Successful management of diverse corporate innovation communities

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Abstract

Purpose – Increasing demographic diversity within societies and workforces causes challenges with regard to the innovation performance of companies. By definition, innovation communities nowadays are composed of members with diverse function background and age diversity. The challenging question is how to manage diverse corporate innovation communities. The purpose of this paper is to find out which factors determine the success of corporate innovation communities in times of demographic shifts.

Design/methodology/approach – The empirical field to answer the research question are three corporate innovation communities in companies of different industries and size. Multiple case study methodology is applied to gather and analyse the data.

Findings – The study presents an empirically derived framework to structure success factors of diverse corporate innovation communities chronologically in the three phases of preparation, execution and finalization of a community work process. The success factors are described in detail and finally a time sequential guideline for those who are responsible for community management in demographic change is provided.

Research limitations/implications – It is contributed to the literature on innovation communities and it is shown that innovation communities are not only an instrument to solve innovation tasks but are also a promising means to tackle other challenges of recent demographic changes. As limitation must be considered, that the analysed innovation communities only received corporate support for a short period of time and the supporting organizations operate in manufacturing industries in Germany only.

Practical implications – The paper highlights that managers need to be aware that diversity in corporate innovation communities *per se* does not lead to success. Furthermore, a guideline of success factors for managers of diverse corporate innovation communities is presented which highlights important aspects that managers need to consider during the community work process.

Social implications – Due to demographic shifts in Germany and other European countries, societies in general and workforces in particular have modified. Most pervasive shifts take place with regard to age structures and diversity. Implications how manager could handle diversity successfully are therefore of high relevance for societies.

Originality/value – This study provides a theoretical understanding of the implications of organizational and age diversity on corporate innovation community management. Extant authors have already focussed on success factors in innovation communities and diverse settings isolated, but have not merged these issues.

Keywords Open innovation, Success factors, Demographic diversity, Corporate innovation community

Paper type Research paper

Introduction

Recently, the concept of communities as a promising tool to support innovation processes has received increasing attention in theory and practice (Jeppesen and Frederiksen, 2006; West and Lakhani, 2008). In this context, researchers have emphasized the beneficial role of community settings for innovation performance (di Gangi and Wasko, 2009; Ozer *et al*., 2013).

In this paper, the focus is on communities that receive corporate support. A corporate innovation community (CIC) is a group of individuals, consisting of both employees and external innovators, who work on a voluntary basis on innovative activities for a certain

company (Dumbach, 2014). Involved employees belong to various organizational departments. Working processes within the innovation community are characterized by intense interaction and hence are a joint innovating effort. Collaboration by community members takes place in offline as well as in virtual environments. Furthermore, CICs receive support from an initiating company which is interested in community work and outcomes. Therefore, it is not crucial for community members to be employed by the focal organization.

Similar to other organizational forms, innovation communities are affected by demographic changes. Due to demographic changes in Germany and other European countries, societies in general and workforces in particular have shifted in terms of age structures and diversity (Verworn, 2009b; Boehm *et al.*, 2010b). In innovation communities, diversity has always been an important facet because members have different functional and organizational backgrounds (Bjelland and Wood, 2008). Yet, demographic changes and increasing differences with regard to seniority add to the pervasiveness of diversity in community settings.

A large body of research has already addressed the benefits and drawbacks of diversity in organizations (Balkundi *et al.*, 2007; Bell *et al.*, 2011; Milliken and Martins, 1996). This literature stream has shown that diversity has an effect on various performance measures, including productivity and innovation (Ancona and Caldwell, 1992; Bantel and Jackson, 1989; Reagans and Zuckerman, 2001; Van der Vegt and Janssen, 2003). A few studies have also examined moderating effects that determine whether diversity tends to be positively or negatively related to performance (e.g. Horwitz, 2005; Jehn *et al.*, 1999).

However, this paper argues that, in the context of recent demographic changes, one particular outstanding issue remains under-investigated, as nowadays managers are not facing the question of whether employee diversity is good or bad, because diversity is merely taken for granted. Therefore, this paper addresses the following research question:

RQ1. Which factors determine the success of diverse CICs?

Furthermore, the goal of the paper is to develop a general model showing relevant factors in handling diverse CICs. This model is intended to guide managers through the most important factors for establishing and running functionally and age-diverse CICs successfully. The empirical field used to answer the research question is three CICs from different industries, which are comparable in terms of age, functional diversity, size, topics and stages. Case study methodology (Eisenhardt, 1989; Yin, 2003) is applied to gather and analyse the data. The paper is intended to contribute to the research field of innovation communities and to consider the impact of demographic change.

The remainder of this paper is structured as follows. First, the literature on innovation communities and the influence of demographic change is reviewed. Second, the focus is on CICs and the success of these age- and functionally diverse groups is defined. Third, the research methodology and the empirical setting are described. Fourth, the findings are presented. Finally, the paper ends with a discussion and conclusion.

Theoretical background
Corporate innovation communities and functional diversity
Many organizations integrate both external and internal partners in innovation processes to achieve access to heterogeneous ideas and knowledge (Bjelland and Wood, 2008; Muhdi and Boutellier, 2011). Popular external innovators are, among others, users, customers or suppliers (di Gangi and Wasko, 2009). Boundary-spanning innovation processes are often discussed under the notion of open innovation (e.g. Neyer *et al.*, 2009), a paradigm popularized by Chesbrough (2003). Innovation communities are considered to be one

instrument that supports open innovation activities, and they have received particular attention (Jeppesen and Frederiksen, 2006; West and Lakhani, 2008).

Referring to CICs, diversity plays a central role. Most obviously, the fact that communities consist of employees of the supporting company who work in different departments as well as external members implies diverse organizational backgrounds of community members (Bjelland and Wood, 2008).

Some studies identify negative consequences of functional diversity on innovation (e.g. Simons *et al.*, 1999). For example, Ancona and Caldwell (1992) observe that product development teams that consist of individuals with heterogeneous functional expertise are likely to fail. These researchers argue that such teams have access to more diverse problem-solving information, but are not able to benefit from that information because of limited flexibility and capacity for teamwork.

In contrast, other authors describe collaboration across functions as promising for innovation and deliver empirical support for their propositions (e.g. Verworn, 2009a; Bantel and Jackson, 1989). As functional diversity has both positive and negative effects on performance, companies need to manage diverse groups in order to overcome the obstacles described (Cuijpers *et al.*, 2011; McDonough, 2000).

The way CICs work and perform is affected by demographic changes in societies and workforces, which result in additional diversity. More specifically, demographic changes increase age diversity in addition to organizational diversity in innovation communities.

Demographic change and its impact on innovation
In many European countries, demographic changes have modified societies and workforces (Verworn, 2009b). From a corporate point of view, these changes in the form of longstanding declines in birth rates, combined with increases in life expectancy (Fougère and Mérette, 1999) are associated with a number of challenges. Boehm *et al.* (2010b) outline four interrelated consequences of demographic changes for organizations: the bottleneck of young and highly qualified employees; the future retirement of a large cohort of employees (baby boomers); the increasing average workforce age; and the increasing age diversity of workforces.

The consequences of demographic change described by Boehm *et al.* (2010b) affect innovation capabilities negatively, as the overall workforce is shrinking (Dychtwald *et al.*, 2004). In addition, with the high drop-off of retired persons, considerable amounts of practical and innovation-relevant knowledge and experience disappear and threaten innovation capabilities (DeLong, 2004). However, increasing age diversity in times of demographic change is a reaction to labour market shortages (e.g. adapted hiring strategies, later retirement as well as earlier working starts) (Boehm *et al.*, 2010a).

While some authors have described age diversity as beneficial for innovation because it involves "interaction among individuals of different ages with different skill profiles, differing perspectives and […] different personality traits" (Backes-Gellner and Veen, 2009, p. 10), others have argued in the opposite direction. For instance, Ostergaard *et al.* (2011) find that age diversity is negatively related to the introduction of innovations. Similarly, Zajac *et al.* (1991) find that age diversity has a negative effect on service innovation and explain their findings with age-related disagreements.

In sum, as is the case for functional diversity, age diversity has positive as well as negative effects on performance, and contextual aspects determine whether positive or negative forces prevail.

Defining success in diverse corporate innovation communities
Extant scholars discuss innovation communities as a means to support and foster innovation processes (Jeppesen and Frederiksen, 2006; West and Lakhani, 2008).

In most cases, organizations apply innovation communities in order to benefit from access to different knowledge and various perspectives (Dahlander and Frederiksen, 2012). While innovation communities are able to support different stages of innovation processes (Ebner *et al.*, 2009), organizations utilize the collective resources of community members most often in the early stages of innovation processes, i.e. idea generation (Ebner *et al.*, 2009; Muhdi and Boutellier, 2011). In this vein, innovation activities include the generation of new ideas, which are applied to markets or organizational improvements later on (Prajogo and Ahmed, 2006).

Scholars from different research fields suggest that innovating and learning are closely connected. For instance, the literature on communities of practice states that innovating and learning processes are strongly linked (Amin and Roberts, 2008; Brown and Duguid, 1991). For example, Jassawalla and Sashittal (1998) show that positive effects for organizational learning in functionally diverse CICs are manifested in terms of innovative outputs as well as human resource and organizational development. In more detail, the second facet refers to individual and organizational learning processes within diverse CICs, especially through knowledge and experience exchange (Lai, 2013).

Methods
The methodological approach follows the recommendations of Eisenhardt (1989) and Yin (2003) with regard to multiple case study designs. This study examines the factors which determine the success of diverse CICs, and takes a processual perspective, as others have done beforehand in comparable research settings (e.g. Muhdi and Boutellier, 2011). In this study multiple cases were investigated to develop theory which is more valid, reliable, generalizable and meaningful compared to single-case studies (Eisenhardt and Graebner, 2007; Yin, 2003).

Setting
The empirical setting consists of three internally diverse CICs supported by organizations of different sizes (i.e. case 1 = 1,900, case 2 = 360,000, and case 3 = 15,500 employees) operating in different industries (i.e. case 1 = the toy industry, case 2 = the electrical engineering and electronics industry and case 3 = the automation engineering industry)[1]. The supporting organizations of the examined communities are aware of demographic changes and make use of the concept of diverse innovation communities. The innovation communities investigated are composed of both external members as well as employees. Moreover, the supporting organizations recruited community members of different ages, ranging from apprentices to employees close to retirement. Moreover, the three innovation communities were diverse in terms of both function and age, and they were all approximately the same size (< 40 participants). All three communities had been recently set up and should be further established in the future. The case studies were therefore conducted right after the very first project in each innovation community and covered all stages of these innovation projects. The communities covered topics referring to digitalization and technological issues. Additionally, a consulting topic was integrated. The topics of all three communities were strategic ones, set up by the senior management and pointing to future solutions. The topics are rather long-term oriented and comparable among each other.

The setting was selected for three reasons. First, the cases are attractive because each of the three industries is characterized by high needs for innovation (Cui *et al.*, 2012; Sun and Wing, 2005). Second, the chosen cases are especially interesting as they are located in Germany, where demographic changes are more dramatic compared to other European countries (Boehm *et al.*, 2010b; Bundesministerium des Innern, 2011). Third, whereas the three organizations differ with regard to industry and size and therefore represent different perspectives, the CICs themselves are comparable in terms of age, functional diversity, size, topics and stages. Age and functional diversity can be compared via the special approach of the setting of the innovation community

cases referred to in this study. Corporate innovation processes were opened up to these communities, which systematically consisted of the following groups of persons: apprentices, young parents on parental leave and employees just starting the retirement phase. Additionally, in each company setting, different departments were considered.

Data collection

As a foundation, multiple data sources (Eisenhardt, 1989) were used to develop the framework of success factors in diverse CICs, i.e. interviews, group discussions, and observations during workshop sessions. Different data sources made it possible to obtain more nuanced impressions, achieve deeper insights and enhanced the accuracy of the framework (Jick, 1979). A key advantage of this study is that interviews were conducted with different informant groups involved in community work. In total, 37 semi-structured interviews were conducted. In all, 29 interviewees were community members and eight were community managers. The interviewees were directly involved in setting up the communities covering specific corporation-related topics. Moreover, their statements reflect their perspective on the particular innovation community. The interview duration ranged from 60 to 90 minutes. Interviews took place directly after the first project within the innovation community setting, enabling the results to be connected directly to internal corporate issues, covering all relevant phases of the innovation project. Additionally, data from three group discussions among the members of each community was used. Furthermore, workshops and virtual meetings of two communities were attended.

The semi-structured interviews were based on two different guidelines dependent on informant characteristics (i.e. community members or community managers). In order to capture critical success factors, community members were asked to report on activities within the focal innovation communities. Questions within the guideline addressed collaboration within the community with a focus on intergenerational aspects, e.g. "Could you please describe the role of trust between diverse community members and which aspects have promoted trust-building?" or "What kind of differences did you recognize between individuals of different ages?" Moreover, respondents were asked how the supporting organization could foster engagement within such communities as well as how barriers to participation could be reduced.

In addition, community managers were interviewed in order to cover the managerial perspective of employing diverse innovation communities. These interviews started with questions concerning the success of the focal communities from a corporate point of view. Additionally, questions on the collaboration within the communities under the circumstances of diversity were asked (e.g. "Which factors fostered and hindered intergenerational knowledge transfer?"). With respect to the "success" dimension, there are no objective measures in this study. Instead, the interviewees' personal assessment and subjective impressions were examined. As the three innovation communities under study had been recently established, they could not be compared in terms of increasing or decreasing success. But the experience of the interviewees, whether they consider their innovation community project to be successful or not and which factors they see as crucial for their assessment, serves as a foundation to develop a general model of crucial success factors to handle diverse CICs.

As interviews are always associated with the danger of informant bias (Eisenhardt and Graebner, 2007), several steps were undertaken to inform potential biases. First, data were triangulated from multiple sources and several perspectives (Jick, 1979). Beyond the interviews and group discussions, data were taken from observations on community activities during workshops and in virtual settings. Second, reported subjective impressions and lessons learned regarding three comparable diverse innovation communities in separate companies that vary in industry and size to allow generalizability were combined (Anand *et al.*, 2007). Third, all

informants were interviewed shortly after their engagement and involvement in the focal community. Finally, to mitigate bias problems, the interviewees were assured confidentiality in order to encourage true statements (Davis and Eisenhardt, 2011).

Data analysis
Interviews and group discussions were recorded and transcribed. In a next step, interview transcripts were examined and primary patterns were identified through qualitative content analysis (Patton, 1990). Statements were coded that comprised factors related to the success of diverse communities from a corporate point of view. Then these assigned codes were categorized and gradually merged into a coding scheme (Miles and Huberman, 1994). In the course of refinement and revision of the resulting categories, different subcategories were identified, including a time sequential order of crucial success factors (e.g. Gioia and Thomas, 1996). In doing so, an iterative approach was followed (Miles and Huberman, 1994), cycling back and forth between data, literature and emerging theory until adequate evidence for our theoretical framework was amassed (Jassawalla and Sashittal, 1998).

Success factors of diverse corporate innovation communities: a process-based framework
In this section, the framework of success factors to be considered in diverse CICs is presented as a finding of the study (see Figure 1). These factors might also be relevant in non-diverse CICs, however, in this study, these factors were mentioned primarily by the interviewees and shall serve as a guideline for the implementation of such communities. Different phases of community processes are distinguished: preparation, execution and finalization phases.

Phase of preparation
In the phase of preparation, success factors which are relevant before actual community work starts were identified: appropriate task design; suitable recruiting activities; and provision of workspace for collaboration.

The data suggests that an appropriate task design is a success factor within diverse CICs. First, the strategic importance of tasks was identified as relevant, as it has positive effects on community members' motivation. The corporate innovation
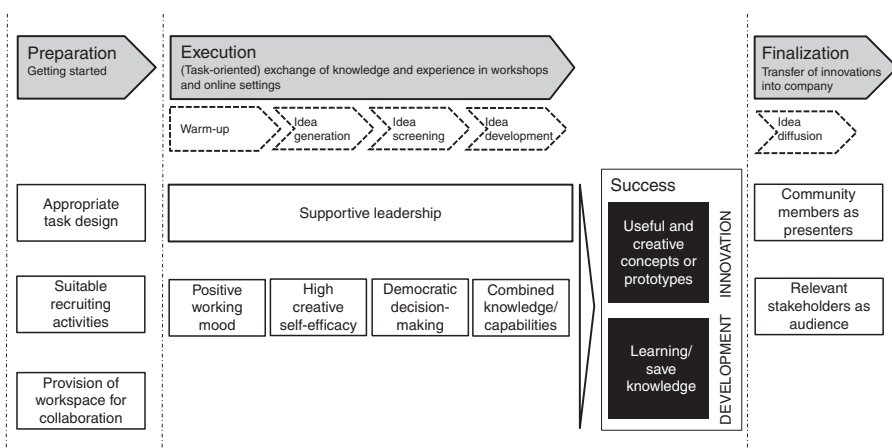

Figure 1.
Framework of success factors to be considered in diverse CICs

management department should be involved in task selection, as it is aware of current and future challenges:

> It was very important that the innovation management was involved in the task identification […] (Case 3, community member).

Second, data suggests that diverse CICs are more likely to succeed in tasks that benefit from multiple perspectives. The creative potential of diverse groups is especially promising when task interdependence is high (Bantel and Jackson, 1989):

> The task was more or less a new arena for everyone and each of us contributed with his or her methods or experiences and finally, we reached a quite good result (Case 2, community member).

> Yes, I liked it that everyone had a different view and behaviour. As a result, you have struck on an idea through comments from others (Case 2, community member).

Finally, data suggests that the concreteness of the community task affects the extent to which the community is able to solve the task. A medium degree of task concreteness provides a vision to work for and avoids inadequate solutions. At the same time, community tasks need to provide a sufficient degree of freedom in order to exploit the creative potential of diverse settings:

> Looking back, we should have attached more importance to a clearly defined task which is more precise so as not to get lost in this open space. That would have been better. Well, for our task, there have been so many starting points for optimization that it was just too vague (Case 2, community manager).

> […] [I]f you would consider a weighting for the task between opened and structured, I would suggest 70-80% openness and 20% structure to avoid boundless and time-consuming processes. If you choose a very concrete task it is no longer different from a usual project. […] [A]nd then, in my opinion this prevents you from utilizing the existing potential when people can work together informally (Case 1, community manager).

A further success factor is suitable recruiting activities. First, data suggests that an age-related balance of community members is essential to run a diverse CIC successfully. We propose that a similar representation of individuals of different age groups enables CICs to access diverse knowledge, experiences and perspectives, because the absence of an age-related dominance has positive effects on the working atmosphere within the community. Such a balance avoids the emergence of unintended social subgroups that support conflict and hamper community functioning (Lau and Murnighan, 2005):

> It is important to maintain parity. This means […] you have to balance the relationship between community members of different ages. […] And dominances have to be avoided […] (Case 3, community member).

> The composition was really balanced with regard to age. And this has ensured an extremely balanced and harmonious atmosphere (Case 2, community manager).

Second, data indicates that a combination of task-related experts and non-experts (i.e. marginal) is relevant. In this context, marginality refers to community members who are distant from the given task in terms of their functional background. During community processes, task experts contribute relevant information to ensure practicable ideas, while marginal members provide the community with unbiased perspectives and new insights:

> […] Maybe the non-professional knowledge as well. I mean, you have to be really open in your approach. Sometimes I had problems because of the experience I gained from previous projects. I knew some ideas were great but difficult to implement or even impossible. But it was awesome that we continued to discuss it and developed it further and everyone has suggested ideas (Case 1, community member).

Experts had much more task-related knowledge than other community members. So at the beginning we were a bit scared but later it proved to be positive. Experts could somewhat steer community work by saying "We have already considered that, but we have not thought about this […] (Case 2, community manager).

Workspace for collaboration provides the environment for the exchange of knowledge and ideas in community settings. This environment involves both offline and online spaces. First, appropriate workshop facilities are a key factor in the success of diverse CICs. Data proposes that community members need to leave their usual working environment in order to trigger creative attitudes and behaviour:

I believe that was the reason for this different atmosphere within the community. We were away from the place of work and away from everyday tasks and so we could think more creatively. We could get really involved with community work and were not absent-minded because of daily work which we still had additionally (Case 1, community member).

In such settings it is always important that people are detached from their usual patterns of thinking and their daily environment […] (Case 2, community manager).

Creativity scholars also view physical space as an important resource for creativity (e.g. Amabile, 1998; Kristensen, 2004; West, 2002).

Second, the launch of an online platform is an important success factor in diverse CICs. Online settings play a decisive role, as these virtual environments bridge geographical distances as well as temporal distances between community members and workshops:

We try to organize workshops every four weeks. In between, we organize online sessions. I guess that has proven to be successful. During online sessions, community members refresh contents of community work […] and continue working […] (Case 1, community manager).

Hence, regular exchange between community members proves important. Online platforms enable more frequent collaboration. The findings refer to extant diversity literature, which describes the frequency of members' interaction as a key moderator between diversity and performance (Ancona and Caldwell, 1992; Schippers *et al.*, 2003; Horwitz, 2005).

Phase of execution
The community working process is divided into four sub-phases: warm-up, idea generation, idea screening and idea development.

Within this phase of execution, the supportive leadership success factor comprehensively concerns all four sub-phases of the community working process. In more detail, supportive leadership is likely to succeed if it addresses the following success factors: a positive working mood in the warm-up phase; high creative self-efficacy in the idea generation phase; democratic decision making in the idea screening phase; and combined knowledge and capabilities in the idea development phase. Particularly, supportive leadership behaviour included the following: keeping track of the community innovation process (i.e. the four sub-phases as well as the process as a whole); stimulating members' creativity; and establishing and controlling conditions that engender knowledge and experience exchange. In this context, it is important to note that supportive community leadership is not associated with hierarchical power, as this would be detrimental to innovative exchange of knowledge and experience between diverse community members:

It is also very important that there is a community leader who supports, triggers, [and] pushes if there is no progress (Case 2, community member).

Well, we have overseen the process, but we were not involved in the innovation process. We have set the framework from outside and in this respect we guided in a very sensitive way (Case 2, community manager).

Diversity research often views leadership style as a central success factor for diverse teams (Somech, 2006). There is evidence that appropriate leadership in diverse settings has positive effects on members' motivation to exchange knowledge (Kearney *et al.*, 2009) as well as on individuals' creative behaviour (Shin *et al.*, 2012).

Warm-up: positive working mood
The warm-up subcategory contains aspects which concern the challenge of fostering community members' "willingness to share knowledge with other members" (Chiu *et al.*, 2006, p. 1873). Based on the data, it is important that community leaders support a positive working mood conducive to knowledge and experience exchange at the beginning of community work. Two significant aspects concerning such an atmosphere were revealed. First, data suggests that mutual trust among diverse community members is an important success factor. In essence, trust determines to a large extent whether community members exchange knowledge and experience in order to innovate and learn:

> […] [C]ommunity members have to build mutual trust. We have noticed that this is of great importance […] and it doesn't happen under pressure. This means community leaders really have to provide sufficient time for it (Case 2, community manager).

> Yes, I enjoyed getting to know each other in the first workshop. It seems to me that this broke the ice and we got to know each other within a fairly short time. And then we could approach one another in an easy-going manner (Case 3, community member).

This proposition is supported by Nahapiet and Ghoshal (1998), who stated that mutual trust between parties enhances their engagement in collaborative activities. Community studies also emphasize trust as an antecedent for knowledge and experience exchange in virtual communities (e.g. Chiu *et al.*, 2006, Ridings *et al.*, 2002) and as an enabler for knowledge sharing (Joshi *et al.*, 2010).

Second, members' positive attitudes towards the focal community's diversity in terms of age and organizational background are a key facet that needs to be considered in the early phases of community work. In essence, such attitudes determine whether communities are able to exploit synergies and to combine different perspectives:

> I believe that if community members have tolerant attitudes from scratch, this is enriching for all. From my perspective, […] this helps to learn more from the experience of peers (Case 2, community member).

> I have no problems with persons who are younger than me. Sometimes it is really interesting to hear a different position. In this way I can learn something new as an experienced man. That is the interesting thing about it (Case 3, community member).

The findings support the arguments of researchers who examine the moderating role of openness between diversity and group outcomes (e.g. Hobman *et al.*, 2004; Mitchell *et al.*, 2009).

Idea generation: high creative self-efficacy
The sub-phase of idea generation is concerned with efforts to collect many ideas to solve the focal innovation task. In this context, data shows that community leaders are more likely to succeed if they reinforce the creative self-efficacy of community members:

> Concerning creativity, I noticed "Wow, I am not as uncreative as I have always thought myself to be (Case 2, community member).

Bansemir *et al.* (2012) find that community members increasingly exchanged knowledge in virtual intra-organizational innovation communities when their self-efficacy was encouraged by a hurray-message.

Idea screening: democratic decision making
Within the subcategory of idea screening, diverse community members critically assess generated ideas and select ideas which should be considered in the final concept. The analysis shows that democratic decision making is a key predictor of success in this phase of community work and should be supported by community leadership. It is essential to avoid intra-community dominances and to ensure that every member can evaluate equally. Via joint decision-making processes, diverse community members are able to integrate and exchange their knowledge and experience in order to learn from each other and to solve the focal community task:

> On the one hand, obviously, we can learn from older community members, […], I really enjoy hearing old stories or if someone proves his arguments in the workshops with professional experience (Case 2, community member).

> I found that every opinion was important. Afterwards, if one opinion was useless or didn't make any sense, it was still important in order to recognize that something else was more important (Case 1, community member).

> Older community members have a lot of professional experience […]. The young ones perhaps have more knowledge about other task-related issues. […] And the result of this combination of age diverse community members' experience and knowledge was a mutual learning process (Case 3, community member).

The findings are consistent with von Hippel's (2005) research, which highlights that organizations have to overcome conventional patterns of innovation processes with only few innovators.

Idea development: combined knowledge and capabilities
The subcategory of idea development captures those success factors which affect the finalization of the community work in the nature of a specific output (i.e. concept or prototype) as a solution for the community task. From a leadership perspective, activities that facilitate the combination of knowledge and capabilities play a critical role in this sub-phase. Community members should provide their know-how and skills on how to integrate the ideas in order to promote the usability of the concept or prototype:

> And I think that older community members have contributed a wealth of experience. I think it is good that these people are part of the community. And considering the others, I think the community will benefit from younger community members' experience with the Internet […] (Case 1, community member).

Similar arguments are raised by Frosch (2011), who proposes that the skills of age-diverse group members jointly lead to successful inventions.

Phase of finalization
The phase of finalization concerns the transfer of the community outputs to the focal company. Data suggests that it is relevant to give community members the opportunity to present their results on their own. Community members' convinced defence of community outputs is central to attracting the audience's support:

> Community members have to present the results, because then the organization recognizes that people get something out of it. The stronger community members present the results in terms of contents, the better it is for the organization (Case 1, community manager).

The presence of relevant stakeholders (e.g. senior management or R&D management) is a further success factor for two reasons: first, it is important for the successful integration of

community outputs into the organization that community members directly present their results to decision-making authorities:

> It was important for the community members to have the impression that they could present their concepts to people within the organization who could promote the ideas. For instance, the entire innovation department was there, they asked the community members critical questions, but they responded really confidently (Case 2, community manager).

This issue is also reflected in a number of extant studies (e.g. Klein and Sorra, 1996; Dahl *et al.*, 2011).

Second, the addressed audience was identified as a beneficial source of constructive feedback. Data suggests that such feedback contributes to the learning aspect of success in diverse CICs. Hence, managers are able to assess the appropriateness of community outputs for internal or market implementation:

> To receive feedback is really important to me, because only from this I can learn (Case 2, community member).

> I would say feedback as well. It doesn't have to be […] always positive. For me, constructive negative feedback is just as well in the end, because it shows that someone was actually interested in my work (Case 2, community member).

The finding strongly relates to the learning literature, which often mentions feedback as an essential contribution to learning (e.g. Askew, 2000; Higgins *et al.*, 2002).

To sum up, it can be stated that success factors in diverse CICs are inherent in all phases of community work. Table I sums up the arguments.

Conclusion

In addition to other innovation community scholars, who have already discussed the beneficial role of organizational diversity (Bjelland and Wood, 2008), this study focusses on the consequences of demographic changes and age diversity in such settings – a facet of significant relevance in modern economies. The framework presented divides community processes into the three sub-phases of preparation, execution and finalization, and structures success factors in a chronological order.

Theoretical contributions

The theoretical contribution of this study is threefold. First, the understanding of the implications of demographic changes and diversity in CIC settings is enhanced. A key finding is that diversity in CICs is not a success factor *per se*, but needs to be managed in order to lead to the desired outcomes. This is particularly important as age and functional diversity often lead to different types of obstacles which have to be overcome in order to enable democratic decision making and innovation processes. As such, the findings transfer the arguments of diversity scholars (Horwitz, 2005; Shin *et al.*, 2012; Williams and O'Reilly, 1998) to the context of innovation communities.

Second, the findings indicate that diverse CICs are not only an instrument to solve innovation tasks, but are also a promising means to tackle other challenges of recent demographic changes. An example is the drainage of valuable knowledge of large numbers of retiring employees (DeLong, 2004). Scholars recommend that organizations create a common space to facilitate intergenerational knowledge transfer in order to react to this knowledge loss (Harvey, 2012). In this paper, innovation communities provide such a space and offer opportunities for the exchange of innovation-related knowledge between different age cohorts. In other words, innovation communities have positive consequences for both innovation as well as intergenerational learning.

Phase/sub phase	Success factor	Impact on success
Preparation	Appropriate task design	Strategic importance of tasks increases community members' engagement and motivation to contribute Need for multiple perspectives fosters knowledge exchange and enhances the creative potential of diverse communities A mediocre degree of concreteness affects the extent to which the community is able to solve the task
	Suitable recruiting activities	Age-related balance within the community provides access to diverse knowledge, has positive effects on the working atmosphere and facilitates to intergenerational learning Mutual contribution of both experts and non-experts is beneficial for the production of creative and useful innovation ideas as well as for learning processes
	Workspace for collaboration	In external settings, community members tend to try new approaches and ways of thinking Online platforms bridge temporal distances between workshops and ensure frequent collaboration among community members
Execution	Supportive leadership	Supportive leadership behaviour provides framing conditions for successful community activities
Warm-up	Positive working mood	Mutual trust determines to a large extent whether community members exchange knowledge and experience in order to innovate and learn Positive attitude towards the focal community's diversity is a key facet in the early phases of community work
Idea generation	High creative self-efficacy	Community leaders are more likely to succeed if they reinforce the creative self-efficacy of community members
Idea screening	Democratic decision-making	Democratic decision processes support learning processes and identification of promising ideas
Idea development	Combined knowledge and capabilities	The combination of knowledge and capabilities of demographically diverse community members promotes the usability of the concept
Finalization/ Idea diffusion	United appearance	Community members' united appearance in the presentation and discussion of innovation outputs supports the transfer to the supporting organization
	Presence of relevant stakeholders	The presence of decision-makers positively affects the integration of community outputs into the focal organization Constructive feedback on the appropriateness of community outputs fosters learning

Finally, prior research was extended by structuring the findings in a detailed chronological order and offering a holistic concept, which relates success factors of demographically diverse innovation community settings to the phases of community preparation, execution and finalization.

Managerial implications
The framework presented offers innovation community managers a multitude of levers to influence successful knowledge exchange and creation.

Most importantly, the model highlights that managers need to be aware that diversity in CICs *per se* does not lead to success. Rather, managers are asked to establish a holistic approach with numerous factors in order to benefit from the concept in times of demographic change.

Second, and more specifically, the model highlights the fact that managers need to consider three important aspects while preparing the actual community work: first, the need

for an appropriate task; second, with regard to recruiting activities, a balance of community members in terms of age and expertise is required; and third, the organization of the workspace for community collaboration in the preparation phase.

The study revealed that exchange of knowledge and experience among diverse members during workshops and in online settings is related to supportive leadership, and that as such, the latter must be promoted.

Finally, with respect to the integration of community outputs into the supporting organization, community managers should organize an event with decision-making authorities to present and discuss the results of community work. Moreover, senior managers and innovation managers should provide constructive feedback to the community.

Limitations and further research directions
The study has a number of limitations, which suggest avenues for future research. First, the empirical sample exclusively includes communities that have received corporate support for a short period of time. As a consequence, these communities consist mainly of people who are meeting in this setting for the first time. It can be argued that there is a need for additional research, to shed light on the success factors which are valid for longer established communities. Second, the organizations that support the communities under study operate in manufacturing industries in Germany. Thus, generalization of our findings to other settings should be tempered with caution. Third, the "success" dimension is not analysed by objective measures, but by personal statements of the interviewees. Further research should be conducted, to compare different community settings and the influence on objective success criteria. Further research is also needed to find additional factors to handle CICs successfully. There is also a need for further studies, both in other industries and from different cultural backgrounds.

Note

1. The data analysed in this paper has also been investigated in other studies with different research questions (e.g. Dumbach, 2014).

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