Ecosystems/Network
Dear readers of this research report,

It is my pleasure to inform you about our current research and managerial activities. We aim at presenting you this information in a rather non-typical scientific way in order to foster discussion and interaction with you. Therefore, my team and I summarized the most important research results and projects undertaken into short articles which should serve as impulse for your daily innovation practice as well as to rethink and deepen your knowledge about innovation management.

With this report, we would like to thank our engaged research partners who helped us tremendously conducting our research and advancing the field of innovation management. Within joined projects, responses to our surveys and cooperation in teaching, we aim to work very close at the needs of practice with our scientific knowledge and tools. Please stay in contact with us and help us to identify future needs and research topics!

Again, thank you for your time and effort and please do not hesitate to contact us!

Best regards

Ellen Enkel

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the institute in a nutshell
Highlights and our major topics of the year

In the following section, you will find selected events the team of the Dr. Manfred Bischoff Institute participated during the year 2016. For more events please look at our website and the sections news to be informed about past and future events.

Colloquium for doctoral candidates from January, 18th – 19th 2016

“Can organisations with distinctive social integration mechanisms profit from a higher absorptive capacity if they collaborate with partners from distant industries?”, “Is networking associated with realizing radical innovations?”

These are only two of the research questions, which have been illustrated at the chair of Prof. Enkel during the colloquium for doctoral candidates. Prof. Dr. Jens Leker from the Westfälische Wilhelms-Universität Münster as well as Prof. Dr. Holger Ernst from the WHU were visiting the institute with their research fellows, who presented their current research projects and topics ahead of the teams as well as three other external doctoral candidates. At the end of the second day, everybody agreed: the cross-university exchange has been expiring for the own academic activity, and the networking emerging from it, offers new possibilities of collaboration.
Prof. Ellen Enkel had the honor to be invited to the advisory expert group for Societal Challenge 6 „Europe in a changing World“ of the European Commission. The expert group is responsible for giving recommendation to the European Commission which topics and areas should be addressed in the last round of the Horizon 2020 funding. Therefore, current challenges in Europe like migration and digital education are discussed by the expert group and possible solutions through the definition of research areas identified. This was the second-time Prof. Ellen Enkel served as an expert for the EU commission besides her engagement as European open innovation expert in 2013.

Prof. Dr. Ellen visits Vinnova in Sweden on May, 23rd 2016

Prof. Ellen Enkel was invited to act as an evaluator for the Swedish funding agency Vinnova in order to support the evaluation and selection of the most promising proposals for new research centers in Sweden. The proposals targeted a large variety of different technologies and markets from sustainability in water management to stroke prevention.
NaKoGi-Workshop at Zeppelin University

Participants of the NaKoGi-WS at Zeppelin Hangar ©: private

The national competence center for business model innovation – NaKoGi – organized from June, 15th to 16th 2016 a workshop at Zeppelin University, dealing with measuring and operating business model innovation processes. Precisely, the task force discussed on this two-day workshop by what criteria enterprises in the particular phases of the business model development can measure the success of a business model, and how the management appropriately makes a decision. Fascinating lectures from both academia and practice completed the programme.

A special event represented the guided tour across the Zeppelin Hangar of Friedrichshafen, where the participating company representatives could assure themselves of the impressing dimensions of a zeppelin, and furthermore got other information about the technic details and the history by one of the most experienced pilots of the Zeppelin.
At the ISPIM 2016, themed „Blending to tomorrow’s innovation vintage“ and located in Porto from June, 19th – 22nd, Prof. Dr. Ellen Enkel and her doctoral students Annika Dingler and Monika Hengstler presented their newest research results. The conference for academics from the field of innovation, industry managing boards, masterminds, and policy makers offered a platform with more than 50 workshops, keynotes and discussion panels.

The two introduced articles “Managing Technological Distance in Collaborative Innovation: AC-Routines and Social Integration.” and “Innovation Ecosystems: With Great Power Comes Great Responsibility” found high agreement and a lot of positive feedback by the audience.

We have been very pleased that SAP with Claus von Riegen was nominated to the three finalists for the practitioner award for outstanding innovation management, especially in the area of business model innovation. This area at SAP has been supporting the Chair of Innovation Management since 2013 by the NaKoGi-project.
Prof. Dr. Ellen Enkel with her research fellow Annika Dingler at the EURAM 2016 in Paris

From July, 01st – 04th 2016, the EURAM conference took place at the university Est-Créteil in Paris. Like every year, the conference offered a platform to discuss current management research topics. This year the conference was themed “Manageable Cooperation?” Annika Dingler presented successfully her paper “The social structure of innovation: A network perspective on intraorganizational knowledge transfer”, for what she received an excellent feedback.

In her role as editor at the R&D Management Journal, Prof. Enkel gave the lecture ”How to publish in R&D Management Journal" at the meet the editor session, and faced the audiences’ questions in the subsequent discussion.
From left to right: Prof. Dr. Ellen Enkel, Prof. David Teece (University of California, Berkeley), Mark Samuels (NIHR Office for Clinical Research Infrastructure (NOCRI), Centre for Science and Policy), David Probert (IfM, University of Cambridge), Jeremy Klein (chairman of RADMA trustees) © R&D Management Conference 2016

From July, 03rd – 06th 2016, the R&D Management Conference themed "From Science to society: Innovation & Value Creation", organized by the Centre for Technology Management, University of Cambridge took place.

This conference will be annually organized in close alignment with the R&D Management Journal, which is the internationally leading journal in innovation and technology management. Prof. Enkel is not only member of the advisory board of the conference, but also editor-in-chief of the journal since 2012. The conference, which addresses both academics and practitioners, reveals that research and development lies at the heart of all technology intensive enterprises. High-class keynote speakers like Prof. David Teece from the University of Berkeley, workshops, and tutorials demonstrated the numerous participants the challenges for research and development, if it should be of societal, environmental and economic benefit. On this occasion, Annika Dingler, doctoral student at the institute, presented her paper "Social Integration Mechanisms as Enablers for Learning and Innovation.", which found great favor by the audience.

In the framework of the meet the editor session, Prof. Dr. Ellen Enkel gave the lecture "How to publish in R&D Management Journal" as well as the workshop "New Trends in Publishing" in collaboration with the publishing house Wiley.
Prof. Dr. Ellen Enkel at the 14th International Open and User Innovation Conference in Harvard

From left to right: Prof. Dr. Ruth Stock-Homburg and Prof. Gloria Barczak (both from Journal of Product Development), Prof. Dr. Ellen Enkel, Prof. Dr. Nik Franke (Journal of Business Venturing), Prof. Karim Lakhani (Management Science)  ©: hbs

During her stay as guest researcher at Harvard Business School, Prof. Dr. Enkel visited the 14th International Open and User Innovation Conference, which took place at the Harvard Business School Campus in Boston, USA from August, 1st – 3rd.

The International Open and User Innovation Conference is the leading academic conference in the area of open and user innovation. Approx. 200 researchers from different fields (like innovation management, strategic management, organizational planning, marketing, management for intellectual property right, entrepreneurship, and public policy) meet annually to exchange newest research results and plans respective open and user innovation.

In the course of the editor panel Prof. Dr. Ellen Enkel discussed with Prof. Gloria Barczak and Prof. Dr. Ruth Stock-Homburg from Journal of Product Innovation Management, Prof. Dr. Nik Franke from Journal of Business Venturing as well as Prof. Karim Lakhani from Management Science the questions, what distinguishes their journals from others, and how publishing open and user innovation topics in these journals.
From August 25th to 26th, Prof. Dr. Enkel held a two-day open innovation workshop in Belfast at the invitation of and the collaboration with the University of Strathclyde Dr. Beverley Wagner. The workshop series funded by Scottish Enterprise should facilitate the knowledge exchange between practice and research, especially in the field of applying open innovation. Based on numerous practical examples, Prof. Enkel illustrated the collaboration of small and medium-sized enterprises based on her 20 years’ experience with the topic of implementing open innovation in companies.
Annika Dingler and Monika Hengstler have both finished successfully on December, 6th their biennial graduation at the chair for innovation management with their disputations.

Ms. Dingler wrote her dissertation entitled „A knowledge-based perspective on open innovation: The role of social integration.” Her thesis investigates the following research question to emphasize the relevance of social integration to an organization’s open innovation capabilities: How can an organization facilitate social integration to enhance knowledge transfer with internal and external partners and hence improve the benefits of open innovation? Ms. Dingler’s thesis comprises four empirical studies that address this research question and investigate how, why and to what extent social integration influences knowledge transfer between partners collaborating for open innovation.

Ms. Hengster wrote her thesis entitled “Radical innovation by means of open innovation: Empirical studies on ecosystems, capabilities and trust.” Her dissertation investigates the research question: How do firms systematically and purposefully engage in radical innovation under the paradigm of open innovation? Based on theoretical insights and five empirical studies, this dissertation does not only depict a comprehensive picture of radical innovation under the paradigm of open innovation, it also contributes to understanding of the troika of trust, collaboration, and radical innovation, it fundamentally extends research on innovation ecosystems as a means for radical business model innovation, it links multiple disciplines and consolidates a broad range of research streams, and finally, it outlines developments in research methodology.

In the presence of the university examination board as well as the primary and secondary supervisors – Prof. Dr. Ellen Enkel and Dr. Lawrence Dooley from the University College Cork, Ireland for Ms. Dingler as well as Prof. Dr. Ellen Enkel and Prof. Dr. Oliver Gassmann from the University of St. Gallen, Switzerland for Ms Hegstler – both examinees presented each their research study and faced up subsequent to the critical questions of the supervisors as well as the examination board. Both documented with aplomb their academic knowledge and have been rewarded for their theses with summa cum laude.
The 3rd Annual World Open Innovation Conference, themed “Open Innovation in the Digital Age”, co-hosted with ESADE in Barcelona, Spain, took place from December 15th to 16th and brought together renowned academics, leading enterprises and innovators in the Open Innovation area to discuss new theoretical and applied research in open innovation.

Prof. Ellen Enkel was invited to give a keynote at the conference in Barcelona at the Esade Business School organized by Prof. Dr. Henry Chesbrough and Prof. Dr. Marcel Bogers. She spoke in front of 200 participants from science and practice about the influence of digitalization on the research field open innovation as well as how digital technologies might help to study collaborative innovation in the future. Additionally, she was inviting scholars to submit their work to the special issue she is editing with Prof. Dr. Henry Chesbrough and Prof. Marcel Bogers in the R&D Management Journal in March 2017.
Innovation at the institute in figures 2016

4 Best Open Innovator Awards

About 200 companies participating in open innovation survey 2015

Participation in 8 international scientific conferences and workshops

5 Presentations at Management Conferences and Symposia

Research projects in practice done with

International research cooperations with
Harvard Business School, INSEAD Business School Paris, Universität Wien, Aston Business School, Birmingham University, Cambridge University, University of San Francisco, University of California Berkeley, University of Tilburg, Universität Stuttgart, Heinrich-Heine-Universität Düsseldorf, Universität St. Gallen, TU Berlin, TU München, Westfälische Wilhelmsuniversität Münster, LUT Lappeenranta
32 academic and managerial articles

14 international conference submissions
9 scientific articles under review
7 published or accepted scientific articles
3 published managerial contributions

29 supervised theses
2 graduate theses
10 bachelor theses
17 master theses

1,880 participants at lectures of the institute

368 students learning about innovation in fall/spring-semester

<table>
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<th>115 Bachelor students</th>
<th>at the courses Introduction to Innovation &amp; Technology Management; Business Model Innovation as well as Open Innovation</th>
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<td>104 Master students</td>
<td>at the courses Advanced Open Innovation, R&amp;D Metrics &amp; Creativity, Knowledge Management,</td>
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<tr>
<td>149 Executive Master</td>
<td>students participated in each of the modules Collaborating in Networks, Digital Trends, Scenario Technique, Entrepreneurial Culture and Business Plan Creation, Micro Trends in Web 3.0, Innovation &amp; Technology Management, Trend Research &amp; Scenario Technique and Business Model Innovation</td>
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insights in open innovation
Open Innovation Research – What do we know until now?

The open innovation study under the direction of the Chair for Innovation Management is taking place since 2010 and examines frequently, how the collaborative innovation behavior of middle and big enterprises in Germany, Austria and Switzerland is developing. Since Henry Chesbrough has introduced the concept of open innovation, in Europe the awareness has turned out to be a dominant design that collaborative innovation processes enable innovation performance in a more efficient and effective way.

While current practice and theory dealt more intensive with the success of single activities like customer and supplier integration (Gassmann et al. 2010), crowdsourcing and common research projects with universities, the newer research is engaged in the right balance of open and closed innovation activities corresponding the strategic orientation and business culture (Bader and Enkel 2014). Generally, we know today that enterprises which are willing to position themselves as technological leaders, have to execute more and manifold open innovation activities to exploit all innovation potentials than fast followers or cost leaders, who want to realize the improvement in efficiency rather by customer and supplier integration. Niche leaders, however, do not even need any external knowledge as well as no external resources, they can successfully pursue closed innovation. Also industry speed and size of the enterprise have an influence on the necessity and the way of activities, which illustrate the best cost-benefit ratio for the company.

Three core processes of open innovation activities can be categorized, in which one the outside-in process describes the integration of external knowledge, the inside-out process the delivery of knowledge for external commercialization and the coupled or co-creation process the common knowledge development with partners (Gassmann and Enkel 2004). Also today it is clear that these processes need different capabilities within the company, e.g. absorptive capacity (Enkel and Heil 2014) or integration capabilities (Enkel and Dingler forthcoming), and can result in new technologies, products, processes, business models (Roseno et al. 2013) as well as the capture of new markets or the installation of quite new businesses (Enkel and Mezger 2013).
with and without partner (e.g. in ecosystems, see Enkel and Hengstler forthcoming).

But how much open innovation does your company really need and which role does the business strategy and culture play in this process? Our current research based on the open innovation study 2015 has dealt with exactly this question. From the results, we have developed the following concept, which will be explained below.

Fig. 1: Open Innovation archetypes

If a business strategy and the opening degree thereby connected enables a company to provide top efficiency depends relevantly on the business culture. A business culture, which enables the company purposeful inflow and outflow of knowledge, has to be established systematically. While the personnel at the beginning of the opening sense external knowledge as threat for the own reputation of an expert - the so-called not-invented-here syndrome takes effect -, the management has to get the necessity across by appointing an open innovation officer and to incentivize the employees for desired open innovation behavior the culture will be slowly changing to more openness by first achievements in the integration of external knowledge.

Thus a ‘traditionalist’ becomes a ‘modernist’ and the opening of the innovation process will be seen as a chance. In an initial stage the enterprises focus first of all stronger on the outside-in process and here on the integration of familiar partners of the
value chain. Thereunto belong customers, suppliers and research organizations or consultancies. Only by first achievements and with the help of a responsible department new partners - that are knowledge resources - will be acquired, and long-term collaborations with different partners in diverse stages of the innovation projects will be coordinated. Now the enterprise uses a huge variety of different activities both in the integration of external knowledge (outside-in process) and the collaboration with partners (co-creation). The business culture has opened so wide that every employee not only sees the potentials of open innovation for his innovation activities, but also can choose and execute the correct activities. At this point the company changes from a central open innovation department, which serves with coordinating and supporting functions to a decentralized organization within the business units. A consequence of this adjustment is an increase of open innovation activities, but also a focus on rather incremental innovations in customer-orientated business units without the long-term vision and the financial support of the top management. The proportion of radical versus incremental innovation differs strongly corresponding to the strategic orientation of the company (a technological leader has to integrate the newest technologies in his products, which are often radical innovations, while a fast follower rather focusses on cost-efficient incremental innovation) and the industry (by way of example enterprises have more incremental innovation in the consumer goods industry, because they have faster product life cycles and lower costs per innovation, while the companies of the IT industry have to keep pace with new technologies and quickly changing customer, which will be addressed by means of radical innovations).

The ‘visionaries’ now are applying open innovation stronger as a strategic instrument to develop for example radical innovation with partners from different industries and to orchestrate networks, which combined in an ecosystem, open the company new dynamic innovation possibilities. Thus, in the business-to-business area the realization of smart manufacturing (industry 4.0) will not be successful without a tight networking with other enterprises of the same and other industries. Also in the business-to-consumer area innovations like autonomous driving or smart home will be only possible in ecosystems of partners from diverse sectors. Here the company will profit most, which knows how to orchestrate its network as a keystone and to commit itself preferably quick and flexible with the help of new business models to changing environmental conditions by policy, technological development and market needs. Also the collaboration with other major enterprises, start-ups, as well as
governments and citizens will become powerful. The for this purpose needed dynamic capabilities assume the percipience and the adequate reaction to environmental changes, the mobilization of partners in a network and the orchestration of these partners in changing cooperative and competitive activities. Beside the dynamic capabilities of opportunity recognition and adoption, communicative capabilities are of vital importance. The professional interacting of knowledge need and the potential, to absorb and assimilate distant knowledge, to establish a trusting relationship, and to be able to reuse anytime the acquired knowledge, boost the efficiency and the effectiveness of the visionary.

At this juncture, it needs to be stressed that the described developmental stages represent in no case a compulsory continuum, because the business culture can both delay or prevent the further development and the strategic positioning can make an intensification of the open innovation activities counterproductive. Thus, an enterprise has to find its own balance of in-house development and collaboration in innovation management. Every phase, traditionalist, modernist, and visionary need different capabilities, which have to be accordingly to the changes of the outside world. In slow industries, a change from a traditionalist to a modernist is long-term reasonable, in fast industries the further development to a visionary quickly is essential for survival.

In the last years, Prof. Enkel and her team have developed detailed analysis on the interaction between strategy, culture and opening as well as the capabilities needed, and we therefore can explain the requirements, tasks and challenges of traditionalists, modernists and visionaries. The current research focuses on understanding ecosystems, the visionary needs to build up and maintain in order to grow in existing and new markets. Thus we have dealt with the capabilities of the keystone, the leading enterprise of an ecosystem (Heil and Enkel 2015; Enkel and Hengstler forthcoming), with the strategic open innovation activity portfolio of the enterprise, supporting rather radical than incremental innovation (Enkel and Hengstler forthcoming), the digitalization as significant driver for new business models (Enkel and Mezger 2013) and cooperation as well as the so-called social integration mechanisms, to which belong the assimilation and transmission of knowledge from external and internal partners (Dingler and Enkel 2016) and their socialization, e.g. to orchestrate a network (Enkel and Hengstler forthcoming).
Further publications of the chair in open innovation


cross-industry innovation
Managing technological distance in collaboration: Social integration for innovation.

Problem

The innovation process involves resource-intensive search to explore new frontiers that are radically different from existing offerings and to find commercially exploitable new combinations of technological knowledge (Rosenkopf and Nerkar, 2001). This requires organizations to work with and draw knowledge from many actors within and outside their organization.

To build this knowledge, organizations often look beyond their focal industry and recognize the value of having partners from outside the established value chain through informal collaborations, strategic alliances, and joint ventures for opportunities to diversify knowledge related to new technologies and innovations (Rosenkopf and Nerkar, 2001). By seeking innovation outside their own industry, firms extend their boundaries to acquire technologies different from their current portfolio while increasing the number and variety of possible new technological combinations with potential for highly novel solutions. The “extent that firms differ in their technological knowledge” (Gilsing et al., 2008) reflects their technological distance. High technological distance makes it more likely that organizations will encounter potentially valuable internal and external collaboration partners during collaboration, which contributes to the value of novel interaction, which, in turn, leads to radical innovation.

However, at a certain point, technological distance becomes so high that it can obscure the sufficient mutual understanding required to utilize opportunities that arise during collaboration (Nooteboom et al., 2007, Gilsing et al., 2008). Thus, when venturing a field of its focal industry, an organization’s ability to preclude complexity of interaction lies at the core of explorative learning and knowledge creation, which minimize inconclusive results. Moreover, since interaction promotes the sharing of distant knowledge, many of the costs of integration and recombinatory innovation (Phelps, 2010) can be reduced.

Current understanding

Since other forms of proximity are frequently substituted for technological distance in collaborative innovation (Huber, 2012), embeddedness literature
points to the role of social proximity in organizations’ ability to learn and innovate by interaction (Uzzi, 1997). In essence, this literature indicates that the integration of difficult transferable knowledge depends on the degree to which social ties are embedded in an overall social context. Further, and particularly important regarding distant collaboration, embedded ties are believed to provide alternative solutions to the problem of coordination and communication of private and proprietary knowledge that can increase team productivity and facilitate explorative learning (Uzzi, 1997). This is consistent with other work emphasizing that an organization’s connectedness to external knowledge sources provides benefits in terms of access to and exploitation of external knowledge and innovation performance (Phelps, 2010).

In particular, absorptive capacity literature has pointed to the importance of social integration mechanisms that transcend internal and external absorptive capacity routines and facilitate coordination and communication within and between organizations (Lewin et al., 2011). Jansen et al. (2005) empirically demonstrated that connectedness to internal knowledge sources at various hierarchical levels and socialization tactics of individuals within organizations strengthen absorptive capacity. Concurrently, Ebers and Maurer (2014) showed how the capacities of organizational boundary spanners who stand at the interface between potential external knowledge providers, on one hand, and employees within the organization, on the other, impact organizations’ potential and realized absorptive capacity.

While this work emphasizes the importance of the role of social interaction in accessing external knowledge related to the current knowledge base of an organization, it does not provide or test theory on how social interaction patterns of lower-level actors enrich an organization’s ability to integrate distant knowledge or whether organizational learning efforts are primarily sustained by facilitating social interaction and, hence, actors’ involvement in the integration of new knowledge (Nooteboom et al., 2007). In this regard, Volberda et al. (2010) suggested further research to explore the complementarity between socially enabling intra- and inter-organizational antecedents of absorptive capacity. They further emphasized the importance of future research into the dynamic representation of absorptive capacity, which assists organizations in recognizing new knowledge through the incorporation of feedback loops, allowing them to collaborate at great distance.
Research question

The main aim of this study is to explore how social integration mechanisms such as connectedness and socialization and the extent of informal interaction facilitate learning in distant collaboration within and across organizational boundaries.

Research Design

The topics are approached by multiple case study analysis, including interactions with managers from 26 projects, all of which were coping with technological distance in internal or external collaboration. We ensured that our sample includes not only successful projects, but also failed projects, to enhance the comparability of the cases regarding differences in social integration mechanisms and respective learning outcomes. Data collection relied on semi-structured interviews and company workshops, which was further triangulated with secondary data, to grasp the empirical richness of such disruptive contexts. The interviews were administrated on face-to-face visits to headquarters and subsidiaries and by phone contacts. The interviews lasted between 60 and 90 minutes and were taped and transcribed where possible for the majority of cases to ensure information reliability.

Findings

The analysis of our data provides a substantial basis to understand and explain how firms apply different internal and external absorptive capacity routines to managing technological distance in internal and external collaboration. We inferred four types of social integration mechanisms that alone, and in combination, determine whether the project team was able to transfer and adapt distant knowledge. Internal connectedness precludes project teams from locking out alternative technologies, setting the stage for knowledge transfer in technology from other industries by fostering acceptance and use of foreign knowledge brought in by peer. External connectedness increases a project’s capacity to translate and leverage the new knowledge that has been absorbed, by incorporating it into the firm’s knowledge stock. Systematic communication is notably exposed as a catalytic converter, as it builds the bridge and provides complementarities between internal and external absorptive capacity routines during the cause of overcoming technological distance. Finally, socialization proposes an umbrella mechanism for internal and external connectedness that primarily reinforces knowledge transfer at all stages of internal and external absorptive capacity routines within and between firms.
Together, our findings indicate that the combined effect of social integration mechanisms is greater than the effects of individual mechanisms that are conducive to the development of absorptive capacity. Social integration mechanisms link “horizontal” and “vertical” knowledge increasing the breadth and depth of the project team’s knowledge base as well as ensuring that the project will be successfully completed. If a firm possesses the mechanisms to induce collaboration with internal partners, the similar mechanisms are also conducive to collaboration with external partners, and vice versa. In addition, strong and trusted relationships build up cooperative routines that allow project members to manage other ties effectively and efficiently. Thus, due to such learning effects, project members with strong and trusted internal ties will be better able to establish such ties externally, and vice versa.

Contribution

We focused on how social integration mechanisms facilitate learning in distant collaboration within and across organizational boundaries. While high technological distance can have a positive influence on innovation performance (Nooteboom et al., 2007, Gilsing et al., 2008), achievement of project goals requires increased social interaction in terms of coordination and communication between project members (Huber, 2012). We draw on embeddedness and absorptive capacity literature to shed light on how social integration mechanisms translate into different learning outcomes (Uzzi, 1997). The findings suggest that it is not merely the scale or extent of social integration mechanism, but also the diversity and interplay of social integration mechanisms surrounding internal and external absorptive capacity routines, which enables project members to engage in the exploration, transformation, and exploitation of distant knowledge.

Practical Implications

The results of this study have several implications for managers. Successful adoption of distant knowledge not only requires a certain configuration of absorptive routines, but also social integration mechanisms that foster complementarities between these routines. The acceptance and application of distant knowledge must be actively encouraged and facilitated through, for instance, the adoption and promotion of a participatory leadership style, limiting of structural demarcations of different functional and industry areas within and between organization, and the development of appropriate communication. Impediments such as hierarchical organizational structure and decision processes prevent the
emergence of social integration and the flexibility necessary to manage technological distance.

Managing technological distance in internal and external collaborations: Absorptive capacity routines and social integration for innovation

This article investigates how social integration mechanisms facilitate knowledge transfer in innovation collaboration within and between organizations. As the starting point for this thesis, this article draws on absorptive capacity literature, pointing out the relevance of social integration to the absorption of external knowledge (e.g., Cohen and Levinthal, 1990; Ebers and Maurer, 2014; Jansen et al., 2005; Todorova and Durisin, 2007; Zahra and George, 2002). Although literature repeatedly emphasizes the importance of the different social integration mechanisms (ibid.), there is no comprehensive view of what these mechanisms are and how they contribute to an organization’s ability to completely absorb external knowledge and innovate (Nooteboom et al., 2007; Volberda et al., 2010).

Using a multiple case study approach, this article analyzes 26 projects at German organizations operating in the manufacturing sector, with surveys and expert interviews as the primary data sources. In all of these projects, the innovation process comprised knowledge transfer between partners in different industries. The sample provided a meaningful context for studying the mechanisms of integration relevant to the absorption of external knowledge as it included cases where the absorption of external knowledge was successful as well those where it wasn’t. The project cases were clustered and accordingly analyzed. The absorptive capacity routines of the organizations were examined to identify their distinct social integration mechanisms.

In terms of its theoretical implications, this article reveals four mechanisms of social integration that determine the ability of an organization to absorb external knowledge in innovation collaboration: systematic communication, internal connectedness, external connectedness and socialization. The diversity and interplay of these mechanisms in the knowledge absorption process not only determine how efficiently but also how completely the knowledge is transferred. By differentiating between distinct social integration mechanisms and operationalizing them within the absorptive capacity routines of organizations, this article contributes to the reification of the concept of
absorptive capacity (Cohen and Levinthal, 1990; Jansen et al., 2005; Lewin et al., 2011; Zahra and George, 2002). It creates a qualitatively explored basis for further investigation of the identified mechanisms and their relevance to knowledge transfer, when adopting an open innovation approach.

![Diagram of Social Integration Mechanisms]

Figure 2: Social integration mechanisms surrounding internal and external AC routines

Socialization and innovation: Insights from collaboration across industry boundaries

The previous article established a framework that explains how organizations can profit from enhanced knowledge transfer by operationalizing different social integration mechanisms within their absorptive capacity routines. Literature provides insights into the development of systematic communication and internal and external connectedness (e.g., Ebers and Maurer, 2014; Gilting et al., 2008; Granovetter, 1985; Lin, 2006; Uzzi, 1997) and the effect they have on knowledge transfer processes in innovation collaboration (e.g., Chen and Paulraj, 2004; Christensen and Cornelissen, 2011; Johnson et al., 1994; Nobel and Birkinshaw, 1998; Zerfaß and Huck, 2007). However, there is little empirical evidence of how socialization influences the absorption of external knowledge within the context of innovation (Hoho et al., 2012; Volberda et al., 2010). Thus, the focus of this article is on investigating the role of socialization in innovation collaboration and its effects on knowledge absorption.

Drawing on case study analysis, this article empirically analyses how six case firms manage knowledge absorption when innovating across industry boundaries. The study combines literature on organizational socialization tactics (Allen and Meyer, 1990; Bauer et al., 2007; Cooper-Thomas and Anderson, 2006; Jones, 1986; Van Maanen and Schein, 1979) with existing research on absorptive capacity and knowledge processes and applies the resulting framework to analyze innovation collaboration in the case studies from a socialization perspective. It investigates how organizations develop socialization for interacting with partners during the innovation process, and how that enables them to subsequently benefit from extensive knowledge transfer.

The findings illustrate the relevance of socialization to knowledge transfer and innovation collaboration with partners in different industries. This article also reveals three distinct ways in which organizations can profit from socialization to enhance knowledge absorption and open innovation processes: by facilitating internalization of knowledge (outside-in processes), by facilitating externalization of knowledge (inside-out processes) and by facilitating knowledge combination (coupled processes). Thus, from a theoretical perspective, the study contributes to literature on knowledge absorption and the management of open innovation (Barringer and Harrison, 2000; Enkel et al., 2009;
Figure 3: Socialization effects and development in collaboration across industry boundaries

The role of social integration in the development of potential and realized absorptive capacity and innovation

While the previous articles are more exploratory in nature, identifying the distinct social mechanisms of knowledge transfer in innovation collaboration and how they operate as well as aiming to increase understanding of socialization and internal connectedness as mechanisms of social integration. This article takes a quantitative research approach to confirm the role of the four originally-identified mechanisms (i.e. those of systematic communication, internal connectedness, external connectedness and socialization) in the development of an organization’s absorptive capacity. Hence, it contributes to an understanding of the extent to which distinct mechanisms facilitate or hinder the development of potential and realized absorptive capacity, when adopting an open innovation approach.

The empirical data was analyzed using partial least squares structural equation modeling. The results show that, in terms of the overall impact of social integration mechanisms, each of the four studies has a significant effect on the development of the absorptive capacity of an organization. However, the impact of external connectedness on an organization’s ability to transform and exploit external knowledge was found to be a negative one, which contrasts with the common assumption in literature (e.g., Ebers and Maurer, 2014; Hansen et al., 2001; Rindfleisch and Moorman, 2001). This might be explaining by the findings of the article “Socialization and innovation: Insights from collaboration across industry boundaries”, which suggest that a high level of socialization with external partners leads to a loss of trust between internal partners in the organization. As a result, the organization not only loses access to the novel knowledge of their internal partners but also their support. In contrast, socialization with internal partners was found to be highly beneficial to the acquisition and assimilation of external knowledge.

This article contributes to theory by demonstrating that social integration mechanisms do not generally enhance the development of an organization’s absorptive capacity. Specifically, it illustrates the importance of differentiating between the impact on the development of potential absorptive capacity and the impact on the development of realized absorptive
capacity (Jansen et al., 2005; Todorova and Durisin, 2007). Beside the different impacts, there is also a clear need to understand the distinct mechanisms (Husted et al., 2015; Lewin et al., 2011; McEvily and Marcus, 2005). Only then can organizations facilitate social integration in order to enhance their ability to absorb external knowledge and benefit from an open innovation approach.

Note: significance levels for $n = 124$ according to a two-sided t-test: * $p \leq .1$; ** $p \leq .05$; *** $p \leq .01$; n.s. = not significant

PLS algorithm: mean replacement, path weighting scheme, mean 0, var 1, max. iterations 500, stop criterion $10^{-7}$, initial weights 1
Bootstrapping: mean replacement, no sign changes, complete bootstrapping, subsamples: 5000

Figure 10: Results of the hypotheses testing

Enkel, E., & Dingler, A.: The role of social integration in the development of potential and realized absorptive capacity and innovation.
Exploratory and exploitative innovation: To what extent do the dimensions of individual level absorptive capacity contribute?

This study examines absorptive capacity at the individual level. In their original work on absorptive capacity, Cohen and Levinthal (1990) stressed the importance of individuals in the process of absorption of external knowledge. Drawing on their work, this study addresses the research question of the extent to which the dimensions of individual-level absorptive capacity are related to exploratory (radical) and exploitative (incremental) innovation. In this context, individual-level absorptive capacity comprises three dimensions: identification of external knowledge, assimilation of external knowledge, and utilization of external knowledge (e.g., ter Wal et al., 2011). Based on the work of Jansen et al. (2006), exploratory innovation is defined as deriving from a firm’s exploration strategy (March, 1991) while exploitative innovation is considered the result of a firm’s exploitation strategy (ibid.). Using data from a survey undertaken in a business sector of Bosch Group, partial least squares structural equation modeling (PLS-SEM) analysis (Fornell and Cha, 1994; Lohmöller, 1989) was used to examine the relationships between the dimensions of individual-level absorptive capacity and exploratory and exploitative innovation.

From a theoretical point of view, this study addresses the gap of quantitative studies that examine the concept of individual-level absorptive capacity. The study reveals distinct patterns of individual-level absorptive capacity as an antecedent of exploratory (radical) innovation outcomes (in the form of product and service innovation) and exploitative (incremental) outcomes. More concretely, the results demonstrate that individuals’ efforts to identify external knowledge contribute to both exploratory and exploitative innovation. As a consequence, underlying individual characteristics are a source of organizational ambidexterity (Duncan, 1976; Tushman and O’Reilly, 1996), which allows firms to simultaneously pursue both exploration and exploitation. On the contrary, individual assimilation efforts contribute only to exploratory innovation and not to exploitative innovation. Ultimately, individual utilization efforts are significantly related to neither exploratory innovation nor exploitative innovation.
Further publications of the chair in cross-industry innovation


innovation
model
business
Boost for the Business: Incubators and Accelerator in Silicon Valley

Problem

Entrepreneurship is a central topic in today’s globalized and fast moving society. Whereas young, unknown ventures benefit from their agility and absence of formal requirements, well-established corporations are caught in their highly structured, inflexible procedures inhibiting their ability to respond to ad-hoc market demands. As a consequence, truly novel and adaptive concepts are hard to achieve for them and Schumpeter’s paradigm of disruptive innovation almost impossible to implement.

However, there are geographical regions facilitating (disruptive) innovation more than others (Saxenian, 1990). A global hub of innovation and cutting-edge technology is Silicon Valley and the San Francisco Bay Area. Here, a highly collaborative work attitude and accumulation of talent lead to successful disruptive business models, financially backed by the availability of capital (Saxenian, 1990; 1994). Researchers argue that Silicon Valley’s success can be ascribed to its two economies (Kenney & Burg, 2004). Whereas one economy (economy number one) establishes new technologies and innovations, the other economy (economy number two) builds the business environments of the preceding economy. Therefore, both economies are creating a cycle and ecosystem to facilitate and combine technology innovation and business manufacturing itself (Kenney & Burg, 2004).

Current understanding

The classic way of institutionalized business manufacturing is called incubation. Incubators are aiming to minimize failure rates of young ventures by providing general support and services for startups until they are viable (Kenney & Burg, 2004). In 2005, a new model of incubation called acceleration came to the market in Silicon Valley. Accelerators pursue the strategy to shorten incubation processes while organizing programs which literally speed up the development and economic success of mainly early-stage startups for a limited amount of time (Pauwels, Clarysse, Wright, & Van Hove, 2014).

Both organizations are considered as network organizations, which facilitate collaboration as well as strategic responses to dynamic environmental change (Hansen, Chesbrough, Nohria, & Sull, 2000). Lately, especially the amount of corporate venturing organizations, like corporate accelerators has risen most saliently.
These organizations basically combine talent and capital, aiming to generate innovation (Battistini, Hacklin, & Baschera, 2013). Nevertheless, these two components cannot ensure innovation alone (Kenney, 2004). Instead, technology innovations need intelligent strategies and institutions that are able to cope with continuous and fast-paced change, while simultaneously thinking ahead in the process of business model generation.

Currently, most studies view incubators and accelerators in the context of specific institutional details or venture manufacturing success. This leads to narrowed insights, the limitation to particular industries and a focus on corporate venturing approaches. For these reasons, this study addresses the lack of a more holistic approach towards the current setup of incubators and accelerators, located in Silicon Valley. Silicon Valley is chosen because in this region a lot of innovation and creation happens, which is accompanied by constant change (Kenney & Burg, 2004; Saxenian, 1994). Hence, organizations are forced to cope with constant transformation and variation to stay competitive. Considering that incubators and accelerators are network organizations, a study with respect to their networking capabilities and design is provided by addressing the following research question:

**Research question**

How are networks of acceleration and incubation organizations in Silicon Valley structured and what reasons can be identified for the observed patterns?

**Research Design**

Due to the limited amount of theory about the network design and networking capabilities of accelerators and incubators based in Silicon Valley, the chosen research design is a combination of egocentric network analysis and multiple case studies. Following Johnson, Onwuegbuzie, & Turner (2007), a mixed method research approach of quantitative and qualitative methods is used. For the quantitative approach, an egocentric network analysis of the investigated incubators and accelerators is used to capture their specific network relations, revealing relevant actors, structures and modalities. Furthermore, for the qualitative approach semi-structured interviews with managers of the examined organizations are conducted to develop multiple case studies (Eisenhardt, 1989). Therefore, key decision-makers are taken as expert interview partners of each particular organization due to their contextual knowledge about characteristic insights and setups of the organization, its performance and strategy. More than 100 experts have been identified, about 75 of them have been contacted and 13 interviews have been conducted of which 11
fulfilled all quantitative and qualitative parts. The conduction of the qualitative interviews via telephone took on average 25 minutes and were conducted via phone. All interviews were recorded and literally transcribed afterwards.

Findings

Across all cases the terminology incubator or accelerator approved a lack of precision and sufficiency to display organizations commonalities from a network design perspective. Instead, two network design types were detected, namely, Plug in type and Mediator type.

Plug in type organizations are bounded by their need of a third party to enlarge their own network which is reflected by their restricted areas of external connections. Thus, they show necessity for external support and an external network adoption.

Mediator type organizations have broad networks and are connected with various stakeholder which creates economies of scope. Moreover, they can use these to supply innovation advisory and to support other less experienced organizations. This leads to the possibility for other organizations (including Plug in types) to outsource innovation management to innovation experts like Mediator type organizations.

In the context of networking mechanisms, the case studies revealed two main networking mechanisms, namely, Relations and Supplies.

Relations underline the importance of events as network maintainer, the mechanisms of introductions and referrals as well as “free” mentoring, thus following a concept where serial entrepreneurs give back to the community what it once paid forward to them. Supplies cover the organizations community and corporate advisory efforts. In this context it was found that all organizations were either affiliated with a community or have created their own one. Additionally, some organizations capitalize their expertise and knowledge on innovation management as service for corporations by offering corporate advisory. Thus, the experienced organizations are serving the unexperienced organizations’ demand for innovation management advice. This leads to the outsourcing of the setup and design of innovation institutionalization which can better be done by innovation experts than unexperienced corporations.

Contribution

Literature examines incubators and accelerators often only with respect to their incubation and acceleration programs. In contrast, this study reveals a networking design that consists of various networking ties in diverse fields. Thus, considering the entire network design, the amount of stakeholders exceeds incubators’ and
accelerators’ designated focus. Furthermore, their organizations’ general network design exposes information on other important stakeholders of these organizations. A broader community of stakeholders can be detected. In this way, economies of scope and scale can be established, which overall leads to competitive advantages (Bøllingtoft & Ulhøi, 2005).

These enlargements of focus and expertise in incubation and acceleration organizations indicate a change in their positioning which lets them achieve a broader relevance. Due to a rather holistic and general encounter of the innovation management topic, incubators and accelerators are able to create an offer for other parties. This suggests an incremental shift in their approach by their stakeholders, e.g., as corporate clients. Thereby, Silicon Valley’s incubators and accelerators are no longer in a position of market push but market pull which makes them demanded players in the innovation management field.

This study aimed to provide insights into the network design and capabilities of today’s accelerator and incubator organizations that are concerned with the manufacturing of innovation in Silicon Valley. It can be found that the so called “economy two” (Kenney, 2004) can no longer be perceived as merely being a manufacturer of startups. It has rather become an independent and increasing economy for innovation management and facilitation which established a cycle of supply and demand for this expertise.

Practical implications

Managers can learn to which of these two network types their organization belongs to and make their decisions accordingly. Thus, the Plug in type organization should search for a community it wants to be affiliated with. In contrast, the Mediator type creates its own community which should be known for a specific expertise or as a brand.

Ultimately, the most important network capabilities for both network types are Relations. Especially, in terms of network enlargement, all organizations should stay flexible in their network approach to achieve competitive advantage.

Applied artificial intelligence and trust – The case of autonomous vehicles and medical assistance devices

This study predominantly considers the commercialization process of radical innovation. More concretely, it analyzes trust as a mechanism of acceptance of applied AI and thus serves as an example of radical technological innovation. Radical technological innovations such as intelligent personal robots are increasingly appearing in diverse application fields. The decision-making process employed in these applications is based on inherent artificial intelligence. Via multiple case-study research (Eisenhardt, 1989; Eisenhardt and Graebner, 2007), Study 5 examines firms that have developed applications of AI and addresses the research question: How is trust in applied AI fostered?

The study focuses on the weakness of AI in the sense that the examined AI applications describe the tasks humans perform rather than the way humans think. Specifically, five cases from the transportation industry (i.e., semi-autonomous and fully autonomous cars, autonomous trucks, driving assistance systems, semi-autonomous and fully autonomous trains, and fully automated underground trains) and four cases from the medical technology industry (i.e., IBM’s Watson cognitive system, a data analytic system for automated fraud detection, a medical adherence app, and a service robot) are examined.

Considering theoretical contributions, this study represents a departure from the earlier technology acceptance literature based on the technology acceptance model (TAM) (Davis, 1989). In particular, the study considers trust a distinct antecedent for acceptance of radical technological innovation and illustrates that trust in applied AI is a dichotomous construct. Trust in applied AI comprises trust in the technology on one hand and trust in the innovating firm and its communication with users on the other hand. For both of these trust dimensions, this study reveals tangible mechanisms for building trust. Trust in the technology develops alongside increases in information about performance, process, and purpose (Lee and Moray, 1992). The performance basis depends on the aspects of both operational and data security; the process basis relies on cognitive compatibility and usability of the application; and the purpose basis is determined by application context and design. Regarding trust in the
innovating firm and its communication, this study reveals the necessity of a
democratic development process for applied AI (e.g., via stakeholder alignment, transparency in
development, and early and proactive communication).

Hengstler, M., Enkel, E. & Duelli, S., Applied artificial intelligence and trust –
The case of autonomous vehicles and medical assistance devices,
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National Competence Center for Business Model Innovation - NaKoGi

The National Competence Center for Business Model Innovation – NaKoGi – tries to increase the speed during the development and implementation of new business models within the involved enterprises. By sharing newest insights from research and practice the Institute for Innovation Management developed an academic and in practice established context for business models and business model innovation. The increasing relevance of new business models occurs for almost all participating companies due to the growth of disruptive innovations strongly connected to partnering solutions, technological innovations strongly linked to new business models (digitalization etc), as well as the acceleration of open innovation dynamics via incubation, ecosystem cooperations, startup cooperations, venturing strategies etc. During the regularly occurring workshops with the members of the competence center, the newest insights for a systematic development and implementation of business model innovation are discussed and applied. An active exchange in a group of experts between the participants of NaKoGi, external guests and academics enables an individualized best practice transfer between the participants beyond established industry boundaries.

In July 2015, SAP hosted the workshop themed “Business Ecosystems”. Enterprises like Airbus Group, Rolls-Royce Power Systems, Schaeffler and Allianz SE presented their approach in ecosystems, while Dietmar Becüwe of Hewlett & Packard Germany as external expert reported on the challenges of ecosystems in the ICT sector and at HP.

Prof. Dr. Wolfgang H. Schulz, director of the Amadeus Center for Mobility Studies and holder of the chair for Mobility, Trade and Logistic at Zeppelin University referred from an academic prospective to institutional role models in mobility business ecosystems, and gave a summary of the technological and economical side of an ecosystem.

Furthermore, Beegy GmbH, a joint venture of MVV AG and three other ecosystem partners offering services for the decentralized energy sector, was introduced. Status and challenges of the young joint venture has been presented by Dr. Krawinkel (MVV) as best practice case for the participants.

Monika Hengstler, at this time doctoral candidate and project leader at the institute, spoke about the state of the art in theory in terms of life cycle, roles
and strategy. Her explanation about different roles and stages of an ecosystem are latest and ongoing research at the institute. What is the value proposition in an ecosystem? This question and others about survival, growth and decline of the ecosystems she could respond ahead of a very interested audience. Particular attention she gave to the competition and cooperation in innovation ecosystems. In the following session “How to develop and maintain an ecosystem” the participants discussed questions like “Who is the owner of an ecosystem?”, “Who is organizing the platform?”, “Which partners do one need along the value/supply chain?” or “What competences do the participants need?”. At the following the participants learned about risks, costs and challenges as well as metrics for ecosystems.

“Inside-out innovation strategy” was the topic of the next workshop, which took place in November 2015 at our sponsor Airbus Group in Ottobrunn. Thanks to a fruitful discussion, several aspects and challenges ahead occurred. One aspect was that one driver for external commercialization may be the brand of a company or the market penetration of a technology. If the enterprise is applying inside-out business model innovation, the participants see a great challenge in the protection of the intellectual property. Therefore, they advocate for an IP management, which is responsible for keeping control and protecting area in sense of patent classification, because property rights must be safe after inside-out implementation. Licensing hinders innovation made by the competitor, because it is easier and cheaper at first hand to buy innovation.

Inside-out depends on the intensity of usage or the scope of specialization. If a company does not use an innovation or has an invention without need and implementation and it does not plan to specialize in detail, then it might be useful to externalize the BM. Inside-out implementation can also be seen under the dimensions of garbage can (what do we do with “useless” innovation) and cannibalization (if we give that IP to the market, is some other company going to cannibalize our BM because we are not doing it ourselves)? Several garbage can innovations are quite special, so that there is the possibility to build a blue ocean BM (new niche market or even industry without competition).

On the basis of an individual case study of a complex innovation (IDEEFA Fassadensystem / 4 partners delivering innovation technology modules to a startup as “inside out” innovation) the participants could learn how such a cooperation can run - best practice case- and where the boundaries and limits are to integrate startups in complex ecosystem driven innovation management roles.
As guests, we could greet Mr. Charles Vaillant and Prof. Dr. Gerhard Plasonig. Mr. Vaillant, is Vice President of Innovation & Corporate Strategy at MANN+HUMMEL – the global leader in the market for filtration technology. Mr. Vaillant talked about the startup i2m, a Mann+Hummel company, which president and general manager he is. i2m is a technology company created to deliver unique high-tech filtration solutions to the market. The company stands for innovation to market and its focus areas are clean air, clean water, life science and energy to protect the environment and the earth’s natural resources.

Our second guest, Prof. Dr. Ing. Gerhard Plasonig, is delegate of the board of WoodWelding SA. The company invents, develops, refines and licenses out a new, innovative fixation technology, applicable in a wide range of materials - reaching from wood: WoodWelding® - to bone: BoneWelding®. They work closely with their licensees and partners to further advance the technologies. Elaborately, Prof. Plasonig explained the business model of Woodwelding, which is based on the inside-out process, which was the topic of the workshop.

The Zeppelin University organized in June 2016 a further workshop, themed “Measurement, learning and decision making in BMI” and tried to find answers to the questions what the main benefit of measuring in business model innovation is or considering the relationship between a corporate firm and start-ups, how to measure the success of start-ups. Further, how to define success and how to measure the success of intrapreneurs as well as what a suitable process for business model innovation is.

Beginner was Prof. Dr. Joachim Vogt from the Hochschule Heilbronn/Seven Ventures, who talked about his experience as Senior Investment Manager at SevenVentures, a subsidiary of ProSieben founded in 2009. Prof. Vogt focussed on three topics: (1) What is Venture Capital? (2) Business Plan Analytics, and (3) What are the crucial challenges for start-ups and how can investors manage the risks.

In the following impulses “When do companies need business model innovation and its measurement” Prof. Dr. Enkel defines a business model as a firm’s tactics or as the operationalization of a firm’s strategy. Subsequently, she focussed on three major theoretical constructs: (1) Dynamic Capabilities, (2) Ambidexterity, and (3) Open Innovation and discusses, which organizational forms for business development is fulfilling which organizational need of the company and subsequently, need to be measured accordingly.

According to Teece’s (2007) concept of dynamic capability, an organization needs to adapt due to changes of the
environment. To do so, three basic capabilities are necessary: Sensing business opportunities, seizing these opportunities and reconfiguring. Concerning reconfiguring, three core questions arise in the context of business model innovation: (1) How does an organization need to adapt so that a new business model can survive? (central unit?), (2) Is there a unit that is willing to change? (business unit/decentral unit?), and (3) Is it advantageous to do it alone or together with partners? Each organizational form follows different goals and thus requires a different measurement system. According to March’s (2001) concept of ambidexterity, firms need to create both, explorative (radical) and exploitative (incremental) innovation. Business model innovation is seen as a terrain to reveal radical innovation. Finally, Open Innovation (Chesbrough, 2003) is the use of purposeful inflow and outflow of knowledge. Open Innovation allows sharing of risks and resources and the establishment of ecosystems.

Florian Altman and Dr. Sebastian Heil presented as guest lecturers The Garage by Deloitte Consulting GmbH. Approximately one year ago, Deloitte recognized that they need to change something to be successful as a consulting company. Thus, they created The Garage which enables them to build resilient business models and solutions. To do so, they bundle expertise in the field of innovation, digital business building and data analytics and are able to provide advice in the field of big data and digital business models.

Based on the master thesis by Jörg Brenner, Ms. Hengstler presented a comparative analysis of the participating NaKoGi firms plus two additional companies (BASF and Eurocontrol). Three major contributions derive from this analysis. First, the positive effect of the supportive conditions, i.e., innovation culture, freedom and flexibility, organizational autonomy, risk reduction, and dynamic development, has been shown. Second, the business model development process is based on three phases: vision development, business model development and implementation. Furthermore, the development process is iterative and consists of continuous testing and validating. Third, evaluation criteria for business model innovation depend on the phase and maturity of the business model. In early stages, qualitative criteria are decisive. Contrary, in later stages, standardized quantitative criteria become dominant. Based on these contributions, a summarizing framework for Business Model Innovation Controlling was presented. Furthermore, two different forms were identified: First, a creativity-oriented controlling model and second, an efficiency-oriented controlling model.

The singular enterprises introduced the audience in poster sessions in the company-owned measurements,
learning and decision making approach.

The core messages from the presentations and poster sessions are that (1) for business model innovation, stakeholder management is decisive, (2) a superior strategy is decisive, (3) contrary, a formalized process is not necessary needed, (4) in the beginning, assessment criteria are not crucial. For example, by considering “strategic fit” as a core criterion for the assessment of whether or not a project will be followed, there is danger to only realize incremental innovations. Decisions are often based on gut feeling. (5) However, in a later stage, quantitative criteria become important and (6) the degree of radicalness determines the final assessment.

The last workshop in 2016, themed “Capabilities for business model innovation at the individual and organizational level & Capabilities for outside core business models and ecosystems”, took place at Rolls-Royce Power Systems AG in Friedrichshafen.

Prof. Dr. Ellen Enkel gave a presentation about “Capabilities in business modelling”. At the individual level, she stressed the importance of social integration mechanisms, and referred to four mechanisms: Systematic communication, external connectedness, internal connectedness and socialization. Systematic communication is crucial for the implementation of business model innovation. Furthermore, too much external connectedness may hinder the possibility to identify new business opportunities. At the organizational level, business model innovation requires dynamic capabilities. Concerning recognition of opportunities, companies increasingly need to think in business ecosystems for the purpose of business model innovation. Furthermore, companies vary in the location of the new business department. In general, there is the tendency to follow new business models in central units. Following, by pursuing business model innovation, firms need to balance separation with business unit activities. The tendency towards separating in business model innovation is also due to the general finding that: Culture eats strategy for breakfast! If culture is not supportive, the business development needs to be separated from the core business.

Based on the research results from her PhD thesis, Monika Hengstler presented two research projects on ecosystems. Both projects consider the perspective of the keystone player which is the crucial partner that orchestrates the ecosystem.

The first project deals with the question: How do firms orchestrate their innovation ecosystems and what are the distinctive dynamic capabilities necessary for this orchestration? When initiating an ecosystem, firms are confronted with challenges: (1) the
initiating firm must act as a “keystone” player (Iansiti & Levien, 2004), (2) the entire system passes through several lifecycle stages (Moore, 1993), (3) an ecosystem consists of both collaborative and competitive relationships (ibid.) Drawing on the dynamic capability literature (Teece, 2007), a framework with four categorical dynamic capabilities: “sensing”, “seizing”, “scaling by partnering” and “managing threats and reconfiguring” is developed. The presented framework provides systematic guidance on the capabilities, practices, and mechanisms necessary for orchestrating an innovation ecosystem. Managers can learn which of the capabilities are necessary to manage the cooperative and competitive challenges during each of the four evolutionary stages of an ecosystem. Further, it illustrates the decisive capabilities needed to strategically traverse from one evolutionary stage to the next.

The second project deals with the question: How do orchestrating firms build trust and control in innovation ecosystems? The results illustrate that orchestrating partners need to build trust and control at two distinct system levels: first, at the firm level between their organization and a partner and second, at the level of the innovation ecosystem. Besides presenting system trust as a dichotomous construct in the context of innovation ecosystems, the results of data analysis reveal a concrete basis of trust at the two system levels. Whereas inter-firm trust between the keystone firm and a partner stems from companion and competence trust, trust in the innovation ecosystem is based on commitment trust. Furthermore, data analysis allowed the discovery of tangible mechanisms that stimulate each of these three bases of trust (i.e., companion, competence, and commitment). Third, this study illustrates that in innovation ecosystems, the governance mechanism of control is composed of both formal and social control mechanisms. Whereas formal control is dominant at the firm level between the keystone firm and its partners, social control is at the heart of control at the innovation-ecosystem level.

Dr. Gomeringer, head of Innovation and Technology Management at Festo AG & Co. KG, gave the guest lecture. After introducing the company and its innovation management approach, he referred to the challenges of Industrie 4.0 and Festo’s approach in overcoming these challenges. Concretely, he presented Festo’s approach towards a new business model in the Industrie 4.0 / IIoT world. Here, he introduced various methodological approaches that were undertaken since the project has been starting around one year ago. Finally, he presented some lessons learned of Festo during the project phase.

Every participating enterprise introduced on the basis of well-
prepared poster presentations the individual and organizational in-house capabilities as well as the capabilities for outside core business models and ecosystems.

The core messages from the presentations and poster sessions are:

- Intrapreneurs are only willing to take calculable risks. Following, provision of too much freedom hinders intrapreneurs. Besides, it is advantageous to communicate evaluation criteria to intrapreneurs (e.g., Airbus self-evaluator).
- Systematic communication at the individual and organizational level is decisive for business model innovation.
- Business model strategy must be accompanied by an appropriate culture: “Culture eats strategy for breakfast”
- In the context of business model innovation, firms balance separation and integration.
- According to Amit & Zott (2001), successful business models follow four mechanisms of value creation (novelty, efficiency, complementary and lock-in).
- Ecosystems are highly dynamic constructs. Following, business model innovation by means of ecosystems requires distinctive dynamic capabilities.
- Managing an ecosystem requires management of multiple relationships by balancing trust and control.

Following the flow of the different NaKoGi sessions, nearly all participating enterprises have already followed open innovation approaches, and almost half of the enterprises are working on venturing strategies for 2018 and beyond. The cooperation with startups and the participation in ecosystems is playing a key role to accelerate innovativeness, especially in the field of disruptive technologies and new service offers. The different key topics of the NakoGi 2.0 sessions deliver added value and best practice transfer to determine these strategies.
Further publications of the chair in business model innovation


ecosystems/
networks
Iterative development of digital ecosystems in the manufacturing industry

Problem

Increasingly, established, niche-leading manufacturing firms are working on the integration of digital solutions and new business models to ensure their future competitiveness. To do so, they create digital ecosystems. The concept of digital ecosystem originally emerged in the IT industry (Eisenmann et al., 2011). It is described by a network of partners attracted and connected by a technological platform and other digital technologies, thus, creating new competitive positions and new levels of speed, agility and innovation. A digital ecosystem enables increased knowledge sharing among partners, better flexibility in resources and new capabilities to respond to customer needs (Williamson and de Meyer, 2012). All of these factors are critical for business model innovation in manufacturing.

However, compared to the experienced IT industry, manufacturing firms still struggle with an ecosystem vision and creation of concrete digital ecosystems. The frameworks, processes, resources and information availability are differing from the IT industry and result in dissimilar starting points (Gronum et al., 2012). Specifically, digital ecosystems imply huge opportunities but at the same time manufacturers are challenged by requirements to manage these market innovations. These are in contrast to established processes and methods for product or technology innovations.

In this regard, it is necessary to consider, which capabilities manufacturing companies need, in order to realize digital ecosystems of value for their business model and long term strategic differentiation.

Current understanding

Digital ecosystems are defined as networks of partners aiming towards novel business models where value is created by the partners’ complementary products and/or services that are integrated via digital technologies (Gawer, 2009). They consist of inter-organizational strategic partnerships organized in a business network and deliver more value, than the sum of the value propositions of the individual participants (i.e., Gawer and Cusumano, 2002). The keystone company (Iansiti
and Levien, 2004) is setting scope and goal of the ecosystem, building rules of conduct, regulating the overall function, providing stability, balancing co-evolution of all members, fostering innovation and sharing of values and supporting growth of the ecosystem (Moore, 1993; Williamson and de Meyer, 2012).

The concept of dynamic capabilities by Teece (2007) examines the creation, integration and reconfiguration of internal and external abilities as response to rapidly changing environments. In addition to that, it is proven in fostering innovation and new business models (Eisenhardt and Martin, 2000). Therefore, the concept provides a promising perspective to analyze the required capabilities to prepare digital ecosystems.

Yet, the understanding of the three dynamic capabilities (Teece, 2007) being realized in a sub-sequential schema (Eisenhardt and Martin, 2000) is strongly questioned for radical innovation and new business development (Roseno et al., 2013). As digital ecosystems have characteristically a similar uncertain and changing manifestation as radical innovations, Teece’s rather linear concept needs to be adapted for potential keystones in the manufacturing industry.

In this dynamic and challenging setup, it is of critical importance to consider the development process of digital ecosystems as well as necessary and missing capabilities of potential keystone companies in the manufacturing industry. Hence, the following research question is examined:

**Research question**

How do manufacturing companies realize digital ecosystems using their dynamic capabilities?

**Research Design**

To address the research question, a qualitative research approach via multiple case studies was followed. As digital ecosystems vary in quality and character, depending on the context and the interrelations of events, theoretical sampling is used to ensure comparable context of the case study firms. Selected firms are required to satisfy following three conditions, determined by the research set-up: (1) evaluate, test or strategically discuss digital ecosystem opportunities in the birth phase of digital ecosystems, (2) take the role of a keystone company in the new ecosystems, and (3) be an niche-leading, international manufacturing company.

The criteria were applied to companies in Germany using news, press releases or corporate websites. 18 possible cases were identified showing, that the topic of digital ecosystems is prominent in manufacturing companies. Ultimately, 7 firms in the birth phase of digital ecosystems declared their willingness to...
contribute to the research.

Data collection relied on first, qualitative, personal in-depth interviews, conducted as semi-structured interviews, second, iterative reconciliation of theory and the interview guide based on results during the interviews resulting in informal follow-ups via e-mails and short phone calls, and third, secondary data (i.e., firm presentations, firm websites, annual reports, academic articles, management literature, and press articles). The interviews ranged between 45 and 65 minutes in length, were recorded and later literally transcribed. Ultimately, the broad range of data sources allowed to triangulate the different data sources, thus increasing construct validity.

Findings

As a common conclusion derived from the case studies, digital ecosystems are of strategic importance for manufacturing companies because of the need to timely adapt to the macroeconomic changes. In this context, the manufacturers have some predispositions in the three capabilities of sensing, seizing and reconfiguring. The expansion of these capabilities and concrete microfoundations is desired and necessary in order to evolve the business models. However, the manufacturers are uncertain about capability expansion due to their lack of experience and uncertain realization of digital ecosystems.

Insight showed, the complexity of coping with diverse reliant tangible and intangible issues in digital ecosystems, as well as increased flexibility that new partners add to the ecosystem, can only be managed in an iterative development. While Teece (2007) focused on a rather sequential practice, the process of information collection and evaluation (sensing) needs to be interwoven with seizing of the business opportunity underlying the ecosystem, while complemented with reconfiguring necessary resources.

Manufacturers struggle with a vision, tight timelines, changing requirements and business criticality, which can be resolved by an agile development and interrelated capabilities. In this context rather than using the capabilities sequential, they need to be interrelated and present in all iterative development steps of a digital ecosystem. Moreover, there are intersections but also varying priorities of microfoundations of dynamic capabilities depending on the context and characteristic of the digital ecosystem.

Contribution

Digital ecosystems become core concepts for companies to evolve the value propositions for their customers, sustain their competitive advantage and increase their relevance in increasingly
networked markets. This research extends the diverse research field of digital ecosystems by a concept of preparation in the manufacturing industry.

Concerning the capabilities of keystones in the manufacturing industry, a procedure is given for iterative development of digital ecosystems. The procedure factors the dynamic characteristics of digital ecosystems as well as the current knowledge, methods, principles and resources of niche-leading manufacturers. In addition, the existing literature on dynamic capabilities and analysis of capabilities in manufacturing companies is enhanced by providing insights into interrelation of capabilities and their underlying microfoundations enabling the development of digital ecosystems. Concerning the microfoundations in varying digital ecosystems, the necessary prioritization is defined in regards of (1) the basic foundation and (2) the necessary maturity. Furthermore, the various findings from several research streams, such as lean startup methodology, agile development, additive manufacturing or open and cross-industry innovation are linked for the first time. This benefits a more profound comprehension of digital ecosystems.

**Practical Implications**

Beside the theoretical contributions, this study has several important implications for managers. Realizing digital ecosystems forces a manufacturing enterprise to assess internal capabilities and future strategy in full transparency. There is not one blueprint for the development of digital ecosystems. Of course, the approach has to be customized based on the individual situation and strategy of the firm. The presented framework provides a systematic guideline on how digital ecosystems can be iteratively developed by considering the individually necessary capabilities and microfoundations. This study forms the basis for managers to initiate a digital ecosystem and iteratively work on the capabilities and building blocks of a successful digital ecosystem in their context.

To continue the development of the framework of social integration mechanisms and absorptive capacity routines generated in the previous articles “Managing technological distance in internal and external collaborations: Absorptive capacity routines and social integration for innovation” and “Socialization and innovation: Insights from collaboration across industry boundaries” research switches from a qualitative to a quantitative level.

The article “Managing technological distance in internal and external collaborations: Absorptive capacity routines and social integration for innovation” reveals the distinct role played by internal connectedness in innovation, as the process of transferring, adapting and applying the knowledge of external partners to the local context (Ebers and Maurer, 2014; Herzog and Leker, 2010; Katz and Allen, 1982) requires acceptance by and support of internal partners (Hotho et al., 2012; Maurer et al., 2011). For this reason, the focus of this article is on the relevance of internal connectedness as a social integration mechanism. The characteristics of internal connections in a large-sized multi-unit corporation are examined from a network perspective.

To analyze the empirical data, social network analysis was conducted on the network of inventors at ZF Friedrichshafen AG. This network consists of more than 4300 patent applications filed between 2009 and 2014. As each patent application included the name and personnel number of the involved inventors, the social ties or connections used to transfer knowledge for innovation were fully reproducible. Furthermore, being longitudinal data, it was possible to monitor and investigate the evolution of the network and the internal individual connections of the inventors over time.

The theoretical contribution of this article lies in the extension of literature on inter-organizational knowledge transfer (Bartsch et al., 2013; Maurer et al., 2011; Rodan and Galunic, 2004; Van Wijk et al., 2008). It stresses the importance to organizations of ensuring employees have access to the knowledge of high-performing inventors, either directly or indirectly (McFadyen and Cannella, 2004). In sum, the study enhances understanding of the configuration of inter-organizational connections among
inventors. It sheds light on the development of the key contributors and their internal connections with respect to transfer knowledge and innovation.

Figure 4: Network of inventors from 2009 to 2010 (no isolates)

Figure 5: Network of inventors from 2009 to 2012 (no isolates)
Figure 6: Network of inventors from 2009 to 2014 (no isolates)

Dingler, A.: The social configuration of innovation: A network perspective on inter-organizational knowledge transfer.
How to tackle cooperative and competitive challenges in ecosystem orchestration?

Problem

To survive and thrive in the long-term, firms are constantly challenged to create new business. To address this, firms may initiate one or several innovation ecosystems (Adner, 2006; Adner and Kapoor, 2010, 2016). An innovation ecosystem is a network of different partners (i.e., suppliers, distributors, technology providers, and other organizations) which is formed to jointly develop and introduce innovations.

Despite the advantages, there is evidence that when orchestrating an innovation ecosystem, firms are confronted with challenges. First, the core of an innovation ecosystem is a partner network in which each partner plays a distinctive, strategic role (Iansiti and Levien, 2004). Hence, the initiating firm must act as a “keystone” player by managing highly complex relationships within the partner network while simultaneously overseeing a high level of innovation (ibid.). Second, an innovation ecosystem is not a static construct; instead, the entire system passes through several lifecycle stages (Moore, 1993). Ultimately, an innovation ecosystem consists of both collaborative and competitive relationships (ibid.).

Practice shows that some firms can better cope with these challenges than others. There is evidence that these firms have developed decisive capabilities for orchestrating innovation ecosystems.

Current understanding

The essence of an innovation ecosystem is a collaborative formation by various partners that combines their individual offerings into a coherent, customer-facing solution. Each partner contributes specific components to the solution, thus making it an overarching solution that offers a full-value package to customers (Clarysse et al., 2014). As a result, innovation ecosystems allow firms to create value that no single firm could generate alone (Adner, 2006).

An innovation ecosystem does not follow a linear value creation process, where a partner contributes either upstream or downstream components. Instead, the various partners are embedded in a network with numerous horizontal relations. Thus, the members
of an innovation ecosystem deliver value to end customers as an interrelated system of mutually dependent firms rather than as individual firms (Clarysse et al., 2014).

An innovation ecosystem is an evolving phenomenon (Moore, 1993). This dynamic nature is due to the fact that the system traverses four distinct evolutionary stages, which Moore (1993) defined as birth, expansion, leadership, and self-renewal (or alternatively, death). In each stage, the keystone player experiences constant interplay between cooperative and competitive challenges (Iansiti and Levien, 2004).

The prevailing dynamics of innovation ecosystems and corresponding coopetition challenges imply keystone players are devoted to constantly adapting and renewing their competences and resources (Helfat et al., 2007; Teece, 2007). Previous research has shown that the ability of a firm to substantially renew its competence and resource base is founded in its dynamic capabilities (ibid.). Within the field of dynamic capabilities, Teece (2007) established one of the predominant frameworks.

This study aims to develop an understanding on the distinctive dynamic capabilities for orchestrating innovation ecosystems by examining the following research question:

**Research question**

What kind of distinctive dynamic capabilities help to tackle cooperative and competitive challenges in innovation ecosystem orchestration?

**Research Design**

To address this research question, an inductive research approach via multiple case studies was followed. Suitable firms were identified through data collected via a recurring non-compulsory innovation survey with an emphasis on collaborative innovation. The underlying survey format reviews on a five-year tradition. Between April and October 2015, 2,421 medium-size enterprises and large firms from both the manufacturing and service sectors were surveyed. Managers and senior personnel involved in innovation, R&D, and new business were approached. The resulting database (N = 123) enabled to consciously select the case-study firms.

For the selection of case-study firms, theoretical sampling was used. Firms were selected that satisfied four conditions determined by the research set-up: a selected firm was required to (1) excel in intensive experience with innovation ecosystems, (2) participate in at least one innovation ecosystem, and (3) play the keystone role (Iansiti and Levien, 2004) in the innovation ecosystems/networks.
ecosystem(s), and (4) face cooperative and/or competitive challenges within and across each innovation ecosystem. In the best-case scenario, a selected firm was involved in ecosystems in all of the four phases (i.e., birth, expansion, leadership, and self-renewal) so they could report on the capabilities needed for each.

Ultimately, 11 firms declared their willingness to contribute to the research. From the 11 case firms, insights into a total of 22 different innovation ecosystems were gained.

Data collection relied on first, quantitative questionnaire data from the innovation survey, second, semi-structured interviews and informal follow-ups via e-mails and short phone calls, third, secondary data (firm presentations, firm websites, annual reports, academic articles, management literature, and press articles). The semi-structured interviews were used as major data source, since this kind of data delivers rich insights on time sensitive issues. The interviews ranged between 45 and 65 minutes in length, were recorded and later literally transcribed. Ultimately, the broad range of data sources allowed triangulation of the different data, thus increasing construct validity.

Findings

This study provides insights on the distinctive dynamic capabilities necessary for orchestrating an innovation ecosystem during its four evolutionary stages (birth, expansion, leadership, and self-renewal) and regarding both cooperative and competitive challenges. Concretely, four categorical dynamic capabilities and their underlying distinctive capabilities were identified: sensing, seizing, scaling by partnering, and managing threats and reconfiguring. Birth of an innovation ecosystem relies on distinctive sensing and seizing capabilities. Sensing activities focus on identifying unmet customer and market needs as well as scouting for emerging technologies. In addition to these two dimensions, sensing in the context of innovation ecosystems also aims at identifying scaling potential by partnering. Regarding seizing, three major distinctive capabilities emerged across the cases: creating a vision within the innovation ecosystem, communicating the vision, and translating it into a business model. To capture the full richness of partnering capabilities in the context of innovation ecosystems, we introduce a new capability stage, namely, scaling by partnering, and underlying distinctive capabilities. Although scaling by partnering is already relevant during the birth phase of the innovation ecosystem.
(e.g., for jointly formulating the vision of the innovation ecosystem and designing the underlying business model), cross-case analysis showed that it is indispensable for entering the expansion phase. Whereas sensing, seizing and scaling by partnering capabilities are vital for the keystone player in order to cope with cooperative challenges, the last capability stage “managing threats and reconfiguring” is crucial to overcome competitive challenges. The underlying processes are necessary to react to threats from outside the ecosystem, but also and primarily to threats from within the partner network (e.g., competition between partners).

Contribution

This study makes three major contributions to theory. First, it is the first study to present a superior link between dynamic capability theory and innovation ecosystems. Thus, we contribute to both the established literature on dynamic capabilities (e.g., Eisenhardt and Martin, 2000; Teece, 2007) and the more recent literature on innovation ecosystems (e.g., Adner and Kapoor, 2010, 2016; Gawer and Cusumano, 2014).

Second, we present a comprehensive framework of four categorical dynamic capabilities in the context of innovation ecosystem orchestration: Sensing, seizing, scaling by partnering, and managing threats and reconfiguring. While Teece’s (2007) three capability stages of sensing, seizing, and managing threats/reconfiguring are highly relevant in the context of innovation ecosystems, we introduce a fourth capability stage (scaling by partnering) to fully capture the partnering dimension.

Third, we identify new critical processes and distinctive capabilities underlying the three established capability stages and the newly introduced stage of scaling by partnering.

Practical Implications

In addition to theoretical contributions, this study has several important implications for managers. The presented framework of dynamic capabilities provides systematic guidance on the capabilities and processes necessary for orchestrating an innovation ecosystem. Managers can learn which of the capabilities and processes are necessary to manage the cooperative and competitive challenges during each of the four evolutionary stages of an innovation ecosystem. Further, we illustrate the decisive capabilities needed to strategically traverse from one evolutionary stage to the next.
Figure 12. Theoretical framework of the study.

Collaborating and social networking: Exploring differences between radically and incrementally innovating firms

This study focuses on the open-innovation activity portfolios of radically and incrementally innovating firms. Drawing on previous research on open-innovation activities (e.g., Dahlander and Gann, 2010; Enkel et al., 2009; Laursen and Salter, 2006; West and Bogers, 2014), this study distinguishes output-oriented activities (e.g., integration of customer knowledge) and non-output-oriented activities (e.g., inter-organizational networking within and across industry boundaries). In doing so, it addresses the research question of how inter-organizational networking inside and across industry boundaries is interlinked with other open innovation activities in radically or incrementally innovating firms.

To address the research question, data from a recurring questionnaire survey on open innovation was used. Specifically, data from surveys conducted in 2014 and 2015 was utilized, with a final sample of 220 firms after data cleansing. Following the established definition of radical innovation by Tellis et al. (2009), firms with more radical innovation outcome (in the form of product and service innovations) were distinguished from firms with more incremental innovation outcome. For both groups of firms, the degree of centrality of activities was determined using a network-based approach (e.g., Wasserman and Faust, 1994), and linkages between 21 activities were investigated. The portfolio of 21 activities consisted of 19 output-oriented activities and two non-output-oriented activities, namely, inter-organizational networking within and across industry boundaries.

With regard to theoretical contributions, comprehensive network analysis of 21 open-innovation activities was utilized to determine the central activities in radically and incrementally innovating firms. These central activities can be interpreted as the sources of each type of innovation. In this vein, the analysis emphasizes the cross-industry approach (e.g., Enkel and Gassmann, 2010; Gassmann and Zeschky, 2008; Gassmann et al., 2010) as vital for increasing radical innovation. Furthermore, the results showed that networking across industry boundaries is one of the top-five central activities for both radically and incrementally innovating firms. Conversely, the results revealed that networking within industry boundaries is among the top-five central activities.
for radically innovating firms but not for incrementally innovating firms. Furthermore, by means of network analysis, the study sheds light on not only the centrality of single activities but also the relations between activities. Finally, this study elaborates on organizational-level absorptive capacity as an antecedent for successfully engaging in radical innovation in the context of open innovation.

Enkel, E. & Hengstler, M., Collaborating and social networking: Exploring differences between radically and incrementally innovating firms (upcoming).
“With great power comes great responsibility”: Understanding the role of the orchestrating firm in an innovation ecosystem

Based on previous research that shows that trust is an antecedent of successful co-creation of radical business models in innovation ecosystems, this study examines the research question: How do orchestrating firms build trust and control in innovation ecosystems? This research question is approached via a multiple case-study approach (Eisenhardt, 1989; Eisenhardt and Graebner, 2007) using nine innovation ecosystem case studies.

In bilateral relationships between organizations, trust and control are governance mechanisms (e.g., Bachmann, 2001; Bijlsma-Frankema and Costa, 2005; Das and Teng, 1998; Das and Teng, 2001; Inkpen and Currall, 2004; Vlaar et al., 2007; Woolthuis et al., 2005). The study reveals that in innovation ecosystems (a special form of inter-organizational networks), orchestrating firms need to build trust and control at two distinct system levels: at the firm level between their organization and a partner and at the level of the innovation ecosystem. Trust at the firm level and trust at the ecosystem level are formed on different bases. Inter-firm trust between the keystone organization and a partner stems from companion trust and competence trust. Companion trust is founded on the expectation that partners will act in a way that does not negatively affect other partners in the network (Newell and Swan, 2000), and competence trust is based on the perception that a partner has the competence to fulfill required tasks (Nooteboom, 1996). In contrast, trust in an innovation ecosystem is based on commitment trust, which stems from agreements between partners and the knowledge that each partner gains mutual benefits (Newell and Swan, 2000). Furthermore, for each of the two system levels (i.e., firm level between the keystone organization and a partner and the innovation ecosystem level), tangible mechanisms that promote trust at each of the three trust bases (i.e., companion, competence and commitment) are revealed. Regarding control, the results showed that both formal control (e.g., Gulati, 1995; Poppo and Zenger, 2002) and social control (e.g., Das and Teng, 1998; Das and Teng, 2001; Sheppard and Tuchinsky, 1996) mechanisms are governance mechanisms in innovation ecosystems. Formal control between the orchestrating firm and a partner is the dominant control mechanism at
the firm level. On the contrary, social control is the heart of control at the innovation ecosystem level.

Figure 14. Theoretical concept of trust and control at two system levels: a) firm level between the keystone firm and partners, b) innovation-ecosystem level.

Hengstler, M., Innovation ecosystems: How do orchestrating firms build trust and control?, IAMOT Konferenz, Orlando, Florida, USA 05/2016
How to constantly innovate platforms through self-renewal and openness?

Problem

In the last decade, many platform businesses have become successful in the digital world (Eisenmann et al., 2011) and built services that attracted millions of customers in a fairly short amount of time. Nevertheless, customer demands change over time and platforms that do not adapt lose the interest of once loyal users. Recently, Facebook or Twitter, companies that have had highly successful platforms to date, have started to struggle to attract new customers or even satisfy the existing customer base. In contrast, there are long-existing platform businesses, mainly large IT companies that remained platform leader over several decades with a constantly strong and growing customer base. The difference in the long-term development of these platform-based business models begs the question: how can platform-based business models be constantly innovated and when is the right time to open them?

So far, much research has been done in the area of entering platform markets (Gawer and Henderson, 2007), or strategies to become a platform leader (e.g., Gawer and Cusumano, 2008; 2007). However, little research focused on the sustainable and continuous innovation of platforms. This study will analyze five platform leaders in the IT industry and investigate their strength in constantly innovating and opening their platforms.

Current understanding

According to Cusumano (2011, p. 22), “platforms inevitably evolve and the leader of one generation may lose control over the next”, which means that they “must prepare for the future, even when they are focused and highly successful with their present businesses”. Also Gawer and Henderson (2007, p. 26) emphasize the challenge platform owners face in developing mechanisms to keep up with the continuous development of platforms due to the “complexity of the task of managing the evolution of a platform and the difficulty of making unambiguous welfare predictions in such cases”. Furthermore, Gawer and Cusumano (2002, p.58) state that “platform leaders need to have a vision that extends beyond their current business operations”. 

In addition, little research has been conducted on lifecycles of platforms and especially “on platform strategy and its dynamic changes” along the business ecosystem lifecycle (Rong et al., 2013, p.77). Therefore, this paper will focus on platform leaders that have successfully set up a platform and constantly win platform battles and succeed against competitors. The focus lies on the leadership phase of the business ecosystem lifecycle (Moore, 1993). Dynamic capabilities are an appropriate theory to investigate innovation triggers along the lifecycle of platform ecosystems, in order to better understand the drivers of this competitive advantage and how these platform leaders continue to innovate the platform and keep it successful. “Dynamic capabilities assist in achieving evolutionary fitness”, which is a core requirement in order to adapt to the ever changing ecosystem (Teece, 2007, p.1321). The dynamic capabilities provide a framework, including general microfoundations, that allow to “maintain competitiveness” (Teece, 2007, p. 1319) and to “shape the environment” (Teece, 2007, p. 1321), which however need to be further specified in the context of platforms. Especially dynamic capabilities around ‘managing threats’ (Teece, 2007) are relevant in the leadership phase, as the platform leader needs to protect his platform from outside developments. In addition, the decision for establishing a platform business is made in the previous ‘seizing’ activity, which implies, that ‘managing threat’ activities are required in the leadership phase (Teece, 2007).

This paper will investigate platform leaders within their ecosystem based on the three platform types multi-sided platform, industry platform, and multi-sided industry platform (Heil and Enkel, 2014). As a result, the main supporting theory for the theoretical background will be platform leadership, business ecosystem lifecycle, and dynamic capabilities in order to target the main research question:

**Research question**

How to constantly innovate platforms through self-renewal and openness?

**Research Design**

Given limited theory on the research question, this paper presents an inductive, multiple case study. In order to be able to gather valuable data on the previously outlined assumptions and research question, a suitable set of case study firms were identified. All identified case study firms needed to fulfill the entire set of criteria in order to ensure data quality and integrity, which in turn enables generalization of the findings. The criteria for this thesis are based on three ecosystems/networks.
different aspects: industry, platform type and ecosystem role.

In total, eleven international firms from the U.S., Europe and Asia were contacted, which met the defined set of criteria. Six of the companies agreed to an interview and five of them agreed to be part of this multiple case study. These five case study firms are from Europe (2) and the U.S. (3). All of them are platform leaders within their industry and managed to keep this leadership position over several years.

Personal semi-structured interviews with one expert of each case study firm were conducted and served as the primary source of data collection. Each expert interviewed for the case study is chosen based on two criteria – a positions in top management or product management and the ability to provide retrospective information – in order to ensure that the expert can identify the capabilities of platform leaders and the according strategic decisions, also with regards to the platform lifecycle. The duration of each interview varied between 30 and 75 minutes. The positions included Vice and Senior Vice Presidents, as well as Engineering and Senior Engineering Managers. In addition, the experts have at least 15 years of experience in their firm.

The expert discussions were accompanied by a semi-structured interview guideline. This interview guide was derived from assumptions based on the theoretical foundation discussed in the section ‘Current Understanding’ above. In order to ensure triangulation for data consistency, secondary data like annual reports, the case firm’s Internet pages, as well as independent third party webpages were also consulted.

Findings

All investigated platform leaders develop their platforms along the four-phased ecosystem lifecycle proposed by Moore (1993) while constantly opening their platforms. Especially the fourth phase, self-renewal, turns out to be a continuous activity resulting in a separate ecosystem or platform self-renewal cycle.

Platform leaders enter the ecosystem with their offering in the birth phase, but they do not necessarily start with a platform from the very beginning. Instead, some future platform leaders start out with a single software, product, or service, which can serve as a basis for a future platform. The original offering can be transformed into a platform-based business model through continuous extension, in order to realize important network effects.

When looking at the case firms, which are all multi-sided industry platforms, four of them transitioned, at some point in time, from an industry platform to a multi-sided industry platform. Three out of five case firms transitioned in the leadership phase as part of a self-renewal activity. A major benefit of the
transition to become a multi-sided industry platform is that the platform leader gains control over the relationship between the complementors and the end customer, strengthening the leadership market position. This transition goes along with a continuous process of opening up the platform towards the ecosystem.

**Contribution**

Because there is evidence through the case analysis that firms transition to become multi-sided industry platforms in order to gain back control of the ecosystem, I suggest that there is strong evidence to support Heil and Enkel’s (2014) theory of the economic benefits of multi-sided industry platforms. What is more, all five case firms conducted self-renewal activities as a standard practice in order to maintain or strengthen their leadership position within the ecosystem. There was no evidence that firms moved from the self-renewal phase back to the birth phase. Instead, the findings demonstrate that the leadership and self-renewal phases can actually be a separate, continuous cycle for platform leaders within Moore’s (1993) original lifecycle framework.

**Practical Implications**

This study defines new capabilities for platform leaders and a strategic set of continuously opening up the platform, which contributes to the greater research on platform innovation. Platform leaders should foster certain distinct dynamic capabilities in order to remain in the leadership-renewal cycle, mentioned above, and constantly innovate their platform, instead of moving to rebirth or death.

Further publications of the chair in ecosystems/networks


Enkel, E. & Hengstler, M., Collaborating and social networking: Exploring differences between radically and incrementally innovating firms. Under review.


further information
Research & teaching at the institute

The Dr. Manfred Bischoff Institute of Innovation Management of Airbus Group is named after its founder and the former EADS “architect” Dr. Manfred Bischoff. It is headed by Prof. Dr. phil. Ellen Enkel and consists of two chairs (a full professorship and a junior professorship), as well as PhD candidates and student assistants.

Fields of research

The institute researches within the area of technology and innovation management. By combining theory and practice, we examine influencing factors, actors and processes for successful product, service and business model innovations. Our fields of research encompass open innovation and cross-industry innovation, cooperative innovation processes in networks, business model innovation as well as innovation metrics, communication and culture. Theoretical focal points are resource-based business theories as well as dynamic capabilities and absorptive capacity theory. The chair preferably works practice- and application-oriented. We try to gain insights from practice and to develop, implement and optimize new concepts on a theoretical basis by cooperating closely with companies. Our publication formats range from practical journals up to internationally recognized scientific journals.

Teaching methodology

Our teaching focuses on innovation and technology management in bachelor, master and executive master programs. We include the latest findings from research in the courses. Since the best way to learn and understand a theory is to apply it to illustrative cases, the teaching concept of the Chair of Innovation Management is based on a close link between theory and practice. Hence, we often collaborate with one or more companies to achieve knowledge transfers between theory and practice.

A seminar will be structured as follows: the students develop the theoretical foundations of the subject. As part of practical cooperation, the students then work on tasks and challenges of the real world business practice, which need to be solved with the help of the prepared theoretical foundations and, of course, the students’ creativity and expertise.

Courses

The Chair for Innovation Management offers a wide range of courses for bachelor, master and executive master students (eMA DIP):

- Introduction to Innovation & Technology Management (BA, CME)
- Open Innovation (BA, CME)
- Business Model Innovation (BA, CME)
- Advanced Open Innovation (MA, CME)
- Knowledge Management (MA, CME)
- R&D Metrics & Creativity (MA, CME)
Course example: R&D Metrics & Creativity

As part of the master module „Creativity, Knowledge and Innovation“, this course covers the measurement of R&D input and output as well as the increase in the innovative capacity of companies. During the theoretical part of the course, students discuss the topics of portfolio management, R&D metrics, R&D controlling, innovation culture and different creativity techniques. The subsequent practical phase allows them to collaborate with companies and work in intensive workshops in order to define improvement levers for them. In Spring 2016, we cooperated with the internet platform Verivox, a company specialist on online comparisons of energy, telecommunication and insurance prices. Giving a real world problem, how Verivox business might change in the future, the students worked out theoretical concepts in the course and collected data from Verivox and other companies to develop solutions regarding the problem. In the final presentation at the end of the semester, Verivox representative commented on the solutions and transferred them into their organization for application. The course design, based on theoretical knowledge of state-of-the-art research applied at real-world problems, helps students to gain a deeper understanding of R&D management and its measures by applying theory to practice.
Publications of the institute 2015-2017

Double Blind Refereed Journal Articles:


Managerial Press and Book Chapters:


Refereed Conference Publications:


Team

Ellen Enkel is professor for innovation management and head of the Dr. Manfred Bischoff Institute of Innovation Management of Airbus Group at the Zeppelin University in Friedrichshafen. Since 2008 she holds the Chair for Innovation Management at Zeppelin University. Prior to that, she carried out research projects for more than 10 years in different roles at the University of St. Gallen, Switzerland. There, she managed the Competence Center Open Innovation at the Institute of Technology Management as well as the Competence Center Knowledge Source at the Institute of Information Management and at the Institute of Management. Since 2012 she has been Editor-in-Chief of the internationally renowned R&D Management Journal. Her research focus comprehends the topics of open innovation and cross-industry innovation, business model innovation, intra- and inter-company innovation networks, innovation metric systems and strategic communication of innovativeness as well as entrepreneurial culture. Prof. Enkel disposes of broad experience by the collaboration with enterprises such as BMW, Unilever, IBM, BASF, Alcan and Henkel. Until now, she has published four books and numerous articles in academic and practical journals regarding technology and innovation management.

Marco Hubert was junior professor for innovation and entrepreneurship at the Dr. Manfred Bischoff Institute for Innovation Management of Airbus Group at the Zeppelin University in Friedrichshafen. Prior to that, he performed research and worked as a Ph.D. candidate at the Chair of Marketing (Zeppelin University, Friedrichshafen). His interdisciplinary focus connects topics from innovation research, marketing, psychology and neuroscience. Currently, his research comprises questions regarding the communication of innovation, the perception of innovativeness, innovation metric systems, e-commerce, consumer behavior and foresight. Jun.-Prof. Hubert
has worked in co-operation projects with enterprises such as MARS or IP Germany. He has already published numerous articles in highly ranked academic journals. Since January 2017 Marco Hubert has been associate professor at Aarhus Business School/Aarhus University in Denmark.

Annika Dingler was PhD candidate at the chair of Innovation Management. After receiving her graduate diploma in business administration she worked in corporate communications as well as innovation management at ZF Friedrichshafen AG for more than seven years. Her research focuses on the role of social integration mechanisms, which for example facilitate the way information is distributed, interpretations are formed or ideas are exchanged in collaborative innovation. In particular, she investigates the role of social integration and communication mechanisms in distant collaboration across established industry boundaries (cross-industry innovation). In December 2016, Annika Dingler finished successfully her graduation at the chair for innovation management and turned back to ZF Friedrichshafen AG.

Monika Hengstler worked as a research associate and PhD candidate at the Chair of Innovation Management. She studied mechanical engineering at the Technical University in Munich and received her bachelor’s degree in “Mechanical Engineering and Management” and her master’s degree in “Mechanical Engineering”. Prior to that, she studied business administration with main focus on business taxation at the Duale Hochschule in Villingen-Schwenningen and finished her diploma with distinction. After completing her studies in 2012, she worked for a medical technology company for more than two years. In her position in the strategic product management department of Gebrüder Martin, a company of the KLS Martin Group, she worked on new implant solutions and biomaterials. In December 2016, Monika Hengstler finished successfully her graduation at the chair for innovation management and turned back to KLS Martin Group.
Veronika Sagmeister is research associate and PhD candidate at the Chair of Innovation Management. Her research focuses on the impact of the digital transformation on business modelling. Veronika Sagmeister passed her executive Master of Arts degree in Digital Pioneering at Zeppelin University in Friedrichshafen. She obtained her Bachelor degree in Information Systems at Duale Hochschule in Stuttgart. During her postgraduate master program, Veronika Sagmeister operated in the Chief Technology Office of Hewlett-Packard GmbH and developed and implemented new digital business models. After her master’s degree in 2015, Veronika Sagmeister worked at Porsche Consulting GmbH as a consultant in the field of development and innovation. The projects included amongst others, the elaboration of an overall R&D strategy for an international automobile enterprise or the execution of an e-mobility analysis for an OEM.

Sabine Marx is manager of the Dr. Manfred Bischoff Institute of Innovation Management of Airbus Group at the Zeppelin University in Friedrichshafen. After an employment of 25 years in facilities for the handicapped, she passed a triennial training for management. Since September 2008, Sabine Marx has been working at Zeppelin University and 2010 she joined the institute as administrative head. Now, as manager, she supports the research team in research projects and is responsible for the representation, organization and coordination as well as public relations and marketing of the institute.
We look forward to exploring further opportunities with you in 2017!

Please visit our homepage in order to be informed about current news and further information on our research: zu.de/innovation
References


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