Chapter 15
Development of an Innovation Ecosystem in a Fast-Paced Economic Environment: The Case of the Vodafone Open Innovation Program

Alexander Kerl

Abstract Many companies experience a blurring of traditional industry boundaries. This challenge forces companies from various industries to look for alternative ways toward being innovative. One approach is to start initiatives for multi-cross-industry innovations. These cross-industry activities may lead to the development of new innovation ecosystems. In this context, I pose the central research question: By what kind of organizational framework are initiatives for multi-cross-industry innovation supported, and how can companies utilize this approach for the generation of new innovation ecosystems?

Following this research question, I conduct an in-depth case study of the Vodafone Open Innovation Program which can be characterized as a multi-cross-industry innovation network of the Vodafone GmbH. I present the organizational model of the Vodafone Open Innovation Program and show key characteristics of the case, before I establish that multi-cross-industry activities may lead to the generation of new innovation ecosystems. In this context, the structured approach of the entire program and the staged intellectual property rights mechanism will especially be highlighted as key characteristics.

Keywords Innovation ecosystem • Multi-cross-industry innovation • Organizational structure • Converging industries • Case study • IP management

A. Kerl (✉)
Institute of Project Management and Innovation, University of Bremen, Bremen, Germany
e-mail: Alexander.Kerl@innovation.uni-bremen.de

J. Leitão et al. (eds.), *Entrepreneurial, Innovative and Sustainable Ecosystems*, Applying Quality of Life Research,
https://doi.org/10.1007/978-3-319-71014-3_15

15.1 Introduction: The Need for Innovation Across Industry Boundaries

The open innovation paradigm elaborated by Chesbrough (2003) states a shift from a "closed to an open innovation paradigm" (Chesbrough 2003). At first, companies opened their innovation departments to their respective industries (Gillier et al. 2010), as the integration of interorganizational knowledge results in innovative products (Rosell and Lakemond 2012). Initially, this did lead to more innovative products and also to a decrease in efficiency in the long term, as developed solutions started showing fewer variations (Emden et al. 2006; Datta and Jessup 2013). In order to obtain more distant knowledge, companies took to cooperating with enterprises beyond the boundaries of their industries (Heil 2015). Obvious examples of products or services that originated from cross-industry development activities are Smart TVs or Smart Homes.

The development process of such products involves a variety of companies from different industries. Companies that aim at developing innovative products contribute to increasing industry convergence. The latter phenomenon is intensively discussed in scientific literature and describes a continuous blurring of traditional industry boundaries (e.g. Curran et al. 2010; Jaspers et al. 2012; Dowling et al. 1998; Gambardella and Torrisi 1998, 2009; Kim et al. 2015). Hacklin et al. (2009) describe this phenomenon as a sequential process. They identified four stages of convergence in the information and communication technology (ICT) industries, namely, (1) knowledge convergence, (2) technological convergence, (3) applicational convergence, and (4) industry convergence.

According to Jaspers et al. (2012), the industry convergence spawns new segments which are located in between formerly distant industrial branches. Innovations originating from segments like these are called multi-cross-industry innovations, according to Khan et al. (2013). This concept leads to new challenges regarding established innovation management literature, as elaborated by Hauschildt and Salomo (2011), Ahmed and Shepherd (2010) and Goffin et al. (2009), which deals with the innovation management of individual companies rather than with the management of more than two companies from different industries.

While we know a lot about the reasons why companies cooperate with one another (e.g. cost and risk sharing, reducing time to market, development of skills and competences, etc. (Gillier et al. 2010; Hagedoorn and Duysters 2002)), we still know fairly little about how companies can foster their engagement in such initiatives (e.g. Khan et al. 2013; Kerl and Moehrle 2015; Gillier et al. 2010). Especially the organizational framework of these partnerships and the key characteristics of such collaborative initiatives may be assumed to differ from what existing innovation management literature describes (van Lente et al. 2003). Furthermore, I think that the engagement in cross-industry collaborations may be a starting point for the development of a new innovation ecosystem, as this concept is typically defined as "collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution" (Adner 2006). Hence, an innovation

ecosystem may comprise different companies from various industries that collaborate with one another toward a common goal (West and Wood 2013).

Consequently, the following research question is posed: By what kind of organizational framework are initiatives for multi-cross-industry innovation supported, and how can companies utilize this approach for the generation of new innovation ecosystems? In order to investigate this research question, an in-depth case study of the Vodafone Open Innovation Program, which can be characterized as a German multi-cross-industry innovation network of one of the largest telecommunication companies worldwide, is conducted.

15.2 Multi-Cross-Industry Innovation Initiatives and Innovation Ecosystems: Conceptual Aspects

Multi-cross-industry innovation as a specific type of cross-industry innovation derives from scientific literature of the 1980s. According to Jaffe (1986), a technical spillover across industries has a positive influence on a company's R&D productivity. Kotabe and Scott Swan (1995) state that cross-industry alliances tend to be indicative of more innovative products than the cooperation of companies with partners from their own key business industries. Today, the phenomenon of cross-industry cooperation is intensively discussed in the scientific literature (e.g. Alves et al. 2007; Brockhoff et al. 1991; Couchman and Beckett 2006; Enkel and Gassmann 2010; Enkel and Heil 2014; Fischer and Varga 2002; Fukugawa 2006; Gassmann et al. 2010; Levén et al. 2014; Lew and Sinkovics 2013; Murphy et al. 2012; Sammarra and Biggiero 2008). It is based on two strategic management approaches: the knowledge-based view (Grant 1996; Grant and Baden-Fuller 2004; Kogut and Zander 1992) and the open innovation theory, as elaborated by Chesbrough (2003). Khan and Möhrle (2012) first introduced the concept of multi-cross-industry innovation as a specific form of cross-industry innovation. They describe multi-cross-industry innovation as the process of creating new products, services, or combinations thereof by combining core knowledge elements from at least three different industries in a significantly new way in order to successfully develop and implement new businesses (Khan and Möhrle 2012).

The differentiation between cross-industry innovation and the concept of multi-cross-industry innovation chiefly pertains to the number of actors involved in the cooperation process. Multi-cross-industry innovation activities are characterized by cooperation activities of at least three organizations from different industries. However, an increasing number of actors involved in the development process seem to enhance the network complexity and lead to new challenges in terms of innovation management literature (Khan and Möhrle 2012). The key challenges regarding multi-cross-industry innovation concern overcoming the cognitive distance between representatives of different industries, developing an environment characterized by trust and personal relationships, and transferring knowledge from one industry

partner to another (Cohen and Levinthal 1990; Enkel and Gassmann 2010; Gassmann et al. 2010; Lichtenthaler and Lichtenthaler 2010).

As initiatives for multi-cross-industry innovation typically take place in externally managed innovation networks, these networks may be seen as starting points for the emergence of new innovation ecosystems. The concept of innovation ecosystems is based on an analogy between biological ecosystems and business ecosystems proposed by Moore (1993), who suggests that "a company be viewed not as a member of a single industry but as part of a business ecosystem that crosses a variety of industries" (Moore 1993) and defines a business ecosystem as an environment in which "companies coevolve capabilities around a new innovation: they work co-operatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations" (Moore 1993). According to this definition and to other influential researchers in the field of innovation ecosystems, like Iansiti and Levien (2004) and Adner (2006), companies "should increasingly move away from industry-focused strategic planning towards strategizing within and around ecosystems" (Autio and Thomas 2014). Therefore, the concept of innovation ecosystems seems to be a promising opportunity for companies to engage in open innovation activities like multi-cross-industry innovations within an ecosystem environment. Especially companies faced with challenges resulting from converging industries may benefit from cross-industry collaborations within an innovation ecosystem, because the ecosystem as a whole gives its members access to a highly diverse knowledge base.

In the following chapters, I use the term innovation ecosystem instead of business ecosystem in order to place an emphasis on the innovation activities within such ecosystems. The term innovation ecosystem is also used in other scientific literature (e.g. Adner 2006; Adner and Kapoor 2010; Mercan and Goktas 2011; Dedehayir and Seppänen 2015).

15.3 Selection of the Case Example and Research Setting

For the exploration of the phenomenon of multi-cross-industry innovation in an ecosystem environment, I choose an exploratory approach in accordance with Yin (2014) and Eisenhardt (1989), as the identification of comparable cases and the analysis of cases are of a complex nature. There are many networks which are recognizable as innovation networks, but there are few innovation networks which meet the requirements of a multi-cross-industry innovation network as described above. In addition, to sharpen the selection, I specify the following three criteria:

- The multi-cross-industry innovation network should be managed by an own and specific management entity in order to distinguish between characteristics of a leading organization and the innovation ecosystem.
- Since I regard innovation as a continuous activity of an organization, the multi-cross-industry innovation network should aim for a long-term focus.

- Furthermore, the multi-cross-industry innovation network should be active in a fast-paced economic environment, as the challenges of innovation management are particularly high in this kind of environment.

Consequently, the form of the study is contemporary, and the identification of suitable research objects is an ongoing task for researchers and companies alike.

The exploratory approach is realized in form of an in-depth case study. A case study analysis allows the deduction of new concepts, hypotheses, and theories and is the preferred method "in situations when (1) the main research questions are 'how' or 'why' questions; (2) a researcher has little or no control over behavioral events; and (3) the focus of study is a contemporary (as opposed to entirely historical) phenomenon" (Yin 2014).

I select the case example of the Vodafone Open Innovation Program due to the program's general organizational structure and aim. Compared to other German multi-cross-industry innovation networks, the Vodafone Open Innovation Program is embedded in the Vodafone Innovation Park and primarily aims at the development of innovative business models. The Vodafone Open Innovation Program deals with multi-cross-industry innovations and consequently heads for cross-industry collaborations with companies, start-ups, research institutions, and universities. Alongside with existing bi- and multilateral development partnerships, the program periodically allows the initiation of new multi-cross-industry initiatives. In contrast to other German multi-cross-industry innovation networks, the Vodafone Open Innovation Program can be categorized as a commercial network to which every organization effectively has access as long as it is willing to pay the required participation fee.

In 2015, the network activities of the Vodafone Open Innovation Program are concerned with the focal points of digital economy and smart living. In one section of digital economy, the participating members deal with topics like customer experience, e-commerce, and machine-to-machine communication. The focal point of smart living combines the ongoing digitalization of home appliances, wearable technologies in the field of mobile health, general mobility (like autonomous driving), sustainability, and sharing. In summary, the program is aimed at facing the challenges that companies have to deal with in times of progressing digitalization and the dissolution of established industry boundaries. All these points make the Vodafone Open Innovation Program a highly suitable research object.

Case study relevant primary data was generated through semi-structured in-depth interviews with four representatives of the Vodafone Open Innovation Program and by 2 days of participation in the Vodafone Open Innovation Program in April and again in June 2015. All interviews are conducted on different organizational levels, speaking with the managing director, the head of department, a senior consultant, and a consultant from the Vodafone Innovation Park. All in all, six interviews with the four representatives mentioned above were conducted. The first round of interviews was conducted in 2013, and the second round in 2015 and 2016. Each round comprised three interviews of differing duration. The length ranged from 26 to 107 min, with an average of 62 min. Five of these six interviews were conducted in

personal meetings, and one was conducted by telephone. I chose to conduct the interviews in two rounds with nearly the same interview partners (two of all four representatives were identical in both interview rounds) in order to gain a better understanding of the implementation process of the Vodafone Open Innovation Program and the decisions made during the interval between both rounds.

The questions for the interviews were developed before the empirical process started. A general interview guide was developed which was then modified according to the respective interview partner's position in the Vodafone Company. All in all, the interview guide was divided into four sections: Sect. 1 involved questions about the interview partner's position, Sect. 2 was concerned with the company and the network, Sect. 3 with the specific organizational structure of the network, and Sect. 4 consisted of questions regarding key characteristics based on previous literature.

To avoid a possible bias, all data was triangulated with secondary data. The secondary data consists of presentations, brochures, publications, business reports, and materials collected during participation in the program. For analysis purposes, the data was coded in accordance with Miles et al. (2014) and Silverman (2010). Coding was performed in two successive steps: first, all interview data was coded with concepts used by the participants, also referred to as in vivo coding (Corbin and Strauss 2015), and second, the initial coding was enhanced by means of analysis characteristics based on the work of Kerl and Moehrle (2015), Khan et al. (2013), and Pittaway et al. (2004). In cases of ambiguous information, follow-up talks were conducted.

15.4 Observations in the Case of the Vodafone Open Innovation Program

Due to its aforementioned characteristics, the Vodafone Open Innovation Program proves to be a suitable research object for investigating the organizational structure and specific key characteristics of a multi-cross-industry innovation network in a fast-paced economic environment. Furthermore, it allows investigating the question whether multi-cross-industry innovation activities are a suitable instrument for the development of an innovation ecosystem.

In the following section, the organizational model and specific network characteristics of the Vodafone Open Innovation Program are described. Furthermore, I present the results of the case analysis, based on previously identified key elements of success.

15.4.1 The Organizational Model of the Vodafone Open Innovation Program

The following description of the organizational model of the Vodafone Open Innovation Program focuses on its basic organization, network type, and network composition.

Basic organization: Being part of the Vodafone Innovation Park, the Vodafone Open Innovation Program is organized as a spin-off organization. According to the head of the Vodafone Innovation Park, a spin-off organization ensures the flexibility and responsiveness required by a multi-cross-industry network acting in the field of digital communication. Moreover, a spin-off organization is able to commercialize research and development results, align the innovation system with the open innovation approach, and facilitate networking on the company level (EIRMA 2003; Parhankangas 2001; Rohrbeck et al. 2009). A lack of know-how and methodical competence regarding the management of a cross-industry network initiative like the Vodafone Open Innovation Program led to the appointment of an external open innovation company which took over the general management of the Vodafone Open Innovation Program in 2015.

The basic structure of the program is illustrated in Fig. 15.1 and follows a standard stage-gate approach. The program is divided into four key elements: before potential participants attend the first workshop, they are informed about the basic concept, idea, and structure of the Vodafone Open Innovation Program by means of so-called preliminary information talks. After these preliminary information talks, companies are given the option to pay a participation fee that allows them to take part in either the first workshop, respectively, think tank or in the entire process depicted in Fig. 15.1.

During the semi-structured think tank, the participating companies are asked to develop new innovative ideas for business models either in the field of digital economy or smart living, depending on the program's focus. For the idea-generating process, all members are asked to think up to five ideas in 5 min time in tandem teams. After the first 5 min, each team member elaborates the ideas generated by his/her tandem partner for another 5 min. This process can be categorized as a standard brainwriting method, which is not specially designed for the generation of innovative business models like the integrated approach by Halecker and Hartmann (2013), who posited a systems thinking approach for the generation of business

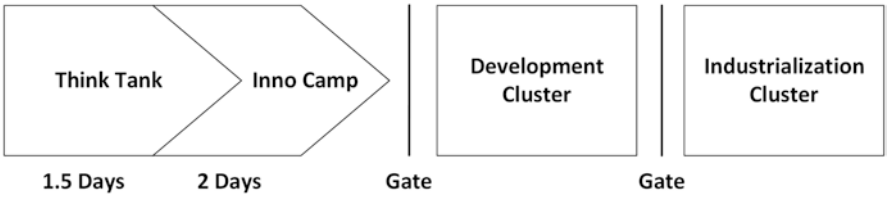

Fig. 15.1 Structure of the Vodafone Open Innovation Program (Source: Author)

model innovations. Subsequently, all generated ideas are discussed by the tandem teams, and three have to be selected for specification. The specification process follows a light version of the Business Model Canvas approach developed by Osterwalder and Pigneur (2010) and seems to be helpful to the participants in terms of structuring and specifying their business models. After working on three ideas for innovative business models, the whole group is asked to rate all ideas by means of points. Each participant is allowed to give up to six points to each individual idea. On the basis of this analysis, new working groups are assigned. The size of these groups is not standardized but based upon the previous voting process. At the close of the workshop, all specified ideas for business models are presented, discussed, and documented in order to enable a further discussion and development of ideas in an online workspace accessible to registered participants only.

Comparable to the think tank workshops, the inno camp workshops are also semi-structured and aimed at the ongoing development and specification of ideas generated in the preceding think tank. There is a mix of structured phases with moderated discussions and the application of creativity techniques, and there are unstructured phases in which the participants are asked to refine their business models in heterogeneous working groups. In 2013 the results of the inno camp workshop were documented by the participants themselves. They did not have the advantage of any tool or method like the Business Model Canvas. Considering the newly assigned network management, it is probable that the upcoming inno camp workshops will see the application of specific methods or tools such as the Business Model Canvas and the like.

After being processed in the think tank and inno camp workshops, the generated ideas have to pass a decision gate. Interested members have to find cooperation partners with whom they sign a development agreement. This agreement is highly customized and deals with intellectual property rights and resource allocation issues. The aim of the third stage, the so-called development cluster, is to realize first prototypes and refine the business models. This stage is marked by profoundly individual cooperation activities. So far, one development cluster could be reached by one initiative in 2013.

After its successful development in the development cluster, an initiative has to pass another gate where all participating companies decide whether the business model is economic and whether further investments should be made. The operational aim of the industrialization cluster is to finalize the business model and to achieve market maturity.

Network type: The Vodafone Open Innovation Program can be characterized as a hybrid network type. On the one hand, the Vodafone Open Innovation Program shows characteristics of an informal network as described by Fischer and Varga (2002) — especially in the first stages of the organizational structure. Although there is a defined structure in place, the initiating company Vodafone does not stipulate many regulations. On the other hand, the more the process reaches a matured stage in the organizational structure, the more regulations have to be met. On the

whole, the program seems to involve more standardized processes than "network relations of a mainly informal nature" (Fischer and Varga 2002).

Network composition: The Vodafone Open Innovation Program aims at a high degree of heterogeneity. There are basically no limitations that concern the application for participation, except for the requirement that potential companies are asked to depute representatives from their innovation departments or at least representatives who are deeply involved in the company specific innovation process and except for the fact that all participants, i.e. companies, have to pay a participation fee to an amount depending on the number of workshops they wish to attend. According to Nooteboom et al. (2007), the effect of cognitive distance related to the overall innovation performance is U-shaped. In consequence, there is an optimal cognitive distance respectively heterogeneity of the participating members in relation to the innovation performance. However, the aim should not be a preferably high degree of cognitive distance but rather "to find partners at sufficient cognitive distance to tell something new, but not so distant as to preclude mutual understanding" (Nooteboom et al. 2007). Melander and Lopez-Vega (2013) suggest that in development projects, which can be characterized by a high degree of technological uncertainty, a detailed selection of cooperation partners is of pivotal importance. Even though their research deals especially with supplier cooperation, their findings can be applied to multi-cross-industry cooperation activities, too. Moreover, Bergendahl and Magnusson (2015) state that the intended type of innovation has an impact on the concept of cognitive distance as well as the supporting knowledge creation processes. Thus, the concept of cognitive distance requires a multidimensional measure which does not only take into account "geographical and organizational distance, but also […] other dimensions such as technology" (Bergendahl and Magnusson 2015; Konsti-Laakso et al. 2012).

Established initiatives: So far, the Vodafone Open Innovation Program has led to one digital prototype of an innovative business model. Due to nondisclosure agreements between the participating companies and the Vodafone GmbH, I am not permitted to refer to this finalized multi-cross-industry innovation in detail before market launch. As regards perceived successes, the organizational model of the Vodafone Open Innovation Program seems to be partially suitable for the program's strategic aim of initiating multi-cross-industry innovations in a fast-paced economic environment and establishing new cooperation links with interindustry as well as cross-industry companies and research institutes in the form of an innovation ecosystem. Participation in the Vodafone Open Innovation Program allows companies to gain insight into foreign industries, to find potential cooperation peers regarding innovative ideas for business models, to develop ideas in the course of network activities, and, as mentioned before, to establish or tighten new or already existing links with other companies and research institutions.

15.4.2 Key Characteristics of the Organizational Model Derived from Case Analysis

The interviews indicate that the Vodafone Open Innovation Program is aimed at facing specific challenges of a fast-paced environment such as the telecommunication industry, which is Vodafone's core business (Hilmola 2012). In order to be able to develop innovative business models in an industry that is characterized by relatively short product life cycles, a more structured and formalized approach seems to be beneficial. Furthermore, the interviews suggest that a high level of absorptive and desorptive capacity and support from the top management seem to have a positive effect on the output performance. On the other hand, an insufficient ability to develop a high level of trust and personal relationships caused by the unstable composition of the network and the absence of multi-cross-industry innovation architects seem to impair development processes at more advanced stages of the program's structure.

Structured approach: In comparison with other German innovation networks that aim to develop an innovation ecosystem, the approach of the Vodafone Open Innovation Program is more structured and formalized. As pointed out above, participants are stimulated by the application of creativity techniques such as the group structured brainwriting technique during workshops. According to Thompson (2003) and Heslin (2009), "Brainwriting groups consistently generate more and better ideas than groups who follow their natural instincts" (Thompson 2003). Hence, the concept of brainwriting may enable the generation of innovative ideas at an early stage of the innovation process. Moreover, a combination of structured and coordinated individual and group working phases seems to have a particularly positive influence on the idea generation process.

Staged intellectual property rights mechanism: As mentioned before, the participating companies are not required to sign any protective contract or agreement dealing with intellectual property rights or nondisclosure in the first two stages of the Vodafone Open Innovation Program structure. After passing the first gate, only those companies which decide to refine the innovative business model or product have to sign a nondisclosure agreement and, if necessary, further contracts dealing with intellectual property rights and resource allocation. Buss and Peukert (2015) state "that there is a link between research and development (R&D) outsourcing and intellectual property (IP) infringement" (Buss and Peukert 2015). Furthermore, they point out that this link is of a positive nature. Hence, development activities occurring in cross-industry networks or R&D cooperations in general increase the infringement risk, depending on the degree of interaction. Jiang et al. (2013) identify two dominant governance mechanisms — trust and formal contracts — which may both influence the degree of knowledge leakage and the occurrence of intellectual property infringements in consequence of this. As mentioned before, the Vodafone Open Innovation Program represents a case in which trust cannot easily develop over a period of several years due to the volatile network composition. Consequently, a staged intellectual property rights mechanism seems to be beneficial

in terms of a high degree of interpersonal trust on the one hand and a relatively low risk of intellectual property infringement on the other. Nevertheless, formal contracts may diminish the risk of knowledge leakage at an early stage of a cooperative innovation process. Although Jiang et al. (2013) state that trust (especially competence trust) is a more effective safeguard compared to formal contracts, the latter still allow companies to minimize the risk of knowledge leakage and consequential intellectual property infringements at an early stage of a cooperation.

Absorptive and desorptive capacity: According to Lichtenthaler and Lichtenthaler (2010) as well as Müller-Seitz (2012), a high absorptive and desorptive capacity may lead to a better network innovation performance. Furthermore, Khan et al. (2013) state that "for a profitable co-operation in the multi-cross-industry innovation context, the transfer and implementation of knowledge from as well as to the knowledge base of an enterprise are essential" (Khan et al. 2013). Three characteristics which seem to have a positive influence on the absorptive and desorptive capacity, on either the network or the company level, have been identified in the case of the Vodafone Open Innovation Program. First, the avoidance of restrictions at the early stage of an idea generation process seems to create a common interest in potential multi-cross-industry innovation initiatives by bringing together different knowledge bases. Second, the heterogeneity of the network composition seems to increase the absorptive and desorptive capacity by bringing together different knowledge bases from different industries. Third, all network members can be characterized by their industry-specific knowledge which enables them to actively enhance network knowledge by participating in network activities. Thus, the network as an entity is able to absorb knowledge on the network level, processes knowledge in the course of network activities, and desorbs knowledge on the company level into the respective innovation departments. The ongoing acquisition of new potential network participants also seems to increase the absorptive and desorptive capacity.

Volatile network composition: Due to the fact that the Vodafone Open Innovation Program aims to develop innovative business models in a fast paced-environment like the telecommunication industry, the program has to deal with the corresponding challenges as mentioned before. Therefore, the network structure is not geared to a long-term existence, evolving over several years, but to intensive short-term workshops. Potential members have the option to participate in the entire program or only in its first stage, depending on the purchased workshop package. The consequence is an unstable composition of the network, which may, on the one hand, lead to a high absorptive and desorptive capacity but on the other hand seems to impair a long-term network cooperation. According to findings by Kerl and Moehrle (2015), trust may be a key success factor for a long-term oriented network.

Multi-cross-industry innovation architect: In order to be successful in a network environment with an initial idea, different companies have to cooperate intensively over a specific time frame. Khan et al. (2013) identified the role of the multi-cross-industry innovation architect, hereinafter referred to as architect, in a different German multi-cross-industry innovation network. The architect takes over two key roles within the development process. One is that he "provides the first problem or need from which the subject is derived and additionally acts as a booster by being

more active and committing more resources" (Khan et al. 2013). Other case studies show that the role of the architect is of pivotal importance for the overall network innovation performance (Khan et al. 2013; Kerl and Moehrle 2015). The interviews I conducted and the information gathered by attending the Vodafone Open Innovation think tank and inno camp workshops suggest that the involvement of at least one architect is also of pivotal importance in the Vodafone Open Innovation Program. The architect's role resembles that of a promoter according to Hauschildt and Salomo (2011) as well as that of a product champion according to Markham and Aiman-Smith (2001). The "promoter theory focuses on several specialists to overcome different barriers to innovation, while champion theory concentrates on generalists playing multiple roles" (Rese et al. 2013). Furthermore, the architect has a stronger need to solve a specific problem or develop a specific business model or product. Hence, the architect is willing to invest more resources and convince other representatives to participate in a specific initiative. In the case of the Vodafone Open Innovation Program, this role is partly taken on by the network itself. Nevertheless a study by Rese et al. (2013) shows that successful interorganizational innovation projects are characterized by the existence of role players who bear characteristics of champions. So the incidental lack of at least one architect seems to be one reason for the low-output rate of the first Open Innovation Program in 2013.

15.4.3 Development of an Innovation Ecosystem

The case of the Vodafone Open Innovation Program is an example of a single company aiming at the establishment of (multi-)cross-industry innovation activities by engaging several organizations from different industries in organized multiday workshops. As shown above, the Vodafone Open Innovation Program bears characteristics of a multi-cross-industry innovation network. In order to answer the research question as to how multi-cross-industry activities lead to the development of new innovation ecosystems, we have to investigate the starting point of an innovation ecosystem. The theoretical definitions of innovation networks and innovation ecosystems are not clear-cut. Several definitions of both concepts exist simultaneously, which is why I define activities that take place during the organized program as network activities. In the case of the Vodafone Open Innovation Program, some initiatives for collaborations are carried out outside the program, including new collaboration partners who are not part of the Vodafone Open Innovation Program yet.

Although it is hard to define where network activities end and where innovation ecosystem activities start, I regard the long-term involvement of new collaboration partners from outside the program's organizational setting as a starting point for the emergence of a new innovation ecosystem. From this point on, all involved parties collaborate with one another outside the program's structure, acquiring or simply involving new partners from various industries.

Figure 15.2 visualizes three different types of innovation ecosystems aimed at by the management of the Vodafone Open Innovation Program. The first ecosystem, as

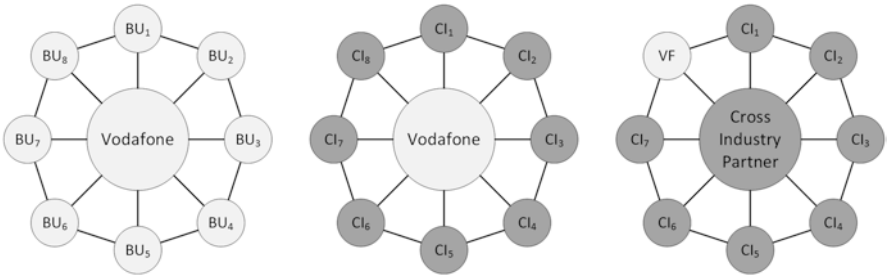

Fig. 15.2 Different types of innovation ecosystems aimed for by the Vodafone Open Innovation Program (Source: Author)

depicted in Fig. 15.2, shows an internal innovation ecosystem of the Vodafone GmbH, in which the company acts as a central member of the ecosystem, collaborating with several internal business units (BU_x) of the same company. The idea of this approach is to create links between different business units of a multinational company like the Vodafone GmbH in order to achieve cross-industry innovation results without having to go beyond the company boundaries. The second and third ecosystems, as depicted in Fig. 15.2, visualize two types of the cross-industry innovation ecosystem. Both comprise the Vodafone GmbH in collaboration with cross-industry partners (CI_x). In the second one, the Vodafone GmbH acts as a leading/centric member of the ecosystem, whereas in the third, it acts like a regular member of an innovation ecosystem, which is mainly steered and influenced by a different organization.

Ultimately, both the interview data and the self-assessment of the management of the Vodafone Open Innovation Program indicate that multi-cross-industry innovation activities are generators of new innovation ecosystems.

15.5 Conclusions

The explorative in-depth case study deals with the questions of what kind of organizational framework serves to support initiatives for multi-cross-industry innovation and how companies can utilize this approach for the generation of new innovation ecosystems. In order to answer these questions, I analyzed a German multi-cross-industry innovation network known as the Vodafone Open Innovation Program, which is part of the Vodafone Open Innovation Park. This multi-cross-industry innovation network can be characterized by its strategic aim to develop innovative business models, setting it apart from other German multi-cross-industry innovation networks which mainly aim at developing innovative products or solutions. Moreover, the Vodafone Open Innovation Program has a management unit of its own, it is focused on long-term innovations, and it is active in the fast-paced economic environment of the telecommunication industry. The study reveals two

new key characteristics of a multi-cross-industry innovation network: the use of a staged intellectual property rights mechanism and a formally structured organizational model. Furthermore, I suggest that the Vodafone Open Innovation Program may be seen as a generator of new innovation ecosystems.

From a theoretical perspective, the in-depth case study contributes to multi-cross-industry innovation as well as innovation ecosystem literature, especially in terms of the organizational framework that is required to achieve a high innovation performance and key characteristics that depend on the environment in which the innovation ecosystem is active. Furthermore, the case leads to new questions concerning the concept of multi-cross-industry innovation. One key question is: What organizational model is needed to meet the industry specific challenges, and what characteristics serve to support the organizational model in regard to a high innovation performance? Another question is: How do the different key characteristics affect each other? To answer questions like these, further research in the field of multi-cross-industry innovation and, respectively, innovation ecosystems has to be undertaken.

From a managerial perspective, the study offers a 'good practice' example of how to develop an innovation ecosystem in order to achieve open innovation cross-industry results. Managers may take up this example and transfer it to their institution, taking into account the contingencies of environments. As we have isolated different mechanisms (such as the staged intellectual property rights mechanism) and roles (such as the multi-cross-industry innovation architect), managers may also use these in different settings — for instance, while improving a "closed" innovation process within a company.

One major shortcoming of this study is the fact that I merely analyzed one German multi-cross-industry innovation network that aims at developing innovative business models. Although all case study relevant data has been triangulated, the development of the organizational model of the Vodafone Open Innovation Program has to be further observed to ensure the consistency of the findings. Additionally, further research has to be done in more diverse environments to answer the above-mentioned research questions.

References

Adner, R. (2006). Match your innovation strategy to your innovation ecosystem. *Harvard Business Review, 84*(4), 98.

Adner, R., & Kapoor, R. (2010). Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal, 31*(3), 306–333.

Ahmed, P. K., & Shepherd, C. (2010). *Innovation management: Context, strategies, systems and processes*. Pearson Harlow.

Alves, J., Marques, M. J., Saur, I., & Marques, P. (2007). Creativity and innovation through multidisciplinary and multisectoral cooperation. *Creativity and Innovation Management, 16*(1), 27–34.

Autio, E., & Thomas, L. (2014). Innovation ecosystems. *The Oxford Handbook of Innovation Management*, 204–288.

Bergendahl, M., & Magnusson, M. (2015). Creating ideas for innovation: Effects of organizational distance on knowledge creation processes. *Creativity and Innovation Management, 24*(1), 87–101.

Brockhoff, K., Gupta, A. K., & Rotering, C. (1991). Inter-firm R&D co-operations in Germany. *Technovation, 11*(4), 219–229.

Buss, P., & Peukert, C. (2015). R&D outsourcing and intellectual property infringement. *Research Policy, 44*(4), 977–989.

Chesbrough, H. W. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business Press.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 128–152.

Corbin, J. M., & Strauss, A. L. (2015). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (4th ed.). Thousand Oaks: SAGE Publications.

Couchman, P. K., & Beckett, R. (2006). Achieving effective cross-sector R&D collaboration: A proposed management framework. *Prometheus, 24*(2), 151–168.

Curran, C.-S., Bröring, S., & Leker, J. (2010). Anticipating converging industries using publicly available data. *Technological Forecasting and Social Change, 77*(3), 385–395.

Datta, A., & Jessup, L. M. (2013). Looking beyond the focal industry and existing technologies for radical innovations. *Technovation, 33*(10), 355–367.

Dedehayir, O., & Seppänen, M. (2015). Birth and expansion of innovation ecosystems: A case study of copper production. *Journal of Technology Management & Innovation, 10*(2), 145–154.

Dowling, M., Lechner, C., & Thielmann, B. (1998). Convergence–Innovation and change of market structures between television and online services. *Electronic Markets, 8*(4), 31–35.

EIRMA. (2003). Innovation through spinning in and out. *Research-Technology Management, 46*, 63–64.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review, 14*(4), 532–550.

Emden, Z., Calantone, R. J., & Droge, C. (2006). Collaborating for new product development: Selecting the partner with maximum potential to create value. *Journal of Product Innovation Management, 23*(4), 330–341.

Enkel, E., & Gassmann, O. (2010). Creative imitation: Exploring the case of cross-industry innovation. *R&D Management, 40*(3), 256–270.

Enkel, E., & Heil, S. (2014). Preparing for distant collaboration: Antecedents to potential absorptive capacity in cross-industry innovation. *Technovation, 34*(4), 242–260.

Fischer, M. M., & Varga, A. (2002). Technological innovation and interfirm cooperation: An exploratory analysis using survey data from manufacturing firms in the metropolitan region of Vienna. *International Journal of Technology Management, 24*(7), 724–742.

Fukugawa, N. (2006). Determining factors in innovation of small firm networks: A case of cross industry groups in Japan. *Small Business Economics, 27*(2–3), 181–193.

Gambardella, A., & Torrisi, S. (1998). Does technological convergence imply convergence in markets? Evidence from the electronics industry. *Research Policy, 27*(5), 445–463.

Gassmann, O., Zeschky, M., Wolff, T., & Stahl, M. (2010). Crossing the industry-line: Breakthrough innovation through cross-industry alliances with 'non-suppliers. *Long Range Planning, 43*(5), 639–654.

Gillier, T., Piat, G., Roussel, B., & Truchot, P. (2010). Managing innovation fields in a cross-industry exploratory partnership with C–K design theory. *Journal of Product Innovation Management, 27*(6), 883–896.

Goffin, K., Herstatt, C., & Mitchell, R. (2009). *Strategien und effektive Umsetzung von Innovationsprozessen mit dem Pentathlon-Prinzip*. München: FinanzBuch.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal, 17*(S2), 109–122.

Grant, R. M., & Baden-Fuller, C. (2004). A knowledge accessing theory of strategic alliances. *Journal of Management Studies, 41*(1), 61–84.

Hacklin, F., Marxt, C., & Fahrni, F. (2009). Coevolutionary cycles of convergence: An extrapolation from the ICT industry. *Technological Forecasting and Social Change, 76*(6), 723–736.

Hagedoorn, J., & Duysters, G. (2002). Learning in dynamic inter-firm networks: The efficacy of multiple contacts. *Organization Studies, 23*(4), 525–548.

Halecker, B., & Hartmann, M. (2013). Contribution of systems thinking to business model research and business model innovation. *International Journal of Technology Intelligence and Planning, 9*(4), 251–270.

Hauschildt, J., & Salomo, S. (2011). Innovationsmanagement. Vahlen.

Heil, S. (2015). *Cross-industry innovation – A theoretical and empirical foundation on the concept of absorptive capacity*. Dissertation, Zeppelin University.

Heslin, P. A. (2009). Better than brainstorming? Potential contextual boundary conditions to brainwriting for idea generation in organizations. *Journal of Occupational and Organizational Psychology, 82*(1), 129–145.

Hilmola, O. (2012). Technological change and performance deterioration of mobile phone suppliers. *International Journal of Technology Intelligence and Planning, 8*(4), 374–388.

Iansiti, M., & Levien, R. (2004). *The keystone advantage: What the new dynamics of business ecosystems mean for strategy, innovation, and sustainability*. Harvard Business Press.

Jaffe, A. B. (1986). Technological opportunity and spillovers of R&D: Evidence from firms' patents, profits and market value. *The American Economic Review, no., 5*, 984–1001.

Jaspers, F., Prencipe, A., & Ende, J. (2012). Organizing interindustry architectural innovations: Evidence from mobile communication applications. *Journal of Product Innovation Management, 29*(3), 419–431.

Jiang, X., Li, M., Gao, S., Bao, Y., & Jiang, F. (2013). Managing knowledge leakage in strategic alliances: The effects of trust and formal contracts. *Industrial Marketing Management, 42*(6), 983–991.

Kerl, A., & Moehrle, M. G. (2015). *Initiatives for multi cross industry innovation: The case of universal home*. Technology Management in the ITDriven Services (PICMET), Proceedings of PICMET'15 (pp. 2223–2229).

Khan, A., & Möhrle, M. G. (2012). Multi cross industry innovation: Eine Herausforderung an das Innovationsmanagement. *Innovative Produktionswirtschaft: Jubiläumsschrift zu 20 Jahren produktionswirtschaftlicher Forschung an der BTU Cottbus, 20*, 45–58.

Khan, A., Möhrle, M. G., & Böttcher, F. (2013) Initiatives for multi cross industry innovation: The case of future_bizz. In: *Technology Management in the IT-Driven Services (PICMET), 2013 Proceedings of PICMET'13*. IEEE, pp. 616–622.

Kim, N., Lee, H., Kim, W., Lee, H., & Suh, J. H. (2015). *Dynamic patterns of industry convergence: Evidence from a large amount of unstructured data*. Research Policy.

Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science, 3*(3), 383–397.

Konsti-Laakso, S., Pihkala, T., & Kraus, S. (2012). Facilitating SME innovation capability through business networking. *Creativity and Innovation Management, 21*(1), 93–105.

Kotabe, M., & Scott Swan, K. (1995). The role of strategic alliances in high-technology new product development. *Strategic Management Journal, 16*(8), 621–636.

Levén, P., Holmström, J., & Mathiassen, L. (2014). Managing research and innovation networks: Evidence from a government sponsored cross-industry program. *Research Policy, 43*(1), 156–168.

Lew, Y. K., & Sinkovics, R. R. (2013). Crossing borders and industry sectors: Behavioral governance in strategic alliances and product innovation for competitive advantage. *Long Range Planning, 46*(1), 13–38.

Lichtenthaler, U., & Lichtenthaler, E. (2010). Technology transfer across organizational boundaries: Absorptive capacity and desorptive capacity. *California Management Review, 53*(1), 154–170.

Markham, S. K., & Aiman-Smith, L. (2001). Product champions: Truths, myths and management. *Research-Technology Management, 44*(3), 44–50.

Melander, L., & Lopez–Vega, H. (2013). Impact of technological uncertainty in supplier selection for NPD collaborations: Literature review and a case study. *International Journal of Technology Intelligence and Planning, 9*(4), 323–339.

Mercan, B., & Goktas, D. (2011). Components of innovation ecosystems: A cross-country study. *International Research Journal of Finance and Economics, 76*, 102–112.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014) *Qualitative data analysis: A methods sourcebook* (3rd ed.).

Moore, J. F. (1993). Predators and prey: A new ecology of competition. *Harvard Business Review, 71*(3), 75–83.

Müller-Seitz, G. (2012). Absorptive and desorptive capacity-related practices at the network level–the case of SEMATECH. *R&D Management, 42*(1), 90–99.

Murphy, M., Perrot, F., & Rivera-Santos, M. (2012). New perspectives on learning and innovation in cross-sector collaborations. *Journal of Business Research, 65*(12), 1700–1709.

Nooteboom, B., van Haverbeke, W., Duysters, G., Gilsing, V., & Van den Oord, A. (2007). Optimal cognitive distance and absorptive capacity. *Research Policy, 36*(7), 1016–1034.

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. Hoboken: Wiley.

Parhankangas, A. (2001). *From a corporate venture to an independent company: A base for a typology for corporate spin-off firms*. IEEE.

Pittaway, L., Robertson, M., Munir, K., Denyer, D., & Neely, A. (2004). Networking and innovation: A systematic review of the evidence. *International Journal of Management Reviews, 5*(3–4), 137–168.

Rese, A., Gemünden, H., & Baier, D. (2013). "Too many cooks spoil the broth": Key persons and their roles in inter-organizational innovations. *Creativity and Innovation Management, 22*(4), 390–407.

Rohrbeck, R., Döhler, M., & Arnold, H. (2009). Creating growth with externalization of R&D results—the spin-along approach. *Global Business and Organizational Excellence, 28*(4), 44–51.

Rosell, D. T., & Lakemond, N. (2012). Collaborative innovation with suppliers – A conceptual model for characterizing supplier contributions to NPD. *8*(2), 197–214.

Sammarra, A., & Biggiero, L. (2008). Heterogeneity and specificity of inter-firm knowledge flows in innovation networks. *Journal of Management Studies, 45*(4), 800–829.

Silverman, D. (2010). *Qualitative research*. London: Sage Publications.

Thompson, L. (2003). Improving the creativity of organizational work groups. *The Academy of Management Executive, 17*(1), 96–109.

van Lente, H., Hekkert, M., Smits, R., & van Waveren, B. (2003). Roles of systemic intermediaries in transition processes. *International Journal of Innovation Management, 7*(03), 247–279.

West, J., & Wood, D. (2013). Creating and evolving an open innovation ecosystem: Lessons from Symbian ltd. In R. Adner, J. E. Oxley, & B. S. Silverman (Eds.), *Collaboration and competition in business ecosystems* (1st ed., pp. 27–67). Bingley: Emerald.

Yin, R. K. (2014). *Case study research: Design and methods*. London: Sage Publications.