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# Managing Open Innovation Communities – Development and Test of an Open Innovation Community Scorecard

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**Abstract:** Company-based open innovation communities (OICs) on the internet in which customers can submit and collaborate on innovation ideas, are an effective means for integrating customers in open innovation processes. Managing these communities needs a flexible management instrument that can cope with the dynamics of OIC. Traditional approaches from R&D are merely applicable as most applied success measures can be determined in the long run only and are outpaced by the OIC's development speed. We present a balanced scorecard approach for managing OICs. This is grounded in traditional innovation and virtual community management approaches and evaluates OIC from an innovation process, community member, organizational learning and financial perspective. We tested the concept in a real world OIC and demonstrate its applicability. Our approach views OICs from a holistic perspective unraveling central cause and effects, enhances our understanding about OICs and helps to develop a comprehensive theory of open innovation.

**Keywords:** Innovation controlling, Innovation community, Virtual community, Open innovation, Balanced scorecard, Innovation management, Innovation performance measurement

## 1. Introduction

In the twentieth century, many leading companies generated and commercialized ideas for innovations mainly through in-house R&D laboratories. Today, companies are increasingly rethinking the ways of managing their innovation activities. Companies, regardless of whether they sell products or services, increasingly open up not only their innovation process but also their production and sales process to customers that are seen as one of the biggest resources for innovations (von Hippel 2005; Chesbrough 2006). Open innovation and crowdsourcing are thus gaining recognition in research and practice. Positive impact of customer integration on company success has been demonstrated in various open innovation related research (von Hippel 2005; Gassmann 2006). The increasing popularity of these approaches has led to the rise of innovation platforms on the Internet, which are an effective means for integrating customers into the innovation process (Ebner, Leimeister et al. 2009). Prominent examples include Dell IdeaStorm or MyStarbucksIdea. With more than 15,000 ideas each, these open innovation communities (OICs) demonstrate this approach's enormous potential for the development of new products and various other stakeholders. Nowadays, such communities play a pivotal role for customer relationship management, public relations and the recruiting of new employees.

OICs develop highly dynamic and for most companies they usually represent a process innovation itself. Managing these communities needs a flexible controlling instrument that can cope with these dynamics as traditional approaches for managing R&D are merely applicable and have reached their limits, e.g., most applied success measures can be determined in the long run only and are outpaced by the community's development speed. Moreover, many important performance indicators for OICs such as the quality of the submitted ideas can not be measured with these approaches. Besides, various approaches from the field of building and managing virtual communities (VCs) exist but lack relation to new product development. In order to utilize the entire potential of OICs, a holistic management instrument that is focused on a company's business objectives from various stakeholders such as R&D, marketing and human resources is required. However, methods that are appropriate for managing open innovation are merely available (Hilgers & Piller 2009).

This paper presents a balanced scorecard specifically designed for the management of OICs that incorporates established research on managing virtual communities (VCs) and innovation development. Based on Leimeister & Krcmar's (2006) community building & community management model we define aims for managing OICs from the viewpoint of the innovation process, community users, organizational learning and finance. For each of these dimensions, we derive indicators for success measurement. Besides this conceptual work, we empirically test our newly developed scorecard in the scope of the real world OIC SAPIens and demonstrate its applicability.

The remainder of the article is structured as follows: In chapter two we introduce and define OIC and highlight central foundations of managing virtual communities and innovation development. In section three we present our approach and pinpoint the single dimensions as well as a strategy map unraveling central interrelations among the previously defined success measures. Chapter four reports on the empirical evaluation of the scorecard within the SAPIens OIC. Chapter 5 summarizes this article's findings and deduces implications for research and practice.

## 2. Related Work

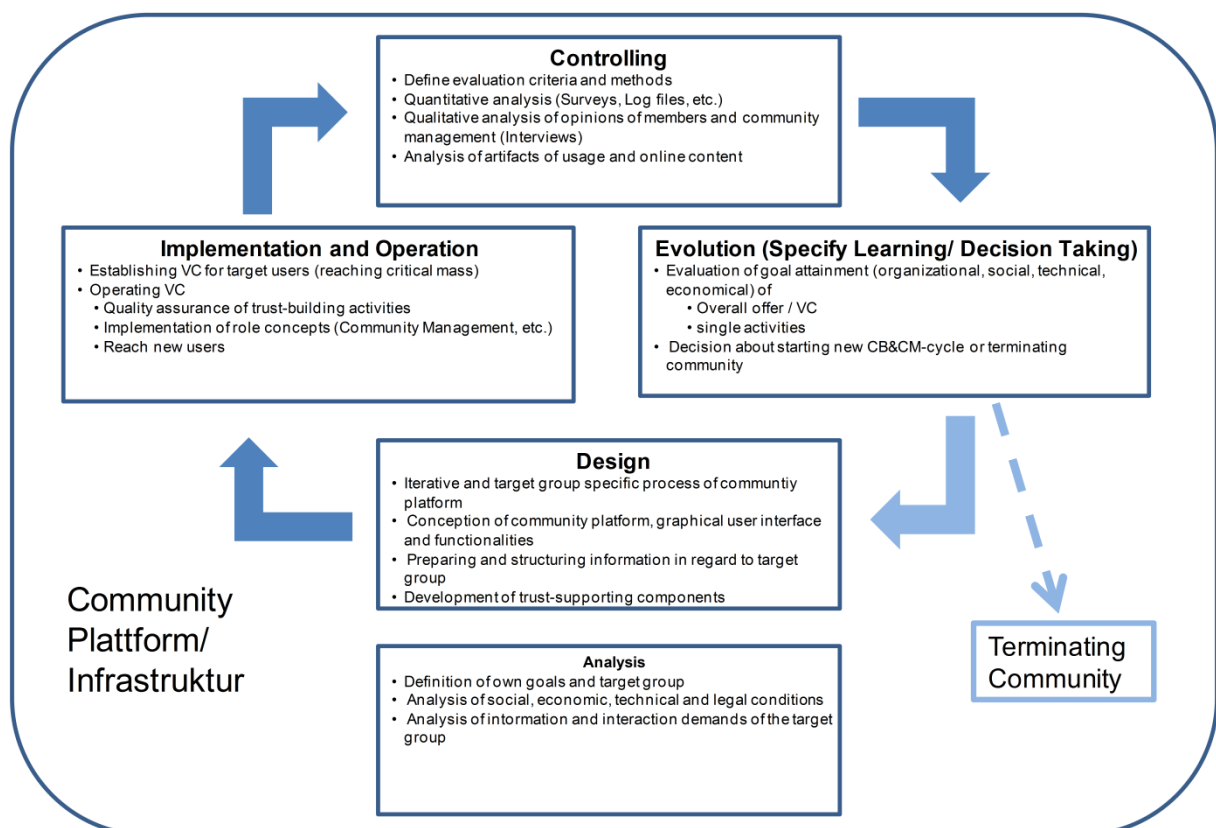
### 2.1. *Open innovation communities*

Open innovation is the renunciation of the classic innovation process that can largely be located within a company and that exclusively commercializes ideas developed by the internal R&D department (Chesbrough 2006). One of the underlying principles of the open innovation approach is the utilization of the 'wisdom of crowds.' According to this principle of collective intelligence the quality of a decision that is jointly made within a community, involving the contribution of every single member, can be superior to decisions made by single experts or individuals (Leimeister 2010). This point is exactly where OICs are rooted, that are initiated and operated by companies to integrate customers and

end-users in the early stages of the innovation process. Customers can submit innovative ideas and can collaborate, as the Internet portal enables them to comment on others' ideas, rate them and/or jointly develop innovations. The community character promotes the creativity and quality of contributions since customers from different backgrounds, with different areas of expertise, and different skills and experiences work together. Since OICs are based on the assumption that customer ideas represent their wishes and needs, companies can use them as an efficient strategy to gain need information of their customers. Depending on the configuration of an OIC, customer ideas can also contain precise information concerning the practical implementation of an innovation. Thus, apart from need information, solution information can also be acquired (von Hippel 1994). The usage of this information can be described as a sequential process. During idea generation community members submit ideas using pre-structured input forms. Using commenting, wiki and rating functionalities the ideas can be discussed, further developed and rated by other users (Riedl, Blohm et al. 2010).

## 2.2 Managing Virtual Communities

The community building & community management model (Leimeister & Krcmar 2006) illustrates how VC can systematically be built up and operated (cf. figure 1). Community controlling is a central element of this model providing the opportunity to estimate and review the success of activities for stimulating the VC and to start counteractions in case a priori specified goals are not met. In this context, community controlling comprises the definition of appropriate evaluation criteria and methods. Usually the required data is directly collected within the VC. By means of quantitative log file analysis the behavior of community members, e.g., the time users spent online can be investigated. Additionally, content analysis of user artifacts such as comments and ongoing member surveys are important instrument for identifying current problems and opportunities for improvement (Leimeister & Krcmar 2006).



**Figure 1: Community building und community management model (Leimeister & Krcmar (2006))**

Generally, the success of VCs can be measured from an operator or an user perspective. However, for operators VCs can only be successful (e.g., in terms of customer retention), if the users perceive the community offer as attractive. Thus, success factors such as the number of members, the number of comments, the mode and number of user interactions, and the quality of contributions are pivotal from the user perspective (Preece 2001). In a similar vein, the number of page views, the visit length, and the frequency of visits are important from an operator's perspective. Other important indicators for providers of successful VCs such as improvement of brand image, customer retention, and profits from additional sales or advertising revenues are often originated in the operator's marketing department (Cothrel 2000).

### 2.3. Innovation performance measurement

Innovation performance measurement is the profit-oriented focus of all processes (planning, control, evaluation) that aim at the development of new technical knowledge regarding products, processes and applications (Gerybadze, Hommel et al. 2010). In this regard, it is of general importance to distinguish between research and development. Research aims at the generation of new insights that will be integrated in the development of new products. The further one proceeds in the innovation process, the further one progresses from research to development, the better are classic management methods applicable. Development processes are regularly well-structured and results can easily be measured. In the course of research success control and success management is far more difficult. The highly variable and unstructured processes involved in research at the fuzzy front end of innovation development are hard to assess. However, in the context of performance measurement variables such as labor costs, number and quality of ideas, and experiences of staff are suggested (Janssen & Möller 2009).

## 3. Development of an open innovation community scorecard

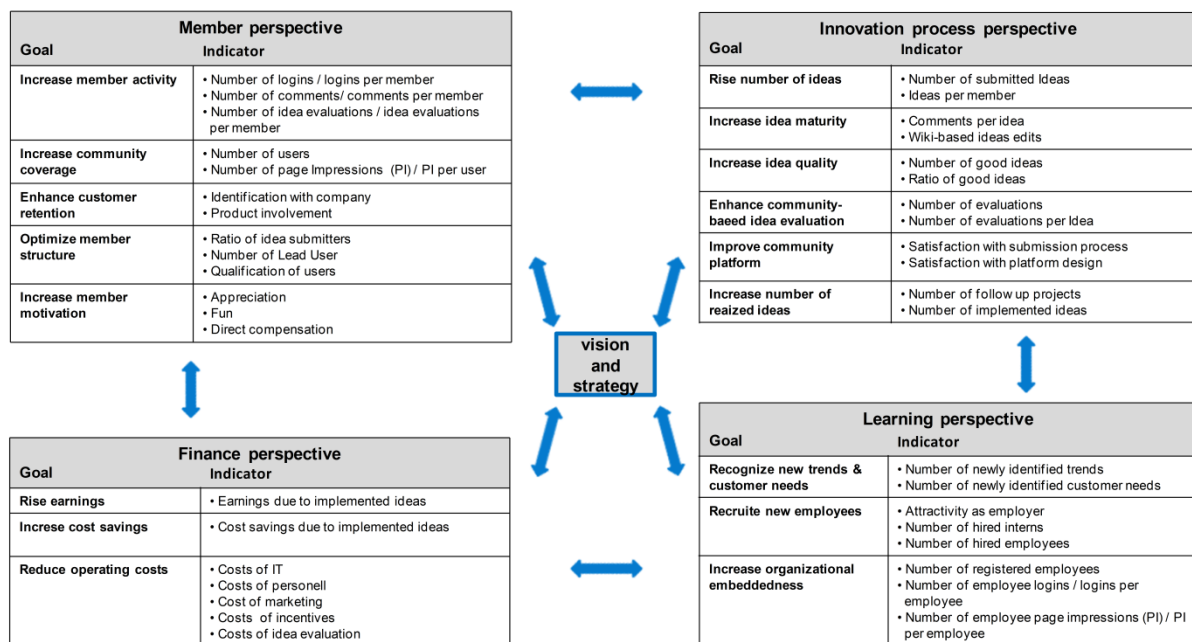
For many companies, the establishment of an OIC can be considered as an organizational innovation itself. For this reason, this process is often accompanied by uncertainty and a high level of variability. Moreover, crucial processes and routines for community management and idea implementation have still to be developed and have thus a rather unstructured character. Moreover, many performance indicators for OICs such as the quality of the submitted ideas are difficult to assess and the objectives of various stakeholders such as marketing and human resources have to be taken into account as well. Thus, existing approaches for managing VCs and innovation development fail to meet all necessary requirements (cf. table 1). While the former do not refer to innovation development, the latter can rarely be applied to OICs. In this context of OICs it is often impossible to collect data on performance measures of product innovations or open innovation projects. If at all, this information can only be generated in the long run. Moreover, because of the narrow focus of these controlling approaches on innovation development crucial performance indicators of OICs are neglected.

Domain	Virtual Community	Research & Development
<b>Main goals</b>	<ul style="list-style-type: none"> <li>• Customer retention</li> <li>• Increase sales</li> </ul>	<ul style="list-style-type: none"> <li>• Development of innovations</li> <li>• Gaining new knowledge</li> </ul>
<b>Central management instruments</b>	<ul style="list-style-type: none"> <li>• Log file analysis</li> <li>• User survey</li> </ul>	<ul style="list-style-type: none"> <li>• Performance Measurement</li> <li>• Activity based costing</li> <li>• Capital Budgeting</li> <li>• Project planning and evaluation</li> </ul>
<b>Shortcomings regarding open innovation community</b>	<ul style="list-style-type: none"> <li>• Not related to innovation development</li> <li>• Inconsistent performance indicators and variables</li> <li>• Little knowledge on interdependencies</li> <li>• Lack of systematic methods</li> </ul>	<ul style="list-style-type: none"> <li>• Performance indicators for OICs can not or can only be collected in the long run</li> <li>• Dynamic of OICs is not assessable</li> <li>• Limited possibility to assess pivotal performance indicators of OIC (e.g., idea quality)</li> </ul>

		<ul style="list-style-type: none"> <li>Lacking consideration of marketing of recruitment goals</li> </ul>
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**Table 1: Shortcoming of existing management approaches**

In this paper, an OIC scorecard is developed. A balanced scorecard (BSC) is an approach for the holistic management of companies. A BSC operationalizes a business strategy, that is usually derived from a company’s vision with the four management perspectives of finance, customers, internal business processes as well as learning and growth (Kaplan & Norton 1996). We adapted these dimensions to the context of OICs and refer to them as finance, members, innovation process and organizational learning. In the following sections, we present our OIC scorecard (cf. figure 2) and for each of the dimensions pivotal objectives and performance indicators are defined.



**Figure 2: Open innovation community scorecard**

### 3.1 The innovation process perspective

Regarding new product development, the quantity and quality of the submitted ideas is one of the prevalent performance measures of an OIC as the creative potential of an OIC is reflected by its submissions. Thus, this potential grows with an increasing quantity and quality of ideas, as more substantial need and solution information can be collected by community operators (von Hippel 1994; von Hippel 2005). Customer ideas are creative products that are usually unspecific and show a low degree of elaboration (Blohm, Bretschneider et al. 2011). Thus, methods of creativity research such as the Consensual Assessment Technique (Amabile 1996) that have been successfully used for the evaluation of customer-generated new product ideas (Blohm, Bretschneider et al. 2011) are needed for a timely quantification of an idea’s quality. As ideas are often poorly elaborated the enhancement of idea quality is a major goal from an innovation process perspective. The number of performed idea revisions within the community and its members are a crucial indicator for this, as these efforts significantly increase the quality of ideas (Blohm, Bretschneider et al. 2011).

Concerning idea quality the ratio of ‘good’ ideas –those ideas that satisfy an a priori defined quality standards – is decisive (Reinig, Briggs et al. 2007,) as only these ideas will be considered for innovation development. Poor ideas, already known suggestions, or ideas of average quality are equally valueless, as their realization will not be pursued by the operator. In case a company adopts an idea for further development, follow-up projects that assess the feasibility to implement ideas are set

up (Blohm, Köroglu et al. 2011). Thus, number and share of good ideas as well as the number of consecutive development projects are pivotal success measures. Besides the possibility to submit or revise ideas, users are able to evaluate ideas of others (Berg-Jensen, Hienerth et al. 2010; Riedl, Blohm et al. 2010). In this context, the community rating is an important indicator of the perception and acceptance of ideas among potential customers and the more customer ratings are aggregated, the higher are the possibilities for generalization to overall customer segments (Di Gangi & Wasko 2009; Riedl, Blohm et al. 2010).

OICs provide toolkits that support idea generation and submission in order to promote the creativity of its users (von Hippel & Katz 2002; Piller & Walcher 2006). An effective design of the toolkit and the entire submission process can activate and motivate community users (Leimeister, Huber et al. 2009) and defines shape and content of the submitted ideas (Di Gangi, Wasko et al. 2010; Blohm, Köroglu et al. 2011). Thus, the continuous improvement of the toolkit is a further goal that can be measured in terms of user satisfaction with idea submission process and the platform (Goodhue & Thompson 1995). Table 2 pinpoints all strategic goals and its performance indicators from the innovation process perspective.

Goal	Definition	Indicator
<b>Rise number of ideas</b>	<ul style="list-style-type: none"> <li>Increase the OIC's creative potential by continuously receiving new ideas from community members</li> </ul>	<ul style="list-style-type: none"> <li>Number of submitted ideas</li> <li>Number of ideas per member</li> </ul>
<b>Increase idea maturity</b>	<ul style="list-style-type: none"> <li>Improve idea quality through user collaboration</li> </ul>	<ul style="list-style-type: none"> <li>Number of comments per idea</li> <li>Number of wiki-based idea edits</li> </ul>
<b>Increase idea quality</b>	<ul style="list-style-type: none"> <li>Increase effectiveness of OIC through rising ratio of good ideas</li> </ul>	<ul style="list-style-type: none"> <li>Number of good ideas</li> <li>Ratio of good ideas</li> </ul>
<b>Enhance community-based idea evaluation</b>	<ul style="list-style-type: none"> <li>Assessing customer acceptance of single ideas</li> </ul>	<ul style="list-style-type: none"> <li>Number of idea evaluations</li> <li>Number of evaluations per idea</li> </ul>
<b>Improve community platform</b>	<ul style="list-style-type: none"> <li>Support user creativity with appropriate toolkit design</li> </ul>	<ul style="list-style-type: none"> <li>Satisfaction with submission process</li> <li>Satisfaction with platform design</li> </ul>
<b>Increase number of realized ideas</b>	<ul style="list-style-type: none"> <li>Improving internal idea absorption and implementation processes</li> </ul>	<ul style="list-style-type: none"> <li>Number of follow-up projects</li> <li>Number of implemented ideas</li> </ul>

**Table 2: Goals and performance measures from the innovation process perspective**

### 3.2 The member perspective

Besides the innovation process perspective the customer related view is of particular importance for the success of an OIC. Activity and coverage are decisive target variables for the management of VCs (Cothrel 2000; Preece 2001). Activity measures the number of user actions such as frequency of communication (Hilgers & Piller 2009) and coverage describes, e.g., the amount of page views or the number of page impressions. In this regard, a critical mass of users has to be gained until a self-energizing circuit develops that leads to a continuous growth of the VC (Hagel & Armstrong 1997). Indicators for measuring activity can directly be generated from the log files and comprise, e.g., the number of logins per member, the share of idea contributors (idea contributors relative to all members), or the share of ideas (ideas in relation to members). A further goal is increasing coverage, e.g., by increasing the number of community members and page impressions in order to achieve self-energizing effects (Hagel & Armstrong 1997; Hilgers & Piller 2009).

Besides, qualitative factors need also to be considered (Preece 2001). From a customer perspective, member's identification with the community operator and their involvement are of particular importance. As community members are potential clients of the community provider, the VC should increase member and customer retention (Cothrel 2000). Moreover, the member structure should be optimized so that the share of active members is growing and as many qualified users as possible are

registered (Cothrel 2000; Preece, Nonnecke et al. 2004; von Hippel 2005). OICs highly attract so called lead users – highly innovative users that have specific needs that will be relevant for the mass market in the future (von Hippel 2005). Moreover, it is particularly important that community members remain motivated in the long run, as otherwise the interest in the OIC and thus its creative potential declines. For OICs, fun, social recognition and direct compensation of effort are of central relevancy (Leimeister, Huber et al. 2009). Table 3 highlights all strategic aims of the user perspective alongside its respective measures.

Goal	Definition	Indicator
<b>Increase member activity</b>	<ul style="list-style-type: none"> <li>Stimulate innovation relevant activities within the community</li> </ul>	<ul style="list-style-type: none"> <li>Number of logins / Logins per member</li> <li>Number of comments / Number of comments per member</li> <li>Number of idea evaluations / Number of idea evaluations per member</li> </ul>
<b>Increase community coverage</b>	<ul style="list-style-type: none"> <li>Rise number of members and page impressions in order to create self-energizing cycle of growth</li> </ul>	<ul style="list-style-type: none"> <li>Number of community members</li> <li>Number of page impressions (PI) / PI per member</li> </ul>
<b>Enhance member retention</b>	<ul style="list-style-type: none"> <li>Enhance member retention and minimize churn rate</li> </ul>	<ul style="list-style-type: none"> <li>Identification with community operator</li> <li>Product involvement of members</li> </ul>
<b>Optimize member structure</b>	<ul style="list-style-type: none"> <li>Increase innovative potential through attracting more qualified members</li> </ul>	<ul style="list-style-type: none"> <li>Ratio of idea submitters</li> <li>Number of lead users</li> <li>Qualification of members</li> </ul>
<b>Increase member motivation</b>	<ul style="list-style-type: none"> <li>Satisfy motives of community members</li> </ul>	<ul style="list-style-type: none"> <li>Direct compensation</li> <li>Appreciation</li> <li>Fun</li> </ul>

**Table 3: Goals and performance measures from the member perspective**

### 3.3. The learning perspective

Since learning is a crucial source of a company's knowledge base, it is a major task of R&D (Cohen & Levinthal 1990). Taking a content analytical approach such as a netnography (Kozinets 2002) ideas and online discussions, conclusions on customer needs can be drawn, so that new trends can be identified (Füller, Bartl et al. 2006).

For effective organizational learning and enabling spillover effects from the OIC on innovation development it is pivotal to embed the OIC into the organizational context of the community provider (Blohm, Köroglu et al. 2011). As more employees of the community operator are registered within the OIC, more employees increase their knowledge on customer needs and the better is the knowledge transfer between the community and the company (Smith, Collins et al. 2005). In this context, the number of members of R&D staff that are registered with a community as well as number of their logins and page impression are indicators that are easy to collect.

Committed and qualified community members have a comprehensive understanding of the community operator's products. They carry need and solution information that is pivotal for the development of innovations (von Hippel 1994; von Hippel 2005). Moreover, they highly identify with the community operator. Therefore, recruiting new staff from the community that can be measured by the number of interns and permanent employees, as well as the general user perception of the attractiveness as employer, are further important performance measures of VCs. Table 4 shows all strategic aims derived from the learning perspective alongside its respective measures.



Goal	Definition	Indicator
<b>Recognize new trends &amp; customer needs</b>	<ul style="list-style-type: none"> <li>Recognition of new trends and customer needs through meta-analysis of online content</li> </ul>	<ul style="list-style-type: none"> <li>Number of newly identified trends</li> <li>Number of newly identified customer needs</li> </ul>
<b>Recruit new employees</b>	<ul style="list-style-type: none"> <li>Using the OIC as platform for recruiting new staff</li> </ul>	<ul style="list-style-type: none"> <li>Number of recruited interns</li> <li>Number of recruited employees</li> <li>Attractivity as employer</li> </ul>
<b>Increase organizational embeddedness</b>	<ul style="list-style-type: none"> <li>Improving exchange between community operator and community members through bigger engagement of employees</li> </ul>	<ul style="list-style-type: none"> <li>Number of registered employees</li> <li>Number of employee logins / Logins per employee</li> <li>Number of employee Page Impressions (PI) / PIs per employee</li> </ul>

**Table 4: Goals and performance measures from the customer perspective**

### 3.4. The financial perspective

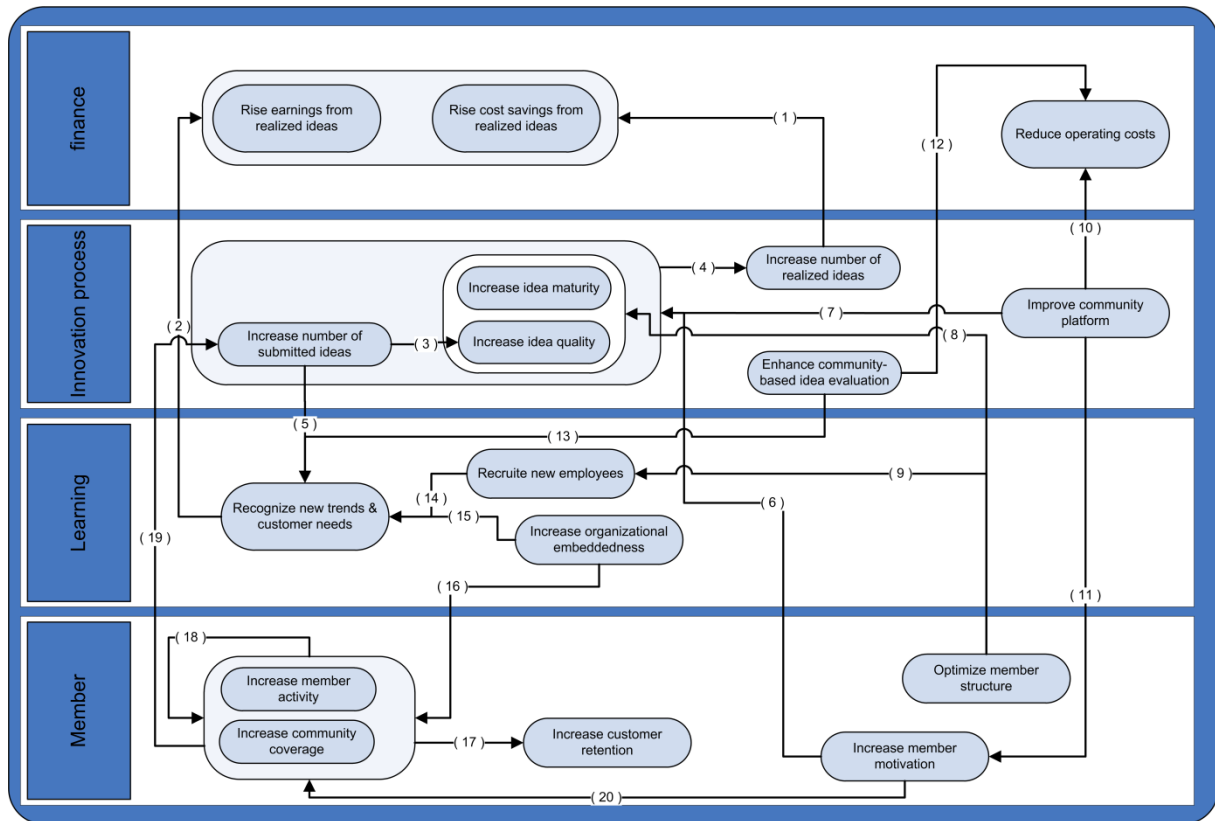
From a financial perspective, the costs and revenues resulting from an OIC have to be considered. A long term goal of OICs is to increase the earnings and cost savings due to the realization of ideas (Chesbrough 2003; Chesbrough 2007; Hilgers & Piller 2009). At the same time, operating costs of the OIC such as developing and hosting the IT platform and labor costs for the community management should be reduced to a minimum. Furthermore, there are costs for accompanying advertising efforts, rewards and incentives for community members as well as the expenditure of time needed for the assessment of ideas. Table 5 demonstrates all strategic aims derived from the financial perspective alongside its respective measures.

Goal	Definition	Indicator
<b>Rise earnings</b>	<ul style="list-style-type: none"> <li>Increase earnings from implemented ideas</li> </ul>	<ul style="list-style-type: none"> <li>Earnings from implemented ideas</li> </ul>
<b>Increase cost savings</b>	<ul style="list-style-type: none"> <li>Increase cost savings from implemented ideas</li> </ul>	<ul style="list-style-type: none"> <li>Cost savings from implemented ideas</li> </ul>
<b>Reduce operating costs</b>	<ul style="list-style-type: none"> <li>Save not necessary costs for operating OIC</li> </ul>	<ul style="list-style-type: none"> <li>Costs of IT</li> <li>Costs of personnel</li> <li>Costs of marketing</li> <li>Costs of incentives</li> <li>Costs of idea evaluation</li> </ul>

**Table 5: Goals and performance measures from the financial perspective**

### 3.5. Cause and effect linkages between performance parameters

Strategy maps are a useful means to demonstrate the relationships of cause and effect between the single perspectives of a BSC and its performance measures. Thus, mutual dependencies and potential conflicts of varying sub-goals are highlighted. From these insights effective measures of goal achievement and strategy realization can be derived (Kaplan & Norton 2004). The strategy map of the developed OIC scorecard is demonstrated in figure 5 and explained in table 6.



**Figure 1: Exemplary Strategy Map for SAPIens OIC**

Relation	Description
(1)	With an increasing number of realized ideas, additional profits and cost savings can be realized (Chesbrough 2003; Chesbrough 2007; Hilgers & Piller 2009).
(2)	Based on the identification of new trends and customer needs, the existing customer base can be served better and those departments with frequent customer contact will be able to realize additional profits (Kozinets 2002; Füller, Bartl et al. 2006).
(3)	A growing number of submitted ideas increases the probability of gaining ideas that are worth implementing (Reinig & Briggs 2008).
(4)	The higher the degree of an idea's elaboration, the higher its likelihood of realization (Blohm, Bretschneider et al. 2010).
(5)	An increasing number of ideas gives rise to a larger pool of ideas, from which trends and needs can be derived by means of netnography (Kozinets 2002; Füller, Bartl et al. 2006).
(6)	Increased member motivation increases quality and elaboration of ideas (Bretschneider 2011).
(7)	Enhanced toolkits support the process of generating ideas so that the quantity and quality of ideas can be improved (von Hippel & Katz 2002; Piller & Walcher 2006).
(8)	Optimizing the member structure entails an enlarged share of lead users and higher qualified members and thus results in the production of a higher share of good ideas and a growing degree of elaboration (von Hippel 2005; Yang, Chen et al. 2009).
(9)	By optimizing the member structure the community transforms into an attractive pool of potentially prospective employees (Hagel & Armstrong 1997; Kim 2000).
(10)	Advancement of the community platform reduces unnecessary costs of operation (e.g., easing the job of community management) (Preece 2000; Di Gangi, Wasko et al. 2010).
(11)	An effectively designed toolkit activates the motives of the users so that a higher degree of motive attainment can be realized (Leimeister, Huber et al. 2009).
(12)	Advancing the quality of idea evaluations of members ease the pre-selection of ideas and thus reduce costs of idea evaluation and selection (Leimeister, Huber et al. 2009).
(13)	Idea evaluations of members help to reveal new trends and customer needs (Di Gangi & Wasko 2009; Riedl, Blohm et al. 2010).
(14)	In case particularly appropriate staff is recruited (e.g., lead users), a company employs competent

	personnel who can reveal trends and customer needs at an early stage (Cothrel 2000; Kim 2000).
(15)	The more staff of the community operator actively takes part in the community, the better is the understanding of ideas, trends and user needs as increased exposure enhances the community operator's absorptive capacity (Cohen & Levinthal 1990; Blohm, Köroglu et al. 2011).
(16)	Direct feedback of representatives of the company is an important incentive for community members and directly affects their activity (Di Gangi, Wasko et al. 2010; Adamczyk, Haller et al. 2011).
(17)	The stronger a member feels connected to the community operator, the more he or she will contribute to it (Kim 2000; Preece & Shneiderman 2009).
(18)	An increase in user activity up to a certain level causes a self-energizing cycle that in turn causes the continuous growth of a community (Hagel & Armstrong 1997).
(19)	A more active and bigger community entails a larger number of submitted ideas (Yang, Chen et al. 2009).
(20)	Every member has certain motives to contribute to a community. The better those motives will be satisfied, the higher is his or her activity (Preece 2000; Preece 2001).

**Table 6: Relations of the strategy map**

#### 4. Test of the open innovation community scorecard

The developed OIC scorecard was empirically tested in the scope of the SAPIens OIC provided by the software-producer SAP. The aim of this OIC is to provide SAP users with the opportunity to develop new ideas concerning SAP and submit these ideas on an IT-supported platform. The OIC is a further development of an idea competition and was set up in 2007. The following analysis is based on data from the year 2008.

Data presented in this paper, was collected from community log files, from a qualitative interview with the community manager and from a small survey of community members (n = 33). The items of the user survey were ranked on a scale reaching from 1 (very low) to 5 (very high). Table 7 demonstrates the collected performance parameters of the SAPIens OIC.

During the period of investigation 57 ideas were submitted. Amongst these ideas, 7 (ca. 12%) were of high quality according to the assessment of the expert jury. From these ideas one follow-up project was set up, the idea was developed further in-house, but was not realized in the end. Each idea was rated 7 times on average by other community members. The typical user assessment of the idea quality was relatively low with an average of 1.74 (1 = very low; 5 = very high).

Altogether all 145 members logged in 1428 times with an average of 10 logins per member. Hence, 20,889 page impressions were gained collectively (approximately 144 page impressions per member). Approximately 27% of all members submitted at least one idea. The idea share was 39%. Amongst the members there were two particular active participants who submitted about 35% of all ideas. On average, Identified with SAP was decent (average  $\mu = 3.53$ ) and user involvement high ( $\mu = 3.93$ ). In order to reveal users' motivation to participate the variables reward ( $\mu = 3.81$ ), recognition ( $\mu = 3.31$ ) and fun ( $\mu = 4.22$ ) were assessed by community users by means of the questionnaire. Hence, in particular fun was highly rated. Moreover, satisfaction with the submission process ( $\mu = 4.07$ ) and the platform design ( $\mu = 3.46$ ) were evaluated as high.

Based on an follow-up analysis of the submissions and the customer discussion 3 trends were identified. 13 members of staff of SAP signed up for the community. In total, staff members logged on 75 times and gained 129 page impressions. The attractiveness of the community provider as employer was rated with a mean of 3.64 and can be considered as high. One user was recruited as an intern and subsequently became a full-time employee of SAP.

Concerning development and operation of the SAPIens community, the community management is responsible for a majority of the costs, as on an average approximately two man-days per week were required. The expert evaluation of the submitted ideas accounted for about 7.5 additional man-days. In total 10,800 Euro were spent on rewards utilized to activate or motivate community members. Apart from the labor costs of the community manager no additional marketing expenditures were made. The

SAPiS OIC was set up in the course of a research project. Thus, information on expenditures on the development of the IT platform have to be treated confidentially. As none of the submitted ideas was realized, no direct earnings or cost savings that resulted from the submitted ideas were realized.

Perspective	Goal	Indicator	SAPiS
<b>Innovation process</b>	Rise number of ideas	<ul style="list-style-type: none"> <li>Number of submitted ideas</li> <li>Number of ideas per member</li> </ul>	<ul style="list-style-type: none"> <li>57</li> <li>0.39</li> </ul>
	Increase idea maturity	<ul style="list-style-type: none"> <li>Number of Comments per idea</li> <li>Number of wiki-based idea edits</li> </ul>	<ul style="list-style-type: none"> <li>0.46</li> <li>0.75</li> </ul>
	Increase idea quality	<ul style="list-style-type: none"> <li>Number of good ideas</li> <li>Ratio of good ideas</li> </ul>	<ul style="list-style-type: none"> <li>7</li> <li>0.12</li> </ul>
	Enhance community-based idea evaluation	<ul style="list-style-type: none"> <li>Number of idea evaluations</li> <li>Number of evaluations per idea</li> </ul>	<ul style="list-style-type: none"> <li>1.74</li> <li>7</li> </ul>
	Improve community platform	<ul style="list-style-type: none"> <li>Satisfaction with submission process</li> <li>Satisfaction with platform design</li> </ul>	<ul style="list-style-type: none"> <li>4.07*</li> <li>3.46*</li> </ul>
	Increase number of realized ideas	<ul style="list-style-type: none"> <li>Number of follow-up projects</li> <li>Number of implemented ideas</li> </ul>	<ul style="list-style-type: none"> <li>57</li> <li>0.39</li> </ul>
<b>Member</b>	Increase member activity	<ul style="list-style-type: none"> <li>Number of logins / Logins per member</li> <li>Number of comments / Number of comments per member</li> <li>Number of idea evaluations / Number of idea evaluations per member</li> </ul>	<ul style="list-style-type: none"> <li>1428 / 9.85</li> <li>26 / 0.18</li> <li>142 / 0.39</li> </ul>
	Increase community coverage	<ul style="list-style-type: none"> <li>Number of community members</li> <li>Number of page impressions (PI) / PI per member</li> </ul>	<ul style="list-style-type: none"> <li>145</li> <li>20889 / 44</li> </ul>
	Enhance member retention	<ul style="list-style-type: none"> <li>Identification with community operator</li> <li>Product involvement of members</li> </ul>	<ul style="list-style-type: none"> <li>3.53*</li> <li>3.93*</li> </ul>
	Optimize member structure	<ul style="list-style-type: none"> <li>Ratio of idea submitters</li> <li>Number of lead users</li> <li>Qualification of members</li> </ul>	<ul style="list-style-type: none"> <li>0.27</li> <li>2</li> <li>3.35*</li> </ul>
	Increase member motivation	<ul style="list-style-type: none"> <li>Direct compensation</li> <li>Appreciation</li> <li>Fun</li> </ul>	<ul style="list-style-type: none"> <li>3.81*</li> <li>3.31*</li> <li>4.22*</li> </ul>
<b>Learning</b>	Recognize new trends & customer needs	<ul style="list-style-type: none"> <li>Number of newly identified trends</li> <li>Number of newly identified customer needs</li> </ul>	<ul style="list-style-type: none"> <li>3</li> <li>0</li> </ul>
	Recruit new employees	<ul style="list-style-type: none"> <li>Number of recruited interns</li> <li>Number of recruited employees</li> <li>Attractivity as employer</li> </ul>	<ul style="list-style-type: none"> <li>3.64*</li> <li>1</li> <li>1</li> </ul>
	Increase organizational embeddedness	<ul style="list-style-type: none"> <li>Number of registered employees</li> <li>Number of employee logins / Logins per employee</li> <li>Number of employee Page Impressions (PI) / PIs per employee</li> </ul>	<ul style="list-style-type: none"> <li>13</li> <li>75 / 5.7</li> <li>129 / 9.9</li> </ul>
<b>Finance</b>	Rise earnings	<ul style="list-style-type: none"> <li>Earnings from implemented ideas</li> </ul>	<ul style="list-style-type: none"> <li>0€</li> </ul>
	Increase cost savings	<ul style="list-style-type: none"> <li>Cost savings from implemented ideas</li> </ul>	<ul style="list-style-type: none"> <li>0€</li> </ul>
	Reduce operating costs	<ul style="list-style-type: none"> <li>Costs of IT</li> <li>Costs of personnel</li> <li>Costs of marketing</li> <li>Costs of incentives</li> <li>Costs of idea evaluation</li> </ul>	<ul style="list-style-type: none"> <li>-</li> <li>104 PT</li> <li>0€</li> <li>10.800€</li> <li>7.5 PT</li> </ul>

\* Min = 1; Max = 5

**Table 7: Application of open innovation scorecard at the SAPiS Community**

Though there were no direct profits originating from the SAPIens Community, our approach could clearly demonstrate the OIC's various contributions to innovation development as well other business functions such as marketing reflecting SAP's high satisfaction with the community. Moreover, based on the application of the scorecard, the community could be developed further and precise figures for the future management be obtained. Based on this analysis, additional functionalities, which support collaboration amongst users were developed in order to increase idea quality.

## 5. Conclusion and Implications

This contribution presented a newly developed OIC scorecard and demonstrated its applicability using a real world example. This application revealed that this approach allows for the effective management of OICs that can easily be accomplished, without limiting the space for creativity that is essential for successfully using OICs. Although this study is of explorative nature the generalizability of our results are limited by the nature of the ideas developed in OICs. In this regard, submitted ideas will be highly influenced by the characteristics of the product an idea strives to improve. Depending on whether users describe their ideas in written form or submit graphical illustrations of their concepts, the characteristics of performance measures will vary as well. Thus, our approach will serve for the comparison of different OICs only, if the submitted ideas of these OICs are of similar type. Moreover, the SAPIens community was built up in the scope of a research project, thus a purely commercial OIC may lead to other results as strategic goals with the OIC may differ.

This paper has two important theoretical contributions. Firstly, the concept of balanced scorecards is applied in a new context. Our developed OIC scorecard helps to evaluate the effectiveness of OICs and most of our success measures will be applicable for other open innovation approaches such as idea competitions as well. Secondly, our approach views OICs from a holistic perspective unraveling central cause and effects among different success criteria. This enhances our understanding about innovation communities and helps to develop a comprehensive theory of open innovation – a research stream that mainly derived from the observation of practice. However, the interrelations between success measures stem from exploratory research and needs further validation. For future research, several issues need to be explored. Little is known, on the effectiveness of OICs as a marketing or recruiting instrument as well as on embedding OIC into other organizational processes. Moreover, the case of SAPIens demonstrates that cost-based measures can easily be collected. However, the ascertainment of profits gained from the realization of individual ideas is hardly practicable and can only be carried out at enormous expenses. In practice, customer ideas will rarely be realized unmodified. Ideas are usually developed picked up from the OIC enhanced within the R&D department of the operator, combined with other ideas, or serve as stimulus for the development of new products in a different product-line. During realization, both internally and externally generated ideas go through a transformation process. For this reason, the final product often shows little similarity with the originally submitted idea. Thus, methods have to be developed that enable the quantifiable assessment of both, the costs, and the value obtained from OICs. Additionally a benchmarking instrument is required that allows for comparison of various OICs.

For practice, our paper offers a theoretically grounded and empirically tested instrument for managing OICs. It helps to visualize the value innovation communities endow and provides practical advice for capturing this value. The continuous application of this instrument unravels the dynamic development of OICs, helps to assess the impact of activities performed for measuring the community provides guidance for systematically evaluating the engagement in OICs. Additionally, the presented OIC scorecard is useful to justify an OICs various contribution to the different stakeholders involved such as R&D, marketing, and human resources.

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