cambridge. Cambridge is not the Science Park, it's not the University, but it's all these things. It's a very complex, very rich system. Rich in the sense of rich in depth and extent*", explains C11. One reason for the cluster's complexity is seen in its bottoms-up evolution (C1-C4, C11, C12). "*Very much the Cambridge cluster is what I call a bottoms-up approach. Other clusters, particularly more recent ones, are very much top-down, where government has a significant role to play because they want to see technology clusters being created which will provide long term economic security for countries or regions of countries*" (C4). While the unstructuredness is discussed as challenge, it also enhances the development of a dense social network and the feeling of responsibility among the communicators (C1-C12). "*The cluster now is very highly networked. Everybody knows each other. Everybody knows how this stuff works, so I think it's very robust. It has grown, organically. It has not grown because of some government intervention. It has grown from the ground up*" (C11). The challenges are rather seen in terms of the University's dominating image (C2, C3, C5, C6, C8, C10) and the B2B nature of the cluster's companies, which aggravates public communication (C4-C6, C8, C10-C12). *"Most Cambridge companies are not well known, don't have famous names because their products are used in other peoples' products or services rather than being used by consumers themselves. (…) and when people read about them in the paper, they probably don't want to read on, on those articles. They would be much more likely to read about companies like Apple, Sony, Vodafone or someone like that, that people are familiar with. It's one of the challenges of being in a business-to-business world",* explains C4 (C4). The strongest

challenge however is the competition with the innovation cluster Tech City in London (C1, C4-C7, C9-C12). "*If you come into Heathrow, you can see a great big advert saying, 'Tech City of London. The Leading European Cluster'. They claim that they are bigger than Cambridge. If you look at their data, it's not true. However, they are putting a lot of money into publicity, about how wonderful they are, and how big they are. The problem is, for Cambridge, that in the long run, over five or 10 years, if we do not improve our image, then we will not get the attention from external investors. That means that we will not then grow the companies. That means that we will not attract new investment. So, we have to respond to Tech City, by starting to do some marketing and publicity about what Cambridge is doing*", explains C11. One reason for the strongly perceived challenge can be seen in the lack of government support. "*I think it's going to get to be a little embarrassing for the government to promote London and therefore to not promote all of the other clusters in the UK*", explains C9 and reveals the tension between the capital of London and the wider UK periphery. Analysing stakeholders, the data shows that the most important recipients are thus investors and governmental bodies (C1-C6, C8-C12) to draw the attention to the Cambridge cluster and secure funding. "*In terms of the communicating we're doing, we are thinking government primarily*, *our goals are to protect research funding. So basically, our primary audience (…) is government because we want to protect research funding*" (C6). Furthermore the communicators address a wide range of recipients, encompassing cluster members (C1-12), visitors and potential collaboration partners (C1, C3, C4, C5, C6, C9, C11, C12) and employees (C8, C9). The communicators highlight potential improvements in terms of public relation and marketing campaigns in order to strengthen Cambridge's competitiveness (C4, C5, C6, C9, C11, C12). "*I think the communication could be improved, a lot. If we look at the PR that Tech City has managed to create, if the only thing that you hear is the public communication, you would think that Tech City is a lot bigger than Cambridge. Of course, the opposite is true*" (C12). While the communicators pursue cluster external collaborations, the data makes the strong cluster internal collaborations visible as the communicators refer the dense social network within the region and their efforts to strengthen it (C1-C12). "*I think there is also something rather weird and positive about collaboration. It is amazingly easy to get people to help you. I find that very odd, well I don't find it odd now, I used to find it odd. You would ring somebody up and there is no real benefit to them, but they would ask, they would spend some time with you and connect you*", explains C1. This perception also leads to the perceived role in the cluster, which reflects the collective identity of Cambridge as many communicators use "*we*" and "*us*" when referring to the cluster community (C1, C2, C4-C6, C9-C12). The strong community is also seen as distinct feature of the Cambridge cluster (C1, C4, C5, C7, C8, C9, C11, C12). *"It sounds terribly lovey-dovey, but there's something about the sense that we all want to help each other. Some people say: oh it's because the University is collegian, people are used to being very engaged with people*

*from different disciplines. I don't know if it's that. But going to other places where it's, it's much more 'why would I do that, how is this going to help me'. We don't have that"*, explains C1 (C1).

### 5.3 Comparative Analysis

In order to provide a comprehensive understanding of the two case studies, the following section offers a contrast of the findings and highlights the differences between the role of communicators in Munich and Cambridge (exhibit 5.3).

| Influence Factors | Case Study Munich | Case Study Cambridge |
|---|---|---|
| **Professional Position** | The communicators work in the corporate communication sector including public relations (M2, M7, M9), communication and marketing (M10, M11) and coordination (M1, M4, M6, M8). | The communicators work in diverse professions, including academics (C1), managing directors (C3), public relations consultants (C5, C6, C8), journalists (C2, C7, C10), writers (C3) and entrepreneurs (C4, C9, C11, C12). |
| **Education and Professional Career** | The communicators focus on their academic career and are influenced by their study interest (M1-M11). | The communicators focus on their professional career and refer to practical experiences (C1, C3-C6, C9-C12). |
| **Motivation** | The communicators show a strong interest for science and the motivation to create an access to the respective field (M1-M4, M7-M11). | The communicators reveal a personal connection to the Cambridge cluster and the motivation to support it (C1-C12). |
| **Organizational / Surrounding Structures** | The communicators are positioned in rather huge institutions, which are hierarchically or decentralized structured (M1-M8). | The surrounding structures of communicators are characterized by the self-employed and entrepreneurial working situation of the communicators (C4, C8-C11, C12). |
| **Professional Practices** | The professional practices refer to classic external communication channels and emphasize the significance of internal communication (M1-M11). | Besides classic communication activities (C2, C5, C6, C7, C8, C10) the communicators extend the repertoire by including advisory and consultancy (C4, C9, C11, C12). |
| **Challenges (on the organizational level)** | The communicators refer to challenges in terms of securing funding for basic research (M2, M8, M11), and coordinate (M4, M9) and translate (M3, M7) inventions. | |

| | | |
|---|---|---|
| **Control and Values** | The communicators hardly notice control and refer to confidentiality agreements as limits (M2, M3, M7). In terms of values, the communicators aim to create transparency (M2-M4, M7, M9-M11). | The communicators don't feel controlled yet separate strictly commercial communication from informative communication, which can be also understood as their working ethos (C2, C5, C7, C10). |
| **Working Aims** | The aims refer to explanation of complex discoveries (M2-M4, M7, M9, M11), justification of public funding (M1-M8) and representation of the affiliated organization (M2-M6, M7, M9-M11). | The aims refer to creating an access to the cluster (C1-C6, C8-C12) and representing it successfully in the public (C1-C3, C5, C6, C9, C11, C12). |
| **Power of Communication** | The communicators refer to powerful communication in terms of coordination and representation (M1-M7, M9, M10). | The communicators regard communication very powerful regarding information sharing, representing and connecting at an individual, organizational and cluster level (C1, C2, C4-C6, C8, C9, C11, C12). |

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|---|---|---|
| **The Term Cluster** | The communicators understand the term "cluster" not in its economic-geographical sense, but associate it with three different meanings deriving from governmental initiatives (M1-M11). Thus the interviews and analysis draws upon the term "innovation region" to describe the agglomeration of science and innovation in Munich. | The communicators understand and agree upon an economic geographical meaning of the term cluster (C1-C12). |
| **Perception of the Innovation Region / Cluster** | The communicators don't agree upon a Munich cluster and don't feel part of a collective identity (M2-M4, M6-M8, M10) due to the historical development of the city (M4, M7, M8), the success of the single institutions (M4, M5, M8, M10) and policies addressing the region (M1, M4, M8). | The communicators strongly identify with the cluster (C1-C12) and describe it as complex place (C1, C2, C4, C8, C11, C12) due to its bottoms-up evolution without external support (C4, C5, C11, C12). This perception strengthens the feeling of responsibility and the creation of an internal social network (C1-C12). |
| **Challenges (on a cluster** | | The communicators refer to challenges |

| | | |
|---|---|---|
| **level)** | | in terms of the University's dominance (C2, C3, C4, C8) and the B2B nature of the cluster's companies (C4-C6, C10-C12). |
| **Competition** | A fierce competition is perceived between the institutions within the innovation region (M1, M2, M4, M5, M7, M8, M10), aggravating collaborations yet strengthening the institutions' profiles and success (M1, M2, M4, M5, M8) | While there is no cluster internal competition perceived, the communicators describe a strong competition deriving from the innovation cluster London Tech City in terms of public funding and media attention (C1, C4-C7, C9-C12). |
| **Stakeholders and Recipients** | Stakeholders and recipients include groups linked to financial support, which are primarily governmental bodies (M1-M5, M7), potential partners, members and employees (M2-M7, M10, M11) and media (M2-M4, M7-M11). | Stakeholders and recipients encompass internal cluster members (C1-C12), potential external collaboration partners (C1-C3, C5, C6, C8, C9-C11) and especially governmental bodies (C1-C6, C8-C12). |
| **Collaborations** | The communicators emphasize collaborations on a national and international level (M1-M7, M9-M11) yet also reveal local collaborations (M1-M11). | The communicators highlight the strong collaboration network inside the cluster in order to strengthen the region's position and success (C1-C3, C5, C6, C8, C9, C11, C12). |
| **Public Communication in the Innovation Region / Cluster** | The communicators don't pursue an integrated representation as it could harm the diversity and profiles of the Munich institutions (M3-M4, M7, M8, M10). | The communicators point out to potential improvements and discuss the positive effect of a common public representation (C1, C4-C6, C8, C9, C11, C12). |
| **Position and Role in the Innovation Region / Cluster** | The communicators describe a central role of their institution in the innovation region (M1-M4, M7, M11). | The communicators emphasize the strong community of the cluster and regard themselves as networker (C2-C5, C8, C9, C11, C12). |
| **Image and Distinctiveness** | The communicators associate the term "excellence" with the innovation region (M1-M6, M8-M10). | The communicators describe the close and helpful social network within the cluster (C1, C3-C5, C7-C12). |

*Exhibit 5.3: Comparative Analysis of the Case Studies*

# 6 Contributions

The basis for the contributions can be seen in the interdisciplinary analysis of the two research fields cluster theories and communication studies, as their interrelations have not been analysed empirically. Also the conceptual approach extends the previous communication studies, which usually focus on one profession and this research interest takes into account the heterogeneity of clusters and includes diverse professions. Based on this interdisciplinary and explorative approach, the findings contribute theoretical knowledge to cluster theories and innovation communication and practical implications to cluster communication and policies addressing innovation and research.

## 6.1 Theoretical Contributions

### *Contributions to Cluster Theories*

The empirical study on the role of communicators in innovation clusters makes visible the practices and processes which underlie the creation of knowledge and network externalities. Whilst the literature review (chapter 2) discussed the significance of knowledge externalities in economic cluster theories the relevant activities are not explained: Marshall introduces the notion of knowledge spillovers, which describe knowledge flows inside the cluster (Marshall 1920: 271). Whilst the process of knowledge spillover is critical in the creation of knowledge externalities, Marshall explains the knowledge flow as if "it were in the air, and children learn many of them unconsciously" (Marshall 1920: 271). Also Porter regards the exchange of coded information as a self-evident process: "specialized knowledge, both explicit and implicit accumulates in firms and local institutions" (Porter 2000: 260). Knowledge externalities are taken for granted in regionally close environments. Focusing on communicators in innovation clusters, this study contributes insight into the creation of knowledge externalities. By making knowledge accessible to the public, the communicators actively influence the clusters' information base through external communication channels and their thematic focus. The external communication in the Munich innovation region is based on organizational communication channels, such as organizational magazines (M2-M5, M9), newsletters and press releases (M2-M5, M9-M11), reports (M6, M8), and social media (M2-M5, M7, M9-M11). These publications represent the individual organizations and do not pursue a common communication of the innovation region. "*My experience is that it is extremely difficult to motivate people to participate in a common appearance,"* explains M10 (M10). Drawing on corporate communication channels, the Munich knowledge externalities are characterized by strategic communication that follows organizational aims. "*The aim is an exact positioning of our organization that is linked to the applied research, the innovation engine, and the securing of the future for the business location by collaborating with industry, that's our aim*" (M7). The findings demonstrate that the Munich communicators focus on information on scientific discoveries and innovations affiliated

with their respective institution. In contrast the Cambridge cluster includes journalistic newspapers (C2, C7), magazines (C7, C10), non-commercial reports (C1), blogs (C1), online magazines (C10), books (C4) and public relations newsletters, press releases and articles (C5, C6, C8), which pursue the representation of the cluster. "*I would like to provide them with information that is unique to the Cambridge cluster, information that tells them about emerging start-ups, about emerging trends, about what is happening," explains C10 and is seconded by C11* "*I'd like to make sure that they understand how Cambridge works*" (C11). The data shows that the Cambridge knowledge externalities focus on information about the cluster.

Both economic and sociological cluster theories include the importance of network externalities as a critical element in the successful development of clusters. Network externalities are closely linked to knowledge externalities, as knowledge is transferred through social ties. Economic cluster theories include the importance of network externalities in terms of accessing collaborations and support. According to Marshall (1920), connections allow ideas "to be taken up by others and combined with suggestions of their own", which strengthens innovative capability (Marshall 1920: 271). Krugman (1991) and Porter (1998) extend this perspective by highlighting tangible resources that may be available through supporting industries. Network externalities thus enhance the competitive advantage as "the social glue that binds clusters together also facilitates access to important resources and information" (Porter 1998: 88). Understanding social networks as an access to knowledge that strengthens the innovative capability and the competitive advantage, Nahapiet and Ghoshal (1998) discuss the network's configuration with respect to social capital. Whilst network externalities are critical in the cluster's successful development, the activities underlying the connections are not explained explicitly. The empirical findings point to the communicators' strong influence in the creation of network externalities and highlight the diverging perception of social capital. The Munich communicators pursue national and international connections in order to exploit potential non-redundant human and knowledge resources, based on weak ties, bridges and structural holes (Granovetter 1973, Burt 1992). "*If one of our researchers wants to investigate something then he does not look for what does the city offer but he looks where is currently the company, or the university, which is cutting-edge, which really has the most advanced, the greatest, the most exciting, the most promising approach. And that leads to a very international networ*k" (M2). The Cambridge communicators focus on local connections in order to strengthen the social network inside the innovation cluster, basing it on strong ties (Granovetter 1973). *"The community is very small and it's very networked and everybody knows everybody", describes C5*. The different network externalities shed light on the factors influencing them. Not only the supporting factors of social networks, as discussed by Marshall (1920), Krugman (1991) and Porter (1998) define network externalities, but also the challenging ones. Porter (1998, 2000) highlights the effect of competition,

which is supported by the empirical findings. The perceived location of competition influences the clusters' network externalities significantly. Porter discusses the location of competition and points out that domestic rivalry is more intense than foreign competition and therefore particularly effective in promoting the upgrading of competitive advantage (Porter 2000: 255). Referring to Munich institutions M8 agrees that "they are so successful because they are such fierce competitors" (M8). The data thus reflects the interrelations of domestic competition and competitive advantage as cited by Porter (2000). The Cambridge case extends this perspective by applying competition at a cluster level, as competition also takes place between clusters and strengthens the cluster's innovative capability and competitive advantage.

The empirical findings of the two case studies show diverging knowledge and network externalities: in terms of knowledge externalities, the Munich innovation region is characterized by an organizational perspective and the network externalities are characterized by internal competition and seeking to establish national and international connections. In contrast, the knowledge externalities of the Cambridge innovation cluster are based on information about the cluster and the network externalities are characterized by a strong internal cohesion and external competition. The empirical findings point to the influence of the communicators on promoting these externalities and reveal the close interrelation between the communicators' roles and the diverging cluster dynamics.

***Contributions to Innovation Communication***

The theoretical contributions to the new research field innovation communication provide insight to communication in open innovation processes and communication as dynamic capability.

Zerfass (2005) and Pfeffermann (2011) discuss innovation communication in the context of open innovation. As defined by Chesbrough open innovation is "the use of purposive inflows and outflows of knowledge" (Chesbrough & Crowther 2006: 230). Discussing inflows of knowledge, Chesbrough stresses the necessity to "find and tap into the knowledge and expertise of bright individuals outside our company" (Chesbrough 2003: 38). The findings highlight the capacity of communicators to identify relevant knowledge and select collaboration partners (M1-M11, C1-C12). *"Everyone in ICT knows everyone in ICT, but they don't know anyone in biotech and vice versa. So here's a notion and I think this is the way the network has always worked, is to cross-fertilise. To make sure that someone in biotech is talking to someone in ICT. So breaking down boundaries, that's the core of the communication*", explains C8. Combining external and internal sources, the communicators have to manage the collaboration partners' needs and interests. *"We have a large number of stakeholders*", explains C5*, "they are everywhere. (…) From our point of view it is where do you stop? (…) You have to always think of the bigger picture and what you might be able to do for the*

*biggest impact" (C5).* Both case studies stress the importance of coordinating stakeholders as "*managing people's expectations is important*" (C3). Outflows of knowledge refer to the presentation of the invention and affiliated organization to the public. The findings highlight the communicators' capacity to explain complex inventions at any stage of the innovation process in an accessible way to various stakeholders and successfully present and position the innovations and affiliated organizations (M1-M11, C1-C12). *"I aim to write in a way so that even the technological things are accessible to a broad public. You can really show society what scientists are doing. Why it is important and what the sense and purpose of their work is. This is what I want to express*", explains M3 (M3). Creating meaning that is accessible to the public, C5 and M9 describe innovation communication as "*translation*" of complex innovations (C5, C9). This access strengthens the successful position of the cluster. *"You have people from around the world that are coming to Cambridge to look at it, and some of them are coming in to invest. That is because they're hearing about it, and they're hearing the positive news",* describes C5 (C5). Highlighting the relevant role of communicators in managing purposive inflows and outflows, the findings provide insight to innovation communication within open innovation processes.

Pfeffermann (2011) regards innovation communication as a cross-functional dynamic capability and creates a theoretical basis for this understanding. The findings of the two case studies provide empirical insight to this perspective. Teece, Pisano and Shuen (1997) define dynamic capabilities as a firm's capacity to integrate, build and reconfigure internal and external resources and competences to address and rapidly shape changing business environments (Teece, Pisano & Shuen 1997: 516). Teece (1997) structures dynamic capabilities into the capacity to: (1) sense and shape opportunities and threats, (2) seize opportunities and (3) maintain competitiveness through enhancing, combining, protecting and, when necessary, reconfiguring the business enterprise's intangible and tangible assets (Teece 1997: 1319). The empirical findings demonstrate that sensing and shaping opportunities and threats can be understood in terms of gathering knowledge and evaluation of its relevance (M1-M11, C1-C12). M3 explains how she stays informed. "*Max-Planck has its headquarters in Munich and they also publish a magazine, which I read on a regular basis, as well as the newsletter, this is something that I would always read. Furthermore there's the Technical University here in Munich, they publish a magazine as well and the Ludwig-Maximilians-University too, that's all very important for us. Siemens, a huge industrial company (…) is also very interesting. And BMW of course, we read all their publications. It's really important to keep up with that" (M3).* Seizing opportunities reflects the communicators' capacity to make entrepreneurial or collaborative projects visible and accessible to the public (M1-M11, C1-C12). C2 describes his newspaper as catalyst for collaborations. *"We actually joined up companies, within the business community, which helped them collaborate with one another. Before you would have had companies operating in isolation. You've*

*got to have networks and connections (…) We actually formed that role, by publicising companies and their role and what they were doing. So we actually acted as a catalyst for collaboration*" (C2). Finally the maintenance of competitive advantage describes the communicators' capacity to position the invention or organization in the public domain by enhancing information on its strengths and uniqueness, which then may be recombined and reconfigured to protect the successful position in a changing environment (M1-M11, C1-C12). "*I want the people to know what our research is about, to attract further scientists, to show them that our university is the best employer. I want to tell an organization that if they are interested to collaborate scientifically, our university is the best collaboration partner. I want to show that innovative science is happening here*", describes M4 (M4). Revealing the relevance of communicators' capacities in terms of sensing and shaping opportunities and threats, seizing opportunities and maintaining competitiveness, the findings provides empirical insight to innovation communication as dynamic capability.

### 6.2 Practical Implications

Besides the theoretical contributions, this study also provides practical implications. Analysing the role of communicators in innovation clusters, the empirical findings offer insight to the current and relevant fields of cluster communication and policies addressing innovation clusters.

#### *Implications for Cluster Communication*

As demonstrated by East London Tech City, cluster communication is a current issue. The new cluster established a centrally organized public communication that strategically manages information and presentation in order to coordinate companies in the cluster, recruit potential members and employees and gain attention from financial supporters. Eliciting contrasting findings in terms of public communication on a cluster level, the case studies Munich and Cambridge identify relevant implications regarding a common communication.

- A major factor is the developmental phase of the cluster. The findings highlight establishing a common communication at an early stage of the cluster. Tech City implemented the central coordination from its very beginning, whereas the mature clusters Munich and Cambridge evolved over the last 50 years developing specific dynamics of communication. M7 explains "*if a cluster is established from scratch, I would support the pursuit of a common communication. But now it is difficult to integrate the diverse players of the innovation region, with all their different interests*" (M7) and C5 seconds referring to Cambridge that "*you would never create a cluster like this (…) because it is crazy*" (C5). In the early stage of cluster development, a common communication is therefore encouraged, as later stages challenge the integration of different cluster members due to the cluster's complexity.

- A further factor can be seen in the companies' natures within the cluster. The Munich organizations and institutions are perceived as advantageous on their own due to their diversity and success. M10 explains that "*the diversity of voices can be a big, big advantage*." (M10). Despite the success of the Cambridge organizations, the findings show that the B2B nature of the companies challenges organizational communication, which encourages a cluster communication to gain the attention of relevant stakeholders, as C1 explains "*if a cluster is visible then investors would come here and then look for individual companies. It is unlikely that they come straight from over there to a company if there isn't this layer of communication and activity up here*" (C1). The situation of the cluster's companies should thus be taken into account in terms of cluster communication.
- The research revealed the strong impact of competition on the clusters and is also a critical factor for common cluster communication. The findings reveal that the Munich organizations are competitors which aggravates an integrated cluster communication. "*I can't see it working for Munich. The players are just too different, the region is just too big",* explains M8. In contrast, the Cambridge cluster is influenced by strong external competition, which calls for a common communication and representation in order to establish a successful position in the public domain. *"Well, it is necessary, and at the moment, I'm working on some plans for improving that situation, which will end up with an entity which will be marketing Cambridge*" (C11). Therefore the competition that the cluster's organizations face should be seen as having implications for cluster communication.

***Implications for Policymakers***

Innovation clusters continue to be a relevant topic for policymakers as successful clusters strengthen the dynamic capability and thus the competitive advantage of a region. The case studies Munich and Cambridge highlight the divergence between the actual aim of the policies addressing innovation and research and their impacts and thus provide practical implications for opportunities and challenges of governmental involvement.

- The Munich innovation region is strongly influenced by the *Cluster Initiative*, the *Excellence Initiative* and the *Spitzencluster Competition*. The contextual facts show that the three major initiatives aim to foster regional collaborations and the creation of an innovation cluster. Yet the empirical findings from the interview data reveal that the communicators do not regard themselves as part of a cluster. "*I could imagine that the confusion stems from the policies, which define the term cluster quite narrowly, and intervene with very concrete funding projects*" (M2). The Bavarian and German ministries introduced the term "cluster" in a specific way and established meanings, which don't reflect the economic-geographical agglomeration of

innovativeness. As most of the interviewees are not directly affiliated with the governmental initiative, they don't identify with a cluster.

- The contextual facts show that the Cambridge innovation cluster has been financially strengthened by the government in terms of direct and indirect support. However the data reveals a perceived absence of supportive policies. One reason for this can be seen in the comparison with the cluster London Tech City. Whilst the UK government established Tech City by providing substantial financial support, the policies addressing Cambridge created a supportive infrastructure rather than the cluster itself. In comparison to the extensive funding of Tech City, the findings reveal a perceived lack of financial support. Focusing on Tech City, C9 regards the UK involvement as "*a policy they might come to question in the future, because to hold up the capital and not the other cities and clusters around the UK might come back to bite them. It's probably better to recognise that there are several centres of excellence around the UK"* (C9). The findings thus implicate the significance of supporting geographically close competitive locations and spread policies evenly on a national basis.

# 7 Discussion

Based on the theoretical and practical contributions, this chapter discusses the study and provides an evaluation of the research. Due to the empirical insights the conceptual model needs to be revised by taking the inductive findings into account to complement the understanding of the communicators' role in innovation clusters. Furthermore future research suggestions are proposed based on the insights of this study. Finally this chapter identifies methodological and language limitations and discusses how these potential difficulties were addressed.

## 7.1 Revision of the Conceptual Model

The inductive findings suggest the influence factor *Challenges* on the *Organizational Level* for the Munich case study as the Munich communicators referred to difficulties in the innovation process, starting from challenges in basic research to challenges in applied research. While organizational challenges are not observed in the Cambridge case, the findings point to the influence factor *Challenges* on the *Cluster Level* as the communicators refer to difficulties in terms of cluster characteristics such as the dominance of the University and the B2B nature of the companies. At the *Cluster Level*, both case studies reveal the theme *Competition*, which ultimately was the most influential inductive factor. The Munich case study showed an internal competition amongst the institutions within the innovation region. The Cambridge case study highlighted strongly perceived external competition deriving from the cluster London Tech City. The location of the perceived competition can be regarded as highly influential as it impacts the role of communicators and the

innovation clusters significantly. The *Context* is complemented by *Economic* and *Political* factors in Munich and *Financial* and *Geographical* factors in Cambridge. These additions make the specific situation of the case studies visible and thus should be taken into account. The revised conceptual model can be seen as a valuable conceptual contribution to communication studies. Whilst previous communicator studies focus on one profession or one media-company this model takes a broad field of communication professions, sectors and institutions into account, as defined by the cluster context. The conceptual approach of this study thus extends the investigation of the concept "role". Furthermore the model reflects the interdisciplinary foundation of this study. Taking the *Cluster Level* into account, the model applies a conceptual approach derived from communication studies to a new field of research. Broadening the understanding of communicators and the research field, this model creates a valuable foundation for further interdisciplinary communicator studies. The revised conceptual model is presented in appendix II.

### 7.2 Suggestions for Future Research

In analysing the role of communicators in innovation clusters, the findings reveal significant differences regarding the identity of the clusters: While the Munich communicators do not agree upon a collective cluster identity, the Cambridge communicators share a common understanding of the cluster's identity. Based on this study, it is assumed that the cluster's identity can be seen as a critical element in the successful development of innovation clusters. Given the explorative nature of the research on cluster identity, a qualitative approach would appear most suitable. By means of contrasting case studies, the relevant factors in creating and influencing a collective identity could be identified. Furthermore the analysis could explore the implications of the identity's presence or absence, contributing new insight into cluster research. This study suggests the following factors as significant basis for future research:

- The historical development of the innovation clusters appears to be significant in creating a cluster's identity. Whilst the Munich innovation region evolved from individual successful organizations and institutions, the Cambridge cluster grew through spin-outs from the University and collaborations between academia and industry.
- Policies addressing innovation and research influence the identity of a cluster significantly. Whilst Bavarian and German policies introduced specific cluster meanings, British policies supported the infrastructure for collaborations, which promotes the formation of a common identity.
- The location of competition plays a strong role in the creation of identity. Whether competition is perceived inside the cluster, as in Munich, or outside the cluster, as in Cambridge, aggravates or strengthens internal collaborations and impacts a collective identity.

- Furthermore this study highlights the significance of communicators in creating a collective identity. In establishing access to the cluster through clarification, explanation and representation, communicators shape the internal and external perception of a cluster's identity.

Based on these insights, a new research is suggested to investigate the identity of clusters on an empirical level.

### 7.3 Limitations of the Study

Investigating the role of communicators in innovation clusters, the explorative, interdisciplinary approach of the research posed challenges, which led to potential limitations for the work.

A methodological challenge can be seen in the selection of interviewees based on the systematic Google research. Whilst the systematic Google research provided initial insight by allowing a structured approach to a complex research interest, it faces limitations. First of all, Google only reaches online communication and digital representation. Yet not all potentially relevant communicators might publish online. Furthermore it is important to take the regulations of Google into account. Although it is a commonly used program, its results are influenced by various factors, such as the country, former Google searches and currently trending themes, which can lead to changing results. Taking only the first Google page into account to narrow down the results to a manageable size, variations in the ranking might exclude potentially relevant publications. In terms of Google rankings, it should be noted that many publishers draw upon Google optimizations to manipulate their position on the result list, which can replace further potentially relevant communicators. To meet those shortcomings, the following steps of the communicator selection process are essential and complement the Google research: The second step of close reading provided insight to print publication and broadens the range of relevant communicators. Finally the snowball methods created an access to insider knowledge and included personal information. The selection steps thus need to be understood as consecutive by complementing the insights.

Conducting an international study, language limitations have to be taken into account. The challenges for bilingual studies became visible concerning the term "cluster". The English term is used as an Anglicism in Germany and thus not as well understood as in the UK. The findings revealed that the policies of the Bavarian and German ministries introduced the term cluster in a customized and specific context that did not correspond with the English meaning. The communicators agreed upon the term "innovation region" to describe the meaning of cluster and this was therefore used for the rest of the study. This language difficulty was unforeseen and became apparent during the data collection. It can thus be argued that the confusion over the terms used generated inconsistency in the Munich data conduction: while the approach of the research focused on the term cluster, the interviews were based on the term innovation region. This potential limitation

impacted the interviewee selection, as the selection process used the term cluster. To address this potential limitation, an examination of the systematic Google research was conducted, using the term “innovation region”. The Google hits revealed that this term would not have led to useful results for the research interest and would have aggravated the identification of relevant communicators. Furthermore, the fact that the selection process was based on the term “cluster” identified communicators who do not identify with a cluster strengthens the study’s validity.

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**Appendix I Systematic Google Research**

Exhibit I.1 demonstrates the search terms that created the initial access to the field of the communicator selection. To achieve a broad spectrum of results, the search terms were applied with different spellings and both with and without hyphens. A subsequent search included quotation marks to allow the exact order of the search terms and provided further insight. Furthermore, the research of the Munich cluster drew upon both German and English search terms to meet the standards of an international investigation.

| **Munich** | **Cambridge** |
|---|---|
| München Cluster | Cambridge Cluster |
| „München Cluster“ | “Cambridge Cluster” |
| Cluster München | Cambridge Innovation Cluster |
| „Cluster München“ | “Cambridge Innovation Cluster” |
| Munich Cluster | Cambridge Technology Cluster |
| „Munich Cluster“ | “Cambridge Technology Cluster” |
| Innovationscluster München | Cambridge High Tech Cluster |
| “Innovationscluster München” | “Cambridge High Tech Cluster” |
| Innovation Cluster Munich | Cambridge High-Tech Cluster |
| Exzellenz Cluster München | “Cambridge High-Tech Cluster” |
| „Exzellenz Cluster München“ | Cambridge High Tech Cluster |
| Excellence Cluster Munich | Cambridge Hi Tech Cluster |
| „Excellence Cluster Munich“ | Cambridge Hi-Tech Cluster |
| Technology Cluster München | Cambridge Business Cluster |
| „Technology Cluster München“ | “Cambridge Business Cluster” |
| Technology Cluster Munich | Cambridge Business-Cluster |
| Technologie Cluster München | “Cambridge Business-Cluster” |
| “Technologie Cluster München” | Cambridge Technopole |
| Spitzen Cluster München | “Cambridge Technopole” |
| Spitzencluster München | Silicon Fen |
| High Tech Cluster München | “Silicon Fen” |
| High-Tech Cluster München | The Cambridge Phenomenon |
| “High-Tech Cluster München” | “The Cambridge Phenomenon” |
| High Tech Cluster Munich | |
| High-Tech Cluster Munich | |

*Exhibit I.1 List of Search Terms for the Systematic Google Research*

**Appendix II Revised Conceptual Model**

Due to the empirical insights the conceptual model was revised by taking the inductive findings into account to complement the understanding of the communicators' role in innovation clusters. The findings suggested the influence factor *Challenges* on the *Organizational Level* for the Munich case study, as well as *Challenges* on the *Cluster Level* for the Cambridge case study. In addition, both case studies emphasized the significance of the factor *Competition* on the *Cluster Level*. The *Context* is complemented by *Economic* and *Political* factors in Munich and *Financial* and *Geographical* factors in Cambridge. Exhibit II.1 presents the revised conceptual model.

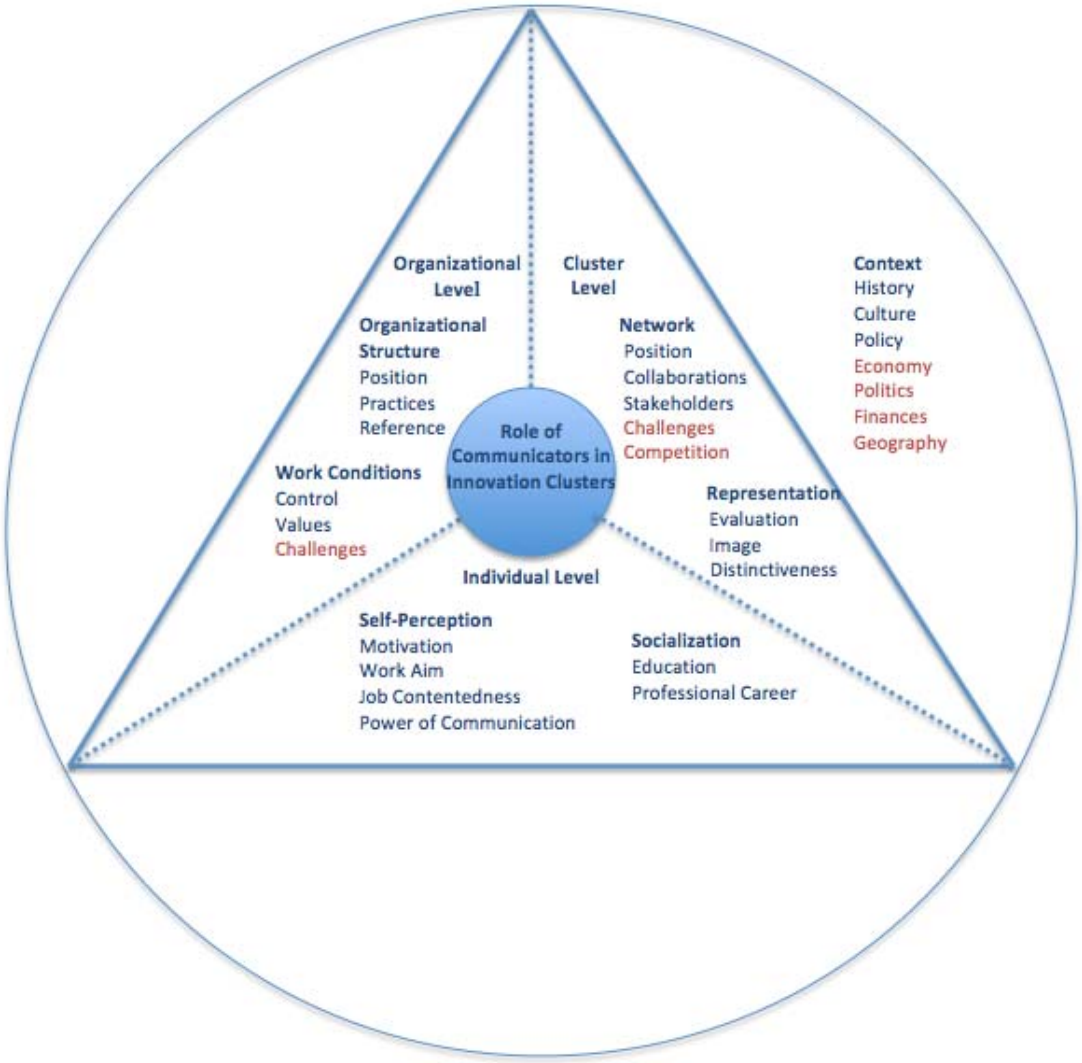


*Exhibit II. Revised Conceptual Model*