

A MEMBERS' PERSPECTIVE ON THE SUCCESS OF COMMUNITIES OF PRACTICE – PRELIMINARY EMPIRICAL RESULTS

Katja Zboralski^a
Hans Georg Gemuenden^b
Christopher Lettl^c

^{a,b,c}Institute of Technology and Management,
Technical University of Berlin, Germany

^a katja.zboralski@tim.tu-berlin.de

^b hans.gemuenden@tim.tu-berlin.de

^c christopher.lettl@tim.tu-berlin.de

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Abstract

Communities of Practice (CoPs) are a concept which became widely recognized over the last decade when organizations realized the importance of knowledge sharing and learning for organizational performance. However, their day-to-day activities, their impact and the driver of their success have not been fully researched yet, especially empirical results are still missing. Investigating 59 communities of practice of a German multinational company, the authors' research shows that CoPs can be important for the success of a company in today's knowledge-based economy. Based on a developed conceptual model, the paper addresses the challenge of measuring the value of communities by looking at the value a community provides for both, its members and for the company. It presents results on the relationship of member motivation, organizational context, community identity, community activities and the community success.

Keywords: Communities of Practice, Knowledge Management, Learning Organizations, Performance Measurement, Intra-organizational Networks.

A members' perspective on the success of Communities of Practice – Preliminary empirical results

Katja Zboralski ^a,
Hans Georg Gemuenden ^a,
Christopher Lettl ^a

^a Institute of Technology and Management
Technical University of Berlin, Germany
katja.zboralski@tim.tu-berlin.de
hans.gemuenden@tim.tu-berlin.de
christopher.lettl@tim.tu-berlin.de

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1 Introduction

Today, most companies are facing radical changes: From an industrial economy to a knowledge economy, from business focused on products to service business with shorter life cycles, high complexity, and strong competition on technology-oriented global markets. As a result, most companies are hardly able to develop the diverse knowledge by themselves that is required for new products and services. There is a strong need to acquire and modify knowledge generated by others. Hence, the ability to acquire, develop, and strategically leverage knowledge has become a crucial factor

for global competitiveness (Drucker, 1993; Kogut and Zander, 1992; Nonaka and Takeuchi, 1995; Zack, 1999). Following this demand new information and communication technologies have created the means for transferring knowledge from one part of the organization to another or even across organizational boundaries (Picot et al., 2001).

More and more organizations view knowledge management as a substantial strategic success factor. A growing number of multinational companies, especially from knowledge-intensive industries, have introduced knowledge management systems into their organizations to use the resource knowledge more effectively and efficiently (Davenport and Prusak, 1998; Maier, 2002). A central concept in this context are *Communities of Practice*. Described as knowledge networks CoPs recently gained great attention from practitioners and scholars alike (Pan and Leidner, 2003; Saint-Onge and Wallace, 2003; Wenger and Snyder, 2000). They are increasingly seen as an instrument to foster and enhance knowledge sharing and learning in organizations, processes crucial to company success (Brown and Duguid, 1991; Leonard-Barton, 1995; Probst and Büchel, 1998).

Even though the number of communities of practice have grown significantly over the last years, little is known about the specific benefits of these knowledge networks and the antecedents for community success. The main reason can be seen in the difficult measurement of community performance (Schoen, 2001; Smith and McKeen, 2003). Above all, these difficulties arise due to problems with the internal validity of the measurement: Some effects can not be assigned exclusively to the activities of the community, e.g. the generation of new ideas. As a consequence, the following research questions are addressed in this study: (1) How can CoP success be measured? (2) Which CoP characteristics are critical for CoP success? To answer these questions, a generic core model of the critical success factors of a community of practice is developed. The model was tested in a quantitative study surveying 59 communities respectively 222 community members of a German multinational company.

The authors intend to contribute to the literature on communities of practice in three ways: First, literature from other research streams, particularly team research, is reviewed and existing measures are adapted to the specifics of CoPs. Second, detailed measures for CoP research are developed and discussed in order to provide scales

which can be used in further research. This is an important gap in knowledge management and specifically in the CoP research. Third, existing research on CoPs which has been mainly of qualitative nature is extended by a large scale quantitative study.

This paper focuses on community members as the level of analysis. The individual and organizational impact of communities will be analyzed from the members' perspective. The paper is organized as follows: First, a conceptual model of a community of practice is developed. Second, the research design and the methodology applied are introduced. Third, the findings of the study are presented. This is followed by a discussion of the results. Finally, the authors derive implications for future research as well as recommendations for corporate practice.

2 Research Framework

2.1 Conceptual Model

Before a conceptual model can be developed, the term 'Community of Practice' needs to be defined. Reviewing definitions of CoPs, several key objectives can be distinguished: working together, exchanging information, knowledge and experiences, and thereby, learning and developing new knowledge and 'common practices' (APQC, 2000; Lave and Wenger, 1991; Lesser and Storck, 2001; Wenger, 1998a).

In this paper, the authors define CoP as follows: *A community of practice is a group of people, who interact with each other across organizational units or even outside the organization due to a common interest or field of application. Their objective is to learn and support one another in order to develop, spread, retain, and use knowledge relevant to the organization.*

Although communities are not similar to teams as their membership is voluntarily, they are semi-formal entities within the organization and their objective is not based on specific projects (Lesser and Prusak, 1999; Smith and McKeen, 2003; Wenger, 1998a), research on team and work group performance can be applied as a basis to develop a research framework for communities. In accordance to Guzzo and Shea (1992), a conventional perspective on group performance reflects an input-process-output model. These three components are included in the conceptual model. Thereby both community input and process variables are considered as CoP characteristics, community output is considered as CoP performance. In addition the authors consider contextual variables. Figure 1 summarizes the overall conceptual framework.

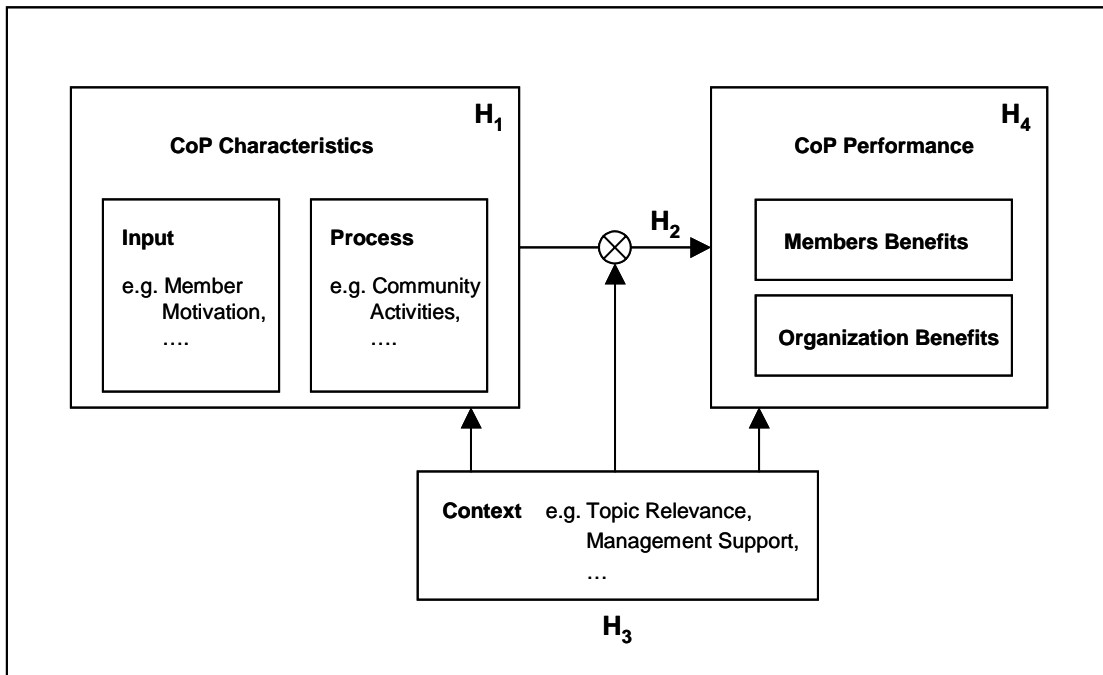


Fig. 1. A conceptual model of a community of practice

The conceptual model is structured along *four central hypotheses*. H_1 and H_4 suggest community characteristics and community performance to be multi-dimensional constructs. H_2 relates community characteristics to community performance. H_3 proposes that there are specific contextual variables that have to be considered. The authors suppose a direct influence of the contextual variables on both community characteristics and community performance and, additionally, a moderating impact of these variables on the relationship of community characteristics and community performance.

2.2 Community Characteristics

In order to identify characteristics of community performance existing literature on team and knowledge management research was reviewed. As teams have been of high interest to researchers in the last years, several critical success factors of teams were identified (Cohen and Bailey, 1997; Denison et al., 1996; Gemünden and Högl, 2001; Guzzo and Dickson, 1996). In a generic sense, these factors can be assigned to two groups: input and process variables. Analog CoP characteristics are subdivided.

First, two major *input* factors have to be taken into account when focusing on the member's level: motivation and previous knowledge. The activities within the

community depend to a large extent on the individual *member motivation* to participate in the community. This motivation can stem from various sources. For example the expected benefit of acquiring new knowledge can be one motivational factor (Ardichvili et al., 2003; Osterloh and Frey, 2000). Members who have little knowledge in an area essential for their daily work will tightly focus on learning. Thus, the authors propose that the *member previous knowledge* plays a substantial role for the individual member activity level.

Second, a key feature of communities are the *processes* taking place within it. These processes can be characterized by different activities, the communication intensity, the member activity level, the community identity, and the communication quality. *Community activities* can be subdivided into five activities according to the components of knowledge management by Probst et al. (1999): knowledge development, knowledge distribution, knowledge application, knowledge preservation, and knowledge evaluation. While the first four activities represent core processes of each community, the latter is a rather additive activity and does not take place in every community. All these processes are based on communication, which is supposed to be an elementary antecedent for community performance. Several modes of communication can be distinguished: synchronous or asynchronous, virtual or face-to-face. In accordance to this a range of communication instruments exists within a community. As stated by several authors (DeScantis et al., 2000; Högl, 1998; Leenders et al., 2003; McDonough et al., 1999; Pinto and Pinto, 1990) the *communication intensity* which is associated with the use of these different instruments has an influence on group outcomes. Hoegl and Gemuenden (2001) identify the *communication quality* as a critical antecedent for team success. This factor characterizes to which degree the information exchange is open and accurate. Furthermore, looking at the individual community member, the authors also consider how actively the member participates in the community. Consequently, the *member activity level* is included into the framework. The importance of trust, mutual support, identification with the group, the internal collaboration, etc. is emphasized by several authors (Costa et al., 2001; Hoegl and Gemuenden, 2001; Scott, 1997). Therefore, *community identity* that reflects mutual trust between the members, their identification with the community as well as group cohesion is considered as an important factor influencing community success.

As becomes apparent from this analysis it is argued that community characteristics are a multi-dimensional construct (H₁). Based on the team literature the authors propose that all community characteristics have a positive impact on CoP performance (H₂).

2.3 Context

Former research has pointed out that the *organizational context* is crucial for work group success (Denison et al., 1996; Gladstein, 1984; Govindarajan and Gupta, 2001; Högl, 1998). In the context of CoPs, the authors argue that five context variables are of major importance: management support, knowledge culture, topic relevance, knowledge supply, and knowledge type. *Management support* is an important contextual element as the community work depends on resources provided by the management. The existing *knowledge culture* which influences members' general attitude towards knowledge sharing is a factor that enables and motivates members "to reach beyond the knowledge they carry in their heads as they go about solving technical problems" (Mohrman et al., 2003: 10). In any organization there are knowledge areas and technology fields defined that are of strategic importance for the organization's future. Dependent on the evaluation of the community's *topic relevance* for the company and the daily work, members will be motivated to participate in the community. Apart from that, the topic relevance influences the perceived impact of the community activities on company benefits. Additionally, *knowledge supply* is seen as a critical contextual factor. When the existing knowledge that was available before the community was founded and/or before the member attended the community was up-to-date, easy to access and reliable, people might not see a necessity to join the community. Finally, the *knowledge* type, explicit versus tacit, is considered due to two reasons: First, the type of knowledge transferred influences the communication intensity and the instrument used as the transfer of implicit knowledge requires intense interactions on a face-to-face basis (Leonard and Sensiper, 1998). Second, tacit knowledge is considered as a key prerequisite for long-term competitiveness as this type of knowledge can hardly be imitated (Howells, 1996; von Krogh et al., 2000).

On the basis of the reviewed literature it is proposed that these five variables have effects on community characteristics and community performance as well as a moderating impact on the relationship of community characteristics and community performance (H₃).

2.4 Community Performance

Based on the objective of CoPs, there are two relevant dimensions of community performance: the *individual* and the overall *organizational level*. On the one hand, communities are designed to help individual members of the organization to perform better in their assigned tasks. On the other hand, CoPs are semi-formal organizational tools spanning across intra-organizational formal units (Snyder and Wenger, 2001). Consequently, performance of community activities must be measured on these two levels. In the following, the specific benefits on the two different levels are considered.

Community members profit directly from their activities within the community. Although their performance assessment varies and depends on personal goals and individual motivation, the following general outputs can be distinguished: Due to the community the networking of its members is increased supporting access to new sources of knowledge and the development of social capital (Lesser and Storck, 2001; Nahapiet and Goshal, 1998). By communicating frequently the community members develop a common knowledge base (Schoen, 2001). Existing knowledge is re-used and modified, and by that transformed into new knowledge (Lesser and Prusak, 1999; Nonaka, 1994; Wenger, 1998b). Therefore, members gain new competences which in turn lead to increased performance, higher reputation within the organization, professional development as well as a higher work satisfaction.

All community activities and their effects on members contribute to the performance of the *organization*. Current literature emphasizes the importance of CoPs as a forum for shared learning (Brown and Duguid, 1991; Lesser and Storck, 2001; Swan et al., 2002) and a way to increasing the organizational learning capabilities (Brown and Duguid, 2001; Hedberg and Holmquist, 2001). One important reason for this is that CoPs enable the externalization of knowledge. Particularly, close and intense interactions foster the transfer of “hitherto”-tacit knowledge which has been identified as a central mode of knowledge creation (Nonaka, 1994). Due to organizational learning a common knowledge base is created, new competences are developed and existing know-how is improved (Tsai and Goshal, 1998). In addition, the organization learns about its own competences (Probst and Büchel, 1998). Moreover, communities raise the creative capacity of the organization as the generation of new ideas is supported (Cohen and Levinthal, 1990). The reason for this effect is that the community exhibits a climate which stimulates creativity. An open communication, the exchange of interdisciplinary knowledge and development of mutual trust promote individual learning. By a familiar

atmosphere members are encouraged to articulate new ideas, share knowledge and ‘think out of the box’ (Millen et al., 2002). Resource savings result not only from better solutions of problems and easier access to knowledge, but also from a shorter training period for new employees as well as the avoidance of double work. A decreased learning curve is based, above all, on shared experiences of the individuals and the entire team. Optimized processes and the developed knowledge base will lead to higher customer satisfaction, as customer needs can be addressed in a more flexible manner. Last but not least, CoPs change the existing culture of the organization in a favorable way. On the one hand, change of culture is due to the development of collective sense-making and the emergence of networks among members. On the other hand, peoples’ attitudes towards the issue of knowledge transfer change as knowledge sharing is actively approved and rewarded. As illustrated in Figure 2, all specific outcomes on the two levels affect the business performance of the company.

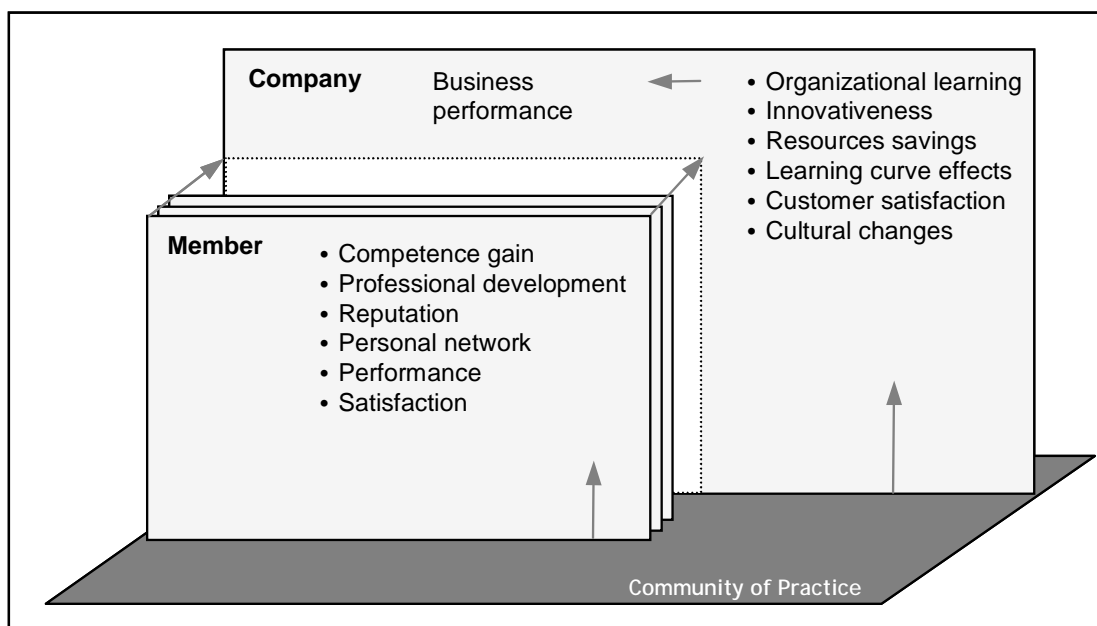


Fig. 2. Potential benefits of communities of practice

Thus, the authors suggest CoP performance to be a two-dimensional construct related (a) to individual success and (b) to company success (H_4). Consequently, the term ‘community success’ which is used in the remainder of the paper reflects these two dimensions.

Notwithstanding the argument that CoPs can have the outlined effects evaluating community outcomes in terms of financial ratios is rather problematic (Schoen, 2001).

First, effects can not always be directly linked to community activities, but could also result from other situative factors. Second, some effects may only become apparent after a certain time lag. Third, most of the community benefits are intangible assets, often related to as human or intellectual capital. As several authors have pointed out, the measurement methodology of these dimensions is still only a partly resolved problem (Adler and Kwon, 2002; Ambrosini and Bowman, 2001; Bontis, 2001).

To capture the value that communities deliver one also has to consider the costs of setting up and supporting a community. These costs consist of more than the investments for technology. Generally, four categories can be differentiated (Millen et al., 2002): (1) Costs of participation in the community (opportunity costs, salaries, incentives), (2) Costs directly related to meetings, (3) Costs of technical infrastructure plus (4) Costs of content publishing, promotional materials, etc. The first category is the most important cost factor, whereas the technology investments constitute a relatively small part of total costs as basic communication instruments, like E-Mail, telephone, etc. are generally available within the organization.

3 Research Design

3.1 Sample and data collection procedures

To test the proposed conceptual model the authors conducted an empirical study in a major German multinational company. This company is regarded as playing a pioneer role in knowledge management. The components of the model were validated in several qualitative interviews with experts. On that basis, a questionnaire was developed both in English and German and successfully pre-tested with fifteen community members of a single community. Besides the member questionnaire, a second questionnaire for the CoP brokers, who can be regarded as the leaders of a community, was developed dealing with general community characteristics. Thereafter, more than 200 community brokers of the company were contacted and asked to participate in the survey. 59 brokers agreed to participate. 50 brokers were interviewed, while nine brokers filled out the broker questionnaire. The main data collection took place between July 2003 and November 2003. Finally, 222 member questionnaires were returned, whereby these members belong to 36 communities. The response rate can not be determined as some of the brokers sent the questionnaire to all community members, whereas others sent it only to the most active community members. Therefore, the authors do not know exactly to how many members the questionnaire was sent to.

The respondents have been community members for an average of 22,5 months and spent on average 1 to 2 hours per week on their community activities. Average tenure of the respondents with the company is 11,5 years. The average age of the community is 15,2 months, with a mean of 73 members. Generally, in a community 28% of the members belong to middle management, 34% to junior management, 34% to office staff, with the reminding 4% being top managers.

3.2 Measures

As discussed before, some input, process and output factors were determined in accordance to former research. Besides adapting items of relevant research streams, own measures were developed by taking into account the specifics of communities. In the following section significant emphasis is placed on the measurement of community success. Therefore applied items for community success are specified, whereas input and process measures are not discussed in detail. If not mentioned differently, the members were asked to rate how strongly they agree or disagree with the statements on a 7-point Likert scale from 1 ("not true at all") to 7 ("completely true").

Measures for Community Characteristics

Member motivation is measured using ten items. Members were asked to rate their agreement with statements covering several motives to join and participate in the community, e.g. to learn, to pass on own knowledge, to meet experts, etc.

Member previous knowledge is a single-item variable measuring whether the members had knowledge about the topic when joining the community or not. The item was reverse-coded.

Community activities are measured by formative indicators, whereby two to seven items were developed for the five different community activities (knowledge development, knowledge distribution, knowledge application, knowledge preservation and knowledge evaluation).

Member activity level, also measured by formative indicators, reflects how often members carry out ten different activities. Members were asked to rate on a 7-point Likert scale the frequency of conducting the activities (from 1 as "never" to 7 "several times a week").

Communication intensity is operationalized as follows. Members were asked to rate to what degree they use 13 different instruments, ranging from face-to-face meetings over e-mails to yellow pages (from 1 as "never" to 7 "several times a week"). Formative indicators measure this variable, too.

Community identity explores on a 13-item scale the members' attitude to their community. It measures to what degree the members identify themselves with the community, they trust the members, they support each other, etc.

Communication quality measures the members' perception of the information accuracy, whether the information within the community is exchanged in an open and intensive way. Five items are used.

Measures for Context Variables

Topic relevance is the first of five contextual variables. It is asked how the members assess the relevance of the community topic with regard to future relevance, relevance for operational business, relevance for other colleagues, etc.

Knowledge type measures whether the knowledge exchanged in the community is of explicit or tacit nature. Three items are used, one of them is reverse-coded.

Knowledge supply is evaluated by four items. Members are asked to assess the knowledge available before the community was founded or before they became a member.

Management support considers the corporate environment of the community. It measures the degree to which the management supports the work of the community. Three items were used.

Knowledge culture, assessed by a five-item scale, reflects general conditions in the company with respect to knowledge sharing and communication.

Measures for Community Success

According to the conceptual model, two dimensions of community success are differentiated: member benefits and company benefits. Consequently, members were not just asked to evaluate the benefits for themselves, but also for the company. Both dependent variables are multi-item constructs being measured by several items.

Member benefits are measured by 14 items, whereby members state their perceived benefits from community participation. Generally, the following benefits are considered: enhanced reputation, acknowledgement by colleagues, a higher expert status, positive effect on career development, positive effect on performance assessment, contacts to experts, new-established relationships to colleagues, expanded competences, new competences, improved work performance, making work easier, positive effect on attitude to work, more integration into the company, and finally, higher work satisfaction.

Company benefits contain which impact the community reflects on the company. Members are asked to assess this issue using ten items: increased company's competences, improved transparency of existing knowledge, improved use of existing knowledge, documentation of knowledge/ experiences, distribution of Best-Practices, reduced duplicate work, increased productivity, increased number of innovations, increased intra-organizational co-operation, and higher mutual trust.

Data analysis

Generally, the level of analysis for testing the conceptual model is the individual community member. Thus, all measures evaluated reflect the members' perception on individual and organizational performance and its antecedents.

Data from the community members were analyzed as follows: The developed groups of items were explored using exploratory factor analysis. Not all of the items initially developed could be used for the analysis. Items not loading strongly on the variables as hypothesized or displaying an item-to-total correlation less 0.4 were eliminated. Factors were then calculated as the mean over their items. Correlation analysis was used to provide an initial test of proposed hypothesis.

4 Findings

Table 1 presents the results of the factor analyses of the developed variables. In order to allow an assessment of the validity Cronbach's Alpha and the variance explained by the variable are reported. As initially assumed the factor analysis shows that member motivation, community identity, member benefits and company benefits are multi-dimensional constructs. The remainders are one-dimensional constructs, measured, apart from previous knowledge, by several items.

Hence, hypothesis H_1 and H_4 which suggested community characteristics and community performance to be multi-dimensional constructs are confirmed.

With respect to community benefits for members several dimensions can be distinguished: (1) enhanced status and reputation (*Status*), (2) expanded networking and, thus, learning (*Learning*), and (3) better work performance and, by this, higher work satisfaction (*Task*). In addition to this, communities foster the following benefits on the company level: (1) increased innovativeness (*Innovation*), (2) the development of competences, (*Competence*), and (3) improved efficiency of processes (*Efficiency*).

Table 1. Results of Factor Analyses

Variable	Dimensions	Items	Cronbach's Alpha	Explained Variance in %
1. Topic Relevance	-	4	0.76	58.84
2. Knowledge Type	-	3	0.69	61.54
3. Knowledge Supply	-	4	0.89	74.74
4. Management Support	-	3	0.92	86.47
5. Knowledge Culture	-	5	0.86	65.28
6. Member Motivation	Knowledge	4	0.75	57.67
	Relationship	4	0.70	53.43
	Process	2	0.81	84.76
7. Member Previous Knowledge*	-	1	-	-
8. Community Activities**	Knowledge development	6	-	-
	Knowledge distribution	7	-	-
	Knowledge application	2	-	-
	Knowledge preservation	3	-	-
	Knowledge evaluation	3	-	-
9. Communication Intensity**	Synchronous, face-to-face	3	-	-
	Synchronous, virtual	5	-	-
	Asynchronous	5	-	-
10. Member Activity Level **	-	10	-	-
11. Community Identity	Identification	4	0.86	71.18
	Trust	4	0.87	71.86
	Cohesion	5	0.88	65.76
12. Communication Quality	-	5	0.88	67.47
13. Member Benefits	Status	5	0.94	81.26
	Learning	4	0.91	78.30
	Task	5	0.89	68.92
14. Company Benefits	Innovation	4	0.90	78.15
	Competence	3	0.91	85.06
	Efficiency	3	0.79	70.16

* Mean 5.05; Standard Deviation 2.04

** Formative Indicator(s)

Table 2 presents the means, standard deviations, and bivariate correlations among the variables of the developed conceptual model. The contextual variables are presented first, followed by input, process and output variables.

Analyzing the CoP characteristics six of the seven considered variables have a significant positive impact on both performance levels: member motivation, community processes, community intensity, member activity level, community identity, communication quality. *Consequently, hypothesis H₂, suggesting a positive impact of community characteristics on community performance, is generally confirmed.*

The only exception is the variable 'member previous knowledge' which does neither have an impact on performance measures nor on any of the considered input and process measures. The following variables of community characteristics have the highest correlations with community success on the member level: community identity (r=.66), community activities (r=.49), and member motivation (r=.49). Regarding benefits on the company level, the highest correlation with company benefits pertains to community activities (r=.71), communication quality (r=.62), and community identity (r=.60).

Studying the contextual variables, the analysis reveals several interesting insights. First, only the topic relevance has a significant positive impact on community input variables. Second, topic relevance, knowledge supply, management support, and knowledge culture have a significant positive impact on all process variables. Third, the same variables have a significant positive impact on member benefits and company benefits. *In general, H₃ which proposes a direct influence of the contextual variables on both community characteristics and community performance can be confirmed.*

However, the moderating role of the contextual variables on the relationship between community characteristics and community performance can not be quantitatively assessed by bivariate correlation analysis. Nevertheless, due to the observed direct impacts of the contextual variables the authors suppose that there are moderating effects.

It is interesting to note that, in contrast to the assumption made when developing the framework, the knowledge type seems to have no influence on input, process and success measures.

Table 2. Sample Descriptive Statistics and Correlations

Variable	Mean	Std.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Topic Relevance	5.22	1.18														
2. Knowledge Type	3.20	1.19	-.16*													
3. Knowledge Supply	4.11	1.39	.24**	-.15*												
4. Management Support	4.46	1.67	.35**	-.23**	.30**											
5. Knowledge Culture	4.48	1.27	.24**	-.16*	.31**	.55**										
6. Member Motivation	4.99	1.03	.32**	-.04	.13	.10	.12									
7. Member Previous Knowledge	5.05	2.04	.25**	-.08	.04	.11	.04	.05								
8. Community Activities	4.81	1.06	.36**	-.12	.25**	.40**	.51**	.43**	.03							
9. Communication Intensity	3.05	1.14	.20**	.01	.31**	.32**	.38**	.21**	-.07	.35**						
10. Member Activity Level	3.47	1.27	.31**	.03	.34**	.33**	.27**	.23**	.02	.25**	.59**					
11. Community Identity	4.83	1.11	.44**	-.11	.32**	.42**	.40**	.35**	.05	.60**	.41**	.42**				
12. Communication Quality	4.59	1.30	.24**	-.08	.13	.38**	.35**	.29**	-.06	.63**	.41**	.24**	.60**			
13. Member Benefits	4.18	1.39	.31**	.00	.26**	.39**	.45**	.49**	.01	.49**	.45**	.42**	.66**	.51**		
14. Company Benefits	4.82	1.10	.36**	-.13	.17*	.47**	.55**	.44**	.04	.71**	.38**	.28**	.60**	.62**	.69**	

* $p < .05$

** $p < .01$

5 Conclusion

This research tried to enhance the understanding of communities of practice and the value they deliver to its members and the organization. Building on existing research on teams and knowledge management this study's objective was to develop a conceptual community model and to test proposed bivariate relationships existing between input, process, output and contextual measures employed.

Thereby, the authors contribute to previous literature by adapting existing measures and developing new measures for community research. On the basis of a large scale survey and following data analyses, the formulated hypothesis were tested. The study reveals that the suggested relationships could be confirmed. The findings have several implications. First, developed scales are a first step towards a valid and reliable measurement of community variables. They can serve as a basis for further research. Second, by testing the model the authors could show that there is indeed a positive relationship between community characteristics and community performance. By this, first insights with regard to critical success factors of CoPs are provided. This allows first indications for an appropriate community management. To positively influence member benefits three variables turned out to be of major importance: community identity, community activities, and member motivation. The three variables that have the highest impact on company benefits are community activities, communication quality, and community identity. Third, the study highlights the importance of contextual factors such as management support and knowledge culture. This implies that management needs to foster a climate encouraging knowledge transfer. Apart from that, management should actively support community work by providing required resources and by establishing the necessary prerequisites in the organization. The results suggest that CoPs have the potential to enhance knowledge sharing and learning in organizations. Hence, the concept of communities of practice can be used to support the development, exchange and application of knowledge in knowledge-intensive organizations in a structured and fostered way.

As this study focuses on the members' perspective on community success without using objective community data, further research should include this type of data. Examples for these data are the number of members, number of e-mails exchanged, number of documents read, and the number of knowledge assets created. In addition further research could extend this study by analyzing CoPs in different companies.

Hereby, the impact of the corporate environment could be addressed. Apart from that, a longitudinal study design could take the evolutionary aspect of communities into account. This research approach could enable to study the lifecycle of a community proposed by other authors (Schoen, 2001; Wenger et al., 2002).

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References

- Adler, S. P., & Kwon, S.-W. (2002). Social capital: prospects for a new concept. *Academy of Management Review*, 27(1), 17-40
- Ambrosini, V., & Bowman, C. (2001). Tacit knowledge: Some suggestions for operationalization. *Journal of Management Studies*, 38(6), 811-829
- APQC. (2000). *Building and sustaining communities of practice: final report*. Houston, TX: American Productivity & Quality Center
- Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*, 7(1), 64-77
- Bontis, N. (2001). Assessing knowledge assets: a review of the models used to measure intellectual capital. *International Journal of Management Reviews*, 3(1), 41-60
- Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science*, 2(1), 40-57
- Brown, J. S., & Duguid, P. (2001). Knowledge and organization: A social practice perspective. *Organization Science*, July, 198-213
- Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: group effectiveness research from the shop floor to the executive suite. *Journal of Management*, 23(3), 239-290
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity. A new perspective on learning and innovation. *Administrative Science Quarterly*, Bd. 35(128-152)
- Costa, A. C., Roe, R. A., & Taillieu, T. (2001). Trust within teams: the relation with performance effectiveness. *European Journal of work and organizational psychology*, 10(3), 225-244
- Davenport, T. H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Boston, Massachusetts: Harvard Business School Press
- Denison, D. R., Hart, S. L., & Kahn, J. A. (1996). From chimneys to cross-functional teams: developing and validating a diagnostic model. *Academy of Management Journal*, 39(4), 1005-1023
- DeScantis, G., Poole, M. S., & Dickson, G. W. (2000). Teams and technology: interactions over time. *Research on Managing Groups and Teams*, 3, 1-27
- Drucker, P. F. (1993). *Post-capitalist society*. New York: Harper Business

- Gemünden, H. G., & Högl, M. H. (2001). *Management von Teams: Theoretische Konzepte und empirische Befunde*: Gabler
- Gladstein, D. (1984). Groups in context: a model of task group effectiveness. *Administrative Science Quarterly*, 29, 499-517
- Govindarajan, V., & Gupta, A. K. (2001). Building an effective global business team. *MIT Sloan Management Review*, Summer 2201, 63-71
- Guzzo, R. A., & Dickson, M. W. (1996). Teams in organizations: recent research on performance and effectiveness. *Annual Review of Psychology*, 47(1), 307-338
- Guzzo, R. A., & Shea, G. (1992). Group performance and intergroup relations in organizations. In L. M. Hough (Ed.), *Handbook of Industrial and Organizational Psychology* (2 ed., Vol. 3, pp. 269-313). Palo Alto, CA: Consulting Psychologists Press.
- Hedberg, B., & Holmquist, M. (2001). Learning in imaginary organizations. In I. Nonaka (Ed.), *Handbook of organizational learning & knowledge* (pp. 733-752). New York: Oxford University Press.
- Hoegl, M., & Gemuenden, H. G. (2001). Teamwork quality and the success of innovative projects: a theoretical concept and empirical evidence. *Organization Science*, 12(4), 435-449
- Högl, M. (1998). *Teamarbeit in innovativen Projekten: Einflußgrößen und Wirkungen*. Wiesbaden: Gabler, Dt. Univ.-Verl.
- Howells, J. (1996). Tacit knowledge, innovation and technology transfer. *Technology Analysis & Strategic Management*, 8(2), 91-106
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities and the replication of technology. *Organization Science*, 3, 383-397
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press
- Leenders, R. T. A. J., van Engelen, J. M. L., & Kratzer, J. (2003). Virtuality, communication and new product team creativity: a social network perspective. *Journal of Engineering and Technology Management*, 20, 69-92
- Leonard, D., & Sensiper, S. (1998). The role of tacit knowlegde on group innovation. *California Management Review*, 40(4), 112-132
- Leonard-Barton, D. (1995). *Wellsprings of knowledge: Building and sustaining the sources of innovation*. Boston: Harvard Business School Press
- Lesser, E. L., & Prusak, L. (1999). Communities of practice, social capital and organizational knowledge. *White Paper August*
- Lesser, E. L., & Storck, J. (2001). Communities of practice and organizational performance. *IBM Systems Journal*, 40(4), 831-841
- Maier, R. (2002). *Knowledge Management Systems: Information and Communication Technologies for Knowledge Management*: Springer
- McDonough, I., Edward F., Kahn, K. B., & Griffin, A. (1999). Managing communication in global product development teams. *IEEE: Transactions on Engineering Management*, 46(4), 375-386
- Millen, D. R., Fontaine, M. A., & Muller, M. J. (2002). Understanding the benefit and costs of communities of practice. *Communications of the ACM, Special Issue: Supporting community and building social capital*, 45(4), 69-73

- Mohrman, S. A., Finegold, D., & Mohemann Jr., A. (2003). An empirical model of the organization knowledge system in new product development firms. *Journal of Engineering and Technology Management*, 20(1-2), 7-38
- Nahapiet, J., & Goshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23(2), 242-266
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14-37
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*: Oxford University Press
- Osterloh, M., & Frey, B. (2000). Motivation, knowledge transfer, and organizational forms. *Organization Science*, 11(5), 538-550
- Pan, S. L., & Leidner, D. E. (2003). Bridging communities of practice with information technology in pursuit of global knowledge sharing. *Journal of Strategic Information Systems*, 12, 71-88
- Picot, A., Reichwald, R., & Wigand, R. T. (2001). *Die grenzenlose Unternehmung: Information, Organisation und Management* (4. ed.). Wiesbaden: Gabler
- Pinto, M. B., & Pinto, J. K. (1990). Project team communication and cross-functional cooperation in new program development. *Journal of Product Innovation Management*, 7, 200-212
- Probst, G. J. B., & Büchel, B. S. T. (1998). *Organisationales Lernen: Wettbewerbsvorteil der Zukunft* (2. ed.). Wiesbaden: Gabler
- Probst, G. J. B., Raub, S., & Romhardt, K. (1999). *Wissen managen: wie Unternehmen ihre wertvollste Ressource optimal nutzen* (3. ed.). Frankfurt am Main; Wiesbaden: Frankfurter Allg. Zeitung für Deutschland; Gabler
- Saint-Onge, H., & Wallace, D. (2003). *Leveraging communities of practice for strategic advantage*. Amsterdam: Butterworth-Heinemann
- Schoen, S. (2001). *Gestaltung und Unterstützung von Communities of Practice*. München: Herbert Utz Verlag
- Scott, S. G. (1997). Social identification effects in product and process development teams. *Journal of Engineering and Technology Management JET-M*, 14(2), 97-127
- Smith, H. A., & McKeen, J. D. (2003). Creating and facilitating Communities of Practice. In C. W. Holsapple (Ed.), *Handbook on Knowledge Management: Knowledge Matters* (Vol. 1, pp. 393-407). Berlin, Heidelberg, New York: Springer.
- Snyder, W. M., & Wenger, E. (2001). Communities of Practice: The organizational frontier. *Harvard Business Review*(January/ February 2000.)
- Swan, J., Scarbrough, H., & Robertson, M. (2002). The Construction of 'Communities of Practice' in the Management of Innovation. *Management Learning*, 33(4), 477-496
- Tsai, W., & Goshal, S. (1998). Social capital and value creation: the role of intrafirm networks. *Academy of Management Journal*, 41, 464-476
- von Krogh, G., Ichijo, K., & Nonaka, I. (2000). *Enabling knowledge creation: How to unlock the mystery of tacit knowledge and release the power of innovation*. New York: Oxford University Press
- Wenger, E. C. (1998a). Communities of Practice - Learning as a social system. *The Systems Thinker*, 9(5), 1-5
- Wenger, E. C. (1998b). *Communities of Practice: Learning, meaning and identity*. Cambridge: Cambridge University Press

Wenger, E. C., McDermott, R., & Snyder, W. M. (2002). *Cultivating communities of practice: a guide to managing knowledge*. Cambridge, MA: Harvard Business School Press

Wenger, E. C., & Snyder, W. M. (2000). Communities of Practice - Warum sie eine wachsende Rolle spielen. *Harvard Business Manager*, 4, 55-62

Zack, M. H. (1999). Developing a knowledge strategy. *California Management Review*, 41(3), 125-145