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Designing Tool Support for Collaborative Business Modeling

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Abstract

This article focuses on how companies can integrate globally distributed stakeholders into their business model innovation activities. By conducting a series of expert interviews, a set of requirements for a business model development tool (BMDT), which allows firms for a collaborative business model development, is derived. Based on these requirements, a corresponding BMDT is piloted and evaluated in the real world setting of the German software supplier SAP. Building on the results of this pilot study we were able to derive a set of design principles for a BMDT, which allows the integration of external stakeholder into a CBM initiative. This research contributes to the body of knowledge on crowdsourcing for innovation by first providing empirical validation that the crowd is able to develop business model innovations. The findings suggest that crowdsourcing the business model development might be as effective as crowdsourcing idea generation for new product development. Sticking to the principles developed in the course of this research, companies can develop their own tools for integrating their stakeholders into future business model innovation activities. This study is the first that empirically found that external stakeholders are able to develop business model innovations in the same manner as innovative ideas for new product development

Key words: Business Model Innovation, Collaborative Business Modeling, Virtual Communities, Action Design Research

Content

1 Introduction

Sustainable innovations are often characterized by the fact that they emerge from collaborative activities by different actors, meaning they require multiple actors to work together. Joint innovation activities where multiple organizations work together with their stakeholder to pool complementary assets are particularly important for sustainability innovations, as Chesbrough's open innovation paradigm illustrates (Chesbrough, 2003). Previous research shows that most innovations are not the result of a single inventor but rather of collaboration processes like these (Gasco-Hernandez and Torres-Coronas, 2004, Franke and Shah, 2003, Nemiro, 2001, Sawhney et al., 2005). Consequently, there is a number of firms that open up and introduce processes and mechanisms that allow them to work together with public and private partners to jointly create innovations (Rohrbeck et al., 2013). This is also referred to as crowdsourcing for innovation (Boudreau and Lakhani, 2013, Lüttgens et al., 2014).

More recently, literature has begun to extend the principle of crowdsourcing for innovation to the field of business model innovation (Rohrbeck et al., 2013, Chiou, 2011). Here, it is characterized by the cooperation in terms of business model innovation within networks of customers, suppliers, and other divisions of a firm. In this vein, Rohrbeck et al. (2013) define this concept of collaborative business modeling (CBM) as an activity where multiple stakeholder of a firm as well as organizational divisions work together to create a value creation system (Rohrbeck et al., 2013). Such co-creation of a company's business model would not only support the integration of customer needs into a company's business development process, but might also enhance the quality of the developed business models.

Despite of the great potential that the collaborative design of new business models holds, research in this area is just at its beginning. The tools currently available for supporting this co-creation are very promising first steps, but are mostly limited to supporting the visualization of a business model (Osterwalder and Pigneur, 2013). Consequently, there is an ongoing call for corresponding business model development tools) that go beyond visualization and draw upon theoretical as well as empirical results to improve the design of new business models in a collaborative setting (Veit et al., 2013). Without such conceptualization and formalization, adequate IT support can hardly be provided (Teece, 2010).

In this paper, we report on a research project to build an IT- tool for collaborative business modeling. The corresponding research project was conducted together with the German software provider SAP. In order to develop the BMDT, we framed the project as an action design research (ADR) as proposed by Sein et al. (2011). The first step of our ADR was to create an empiricism-driven design manifested in expert interviews for derivation of requirements for the IT artifact. After this initial design, our research constitutes a circular process of constant refinement as well as piloting and evaluation of the IT artifact in a real-world setting. The paper at hand provides contributions for practitioners as well as academics. From an academic point of view, we systematically derive a framework that includes the requirements for designing new business models in a collaborative setting. In addition to that, we use the developed framework for building a first instantiation of a BMDT and derive design guidelines for developing a new BMDT. Using these guidelines, companies can develop their own tools for integrating their stakeholders into future CBM activities.

2 Research Methodology

Our research follows an action research approach because we: (1) address a practical concern of people in an immediate problematic situation, (2) design a problem solution for the problem, and (3) pilot this solution as a measure of intervention for this problem. In 2011, Sein et al. (2011) introduced their action design research (ADR) method that claims to be a procedure for action research; even though it focuses solely on an IT artifact as subject of an underlying problem solution. This is what distinguishes it from typical action research, which usually includes non-IT- artifacts as subjects of the problem solution (Rapoport, 1970, Susman and Evered, 1978). Thus, we chose ADR as the procedure for our research.

In a first step (Problem Formulation) we systematically formulated the problem as broached in the introduction of this paper and providing the motivation for our research. In the next section, we move forward by defining this problem as an instance of a broader class of problems (Sein et al., 2011).

In the next step, the so-called Building, Intervention, Evaluation (BIE) step, we developed, piloted, and evaluated the BMDT. Parallel to this BIE cycle, the Reflection and Learning step focuses on reflecting on the results of the different design steps.

In the last step, the Formalization of Learnings, we applied the leanings from our research to a broader class of problems (generalization), identifying the contributions of our research to the theoretical and practical body of knowledge.

3 Problem Formulation

3.1 The Problem at SAP

As outlined in the introduction of the paper, this research project was conducted together with the German software provider SAP. Although the company had been profitable in the past, the company board wanted to explore promising future market segments by using an open innovation approach in order to obtain new insights on the company's relevant markets. Therefore, external consultants (in this case the research team) were commissioned to review the existing product portfolio and to deliver recommendations for further courses of action. Their report recommended that SAP should explore promising future market segments together with their external stakeholders in order to receive new insights on the company's relevant markets.

The company board discussed the report and decided that the establishment of a corresponding CBM initiative might be a promising course of action for identifying new market segments. However, as the company's stakeholders are distributed around the globe, the board considered the identification of new markets and the development of suitable business models within a traditional workshop setting as being too costly and not feasible. As a result, a virtual platform had to be established, allowing the participants to elaborate on new market segments and to identify further courses of action. As the existing solutions in the marketplace lacked sufficient functionalities in order to enable distributed stakeholders to collaborate in designing of new business models, the research team decided to develop a new solution from scratch. Consequently, the research team moved forward and tried to identify requirements for developing a corresponding BMDT.

3.2 Identification of Contributing Knowledge within the Application Domain

When developing the new BMDT, the first reviewed existing literature in order to identify the activities that are necessary to design new business models with a company's external stakeholders. We therefore analyzed the academic literature concerning the design of new business models. After consolidating various publications, we identified three overarching design steps:

1) The project team first has to carefully analyze the company's position concerning the different building blocks that the business model will later include (Osterwalder and Pigneur, 2010, Giesen et al., 2007, Fritscher and Pigneur, 2010, Lee et al., 2011).

2) In the next sub-step, the project team is expected to determine future developments within each of the aforementioned building blocks. This step typically consists of the analysis of future market developments (Leem et al., 2005, Palo and Tähtinen, 2013, Im and Cho, 2013), as well as the corresponding mechanism to capture value from these developments (Giesen et al., 2007, Teece, 2010, Chatterjee, 2013, Lee et al., 2011).

3) In a last sub-step, the project team will then consolidate its results within a unified framework in order to allow a consistent implementation of the business model (Osterwalder and Pigneur, 2010, Fritscher and Pigneur, 2010, Lee et al., 2011, Im and Cho, 2013).

Besides to these three distinct sub-steps which are necessary to design a new business model, there is only sparse knowledge concerning the requirements that have to be fulfilled in order to successfully build a BMDT that would support the design of a company's business model. In order to complement the existing literature in regard to these requirements, we conducted an interview study with experts in the domain of business model design.

3.3 Identification of Additional Empirical Insights within the Application Domain

The expert interviews conducted in the course of this study were designed as semi-structured interviews (DiCicco-Bloom and Crabtree, 2006). Twelve interviews (each lasting around an hour) were conducted with twelve different experts who frequently work in business model development projects. The selection of experts was based on their expertise within the field of business model design and years of experience, which was on average 10 years in the sample. All interviews were recorded and transcribed using qualitative content analysis, as it offers concrete guidelines on analyzing big amounts of data in a rigid manner (Forman and Damschroder, 2008).

In the course of this coding process, the researchers individually examined every single requirement that had been identified during the expert interviews. In order to be confirmed, a requirement had to be mentioned by at least three participants ($n \geq 3$). In a next step, the individual results were merged. Whenever dissimilarities occurred, the

according two researchers discussed and refined the requirements until mutual agreement was reached.

The final requirements were then integrated into a consolidated framework. In order to improve the framework and confirm its utility in the application field, we conducted an exploratory focus group (Hevner and Chatterjee, 2010). Originated in the field of psychology, the focus group gained increasing popularity use as a knowledge elicitation technique in the field of software engineering (Massey and Wallace, 1991, Nielsen, 1997). When conducting our focus group, we followed a process proposed by Hevner and Chatterjee (2010).

We conducted our focus group with six expert developers of virtual collaboration platforms. The involved experts previously developed several different web-based ideation platforms, aiming at activating customers of a company for engaging into the company's innovation process. For this reason the customers are provided with functionalities that would allow them to generate, elaborate and evaluate new ideas concerning a company's product or service portfolio (Leimeister et al., 2009, Ebner et al., 2009). Due to the analogies to the different phases of a business model design project, we considered these experts as suitable candidates for the evaluation of the identified requirements for a BMDT. In addition to that we decided to employ such a homogenous sample in order to integrate the target group of our developed framework and to ensure sufficient depth of the focus groups' results (Bloor et al., 2001).The resulting requirements are depicted in Figure 7.1.

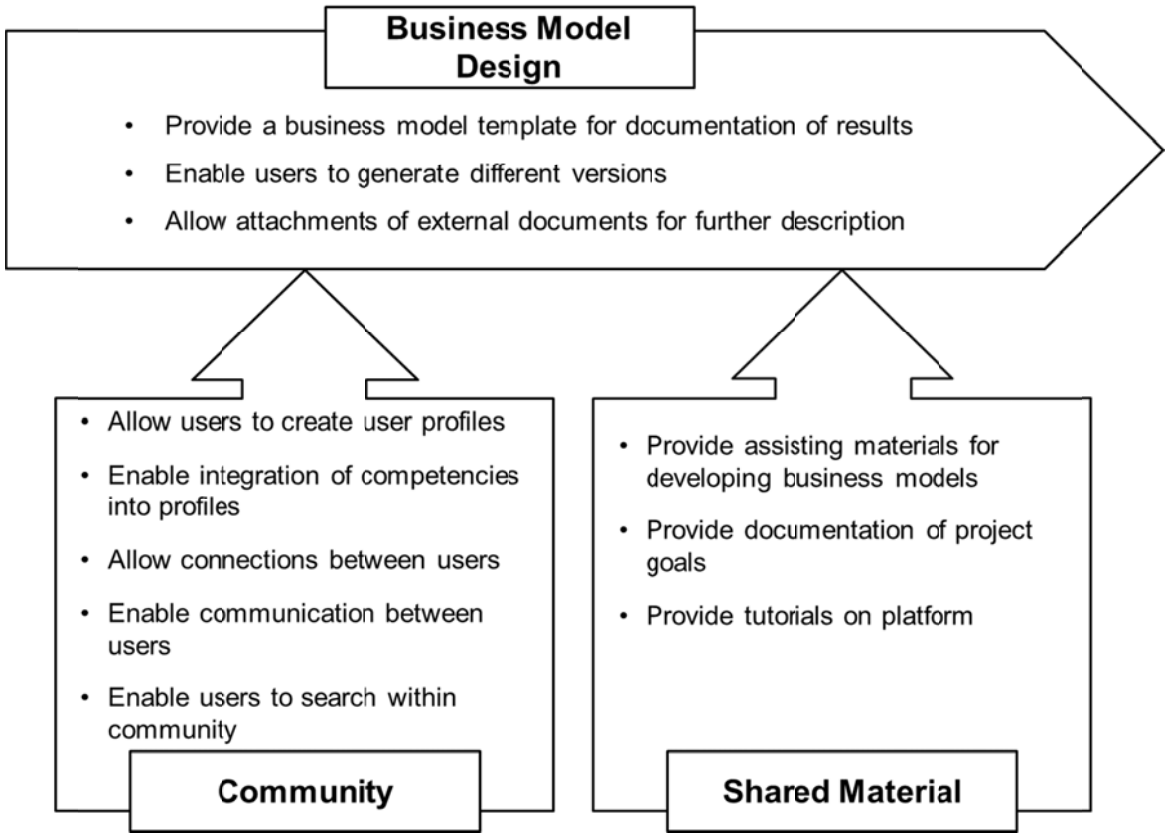

Figure 7.1: Consolidated Requirements for a BMDT that Supports Collaborative Business Modeling

Source: Own Illustration

4 Building, Intervention, and Evaluation: Design of the IT Artifact

In ADR the BIE cycle comprises the development the IT- artifact that has to be developed in the course of the research project, as well as its implementation and evaluation in an organizational setting.

4.1 Design of the BMDT

When building the IT- artifact, the research team started by translating the identified requirements into functional requirements and finally into tangible functionalities, which were then integrated into one single BMDT. In the following, we will go through each of the requirements and elaborate on how they were implemented into the instantiation of the BMDT.

4.1.1 Design of the Community Section

The community serves as the foundation of the project in terms of integrating external stakeholders into the different stages of the project. A discrete profile page was thus implemented for each community member. This profile page serves as the virtual representation of a member's identity within the community. On these profile pages, community members can share their personal information with the community. Apart from the member's name and photo, these profile pages also provide the possibility to list skills and competencies as well as various work-related experiences. All of this profile information is visible to other community members and also indexed and searchable by the platform's search engine. Thus, whenever the project team needs assistance in working on the different project steps, users with needed experiences and skills are identifiable by using the search engine.

Within the community as a whole, the platform allows forming sub-groups consisting of members that work together in a team. We thus provide 'team spaces' that are accessible solely by members of one team. These team spaces basically consist of a page providing team-internal communication functionalities (such as the 'shoutbox' mentioned below), as well as the shared materials mentioned in the following section. The team spaces furthermore allow members to invite other community members to join a team. This invitation functionality is coupled with the search engine of the platform, which allows teams to search for members who can offer useful or required

skills needed to complete a task. Figure 3 provides a screenshot of the described team spaces.

To simultaneously address all members of a group, we implemented a so-called ‘shoutbox’, allowing groups to communicate on a many-to-many basis. This ‘shoutbox’ serves as a chronological list of messages that can be posted and viewed by members of one group.

In order to provide the community members with the possibility to establish direct relationships with other community members, we integrated a functionality that allows for the establishment of friendships based on the user profiles. This functionality was realized by integrating a corresponding button in each user profile that allows for requesting a friendship.

In order to meet the requirement to allow communication between community members, we included a functionality to send and receive personal, one-to-one, asynchronous messages. Each user profile has a button for sending a personal message to a user, which can then be accessed by the receiver in a message inbox on their user profile (c.f. Figure 7.2).

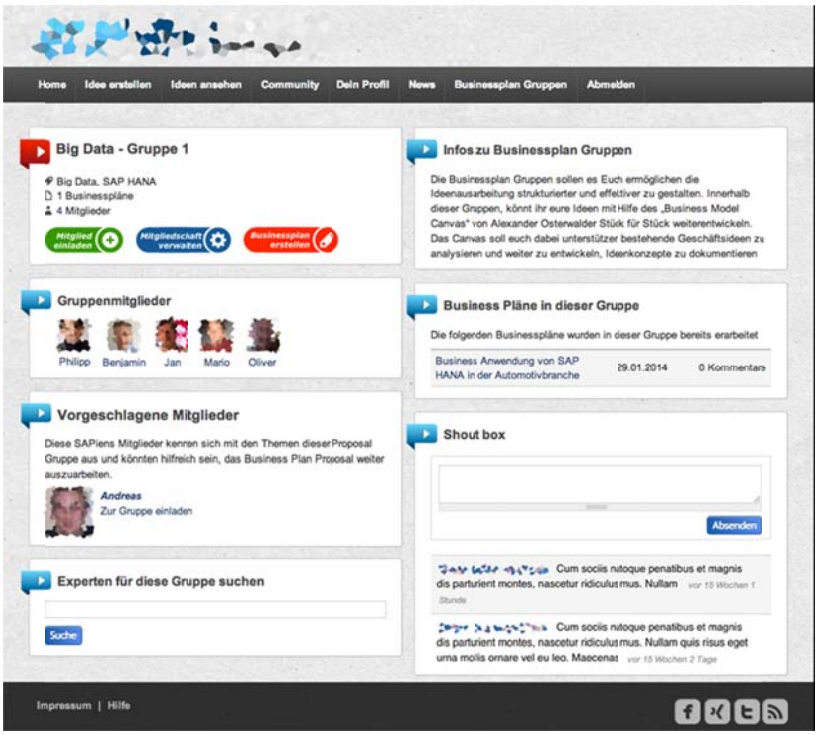

Figure 7.2: Screenshot of the “Team Spaces”

Source: Own Illustration

4.1.2 Design of the Shared Materials Section

In order to assist community members to develop a shared understanding on the different tasks within a project and to provide them with materials for executing the different business model development tasks, we provided the above-mentioned 'team spaces.' These spaces provide several practitioner guidelines on how to develop new business models, as well as a guiding video considering the development of business models. We also implemented functionalities to create and share common materials, basically consisting of one or more business models collaboratively developed by the team. Further, we provided community members with a detailed description of the project goals in order to align the members' efforts when developing new business models. The documentation of the project goals was realized by displaying the several goals on the BMDTs start screen. This ensured that every community member would become aware of the project goals whenever they logged onto the system.

4.1.3 Design of the Business Model Development Section

For the support of the actual business model design, we had to implement a business model framework that would allow community members to document their results. For this purpose, we used the business model canvas proposed by Pigneur and Osterwalder (2010). After the framework was selected, we ensured that users would be able to generate different versions of the business model by implementing a collaborative editor. This editor provides a comprehensive revision history that allows for the tracking of every change made by any group member. Thus, all changes are traceable and can also be reverted 'on demand'. In this way, the whole development process can be documented and the history of the document is preserved. Users were also given the possibility to attach external data without any restrictions of size and format. The described functionalities are illustrated in Figure 7.3.

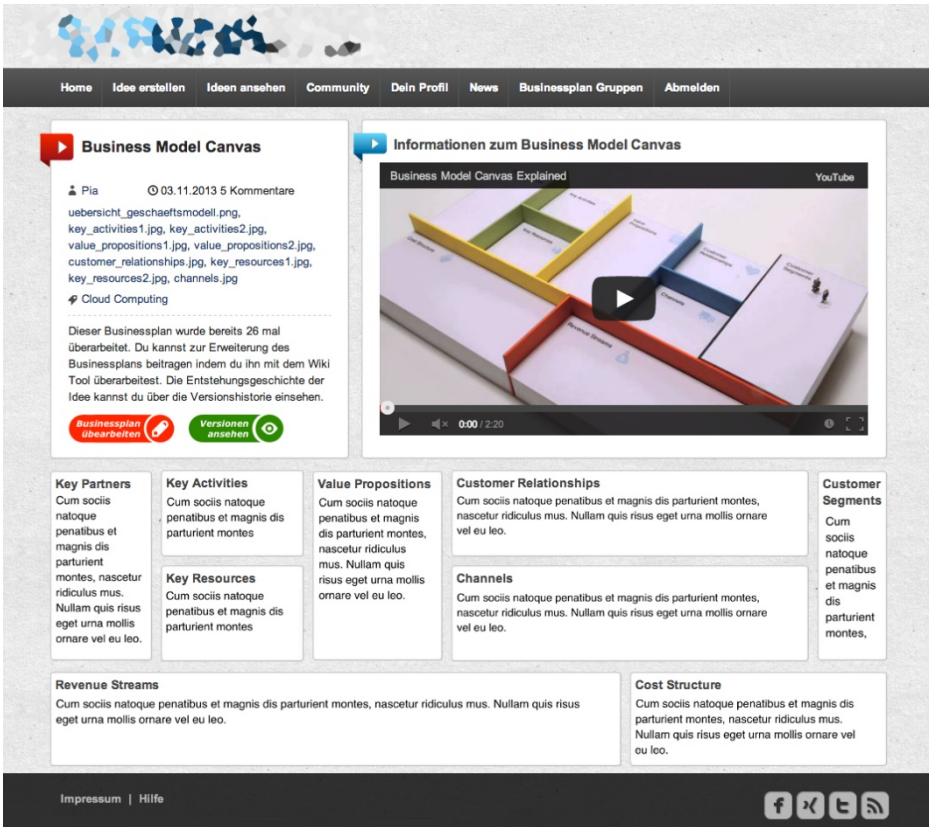

Figure 7.3: Screenshot of the "Business Model Design Space"
Source: Own Illustration

4.2 Piloting and Evaluation

Following Sein et al.'s (2011) ADR, the evaluation of the BMDT focused on assessing the BMDT's efficacy, namely its ability to do what it was designed to do.

4.2.1 Set-up of the Study

When evaluating our IT artifact, we conducted a CBM initiative on the developed BMDT. In a first step, the community of the BMDT was staffed with a mix of stakeholders of SAP who voluntarily committed themselves to contribute to the project. These stakeholders included employees of SAP, professional SAP consultants, and experts in the field of SAP (e.g., professors, external consultants) who were interested to contribute to the project. In a next step, six project teams were formed and commissioned with the task to develop new business models for SAP's in-memory computing division. Each of the project teams consisted of five members. The teams were given six weeks to elaborate on their business models. Whenever they needed help in developing their business models, the teams could contact a member of the community in order to get professional advice. After the development time had expired, the results were forwarded to an expert jury responsible for evaluating the

developed business models. This jury consisted of three experts within the field of in-memory computing, who had at least five years of working experience within this field (average of 6.3 years). The developed business models were evaluated using Amabile's Consensual Assessment Technique (CAT) (Amabile, 1996), which has been extensively used for evaluating creative output. As the business models which have been developed by the project teams also constitute one form of creative output, we decided to use this procedure for the research project at hand. All judges were assigned to rate the ideas with eight different items on a rating scale ranging from 1 (lowest) to 5 (highest). Each jury member evaluated the ideas independent of the others.

4.2.2 Data Analysis

In order to determine the reliability of the gathered data, we checked the inter-rater reliability for our case by calculating Intra-Class-Correlation (ICC) coefficients. In our case, all ICC coefficients were > 0.7, which constitutes a sufficient degree of interrater reliability.

After analyzing the quality of the gathered data, we moved forward and assessed the quality of the generated business models. When comparing the developed business models with business models that had been developed in previous projects, the initiator was very satisfied with the submissions quality. Of the six developed business models, two were completely new to the initiator and were considered as being 'high-quality business models.' This is even above average compared to current research on stakeholder integration, in which about 10 to 20% of stakeholder-generated content is labeled as new and valuable (Kristensson et al., 2004, Piller and Walcher, 2006, Füller et al., 2006). The other business models were described as minor improvements of current products or services. In sum, the developed business models reached quality scores between 12 and 27. The winning business model described an innovative strategy for analyzing customer sales data in order to integrate them into SAPs product development process. The winning team presented their business model in front of the jury as well as selected members of the corresponding business unit. The business model itself was forwarded to the business unit in order to realize the underlying idea.

5 Formalization of Learning – Reflections on the Project at Hand

According to Sein et al. (2011), the objective of the fourth stage of ADR is to formalize the learnings of the research project in order to provide general solution concepts for a class of field problems. Consequently, we translated the functionalities that have been developed in the course of this research project into formalized design principles for the development of future BMDTs. We thereby contribute to the existing body of knowledge by providing an empirical foundation for the design of future IT tools for developing new business models together with a company's external stakeholders (Teece, 2010, Veit et al., 2013).

In order to derive a set of general design principles for a BMDT, the research team consolidated the results of the interviews with the learnings from implementing the BMDT. In order to maximize the applicability of the design guidelines, the several guidelines are independent of a certain application. Table 7.2 provides an overview of these design principles as well as their description.

Design Principle	Description
Shared Materials	
Assisting Material	Provide practitioner guidelines considering the development of business models. Thereby multi-media content should be preferred. Ensure that the materials are cross-referenced in every relevant section of the BMDT in order to ensure their accessibility in every process step.
Project Goals	Provide the community members with a detailed description of the project goals in order to align the member's efforts when developing new business models. The documentation of the project goals should be realized by depicting these goals on a prominent place within the BMDT.
Community	
Community Integration	Implement a profile page that serves as the virtual representation of a member's identity within the community. On these profile pages, community members should be able to share personal information on themselves with the community. Besides these profile pages should include indexed fields that allow the members' to list their skills and competencies as well as their work related experiences.
Visibility	All profile information should be visible to other community members and also searchable by the platform's search engine. Thus, whenever a project team needs assistance in working on the different project steps, suitable community members can be identified.
Relationships	Integrate a functionality that provides the community members with the possibility to build up relationships with other community members, in order to ensure exchange between members.
Communication Between Members	Include a functionality to send and receive personal, one to one, asynchronous messages, which can be accessed by the receiver in a message inbox on his or her user profile. For addressing multiple members of a group, a functionality should be implemented that allows groups to communicate on a many-to-many basis. This functionality should also serve as a chronologic list of messages which can be posted and viewed by members of one group.
Business Model Development	
Documentation of Results	Implement a business model framework that allows community members to document their results.
Versioning of Results	Ensure that the users will be able to generate different versions of the business model by implementing a collaborative editor according to the wiki principle. This editor should provide a comprehensive revision history, which allows for the tracking of every change made by any group member. This way, whole development process is documented and the history of the document is preserved.
Attachments for Further Description	Provide users with the possibility to attach external data without any restrictions of its size and format.

Table 7.1: Design Principles for the Development of a BMDT
Source: Own Illustration

6 Conclusion

As stated within the introduction, the goal of this research was to deliver a first instantiation of a BMDT that would support collaborative business modeling. When developing this BMDT, we started by reviewing existing literature concerning the generation of new business models. By consolidating these publications, we were able to identify three distinct sub-steps which are necessary to design new business models. We then went forward and complemented existing literature in terms of design requirements for the BMDT by conducting a series of semi-structured interviews together with experts in the field of business model development. These requirements were then translated into tangible functionalities for the BMDT. The resulting BMDT was then piloted and evaluated in the course of one BIE cycle. Building on the results of this cycle, we were able to derive a set of design principles for a BMDT, which allows the integration of external stakeholders into a CBM initiative. The described results of our study provide contributions for research as well as for practice.

First, our research is the first that empirically found that external stakeholders are able to develop business model innovations in the same manner as innovative ideas for new product development. As we could indicate, the crowd developed business model innovations in a sufficient degree of quality. Hence, our research contributes to the body of knowledge on crowd integration into a firm's innovation activities (crowdsourcing for innovation) by first providing empirical validation that the crowd is able to develop business model innovations. Managers of business development departments might lean on our findings, which suggest that crowdsourcing the business model development might be as effective as crowdsourcing idea generation for new product development. By suggesting this, it is important to point out that the aim of this study was not to question the general importance of professionals in business model development. An 'optimal' approach in practice might more often than not lie in a combination of both extremes (professionals collaborating with the crowd in some way). However, the findings of our study constitute an important contribution to justifying the more active involvement of a crowd in developing business models.

Second, our findings are of high relevance for practice, in particular for SAP. We could empirically validate that our BMDT helps the crowd to realize collaborative business modeling via the Internet, resulting in an outcome with a sufficient degree of quality. We are the first to provide such a BMDT for realizing CBM in a virtual environment. This is an important finding for SAP, who originally sought to integrate

their external stakeholders scattered around different geographical locations around the globe into the innovation of its business models. Our BMDT enables SAP to integrate stakeholders from all over the world into CBM, thereby reducing transaction cost and improving coordination of different development activities. Hence, a BMDT that allows CBM in a virtual environment of the Internet might also be a good opportunity for other international companies, such as SAP, to realize crowd-based CBM. Sticking to the guidelines that have been developed in the course of this study, companies are now able to integrate their external stakeholders into their business model innovation processes, even in a distributed setting. Doing so could be a means to cope with the increasing pressure for firms to adapt their business logic and processes in order to stay ahead of the market and their competition, as well as to ensure their own economic survival (Teece, 2010, Chesbrough and Rosenbloom, 2002).

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