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Keep them alive! Design and Evaluation of the "Community Fostering Reference Model"

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Abstract Firms host online communities for commercial purposes, for example in order to integrate customers into ideation for new product development. The success of these firm-hosted online communities depends entirely on the cooperation of a high number of customers that constantly produce valuable knowledge for firms. However, in practice, the majority of successfully implemented communities suffers from stagnation and even a decrease of member activities over time. Literature provides numerous guidelines on how to build and launch these online communities. While these models describe the initial steps of acquiring and activating a community base from scratch very well and explicitly, they neglect continuous member activation and acquistion after a successful launch. Against this background, the authors propose the Community Fostering Reference Model (CoFoRM), which represents a set of general procedures and instruments to continuously foster member activity. In this paper, the authors present the theory-driven design as well as the evaluation of the CoFoRM in a practical use setting. The evaluation results reveal that the CoFoRM represents a valuable instrument in the daily working routine of community managers, since it efficiently helps activating community members especially in the late phases of a community's lifecycle.

Keywords Online communities · Community management · Activation of community members · Reference model

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1 Introduction

Online communities originally began to form as social entities (Fischer et al. 1996; Wiertz and de Ruyter 2007). More and more private individuals clustered online with similar others to anchor themselves, support each other, and exchange information (Bressler and Grantham 2000; Wiertz and de Ruyter 2007). Online communities also have an unparalleled capability to produce valuable knowledge, as evidenced for example in the open source movement (e.g., Lakhani and von Hippel 2003; von Hippel and von Krogh 2003). That is why the commercial potential of such online groups was strongly propagated in practice, with the result that numerous organizations started to explore the opportunities for building their own online community (Wiertz and de Ruyter 2007). Nowadays, an increasing number of firms is attempting to exploit this phenomenon by hosting online communities for commercial purposes (Wiertz and de Ruyter 2007), such as building relationships with their customers, getting their feedback, strengthening the brand, or integrating them into ideation for new product development (e.g., Moon and Sproull 2001; Bretschneider et al. 2015a).

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These firm-hosted, commercial online communities of customers constitute the research context of this paper. Following Butler et al. (2002), we define commercial online communities as "…firmhosted online aggregations of customers who collectively co-produce and consume content about a commercial activity that is central to their interest by exchanging intangible resources." These intangible resources often take the form of knowledge, but can also take effect as information, socio-emotional support, and the like (Butler et al. 2002; Wiertz and de Ruyter 2007).

The success of these firm-hosted, commercial online communities depends entirely on the willingness of a high number of customers to spend time and effort in responding to each other's requests for help, thereby producing valuable knowledge (Stieglitz 2008). However, the majority of once successfully implemented firm-hosted communities suffer from stagnation of their development over time, mirrored in a decrease of the number and interactivity of community members (Bateman et al. 2010; Yuqing et al. 2012; Zhu et al. 2013). This practical problem is well known in literature on online communities, but has still not been well addressed (Markus 1987; Oliver and Marwell 2001; Ramanathan 2003, 2004; Iriberri and Leroy 2009; Raban et al. 2010; Geddes 2011). Literature provides numerous guidelines as well as theoretical models of how to build and launch firm-hosted communities (Iriberri and Leroy 2009). Examples include the "Community Building & Community Management Cycle" by Leimeister and Krcmar (2006) as well as the "Online Community Life-Cycle" by Iriberri and Leroy (2009). While these models describe the initial steps in building and launching a community member base from scratch very well and explicitly, they neglect continuous member activation and acquisition after the successful launch of a community.

Against this background, in this research we propose the Community Fostering Reference Model (CoFoRM), which presents a set of general procedures and tools to continuously foster member activation and acquisition in the late phases of a community lifecycle. In this paper, we present the theory-driven design as well as the evaluation of the CoFoRM. Our CoFoRM contributes to the extant body of knowledge, since it extends existing models by focusing on the late phases of a community lifecycle for the first time.

The structure of the rest of this article is as follows: In section two, we introduce the extant body of knowledge about communities as well as about community building and management. Section three describes the methodology approach of our research. In section four, we develop and evaluate the CoFoRM. Section five summarizes and discusses the results of this research. In the last section, we introduce the theoretical as well as the practical contribution.

2 Literature

### 2.1 Background: Firm-Hosted, Production-Based Online Communities

The increasingly interactive, social nature of the World Wide Web has given rise to the term "Web 2.0," suggesting a new era of what it means to "surf the Web." The proliferation of blogs and wikis in the twenty-first century is evidence of the increasingly social, interactive nature of the World Wide Web (Kamel Boulos and Wheeler 2007). Given the ease of actively participating in online discussions, it is scarcely surprising that the number of online communities has grown exponentially in the past few years (Prasarnphanich and Wagner 2011). Literature refers to the phenomenon of the online community as a group of people with a common interest or purpose who communicate online in an organized, sustained way (Ridings et al. 2002; Rajagopalan 2014).

In literature, online communities are often classified as either production-based or information-based (Rajagopalan 2014). A production-based online community can be defined as one in which users collaborate with a common goal to produce something, typically in the form of a certain kind of knowledge or information (Faraj et al. 2011; Ma and Agarwal 2007; Rajagopalan 2014). Examples include the well-known phenomenon of open source communities or Virtual Ideas Communities (VICs), in which customers of firms can submit ideas and collaborate to support product innovation (Bretschneider et al. 2015a). The primary goal of information-based online communities, in contrast, is information exchange through online discussion (Rajagopalan 2014). Examples include the Yahoo! message board community. The focus of this research lies on production-based communities.

Nowadays, firms more frequently explore the opportunities for building their own production-based online community in order to profit from customers' willingness to produce knowledge (Antorini et al. 2012; Nambisan and Baron 2009). In the last years, this strategy has led to the ermergence of new kinds of communities. For example, there are brand communities in which customers are invited to become part of a company's certain brand and engage in supporting each other in solving problems and generating new product ideas for this brand (Füller et al. 2008). The already mentioned VICs also belong to this class of communities. Butler et al. (2002) define such commercial online communities as "…firmhosted online aggregations of customers who collectively co-produce and consume content about a commercial activity that is central to their interest by exchanging intangible resources."

These firm-hosted, production-based communities are fully organized and governed by firms; from initial

Fig. 1 Community building and community management model (Leimeister and Krcmar 2006)
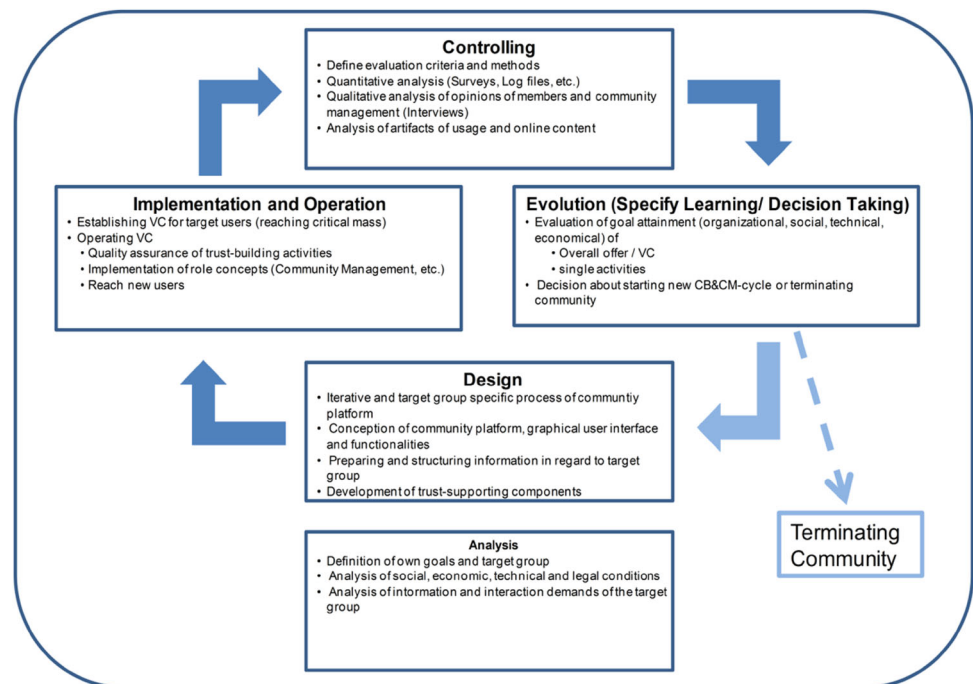
community building to continuous community management (Bretschneider et al. 2015a). This allows firms to thoroughly control the community, from moderating member interaction and production processes to the non-restrictive use of its outcome. In this form, firm-hosted communities differ from the kind of communities that are completely self-launched and self-organized by its members (Crowston et al. 2007; Demil and Lecocq 2006; Ren et al. 2012). Well-known examples for this kind of communties are open source communities as well as typical patient online communities (Bretschneider et al. 2015b).

Our research focuses on firm-hosted, producion-based communities with their typical, inherent governance, management, as well as membership mechanisms as described above. This means that the CoFoRM is specifically customized to the needs of this kind of online community.

2.2 Extant Body of Knowledge on Community Building and Management

The recent surge of interest in online communities has prompted researchers to investigate them in a number of ways. To date, research in the online community domain can be broadly categorized into the following areas: motivations of online community participants, interactions and behavior of online community participants, impacts of online community participation, and design of online communities.

Most of the research in the latter area examines how specific sets of design features ultimately contribute to

online community success. For example, Preece (2000) describes the important role design features play in influencing participants' behavior, and provides numerous examples to illustrate this fact. In the health-care community domain, Leimeister et al. (2005) illustrates that design features play a role in cultivating trust among participants, ultimately contributing to online community success. One sub-stream within the area "design of online communities" focuses on developing process models for systematically implementing and running online communities. In the following, we will briefly introduce four models that have been developed in this context. By outlining the phases that these models involve, we will show that none of the models provides a basis for continuous member acquisition in the later stages of the community lifecycle.

Wenger et al. (2002) mainly focus on the initial launch of a community. They propose a five-step model. The first step ("Potential" phase), aims at identifying certain requirements that should guide the later design of the community. The second step ("Coalescing" phase), focuses on the initial design of the community. The following two steps ("Maturing" and "Stewardship" phase), both aim at pushing the growth of membership. The last step ("Transformation" phase) involves the envisaged adaption of the community to any future environmental changes.

The "Community Building and Community Management" (CBCM) by Leimeister and Krcmar (2006) has gained much attention in the relevant literature, e.g., Blohm et al. (2013) or Stieglitz (2008). The CBCM model (Fig. 1) illustrates how to systematically build and later operate online communities. The model is devided into five phases,

four of which follow an iterative process logic. In the first phase ("Analysis"), the main tasks involve defining the target group and the goal of the community to be built as well as analyzing the underlying social, economic, technical and legal conditions that might affect the launch of the community. The second phase ("Design") focuses on the initial design of the community, regarding its inherent processes and the information to be offered. Furthermore, the graphical user interface and functionalities have to be designed in this phase. The goal of the third phase ("Implementation and Operation") is to launch the community and to reach a critical mass. The fourth phase ("Controlling") aims at analyzing whether the tasks conducted in the third phase have been implemented successfully. The fifth phase ("Evalutaion") involves starting counteractions in case a priori specified goals are not met. If this is the case, concerned features have to be re-designed, implemented, re-controlled, and re-evaluated within a second iteration.

Based on the results of an empirical study, Loyarte and Rivera (2007) created their "cultivation model," with the objective to provide guidelines for companies which aim to nurture online communities in their organization. The model consists of four phases. The first phase checks whether communities exist in an organization. The second phase develops a thinking process to determine whether it is important to cultivate online communities in the organization. The third phase analyzes the different types of online communities based on the organizational objectives and the different dimensions of community. The last phase is an evaluation process to analyze whether the results acquired in the experience are positive.

These three models all provide a set of well-described tasks for each of their phases. These sub-tasks give community managers a detailed idea of what to do within each phase to build and launch a community and to acquire members. While these models describe the initial steps in building and launching a community from scratch very well and explicitly, they neglect describing continuous member activation and acquisition after the successful launch of a community, i.e. in the later phases of a community's lifecycle.

The model by Iriberri and Leroy (2009) is the only one that considers the later phases as well: The development of the model by Iriberri and Leroy (2009) is aligned to a typical lifecycle of a community. The model is divided into five phases (Iriberri and Leroy 2009): Inception, Creation, Growth, Maturity, and Death. During the first phase ("Inception"), individuals or groups develop a demand for an exchange of information (e.g., sports or disease). Based on this demand, a vision for a specific online community arises that shall satisfy the demand. Once the vision of the community has been clearly defined, the needed technical components and applications can be selected and
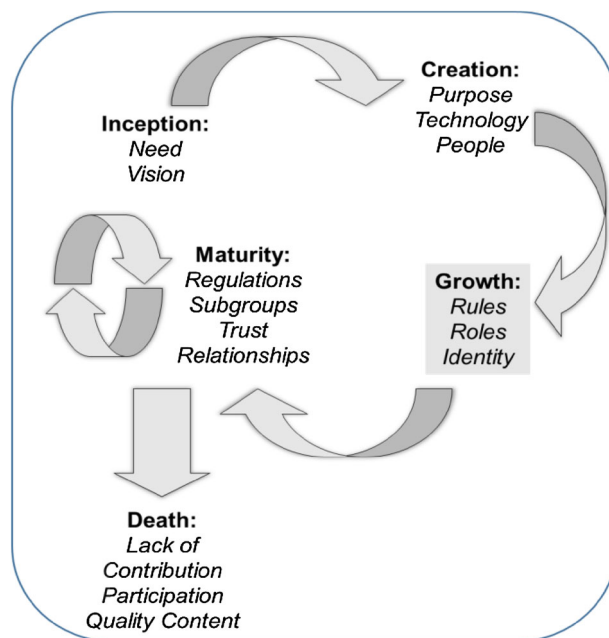

Fig. 2 Online community life cycle model (Iriberri and Leroy 2009)

implemented ("Creation"). Members join the community in the "Growth" phase. A common language as well as a sense of togetherness is developed, and discussions can be held (Iriberri and Leroy 2009). After a certain period of time, close relationships between the members of the online community are developed and sub-groups are formed. Furthermore, there is an ongoing exchange between the exit of old and the entry of new members ("Maturity"). If the community no longer provides interesting contents for the members, the demand for the community will decrease. It will then shrink and eventually cease to exist ("Death").

As mentioned, the model by Iriberri and Leroy 2009 is the only one that also takes into account the late phases that follow the initial launch phase of a community. However, the model lacks the provision of detailed tasks and challenges to be considered during these phases, namely "Maturity" and "Death," in order to (re-)stimulate member activities and also to acquire new members.

Against this background, in this research we propose the Community Fostering Reference Model (CoFoRM), which not only presents standardized procedures but also a set of tools and instruments that allow fostering member activity and acquisition in the late phases of a community lifecycle (Fig. 2).

3 Methodology

To frame the development and evaluation of CoFoRM, we chose the "process model for the construction of adaptive

reference models" by Delfmann (2006). This model belongs to the class of reference modelling methodologies that provide procedures for the construction and application of reference models.

To develop our model, we followed the steps proposed by Delfmann (2006) in his "process model for the construction of adaptive reference models". First, we defined the construction goal. As a second step, we deduced the application fields of a reference model based on the defined aim. The identified construction goal as well as the identified application fields determined the requirements for the reference model and helped to select an appropriate modeling technique (Delfmann and Becker 2008). As a third step, we implemented the reference modeling technique by converting it into a software tool. In general, the usage of a software tool is necessary in order to handle the complexity of a reference model (Delfmann and Becker 2008). As a fourth step, we gradually developed our reference model by using the selected software tool. Finally, as a fifth step, we evaluated the reference model. We conducted two rounds of evaluation, one formative and one summative evaluation.

The "process model for the construction of adaptive reference models" by Delfmann (2006) also involves a sixth step, namely "promote reference model." This step involves a definition of the terms of using the reference model as well as its commercialization (Delfmann 2006). We left this step out due to practical considerations.

According to Delfmann (2006), the steps of the "process model for the construction of adaptive reference models" are arranged in a circular iteration process. For the purposes of our research, it sufficed to go through this process once. Figure 3 illustrates the proceeding of our research.
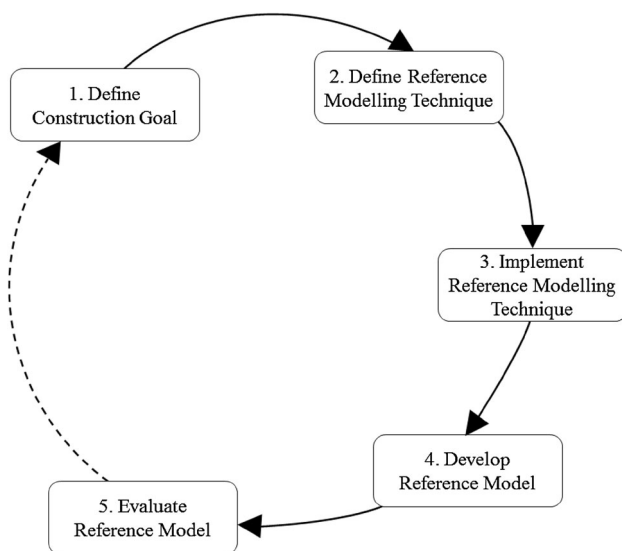
Fig. 3 Methodology of our research according to the "process model for the construction of adaptive reference models" by Delfmann and Becker (2008)

4 Development and Evaluation of the CoFoRM

4.1 Goal of Construction

The aim of the CoFoRM is to support the community's growth in terms of the number of members and to facilitate the usage of the online community. Following this basis, every community has to address two target groups. The first target group consists of people as non-members of a community who serve as a pool for recruiting new members. The second target group comprises the existing (registered) members of a community who need to be motivated to actively participate in the community in order to increase its usage.

To address these objectives, we will integrate concepts from the existing literature into CoFoRM. Firstly, we will include the "Process Model of Community-Joining" (Bateman et al. 2010). This process model explains the individual adoption process of people from the first contact with the online community until achieving full membership. Secondly, we will adopt the "Reader-to-Leader Framework" developed by Preece and Shneiderman (2009). The framework focuses on the second target group and describes the different roles and functions of community members. Finally, we will integrate diffusion theory by Leonard-Barton (1988b) which includes three basic implementation strategies for a successful adoption of innovations. Each of these concepts will be explained in more detail in the following sections.

4.1.1 The Process Model of Community-Joining

The main success factor for online communities is the continuous acquisition of new members (Ransbotham and Kane 2011). In order to become a registered member, the individual has to fully adopt the technology and pass different phases in the adoption process. Bateman et al. (2010) explain the adaption process by presenting the Process Model of Community-Joining based on Rogers's (2003) diffusion theory. Their model consists of four stages: Awareness, Interest, Evaluation, and Decision (Fig. 4).

In the Awareness phase, an individual becomes aware of the existence of an online community for the first time. Based on a certain degree of Awareness, the individual forms a first attitude towards the community ("Interest" phase). By entering this phase, the individual actively starts
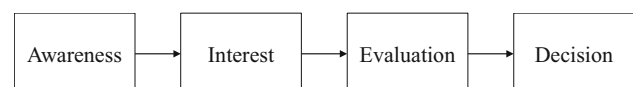
Fig. 4 The process model of community joining by Bateman et al. (2010)

searching for information about the community. As soon as the individual has gathered enough information about the community, it starts to evaluate whether or not the community meets its needs ("Evaluation" phase). Depending on how the evaluation turns out, the individual decides on whether or not to join the community ("Decision" phase). Based on this model, the first requirement (R) for CoFoRM is:

R1: Considering individual adoption processes for entering an online community

4.1.2 The Reader-to-Leader Framework

Users can take different roles in an online community. The role taken by users depends on the particular motivation of each user and is shown in different behaviors. The Reader-to-Leader Framework constitutes Preece and Shneiderman's (2009) approach to these different roles. The authors distinguish the users of a community as: Readers, Contributors, Collaborators, and Leaders (Fig. 5).

Users utilizing an online community to read User Generated Content (UGC) or editorial formed content are called Readers. Alternatively, they may be referred to as Lurkers. Users who contribute content (e.g., images or comments) to a community without collaborating with other users are referred to as Contributors. Mostly, Contributors start out by correcting a post in a wiki (e.g., Wikipedia) or by reporting errors in the source code of an open source software in the community (Preece and Shneiderman 2009). Users who are discussing, cooperating, and collaborating to create, update, or correct content are described as Collaborators (Preece and Shneiderman 2009). The Leaders of a community are usually the users with the most published posts in a community (Preece and Shneiderman 2009). They are characterized by the fact that they summarize and edit contributions and discussions of other users. Leaders take responsibility in communities and resolve disputes between community members (Preece and Shneiderman 2009).

Given this background, the second requirement for the CoFoRM is:

R2: Supporting a target group-oriented design of implementation measures
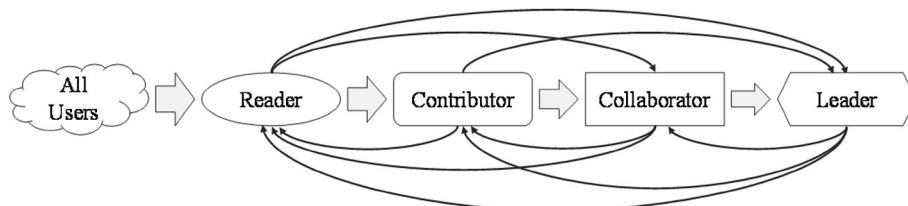
4.1.3 The Diffusion Theory by Leonard-Barton

Innovations are ideas, processes, or projects that are perceived by one or more individuals as new (Rogers 2003). Thus, newly established online communities not only constitute a new offer on a market, but they can also be considered as an innovation (Hartmann 2014). The literature provides a variety of appropriate models to successfully implement innovations. One example is the diffusion theory by Leonard-Barton (1988b).

This theory describes the influence of the innovation's characteristics on implementation strategies and on the reaction of individuals in terms of the implemented innovation. Leonard-Barton's (1988b) theory provides three basic implementation strategies for the implementation of innovations in an organizational context. These strategies simultaneously present three well-recognized principles in the literature (Fig. 6). Given this foundation, CoFoRM adopts and integrates the diffusion theory by Leonard-Barton (1988b).

In her theory, Leonard-Barton (1988b) differentiates whether the usage of an innovation is optional or controlled, respectively, prescribed. In the first case, the members of an organization are free to use or not to use the innovation. If the choice of using an innovation is not free, the organization forces its members to use the innovation. The latter option can lead to refusing the usage or, in the worst case, to sabotaging the innovation.

According to Leonard-Barton (1988b), the characteristics of an innovation influence the design of the implementation strategies and thus the implementation itself. Leonard-Barton (1988b) reveals three generic strategies: (1) User Involvement, (2) Sponsors and Champions, and (3) Mutual Adaption of the Organization and Technology.

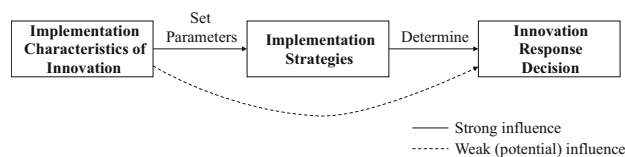The first strategy claims an early involvement of the future users of an innovation in their development.

Fig. 6 Simplified representation of the diffusion theory by Leonard-Barton (1988b)

Fig. 5 Reader-to-leader framework (Preece and Shneiderman 2009)

Involving the users significantly increases the acceptance of the innovation as well as the feasibility of the subsequent utilization (Leonard-Barton 1988b). However, online communities are usually developed by professional agencies (Hartmann et al. 2012b) which claim that their finished software modules can be assembled to meet their customers' requirements more specifically. These software modules are based on general usability guidelines. The involvement of the future target group in the development of the technical platform of the community is therefore not necessary, respectively, not practicable. Rather, it is important to generate commitment of the members towards the community. Commitment is a key success factor for a community (Bateman et al. 2011). Thus for the purposes of our model, the strategy "User Involvement" will be replaced by the strategy "User Commitment."

4.1.3.1 Strategy 1: Development of User Commitment Commitment describes the psychological bond between employees and the organization in which they are employed (Bateman et al. 2011). This bond stabilizes, according to Brickman et al. (1987) the individual behavior of people in situations where they are induced to change their behavior because of certain circumstances. Meyer and Allen (1991) consider commitment as a psychological bond between employees and their organization, and distinguishe three different types of commitment: Continuance Commitment, Affective Commitment, and Normative Commitment.

Continuance Commitment is defined as "an awareness of the costs associated with leaving an organization" (Meyer and Allen 1991). This leads to the point that employees will arrange their relationship to their company in such a way that they get the maximum benefit from their employment. They engage in the company only to the extent that is required to maintain their position in the company (Bateman et al. 2011). Thus, for online communities it is necessary to provide useful content for members to generate Continuance Commitment. According to Bateman et al. (2011), this content can be of lower quality in a short term, as long as the benefit for the member is given. Another measure is the use of incentives to increase the benefits for members. In addition to (non-) cash prizes for being engaged in the community, incentivizing via social approval is possible. Another possibility for creating Continuance Commitment is the highlighting and intensive informing about the relative advantage of a community compared to other competing communities. According to Rogers (2003), highlighting the relative advantage of an innovation increases not only the diffusion speed but also the Normative Commitment. With the use of advertising, the relative advantage of a community can be shown (at events, by press releases, et cetera).

Affective Commitment describes the emotional ties and the identification of an employee with an organization as well as their integration in an organization (Meyer and Allen 1991). It is based on an emotional relationship between the employee and the company (Meyer and Allen 1991). The literature often points out that members of an online community can also build very strong emotional relationships to their community (Preece 1999; Greer 2000). However, the literature does not mention measures that support the development of Affective Commitment. It is therefore not considered later on.

Normative Commitment goes beyond the Affective Commitment since such employees, if they consider their actions to be correct and necessary, take action (Wiener 1982). Normative Commitment is, according to Meyer and Allen (1991), understood as a perceived obligation for ongoing work. Employees who develop Normative Commitment will be active even if their supervisors do not approve their actions. Bateman et al. (2011) indicate this behavior as "organizational citizenship behaviors." This kind of commitment is observable in communities when members intensively participate in discussions, moderating them if necessary. Analogous to Affective Commitment, the literature does not provide specific measures to support the development of Affective Commitment. Thus, CoFoRM, respectively, the strategy "Development of User Commitment" in CoFoRM, will focus only on the development of Continuance Commitment. The third requirement for the reference model is:

R3: Integrating measures for the development of User (Continuance) Commitment

4.1.3.2 Strategy 2: Incorporation of Change Agents as Promoters The strategy "Sponsors and Champions" aims at incorporating those employees into the implementation process of an innovation who actively promote an innovation in the organization (Leonard-Barton 1988b). Sponsors and champions are the employees who at all levels of the organizational hierarchy encourage the use of the innovation and have the necessary resources to support the entire implementation process (Leonard-Barton 1988b). In this context, the communication with change agents is essential. Thus, the strategy is renamed into "Incorporation of Change Agents as Promoters". Studies on the adoption of innovations (e.g., Valente and Rogers 1995) have identified (interpersonal) communication as an essential factor influencing the diffusion speed of an innovation. Later studies show that in addition to communication, especially imitation and social comparison have the greatest impact on the diffusion speed of innovations in a social system (Probst et al. 2013). Imitation and social comparison are concepts subsumed under the term of social

influence. Social influence is often referred to as social contagion/contamination (Probst et al. 2013) and comprises changes in beliefs, attitude, or behavior of a person triggered by actions or the presence of another person (Erchul and Raven 1997). The potential to exert social influence is known as social power (Erchul and Raven 1997). There are five reasons for the exertion of social influence (Probst et al. 2013):

- Draw attention to, and spark interest in, a product/innovation.
- Initiate social learning about the benefits, costs, and risks of products, services, or innovations in order to minimize expenses and risks.
- Generate normative pressure in order to induce personal discomfort onto persons not adapting to an innovation.
- Impose competitive disadvantages or drawbacks on one's social status when not adopting an innovation.
- Generate external network effects.

The two first-mentioned reasons are of special importance for the support of the initial growth of online communities. If a community is newly established, its existence will be known only to those who are directly and indirectly involved in its development. The new community is unknown to the majority of future users, which is why attention and interest have to be awakened in the target group first. Social learning is necessary during the growth phase of a community because existing community members can spread the benefits of the community in their social network. It is thus a prerequisite for the emergence of Word-of-Mouth (WOM) effects that have a self-reinforcing effect on the growth of an online community.

The strategy "Incorporation of Change Agents as Promoters" is based on the principle of social influence. Change Agents serve as multipliers who not only inform non-members about the existence and purpose of an online community and convince them to use the community, but they also motivate already registered members to actively participate in the community. Change Agents do not necessarily need to be members of the community. They can also support a community if they are community-independent, i.e., by being members of a different community and promoting a community in which they are not members. Thus, Change Agents increase the speed of the individual adoption processes in a social network (Goldenberg et al. 2009) and are therefore an essential element in the implementation process of communities. The fourth requirement of the reference model is thus:

R4: Allowing the Incorporation of Change Agents in order to Generate WOM Effects

4.1.3.3 Strategy 3: Continuous Improvement of the Technical Platform and Organization The strategy "Mutual Adaptation of the Organization and Technology," according to Leonard-Barton (1988b), supports the adaptation of the innovation by the employees in order to be well-suited for the requirements of the users in the operating business (Leonard-Barton 1988b). At the same time, this strategy aims at adjustments within the organization in order to better integrate the innovation into the organizational processes (Leonard-Barton 1988b). This increases the probability of a successful implementation.

In the context of online communities, technology refers to the technical platform with which a community operates. The continuous adoption of the technical platform into the organizational routines of an online community often leads to misalignment in the run of time (Butler 2001), as illustrated in Fig. 7. However, alignment of technical platform with the organizational processes and routines in an online community is essential in order to hold member activity at a constant level (Butler 2001). Thus, the fifth requirement is:

R5: Mutual Adaptation of Organization and Technology

4.2 Defining the Reference Modeling Technique

Used as reference modeling technique, the modeling language Business Process Modeling Notation (BPMN) 2.0 was selected because it is a worldwide standard for the graphical representation of business processes (Freund et al. 2010), and the reusability of CoFoRM will thus be supported. However, BPMN 2.0 focuses solely on the
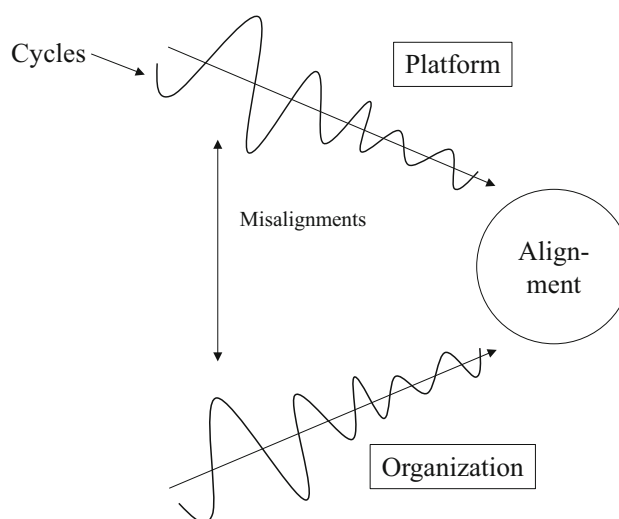
Fig. 7 Adaptation of the technical platform and the organization, based on Leonard-Barton (1988a)

modeling of processes (Freund et al. 2010), whereby the complexity of the modeling and the representation of the reference model remain manageable.

The selected reference modeling technique must fulfill further requirements according to Schütte's (1998) proper Guidelines of Modeling (GoM) (Becker et al. 2009). These requirements include (Schütte 1998):

R6: Construction adequacy: Ensuring an explicit benefit by applying the model in practice.
R7: Language adequacy 1: Considering the linguistically clear formulation.
R8: Language adequacy 2: Considering the linguistically correct formulation.
R9: Economic efficiency 1: Supporting a certain degree of flexibility to environmental changes.
R10: Economic efficiency 2: Supporting a certain degree of robustness to environmental changes.
R11: Systematic design: Providing different views for a differentiated description of the implementation process of online communities.
R12: Clarity: Guaranteeing a clear description of the model.
R13: Comparability: Ensuring the comparability to other models.

4.3 Implementing the Reference Model Technique

Various standard software tools are available for the application of reference models modeled in BPMN 2.0. In addition to ARIS Express (Software AG), Borland Together (Borland), IBM Blue Works Live (IBM), and Microsoft Visio (Microsoft) are often used. For the modeling of CoFoRM, Microsoft Visio is used.

4.4 Developing the Reference Model

The CoFoRM represents a toolbox of several implementation measures which are structured based on the theoretical models described above.

In order to realize the principle of a toolbox, the Process Model of Community-Joining and the Reader-to-Leader Framework are used to first define the target group of an online community. The former model is represented in CoFoRM by the group "Generation of User Growth." The latter model is implemented as the group "Generation of Community Activity" (Fig. 8).

Both groups are freely modifiable, as indicated by the shortcuts "FM+." A free modification is a mechanism allowing a complete modification of the reference model by the user. However, the modification is only possible as long as the user avoids semantic and syntactic inconsistency (Delfmann 2006). This modification mechanism was

chosen in order to realize the "toolbox concept." Hence, the user may not only choose which implementation measure to realize, but they also have the possibility to integrate further measures in the CoFoRM (Fig. 8).

The methodological support of the free modification mechanism is limited by securing the consistency of the model (Delfmann 2006). CoFoRM guarantees consistency by means of three lanes, each of which focuses on one distinct implementation strategy. Consequently, new implementations measures have to pursue the guidelines of these strategies. Further, new measures have to be integrated into the groups "Generation of User Growth" and "Generation of Community Activity."

CoFoRM consists of three lanes. Each of these lanes represents one of the implementation strategies (adapted in the previous sections), which are based on the diffusion theory by Leonard-Barton (1988b):

Lane 1   Development of User Commitment
Lane 2   Incorporation of Change Agents as Promoters
Lane 3   Continuous Improvement of the Technical Platform and Organization

This enables an efficient structuring of implementation measures conforming the individual implementation strategies. In addition, the integration of these strategies as lanes is a prerequisite for the derivation of further implementation measures.

The proposed implementation measures in CoFoRM are integrated as reduced sub-processes within each lane. Each of these sub-processes is specified by detailed processes (A1 Idea Competitions to A16 Organizational Interfaces). The considered implementation measures were identified by means of expert interviews conducted with community providers and organizations operating online communities (e.g., Hartmann et al. 2012b; Hartmann 2014). The classification of the implementation measures in CoFoRM as well as the specifications of the detail processes are literature-based and will be presented in the following section.

4.4.1 Measures of Strategy 1 (Lane 1)

The strategy "Development of User Commitment" aims at creating user commitment within the target group of an online community. For the non-members of a community, the focus must be placed particularly on the development of continuance user commitment as this can be triggered directly through the use of promotional measures. The user commitment strategy not only includes online tools but explicit offline tools as well. This assumption is supported by studies of, e.g., Goodsell and Williamson (2008), Lin (2007), and Young et al. (2011), who suggest a combination of online and offline activities in order to foster member activity within a community. Below, the online-
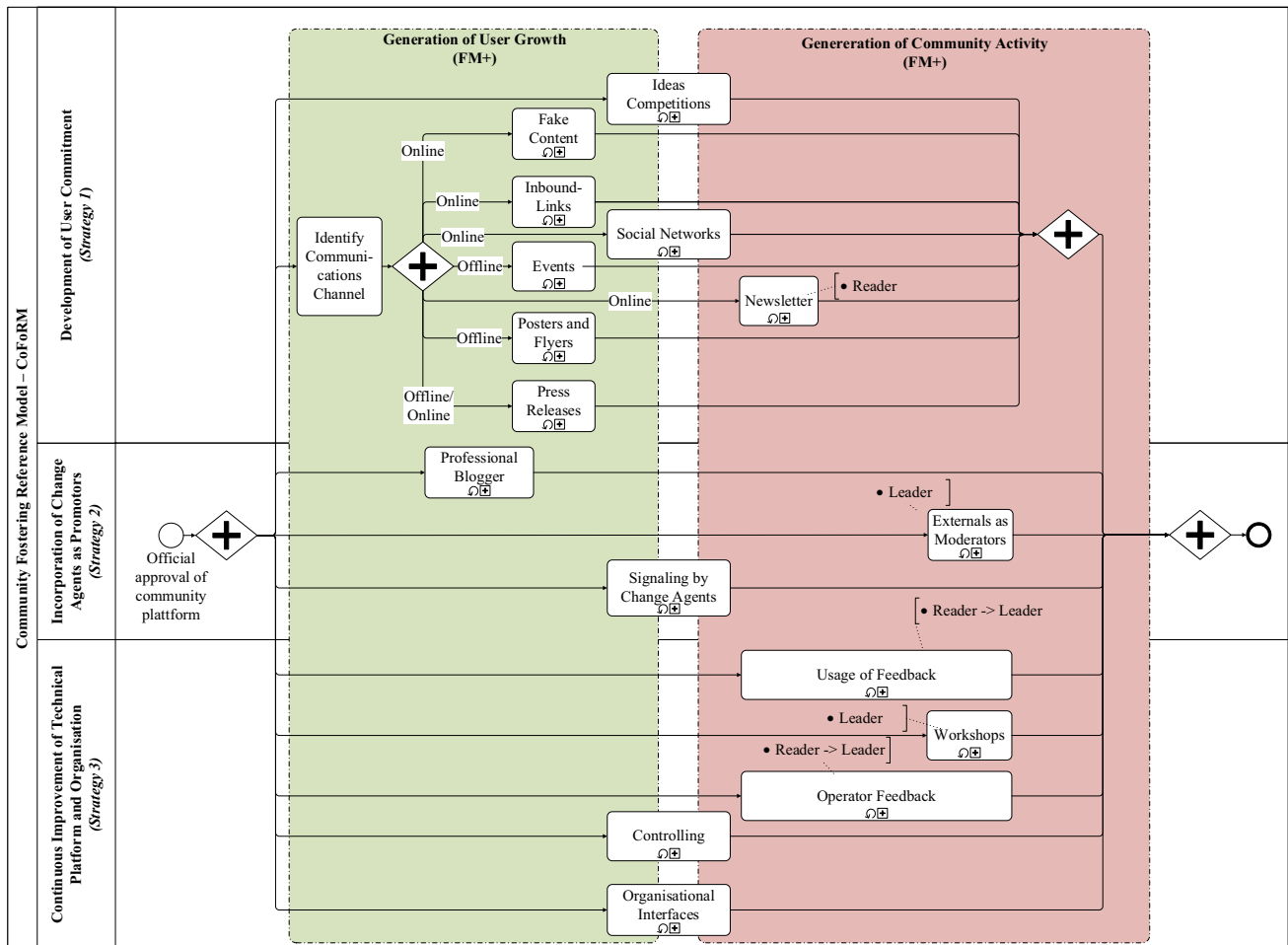
Fig. 8 The community fostering reference model CoFoRM (own illustration)

based implementation measures of Strategy 1 will be explained, followed by a description of the offline measures.

4.4.1.1 Online Measures Idea Competitions Idea competitions are frequently used in practice to collect ideas for solving specific problems. An idea competition is defined as "an invitation of an organizer – namely, a firm – to a general public or a targeted group to submit contributions to a certain topic within a predefined period of time. A review committee evaluates the submitted ideas and selects the winner" (Leimeister et al. 2009). Idea competitions are above all a proven means to attract many people at once and to thus make the widest possible range of different skills and experiences available (Hutter et al. 2011). The chance to be awarded for the best submitted idea as well as the prospect of a realization of the own developed ideas increases the benefits of a community, and it thus focuses on the development of User (Continuance) Commitment. "Idea Competitions" are integrated in lane 1 of CoFoRM in order to both attain new members for a community as

well as encourage registered members to actively participate in the community (A1 Idea Competitions; see Appendix, available online via http://springerlink.com).

Fake Content For new visitors of an online community, the presence of user profiles is an indication that other people find the community interesting and that the community provides benefits. Subsequently, fake profiles exert social influence on community visitors. Linked to this, the likelihood that the personal evaluation of the community by the visitors will be a positive one increases. Community providers use this relationship in practice. Thus, fake profiles are a key element of the implementation process of communities (Hartmann et al. 2012b). In addition to the creation of fake profiles, fake user-generated content (UGC) is posted by community providers (Hartmann et al. 2012b). Fake UGC and fake profiles will be used less and less over the lifecycle of a community and eventually become completely extinct, provided that an active community has formed (Hartmann et al. 2012b). The use of fake profiles and fake UGC should therefore be primarily limited to the initial growth phase of a community. This

measure shall attract new members by providing benefits in terms of valuable content. CoFoRM integrates the measure "Fake Content" in lane 1 within the group "Generation of User Growth" (A2 Fake Content; see Appendix).

Inbound-Links The generation of so-called inbound-links has been identified as a further relevant implementation measure. Inbound links are links from external websites promoting their own websites, respectively in this context, their own community. In literature, this type of link is often referred to as backlink (Chau et al. 2007; Schuff et al. 2010) or incoming-link. The number of inbound-links is one of the parameters by which most of the algorithms create their lists of results (Lewandowski 2005; Chen et al. 2012). Therefore, by using inbound-links, a community's ranking on the result list of a search engine can be improved, which increases the probability that users enter the community via a search engine. Assuming that the majority of the registered members of a community open the community directly or via a browser bookmark, the generation of "Inbound-Links" aims at the group "Generation of User Growth" within the CoFoRM (A3 Inbound-Links; see Appendix).

Social Networks Social networks are extensively used in the course of the implementation management of online communities in order to increase their popularity (Hartmann et al. 2012b). Social networks are used to create and maintain personal contacts with the help of the Internet (Schaefer 2008). Simultaneously, people exchange information about, e.g., products or company services, and thus influence the behavior or purchase-related decisions of other people (Benlian et al. 2010; Oestreicher-Singer and Zalmanson 2013). There are several options to provide people within social networks with information about an online community. One option is to create a so-called fan page that interested users can follow. By means of this, new updates on the community are posted directly to the user's personal social network homepage. These updates can be shared with other people in the social network, giving rise to WOM effects. Against this background, the use of social networks and the integration of relevant social media functions in the community are considered to be a measure to attain new members for the community and to inform registered members about the latest developments of the community. The measure "Social Networks" is integrated in both groups of CoFoRM in lane 1 (A4 Social Networks; see Appendix).

Newsletters Newsletters are sent via e-mail, an asynchronous medium. With the dispatch of the newsletters, organizations wish to inform their customers proactively and individualized (Prandelli et al. 2006). In order to carry out the dispatch of newsletters or messages, the e-mail address of the recipient is required. The use of this implementation measure is therefore only applicable to members of an online community. The readers of the newsletter are able to pursue the development within a community but are not actively involved in it. Therefore, the measure "Newsletter" is classified explicitly as activator of the readers of an online community (A5 Newsletter; see Appendix).

4.4.1.2 Offline Measurements

Events: In the marketing mix of a company, events take over an increasingly important role since they allow a direct and personal contact with customers (Sneath et al. 2005). Thus, events are a possibility to influence the personal experiences of the customers. Herein, events differ from other marketing activities. Personal experiences have made a greater impact on people and their perceptions of reality compared to experiences reported by other people (Wohlfeil and Whelan 2006). This increases the likelihood of people joining an online community. However, the organization of events is complex. Therefore, the participation in an event representing the community's target group is proposed. At events, community providers are able to promote their online community, which is why the measure "Events" is classified in the group "Generation of User Growth" (A6 Events; see Appendix).

Posters and Flyers In addition to events (e.g., conferences, company celebrations, or fairs), print media are used in practice to promote products/services. Print media include all printed and published sources of information. Therefore, the use of "Posters and Flyers" is proposed in the reference model to particularly enhance user growth (A7 Posters and Flyer; see Appendix).

Press Releases Press releases are another way for companies to draw their audiences' attention to a product/service or to inform the public on, e.g., the corporate development. Press releases are news articles and primarily address journalists (Deg 2009) and indirectly the general public. The use of "Press Releases" is implemented in CoFoRM for the generation of user growth as well (A8 Press Releases; see Appendix).

4.4.2 Measures of Strategy 2 (Lane 2)

According to Rogers (2003), Change Agents positively influence the adoption speed of innovations (Thompson and Brown 2008). It is therefore essential for the growth of an online community to incorporate Change Agents. Since they can proclaim the necessity of using an innovation (Thompson and Brown 2008), Change Agents are valuable for promoting the community in their social networks. They may be located internally in the organization which introduces an innovation, or externally, namely, outside the organization (Duncombe and Molla 2006a). Internal change agents usually hold manager positions in an

organization or are its shareholders (Duncombe and Molla 2006b). External change agents represent organizations and/or stakeholders within the social network of the organization wishing to introduce an innovation (Duncombe and Molla 2006b). Based on these characteristics, three measures have been identified for the implementation of the Change Agent Strategy: (1) Professional Bloggers, (2) Externals as Moderators, and (3) Signaling by Change Agents.

Professional Blogger Blogs have been used not only by companies to create an additional interactive communication channel with their clients (Huang et al. 2010), but also by operators of private blogs trying to professionalize their blogs and having influence on their followers to generate income. In this context, one possibility is to publish a product/service review in one's own blog against payment (Müller et al. 2011). This review should positively advertise a product/service (Müller et al. 2011), and at the same time be authentic (Zhu and Tan 2007) in order to obtain the blogger's credibility. Herein, the blogger takes the role of an agent. Companies increasingly consider these offers because they realize the benefits of blogs as an advertising channel (Zhu and Tan 2007). Community providers try to use this potential of blogs and pay bloggers so that they promote their online communities for the purpose of attaining new members (Hartmann et al. 2012a). On the Internet, various agencies acting as intermediaries between a company and a blogger exist (Rabe 2012). Depending on the agency or order, the blogger is paid for publishing certain content (e.g., product reviews, product photos) with cash or non-cash prizes. Among the most well-known agencies in the German-speaking world are Armillaria, Ever Left, Ranksider, Trustlink, and bezahlteartikel.de (Rabe 2012). For the implementation of online communities, professional bloggers are an option to attain new members as part of the strategy "Incorporation of Change Agents as Promoters." Accordingly, the measure "Professional Blogger" is classified in CoFoRM in the group "Generation of User Growth" in lane 2 (A9 Professional Blogger; see Appendix).

Externals as Moderators According to Leonard-Barton (1988b), the involvement of users in the development of an innovation is a success factor for the implementation of innovations. From this, it can be concluded that commitment to an online community is strengthened by the appointment of external people in the community management (i.e., by assigning a moderator role to community members). However, it also indicates to other community members that the members of the community are accepted and respected by the community management. To achieve this, the profiles of the selected users in the online community should be labeled accordingly. In the CoFoRM, this implementation measure is thus referred to as "Externals as

Moderators" as part of the strategy "Incorporation of Change Agents as Promoters" (A10 Externals as Moderators; see Appendix). The focus of this measure is on the leaders, since they are very active in an online community. Therefore, the willingness of leaders to support the community management is higher than that of readers.

Signaling by Change Agents When implementing an online community, the target group and the community operator initially exchange asymmetric information. According to Boulding and Kirmani (1993), this means that the market is not faultless. Akerlof (1970) purports that customers in a market involving unevenly distributed information between suppliers and customers are not able to sufficiently judge the quality of products – in this context, the online communities. A costumer might not purchase a product due to the high risk of purchasing a low-quality product implemented by a lack of information about the product. In consequence, the market collapses (Akerlof 1970). The same principle applies in the context of online communities.

According to Boulding and Kirmani (1993) and Spence (1973), one solution is to give additional information to the customers, respectively, the group of non-members of an online community, in order to reduce the information asymmetry. For this information to reach as many non-members as possible, the use of change agents is expedient due to their large social network and their strong social impact on the people in their social network. At the same time, change agents – provided that they are members of the community-operating organization – signal potential new members of the community the support of the community through the organization (Sandy and Christian 2000; Sharma and Yetton 2001; Klein and Krcmar 2003). Practically, this means that change agents autonomously advertise the community and address the community in their social network (change agents ads). At the same time, advertising should be done with the change agents; i.e., change agents should be referred to in course of the implementation measures, particularly in the context of user commitment-related measures. Both aspects are concluded in the measure of "Signaling by Change Agents" and are thus integrated into the CoFoRM. "Signaling by Change Agents" also aims at the groups of "Generation of User Growth" and "Generation of Community Activity" since community participants feel noticed as long as their support of the community is signaled through the organization (A11 Signaling by Change Agents; see Appendix).

4.4.3 Measures of Strategy 3 (Lane 3)

In the development and implementation of socio-technical systems, the technology itself as well as the relevant organization must be considered (Bygstad et al. 2005). In

this context, communities are also socio-technical systems. Accordingly, it is important to create the prospects of the organization and platform in a holistic and coordinated way.

Usage of Feedback A variety of online communities integrate social media features to promote interaction and the exchange of information between the members (Hartmann et al. 2012b). One of the essential principles of social media is Perpetual Beta. O'Reilly (2007) defines Perpetual Beta as an open development of a software product which is continuously equipped with new features and optimized in short intervals (monthly, weekly, or daily). By recording and analyzing the user behavior, the user reactions to the incurred changes in the software product can be reconstructed and possible adaptions can be made (O'Reilly 2007). In addition, the user feedback (conducted through e-mail contacts or messages in the online community) to the operator needs to be documented and incorporated into the revision routines of the platform. The approach of the Perpetual Beta thus ultimately allows the continuous adjustment of the IT platform to the users' needs and the integration of new features supporting collaboration in the community. The documentation and use of feedback are a measure addressing the entire user base of an online community and are integrated in all target groups within the group "Generation of Community Activity" in the CoFoRM (A12 Usage of Feedback; see Appendix).

Workshops As has been shown, operators of online communities can revert to the feedback communicated within the community. An additional possibility is the conduction of workshops in which selected members of the community discuss possible improvements of the technical platform. In addition to the platform enhancement, workshops are a measure to develop content for the online community face-to-face together with the community members (Hartmann 2014). This fosters the commitment and generates UGC, which can then be published on the platform and serve other community members as a motivation for the development of further contributions. To conduct workshops, it is expedient to limit the number of participants to the group of leaders, as they are intensely involved in the community due to their characteristics and because they are intrinsically motivated to create an active community. Therefore, the implementation measure "Workshops" is assigned to the "Generation of Community Activity" group in the CoFoRM and to the leaders (A13 Workshops; see Appendix).

Operator Feedback According to Bretschneider (2012), the main motivations for community participants are: fun at participation, altruism, recognition, desire for new developments and product improvements, learning, and self-marketing. These motivations need to be addressed in the implementation management since it is responsible for whether users are willing to be active in a community. One way to address these motivations is feedback. A member of a community can receive feedback through comments, news reviews of other users related to their posts, or even directly through the operator of the community. The feedback by the operator aims specifically at the motivations of learning and recognition: through such feedback, the operator can provide users with additional information, thus allowing them to further improve their contribution (learning) (Holgersson and Karlsson 2012). Accordingly, the implementation measure "Operator Feedback" is assigned to the group of "Generation of Community Activity" and in greater detail to the readers, contributors, collaborators, and leaders (A14 Operator Feedback; see Appendix).

Controlling Hallerstede et al. (2012) consider the controlling of the UGC and the user activities as one of the essential tasks in community management in order to, among other things, ensure the compliance with the netiquette. For the implementation management, it is important to control the quantity and quality of published content, since both factors are decisive for the growth of a community. At the same time, controlling is necessary not only to check the effect of the implementation measures on the development of the community but also to adjust the measures if necessary. For a target-oriented controlling of communities, the definition of indicators is necessary because a comprehensible measurement can only be realized by this means. Relevant indicators are: e.g., the number of logins, logins per member, hits (page impressions), and page impressions per member (Blohm et al. 2011). Different software tools which can be implemented in the community and offer various reporting functions are available for the automated detection of the indicators (e.g., Piwik, Google Analytics). The indexes for content and activity controlling in a community are ultimately intended to adjust the implementation measures to the attainment of new members and to an increase in community activity. Therefore, the measure "Controlling" is assigned to the groups of "Generation of User Growth" and "Generation of Community Activity" (A15 Controlling; see Appendix).

Organizational Interfaces Companies rely on communities in order to achieve their marketing goals or to recruit new employees, but communities also make use of the customers' innovation potential by allowing the development of customer ideas for new products/services (Bretschneider et al. 2015a). In this context, one target of the community implementation must be the efficient design of the interfaces between the community and the organizational department, especially when communities are used for the generation of ideas. Practically, this means identifying contact persons in the organization. Ideally, these contact persons are Change Agents, who consequently

advocate the follow-up of ideas of the online community and eliminate any resistance in the company. For instance, the heads of departments could be Change Agents, since they have the necessary resources for the implementation of ideas. Against this background, the measure of "Organizational Interfaces" directly aims at the activation of the entire community user base, since the efficient design of the interfaces increases the probability of the realization of community ideas. This, in turn, positively affects the motivation of the community to actively participate. Indirectly, this measure affects the group of non-members as well, as successfully implemented ideas of the community attract potential new members. The measure "Organizational Interfaces" is accordingly implemented into both groups as "Generation of User Growth" and "Generation of Community Activity" in the CoFoRM (A16 Organizational Interfaces; see Appendix).

4.5 Evaluating the Reference Model

To evaluate the CoFoRM, two rounds of evaluation were performed using different evaluation methods.

In the first round, an analytical evaluation of the CoFoRM according to Hoffmann (2014) was conducted. In the scope of this analytical evaluation, one expert in the field of community management was asked to look at the CoFoRM and to assess whether the CoFoRM met the requirements derived in the previous steps of our development process. This first evaluation round serves as a formative evaluation, meaning it focuses on assessing whether the requirements were implemented. The goal of this formative evaluation was to receive first feedback from an independent expert before the model could be tested in the practical use setting. The analytical evaluation by the expert led to the following results:

Regarding R1, the expert analyzed that CoFoRM considers individual adoption processes insofar as the individual implementation measures highlight the relative benefit of online communities (e.g., posters/flyers) as well as the provision of testing facilities of communities for each target group (e.g., events). A thorough consideration of individual adoption processes is not possible, since this would first require an explicit measurement of a person's internal cognitive processes leading to the adoption. This is not possible in terms of current innovation research. Thus, requirement R1 is only partially fulfilled. Further, the CoFoRM includes two groups ("Generation of User Growth" and "Generation of Community Activity") within which implementation measures are assigned to individual target groups and that is why the expert concluded that requirement R2 is fulfilled. In regard to R3, the CoFoRM comprises promotional activities such as events and posters/flyers. Promotional activities serve, in particular, to

develop user (continuance) commitment. Therefore, requirement R3 fulfilled in the expert's view. Regarding R4, measures such as "Signaling by Change Agent" enable the incorporation of Change Agents. In addition, the definition of the lane "Incorporation of Change Agents as Promoters" in the CoFoRM allows for the derivation of further measures. Hence, requirement R4 is also fulfilled. Concerning R5, the expert considers the enhancement of the organization and the platform, among others, to be addressed by the measures "Controlling" and "Workshops." Therefore, he concludes that requirement R5 is fulfilled.

Throughout the development of the CoFoRM, particular attention was paid to the compliance of the GoM criteria. These criteria include the construction adequacy, language adequacy, economic efficiency, systematic design, the clarity of the model, and its comparability. The evaluation by the expert was based on these criteria. Regarding R6, the model provides a clear practical benefit, as it identifies the activities to be considered in course of the implementation of communities at the process level. In addition, it enables a simple surface adaptation by means of the use of the modeling tool Microsoft Visio. Hence, the expert views requirement R6 as fulfilled. In consideration of R7, the expert concluded that the model is formulated linguistically explicit by using the BPMN 2.0. Furthermore, attention was paid to ensure an understandable labeling of the lanes, processes, and activities in CoFoRM. Hence, requirement R7 was considered to be fulfilled by the expert. He also views R8 to be fulfilled, since the model is formulated linguistically correct. As R9 is concerned, the expert saw that the software tool Microsoft Visio was used allowing for a simple adaptation. In addition, the definition of lanes allows the derivation of further implementation measures starting from a strategic level. Hence, the expert concluded requirement R9 to be fulfilled. The same applies for R10, since the expert views that the CoFoRM is based on the theoretical models. Therefore, the developed reference model is to be regarded as resistant to environmental changes, and requirement R10 can be viewed as fulfilled. In consideration of R11, the model provides different lanes and two groups structuring the implementation measures. CoFoRM thus provides different views on the implementation process of communities. In addition, reduced and detailed sub-processes have been implemented into CoFoRM to provide a more abstract and detailed view on the implementation process of communities. Therefore, requirement R11 is also fulfilled. Further, by using the BPMN 2.0 as a graphical modeling language and integrating reduced as well as detailed sub-processes in CoFoRM, the model is vividly designed, and that is why the expert assessed requirement R12 to be fulfilled, which he concluded also for R13. The reason for this is that the

Table 1 Results of the evaluation

Evaluation criteria	Mean	(SD)
R1: Considering individual adoption processes for entering an online community	4125	0,7071
R2: Supporting a target group-oriented design of implementation measures	4000	0,9071
R3: Integrating measures for the development of User (Continuance) Commitment	4000	0,7081
R4: Allowing the Incorporation of Change Agents in order to Generate WOM Effects	4125	0,6579
R5: Mutual Adaptation of Organization and Technology	4125	0,6309
R6: Construction adequacy: Ensuring an explicit benefit by applying the model in practice	4125	0,6409
R7: Language adequacy 1: Considering the linguistically clear formulation	4000	0,7559
R8: Language adequacy 2: Considering the linguistically correct formulation	4000	1,3093
R9: Economic efficiency 1: Supporting a certain degree of flexibility to environmental changes	4250	0,7071
R10: Economic efficiency 2: Supporting a certain degree of robustness to environmental changes	4250	0,4629
R11: Systematic design: Providing different views for a differentiated description of the implementation process of online communities	4000	0,9258
R12: Clarity: Guaranteeing a clear description of the model	4500	0,53,452
R13: Comparability: Ensuring the comparability to other models	3875	1,1260

use of the modeling language BPMN allows for a comparison of CoFoRM with other similar modeling constructs; accordingly, a comparison with, e.g., an EPC-based model would be possible.

As mentioned, the evaluation within this round of evaluation focused on assessing the model itself and is contrasted with the evaluation of our second round of evaluation, which focuses on assessing CoFoRM's efficiency, namely its ability to do what it was designed to do. During this summative evaluation, the CoFoRM was assessed by eight experts from practice. In a first step, these experts were asked to test the CoFoRM in the use setting, meaning in their daily work routine. All experts have extensive knowledge in community building and management. The model was presented to the experts during a short introduction session conducted by the research team. After this, they were asked to use the model during their daily community management activities for a period of at least several weeks.

After gaining this practical experience, in a second step, the experts were asked to evaluate the model. Before the actual evaluation, they were given training with regard to the evaluation criteria as well as their definition and proper application (Hayes and Krippendorff 2007; Krippendorff 2004). The expert team was asked to use the above defined requirements as evaluation criteria (R1–R13). With the help of these criteria, the expert team was able to adequately assess the CoFoRM. All judges were assigned to rate the ideas with the help of these 13 criteria on a rating scale ranging from 1 (lowest) to 5 (highest). After this individual evaluation, the experts had the opportunity to discuss differences in their assessments and change their individual ratings based on their joint discussion if desired.

To illustrate the results of the evaluation, expert scores (N = 8) for each of the three criteria were averaged. Table 1 shows the results of the evaluation.

Overall, these results clearly indicate a very good level of scores. Compared to the maximum achievable 5 points per criteria, nearly all criteria are significantly above the medium level of 3. This indicates the utility of the CoFoRM.

According to Amabile (1996), the reliability of a scale that is used in the scope of an expert rating is good if all judges of the jury evaluate the evaluation objects almost equally. This means that ratings should be analyzed for interrater reliability (Amabile 1996). Interrater reliability was assessed by calculating Krippendorff's alpha for each criteria. Krippendorff's alpha is a conservative index that measures agreement among multiple raters and is considered to be a highly rigorous measure for assessing interrater reliability for rating scales such as those employed in this study. Values of 0.67 and greater are generally considered to be satisfactory (Krippendorff 2004). The agreement coefficients for the 13 evaluation criteria are shown in Table 2.

Given the difficulty of the specific task (predicting the attractiveness CoFoRM), those results seem to be very satisfactory (Amabile et al. 1996; Franke et al. 2006; Krippendorff 2004; Kristensson et al. 2004).

5 Discussion, Limitation, and Future Research

The aim of this research was to develop and evaluate a reference model that guides activation and acquisition of member activity in the later phases of a community's

Table 2 Results for the interrater reliability

Evaluation Criteria	Krippendorff's alpha
R1: Considering individual adoption processes for entering an online community	0.69
R2: Supporting a target group-oriented design of implementation measures	0.71
R3: Integrating measures for the development of User (Continuance) Commitment	0.78
R4: Allowing the Incorporation of Change Agents in order to Generate WOM Effects	0.69
R5: Mutual Adaptation of Organization and Technology	0.61
R6: Construction adequacy: Ensuring an explicit benefit by applying the model in practice	0.65
R7: Language adequacy 1: Considering the linguistically clear formulation.	0.81
R8: Language adequacy 2: Considering the linguistically correct formulation	0.89
R9: Economic efficiency 1: Supporting a certain degree of flexibility to environmental changes	0.76
R10: Economic efficiency 2: Supporting a certain degree of robustness to environmental changes	0.64
R11: Systematic design: Providing different views for a differentiated description of the implementation process of online communities	0.91
R12: Clarity: Guaranteeing a clear description of the model	0.94
R13: Comparability: Ensuring the comparability to other models	0.84

lifecycle. By means of the evaluation, we could demonstrate that the CoFoRM constitutes a valuable instrument in the daily working routine of community managers. However, this research has to be seen in the light of the following limitations, which impose suggestions for future research.

The results of this paper are limited by the fact that a model is always a simplification of a real-world situation in order to reduce complexity. Consequently, the CoFoRM raises no claim to the completeness of the implementation measures. A further limitation arises from the selection of the "Model of Community Joining," the "Reader-to-Leader Framework," and the diffusion theory by Leonard-Barton (1988b). Relevant literature presents other models suggesting a different categorization of user groups, respectively, providing other explanations for the diffusion of innovations. Consequently, a reference model based on other models might suggest a different implementation process.

A central goal of the CoFoRM is the development of commitment among visitors and members of an online community, as this is a key success factor for the growth and activity of a community. In this paper, theory-based measures for the generation of commitment were derived. However, it has not been studied how effective these measures are in generating commitment, and they thus demand further research.

Further need for research can also be seen in the integration of social networks in communities. By implementing functions such as sharing or liking of UGC, non-members of a community can be informed about the community. However, the type of information that needs to

be shared in a social network in order for people to be more apt to join a community has not yet been investigated. This is indeed necessary for a purposeful and efficient attainment of new community members.

Our CoFoRM is developed and tested for firm-hosted, production-based communities, with their specific governance, management, as well as membership mechanisms. This means that the CoFoRM is exactly customized to the needs of this kind of online community. Until now, we cannot claim that the CoFoRM is also useable for online communities with other governance, management, as well as membership mechanisms, such as the self-organized open source communities described by Crowston et al. (2007), Demil and Lecocq (2006), or Ren et al. (2012), respectively the information-based communities described by Rajagopalan (2014). For this reason, our results might impose some limitations concerning their generalizability. Future research should test and validate and may customize our model for other forms of online communities.

One aspect that future research may consider to include in our CoFoRM is the relatively new concept of leadership in online communities. In the "real" world, e.g., in teams or groups of organizational work settings, a primary aspect of the work of leaders is "influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives" (Yukl 2006). This definition suggests that leadership may also play an important role in online communities. However, the concept of leadership cannot be transferred without restrictions to the online world, since online communities provide markedly different environments when compared to

traditional organizations due to the geographic distribution of members and the constraints imposed on multifaceted communication by technology mediation (Faraj et al. 2015; Eseryel and Eseryel 2013). The current understanding of the role of leadership in online communities is limited. In particular, it is not yet clear whether the leaders in online communities do in fact play leadership roles or to what extent they are influential in shaping online communities (Faraj et al. 2015). Because of this, we did not incorporate the concept of leadership into our CoFoRM yet, and we will leave it to future research efforts to provide evidence whether leadership would enhance the CoFoRM.

6 Conclusion: Theoretical and Practical Contribution

In this research, we developed and evaluated CoFoRM, which represents a reference model fostering continuous member acquisition and activation after the successful launch of a community. CoFoRM does not represent yet another model such as the "Community Building and Community Management" (CBCM) by Leimeister and Krcmar (2006) or the "Cultivation Model" by Loyarte and Rivera (2007) (just to name two out of the rich body of models discussed above) aiming at offering generalized procedures and tools for activation and acquisition of members in online communities in the scope of the launch of a community. Instead, our CoFoRM extends and complements these models. CoFoRM has to be considered a reference model for the continious acquisition and activation of community members escpecially in the late phases of a community lifecycle. Until now, existing models have described how to perform these activities during the launch of a community very well and explicitly, however, these models have neglected describing continuous member activation and acquisition after the successful launch of a community. Our model fills this gap by especially focusing on the late phases of a community's lifecycle. CoFoRM is the first model that not only generalizes successful procedures for continuous member acquisition and activation in the late phases, but also provides a bunch of validated toolkits and instruments for the continuous member acquisition and acitivation. By doing so, our research not only expands, but also complements the existing body of knowledge.

Our research also makes a strong practical contribution. In practice, the majority of successful implemented firm-hosted communities suffer from stagnation of their development over time, mirrored in an decrease of the number and interactivity of community members (Bateman et al. 2010; Yuqing et al. 2012; Zhu et al. 2013). We are the first to provide a guideline for managing the late phases in the lifecycle of a community. As demonstrated, by means of our CoFoRM, community members could stimulate interaction in these phases. Thus, managers of communities might learn from the insights of this research and be enabled to use our CoFoRM as a practical guideline to manage member activities in the late phases of a community. This, in turn, may help not only to overcome the mentioned practical problems but also to lengthen the lifecycle of firm-hosted communities, and community managers may thereby profit from customer contributions in the long run, for example through building relationships with customers, receiving their feedback, strengthening the brand, or integrating them into ideation for new product development.

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