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A Model for Understanding Success of Virtual Community Management Teams

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ABSTRACT

Virtual communities enable people with common interests to interact with each other. Until today, research has mostly focused on the aspects of social interaction, usability and success factors for virtual communities. But due to the link between effective coordination of management teams and success of virtual communities, virtual community management becomes of great importance for both research and practice. Therefore, the imperative of this research is to develop an understanding of what drives management teams of successful virtual communities. Drawing on existing literature, we identify relevant theories and use a previous exploratory case study in order to provide a theoretical explanation of the variables and factors that affect the success of virtual community management teams. Furthermore, we provide first suggestions for measurement instruments in order to subsequently test our proposed model using empirical, quantitative methods.

Keywords

Online communities, virtual communities, virtual community management, theoretical model, Viable System Model.

INTRODUCTION

Virtual or online communities allow people of like interests to come together with little cost, help them exchange ideas and coordinate their activities using the Internet as a technical platform (Leimeister et al. 2006, p. 279). However, the rules and practices that lead to a successful virtual community (VC) are not yet well known or set fast in a codified formal system (Sharp 1997). With regard to the different stakeholders, the success of a VC can be measured from several different perspectives (Leimeister et al. 2006, p. 279). The imperative of this research is to develop an understanding of what management factors contribute to successful virtual communities. Both practitioners and researchers have a critical need for rigorous theories that they can use as guidelines to understand and manage VCs. To move forward the research, this paper aims to contribute to the existing body of knowledge by identifying relevant theories and concepts from existing research and the literature that can be exploited to provide a sound theoretical explanation of the variables and factors with regard to management teams that affect the success in the sense of viability of an individual VC. Thus, the following research question guides this research: *what management factors make a VC viable and successful*? Our contribution especially considers communities of interest or leisure time communities (Schubert & Ginsburg 2000, Hagel & Armstrong 1997). These communities are extremely popular on the Internet where the number of bulletin boards, discussion groups, and other chat-boxes is enormous (Rheingold 1993).

The structure of this paper is as follows. The theoretical base for the research and the literature that contributes to the understanding of VC management teams is discussed in the second section. Following this, the drivers for success of VC management teams are outlined. Referring to these causes and a previous exploratory case study, within the third section of the paper, we introduce and discuss an explanatory model. In the fourth section, we present our strategy for the creation of measurement instruments. We summarize the findings and limitations of the paper in the fifth section, and give an outlook on further empirical research which will be based on this conceptual work.

THEORETICAL FOUNDATIONS AND RELEVANT CONCEPTS

Virtual Communities

The literature offers several different definitions of virtual or online communities (Preece 2000, Rheingold 1993). Communities are groups of people who share a concern, a set of problems, or a passion about a topic and who deepen their knowledge and expertise in this area by interacting and communicating on an ongoing basis (Wenger et al. 2002, p. 4, Cohendet et al. 2004, p. 30, Li 2004, Lee et al. 2003). Along with Preece (2001, pp. 347-350), we use the terms online community and VC as synonyms which mean “any virtual social space where people come together to get and give

information or support, to learn, or to find company." In this paper, we especially consider VCs of interest on the Internet that act as a mechanism for supporting conversation and communication about a topic or a passion.

Most current research on VCs focuses on the role of information technology in enabling people to interact with each other (Preece 2001, Burnett 2000), factors of usability and sociability (Preece 2001), facilitation tasks for communities (Tarmizi & Vreede 2005), and what principles make communities successful (Kollock 1996, Bourhis et al. 2005, Leimeister et al. 2006, Dannecker & Lechner 2007). For example, Porra and Parks (2006) suggest that VC sustainability requires persistent people, continuous support by an online space, and flexibility for alternative sub-communities to emerge. Ginsburg and Weisband (2002) conclude from their survey that volunteerism is an important aspect for a VC's success. Leimeister et al. (2006) gain first empirically validated insights into success factors for establishing and managing VCs from the perspectives of both members and operators. Their study revealed that both members and operators clearly focus on performance, security, up-to-dateness, and quality of the content of VCs. Whereas these existing studies focus on success factors for VCs, we put our emphasis on the role of VC management teams for a VC's success.

For example, communities within an organization must be allowed some reasonable degree of autonomy and interdependence, which must be considered in the design of organizational architecture and the ways communities are linked to each other (Brown & Duguid 1991, p. 54). This architecture should preserve and enhance the healthy autonomy of communities, while building an interconnectedness through which the communities can exchange knowledge. Bourhis et al. (2005) argue that VCs vary in terms of their basic characteristics, that "one-fits-all" advice on how to manage and sustain VCs is not appropriate, and that *management practices* should be put into place to counter the challenges due to a specific combination of structuring characteristics. However, little research has focused on these management practices, the controlling and coordination of VCs and their community management team, and possible design principles for community management teams (Fontaine 2001, Wenger et al. 2002, p. 80). We define a VC management team in this paper as follows:

> A *VC management team* organizes all administrative tasks in a VC and supplies a (technical and behavioral) framework for interaction and communication. The framework is controlled by the VC management team and focuses on supporting the VC.

This definition takes both non-commercial and commercial VCs into account, and regards management teams composed of volunteers as well as paid employees. As Dannecker et al. (2007) note, each VC does have its own view on community management and so each VC must be analyzed separately; a framework on what kind of different community management tasks are possible, and how to manage these tasks, would be helpful to evaluate the best strategy for a special VC. Consequently, we try to identify relevant theories for answering how a VC management team should structure itself in order to be successful.

Contingency Theory

From a theoretical perspective, *Contingency Theory* and the information processing view of the firm offer a sound theoretical foundation (Tushman & Nadler 1978). The *Information Processing Model* (cf. Figure 1) suggests that the more complex the task interdependence, the greater the information processing requirements (Tushman & Nadler 1978). This perspective implies that organizational designers should first consider the tasks, composition and structure of subunits, and then consider appropriate mechanisms for linking those units together. Thus, organizations can be conceptualized as actors connected by information and communication channels, using a range of communication tools (e. g., electronic mail, fax, phone, management information systems, etc.) (Levitt et al. 1999). Based on this, Daft & Lengel (1986) propose specific structural mechanisms to enable the correct amount and type of information processing.

The essence of this theory is that subunits of an organization must choose from a feasible set of structural alternatives, a particular set of organizational arrangements, to most effectively deal with their information processing requirements. A subunit's information processing capacity must deal with the information processing requirements of its tasks. This is essentially a restatement of Ashby's *Law of Requisite Variety* from cybernetics: only variety destroys variety (Ashby 1964, p. 207). Variety is the number of possible states of a system. The Law of Requisite Variety forms a problem for management because in order to make a system responsive to change, management needs to possess as much variety as the system itself exhibits. With systems that exhibit massive variety, such as organizations, only 1) reducing the operational or the environmental variety or 2) increasing the management's own variety enables us to cope with this problem (Jackson 2000, p. 73). Consequently, from a systemic point of view, the evaluation of management practices, information systems, and information channels respectively becomes of great importance for management to adjust variety accordingly.

One major criticism of contingency approaches is the lack of clarity as to what constitutes "fit" between requirements and capacities (Tushman 1979). For example, Donaldson (2001, p. 15) argues that it might be more useful to concentrate on

misfits, which produce a negative effect on organizational performance. But misfits face the identical clarification issues as fits. From a research perspective, we need a way for identifying subunits and actors in VC management teams and information channels between the actors. In the following, we argue that the Viable System Model (Beer 1979, Beer 1981, Beer 1985) as a reference model gives valuable insights for matching information processing capacities and information processing requirements, and for building a theoretical model for success of VC management teams.

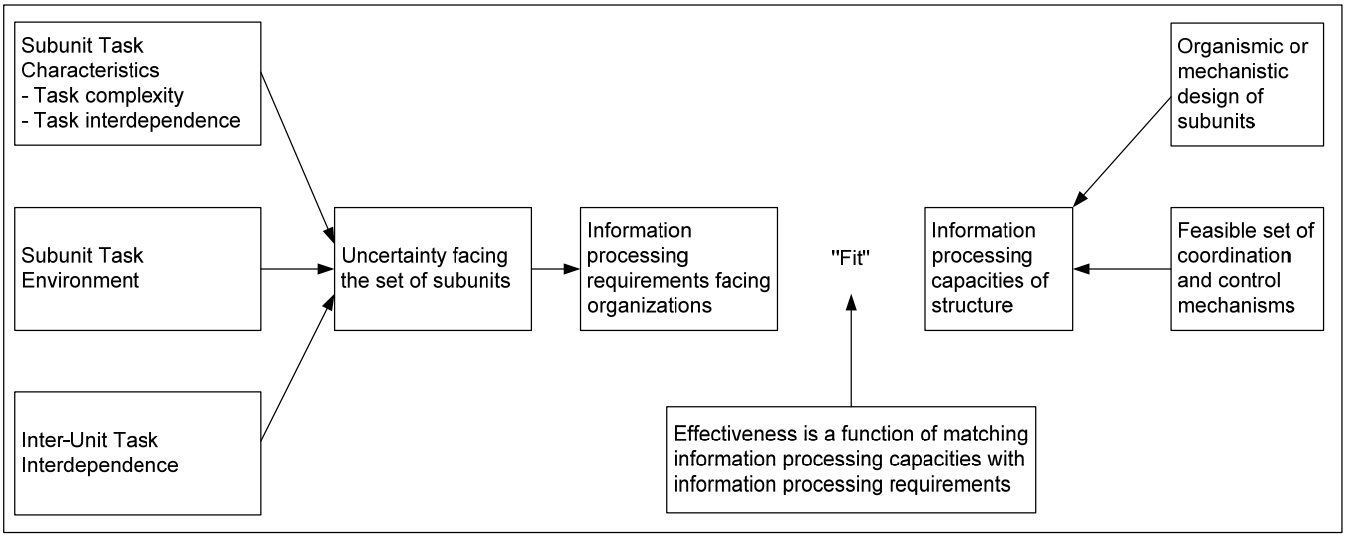

Figure 1. The Information Processing Model (Tushman & Nadler 1978)

The Viable System Model

The *Viable System Model* (VSM) has been developed by Stafford Beer for describing complex systems (Beer 1979, Beer 1981, Beer 1985), and is a well-established cybernetic theory that has been previously applied in management science (e. g., Schwaninger 2006, Espejo & Harnden 1989) and in information systems research (e. g., Vidgen 1998, Kawalek & Wastell 1999). According to Beer, the VSM specifies the minimum functional criteria by which a given system (e. g., an organization) can be said to be capable of independent existence in a changing environment (Beer 1979, pp. 68 ff., 400). If a system meets these criteria it is said to be *viable*, i. e. it is able to maintain and sustain its identity, responding to changes in the environment, even if these changes could not have been foreseen at the time the system was designed (Jackson 2000, p. 157).

The VSM consists of six main components, or sub-systems, and information channels between the sub-systems (cf. Table 1 for an overview, Beer (1985) offers a more detailed introduction). Recursion as the essential principle for structuring within the VSM leads to the fact that each sub-system needs the same structural composition as the whole system; each level of organization is a recursion of its super-system (Beer 1979, p. 68). System 1 serves as an interface between the recursion levels. The information channels between the sub-systems are pairs of variety amplifiers and attenuators which need to be designed with respect to the Law of Requisite Variety (Beer 1985, pp. 19-35). These information channels correspond to the understanding of information and communication channels of the Information Processing Model. In parallel, Flood & Carson (1993, pp. 80-96) argue that examination of the main strands in contingency theory and the VSM reveal many commonalities and close similarities. As such, we argue that the VSM proposes a blueprint for organizational design of management teams (the sub-systems and information channels) which best serves the fit, while replacing the criteria of fit with the criteria of viability.

A THEORETICAL MODEL FOR VIRTUAL COMMUNITY MANAGEMENT TEAM SUCCESS

The VSM as a Reference Model

From our point of view, the VSM serves as an underlying reference model in order to map the necessary information channels within a VC management team, and therefore helps in the process of building a model for controlling and managing the framework of interaction. In a previous exploratory case study, we applied the VSM to a non-commercial VC over a longer period of time to describe the development of a VC management team in detail (Rosenkranz & Feddersen 2007). This

allowed us to model and analyze the information channels of an existing VC management team and to generate a first interpretive understanding of the problem domain. We demonstrated why the VSM is appropriate for modeling information channels and communication within VC management teams, and identified factors that contribute to the successful management of VCs.

Building on our insights from this case study and previous literature, we now conceptualize a model for explaining successful VC management teams. In this, according to Gable (1994), we integrate exploratory case study results and existing theoretical models, before building an explanatory model. After having created a subjective understanding of everyday meanings and common sense within an observed real VC, which provides the basis for an interpretive understanding, we create a positivist understanding in order to explain the empirical reality – the explanation being a scientific theory which can be tested against the subjective meaning as recorded in the interpretive understanding (Lee 1991, pp. 351-354). Following this, our research question can be reformulated and stated more precisely as: *(R1) does the VSM explain the role of management teams for the success and viability of VCs?* Moreover, we want to know if the VSM is invariant regarding different types of VCs, such as VCs of practice in organizations, or more informal web-based VCs, hence: *(R2) do differences exist depending on the type of VC?*

Constructs and Validity of the VSM

We argue that VC management teams can be understood through the lens of the VSM. Success of a VC management team can then be defined with respect to a VC's viability, and the states of the system's elements and relationships. Thus, we deduce our theoretical constructs directly from the sub-systems of the VSM, its information channels and the concept of viability. Table 1 summarizes these constructs. The constructs specify features that a given VC has to display, according to the VSM, to be successful and viable.

Construct	*Description*	*Original definition*
System 1	On each recursive level, operational units (community functions) are responsible for parts of an organization's activities and have contact to the outside environment. The operational units are each managed by a divisional management unit (management of community functions). All operational units and divisional management units on one level of recursion together form System 1.	(Beer 1979, pp. 145-152, Beer 1981, pp. 167-172, Beer 1985, pp. 19-35)
System 2	Each System 2 conducts a service function for System 1 and serves to damp oscillation and other disruptions that occur between the operational units on an operational level (coordination of the VC management team).	(Beer 1979, pp. 176-189, Beer 1981, pp. 172-175, Beer 1985, pp. 55-82)
System 3 / System 3*	System 3 supervises all internal operational activities of all operational units from a higher point of view of the total system. It optimizes the allocation of resources, assigns them to the operational units and regularly checks the use of these resources (structure for internal decision-making).	(Beer 1979, pp. 201-214, Beer 1981, pp. 175-180, Beer 1985, pp. 86-105)
	System 3* is the audit channel, which gives System 3 direct access to the state of affairs in the operational activities. System 3 can obtain immediate information by using System 3*, instead of relying on information passed to it by divisional management (checking of status quo).	
System 4	System 4 deals with the diagnosis of the long-term connection of a viable system to its outside environment and its adaptation to future trends (decision-making for the future).	(Beer 1979, Beer 1981, pp. 183-199, Beer 1985, pp. 107-121)
System 5	The ethos of the whole viable system is formed by System 5. It embodies supreme values, rules and norms for the stabilization of the whole system.	(Beer 1979, pp. 259-266, Beer 1981, pp. 201-209, Beer 1985, pp. 123-134)
Information channels	The information channels exist between all sub-systems. They are pairs of variety amplifiers and attenuators which need to be designed with respect to the Law of Requisite Variety.	(Beer 1979, pp. 90-98, Beer 1981, pp. 359-363, Beer 1985, pp. 1-35, Beer 1989)
Viability	The term viable refers to a system that is active and alive. It means the system (the community) maintains its own identity in the long-run.	(Beer 1979, pp. 113-138, Beer 1985, p. 1, Beer 1989)

Table 1. Components of the VSM as Constructs

The VSM has been criticized for various reasons (cf. Flood & Carson 1993, pp. 87-91, Jackson 2000, pp. 172-177 for an overview). For example, the VSM has a also been criticized for being too general to be of much use (Amey 1986, p. 145). But this is hardly a substantial argument, since Weick (1979, p. 35) observes that "*it is impossible for a theory of social behavior to be simultaneously general, accurate and imple*". Most importantly, despite this critique, the VSM has not been falsified in various applications and case studies. Most severe is the reproach of being a misplaced mechanical and biological analogy which underplays the purposeful role of individuals in organizations (Ulrich 1981). The proponents counter that the VSM is not a pure analogy, that the model has been derived from cybernetic first principles, and that it suggests decentralization, maximal autonomy for individuals, and purpose as a compromise for the advantage of every organization (Beer 1979, Jackson 1989).

In line with *critical rationalism*, we believe that hypotheses can never be verified, but can be corroborated. Science operates with conjectures and jumps to conclusions, even after one single observation, as long as the rules of hypothetico-deductive logic do apply and the emerging theory remains falsifiable and testable (Popper 1959). But as of today, we know only of three empirical studies that tried to corroborate the model or aspects of it using quantitative methods (de Raadt 1990, Frost 2005, Tran 2006). The same is true for measurement instruments, which maps the single concepts of the VSM to constructs and makes them accessible for empirical, quantitative research. As such, most of the corroborations of the model rely on qualitative results yet. This could be due to difficulties in operationalizing the constructs which are not easy to "translate" univocally into questions to be answered by subjects (Zouwen 1996, p. 103). Likewise, the model has never been applied to VCs or VC management teams before. Therefore, we adopt existing work on empirical investigation about the VSM, and build on our exploratory study to carefully deduce both a theoretical model for the domain of VC management and appropriate measurement instruments.

Propositions and Hypotheses

Relating the major theoretical constructs of the VSM to VC and VC management teams, in the following we discuss how viability of VCs can be theoretically conceptualized through the integration of these concepts. Figure 2 gives the proposed model of VC management team success in simplified form, the components of which are discussed below.

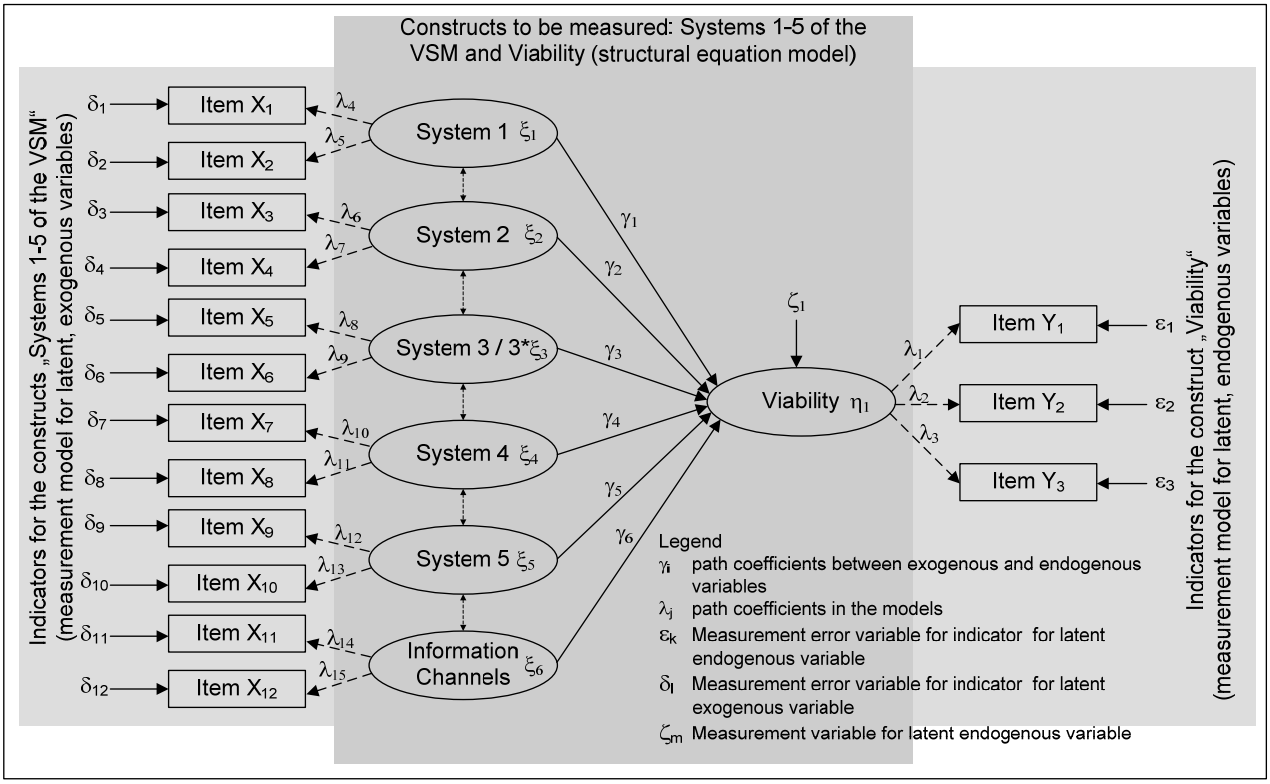

Figure 2. Simplified Exemplary Structural Equation Model

In this paper, we define success of VC management team as equaling to maintaining viability of a VC. If the VC has its own

identity and will be able to retain that identity over a longer period of time, it is viable and the VC management team is successful. In parallel, in this case, we can suppose a fit between information processing capacities and information processing requirements. Forthcoming from Figure 2 we hypothesize that viability of a VC is primarily caused by six different factors:

1. whether the five elements associated with the sub-systems in the VSM have high characteristics and
2. whether the information channels suffice the Law of Requisite Variety.

To be more specific, we expect all factors are direct determinants of viability. We do not presume causal relations between the constructs; if those exist, they will be identifiable by statistical tests. Our adaptation of existing theories presents a strong theoretical framework for success of VC management teams. To summarize the model with regard to our research question, if a VC management team shows high characteristics in the components of the VSM, then it should be observable that the VC is viable and the management team is successful. Therefore, we formulate the following proposition:

P1 *The better the characteristics of control and steering systems 1-5 and the better the information channels operate in a VC management team, the higher will be the viability of the VC.*

This overall proposition can be broken down into single hypotheses for each of the constructs.

MEASUREMENT INSTRUMENT DEVELOPMENT

Our operationalization of the constructs for the domain of VC management is a novelty. To ensure content validity, the proposed candidate items of the item creation stage have been carefully designed based on two existing surveys using the VSM in quite different contexts, findings from related VC literature and findings from our previous exploratory case study (cf. Table 2). We do not 'blindly' adopt the existing measurement inventories to our research domain of VC management, since it is by no means clear that these instruments are appropriate for this particularly domain. As a first step regarding (R2), we plan to limit our scope to web-based VCs of interest.

We operationalize the constructs of the VSM as effect indicators (the latent variable – the construct – causes the indicator) because this research's primary goal is to test a theory for VC management – the VSM – and only secondarily we want to give guidance for practice, for which the use of cause indicators is better suited (the latent variable – the construct – is caused by the indicator) (Bollen & Lennox 1991).

Construct	*Item*	*Indicator Description*
System 1	*S1_1*	The community offers several **different activities & contents** for community members, so-called **community functions** (e. g., bulletin board, chat, wiki, blogs, user-generated content etc.) (Frost 2005, p. 196, Tran 2006, p. 104, Leimeister et al. 2006, p. 287).
	S1_2	**Daily operational tasks** (e. g., moderating bulletin boards, answering e-mails, fixing technical problems with the platform etc.) are **delegated** to the management of the community functions such as moderators, chat operators, technical administrators, content editors etc. (Tran 2006, p. 104).
	S1_3	Moderators, chat operators, content editors etc. manage their respective community function mostly **autonomously** and without senior management on a day-to-day basis, and can take independent decisions regarding the state of affairs in their respective community function.
	S1_4	Managers of community functions such as moderators, chat operators, content editors etc. are responsible for **coordinating and discussing problems among themselves**.
	S1_5	Senior management of the total community solves **coordination of problems** between the community functions by intervention on a regular basis.
	S1_6	The community functions could **exist by themselves** if they would be split from the VC and become independent.
System 2	*S2_1*	**Standard operating procedures & job descriptions** for the team members do exist so that the tasks and responsibilities within the community management team are clearly described and defined well (Tran 2006, p. 103).
	S2_2	**Collaboration software** is used to coordinate team members (e. g, team schedules, bulletin board management tools).
	S2_3	**Team discussion subgroups** in bulletin boards or chat rooms are regularly used (Tran 2006, p. 103).

	S2_4	Regular **virtual team meetings** are conducted (e. g., via chat rooms).
	S2_5	**Guidelines of behavior** for bulletin board moderators and chat operators exist (Leimeister et al. 2006, p. 287).
	S2_6	The community management team is **coordinated well** (e. g., by schedules, time tables, discussion etc.).
	S2_7	The communication tools of the platform are **easy to use** (Leimeister et al. 2006, p. 287).
	S2_8	**Technical support** is available in case I have a question regarding the platform (Leimeister et al. 2006, p. 287).
System 3 / 3*	*S3_1*	In case of **exceptions and important events** unheard of before, **senior management** is contacted immediately.
	S3_2	The general **theme and topic** of the community is clearly defined by senior management (Frost 2005, p. 206).
	S3_3	Community **team members participate** in the topical orientation of the community (Frost 2005, p. 206).
	S3_4	**Community members participate** in the topical orientation of the community (Frost 2005, p. 206).
	S3_5	It is clear **to whom to report** and who has the **last say in operational day-to-day decisions**.
	S3_6	The as-is status of the community is **regularly checked** by senior management on an ad-hoc basis (e. g, by talking to individual community members).
	S3_7	Senior management defines **what it expects** form the team members who manage the community functions (e. g., bulletin board, chat, wiki, blogs, user-generated content etc.) (Tran 2006, p. 101).
	S3_8	Senior management defines **which resources are available** for the team members of the community functions for fulfilling the exceptions (Tran 2006, p. 101).
System 4	*S4_1*	The future of the community is **jointly discussed** by the management team (senior management and the management of the community functions) (Tran 2006, p. 98, Frost 2005, p. 210).
	S4_2	**Community member surveys** are undertaken regularly.
	S4_3	**Marketing and advertisement** are managed professionally.
	S4_4	**Strategic planning** is carried out (i. e. decisions regarding the future development are taken).
	S4_5	The management team thinks regularly on how to **proceed in the future**.
	S4_6	**Community members actively participate** in designing the future of the community (Leimeister et al. 2006, p. 287, Frost 2005, p. 210).
	S4_7	The following **indicators** are used in our VC management team for **strategic management**: turnover, cash flow, market share, quality/community member satisfaction, number of members, others (please specify), I do not know (Tran 2006, p. 98).
System 5	*S5_1*	Team members are selected based on **personal relationships** and trust.
	S5_2	Regular team meetings in **real-life** are conducted (Frost 2005, p. 213).
	S5_3	**Behavioral norms and team rules** do exist in the community management team (Tran 2006, p. 97, Leimeister et al. 2006, p. 287).
	S5_4	**Overall team rules and behavior** are jointly discussed by the community management team.
	S5_5	In the team **we trust** each other (Leimeister et al. 2006, p. 287, Frost 2005, p. 213).
	S5_6	Team members also **share mistakes** and lessons learned (Frost 2005, p. 213).
	S5_7	When a team member **acts inappropriate**, others approach him or her on that (Frost 2005, p. 213).
	S5_8	I know many team members **personally** (Frost 2005, p. 213).
Information Channels	*IC_1*	The **communication between community management team members** works efficiently (e. g., answers to messages are given in an acceptable period of time).
	IC_2	Decisions regarding daily operational issues are **communicated swiftly** and promptly.
	IC_3	The **functions** of the platform used (e. g., bulletin board, forum management, chats, instant messenger, etc.)

		meet our needs for community management.
	IC_4	In the community management team, we share a **common language**.
	IC_5	The **variety of information** communicated by the communication channels is reasonable and sufficient for fulfilling my tasks as a team member.
	IC_6	Please rank the following **communication tools** for their **usefulness** for communication within a VC management team.
	IC_7	I have **enough time** for all my tasks as a community management team member.
Viability	*V_1*	The **organizational structure** of the community management team is chosen well and suited for the tasks.
	V_2	The community **is active** (Frost 2005, p. 195).
	V_3	I expect the community **to exist** in the long run (Frost 2005, p. 195).
	V_4	The community team is **managed well**.
	V_5	How do you rate the development of your community in the long-run with regard to: turnover, team members, community members, content?

Table 2. Proposed Candidate Items for Indication of Constructs

For assessing the validity of our instrument, we will follow the procedure proposed by O'Leary-Kelly & Vokurka (1998) (cf. Figure 3). Many empirical studies undertake the first step in construct validation and choose empirical indicators that are thought to measure their constructs; however, many researchers then move directly to hypothesis testing without ever assessing construct validity. According to O'Leary-Kelly & Vokurka (1998), this ignores the many corrupting elements embedded in measures (e. g., measurement error, informant bias), which can seriously jeopardize the conclusions drawn in a study. In order to counter these elements the second step, establishing construct validity, involves the empirical assessment of the adequacy of a measure and requires that three essential components be established: unidimensionality, reliability and validity (O'Leary-Kelly & Vokurka 1998). In order to determine construct validity, we will undertake a first pilot test based on a small chosen sample of two non-commercial and two commercial US-based VCs to obtain further initial indications for scale reliability and validity. This pilot test will result in a first formal reliability assessment.

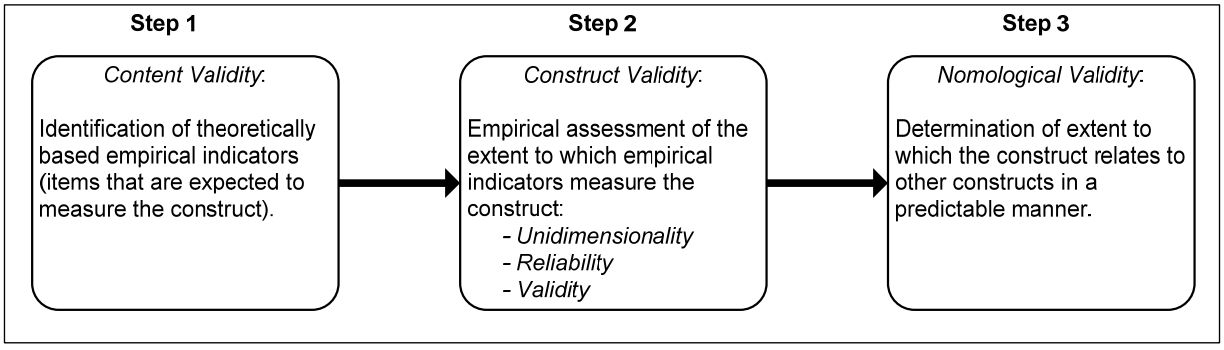

Figure 3. Construct Validation Process (O'Leary-Kelly & Vokurka 1998)

SUMMARY AND CONCLUSION

In this paper, we have described and discussed the theoretical conceptualization of a model to explain what factors contribute to the success of VC management teams. The model has been derived by integrating components of theories from different approaches and areas of research, and findings from previous exploratory case study research. Measures and instruments need to be developed which help to identify the proposed constructs. From a theoretical perspective, this model is the first building block for knowledge on successful VC management teams.

We like to point out that our study has several limitations. First, the underlying case study has been exploratory and is not a validation of the relationship between the structure of the VSM and successful VC management. Second, the replacement of success and fit with the concept of viability can be criticized, but we believe that viability is more easy to operationalize. Third, it is obvious that our paper suffers from being theoretical research only. As such, it needs to be tested and empirically corroborated on a large scale. Third, the proposed items need to be examined with respect to construct validity and

nomological validity. Accordingly, as a next step, we plan to test our items and scales to measure our constructs, and subsequently collect data by various means, e. g., surveys, experiments and case study research.

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