

Management of Market Knowledge in Networks

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Abstract:

Objectives: Networks like strategic alliances, joint ventures, franchise systems and cooperatives face the problem how the required market knowledge can be gathered and how it can be incorporated in the network member's decisions. In our paper we address the problem of generation of knowledge and knowledge transfer. In this context we try to find criteria for organization of networks.

Prior work: Our paper is based on evolutionary economics and the literature of network theory. First implications have been drawn from a case study research that was conducted in 2006 and that can be seen as a starting point for these theoretical considerations.

Approach: Our methodical approach is based on the idea of theory building by the means of case study research. In this article we extend our previous work by using evolutionary economics. Especially we emphasize on market dynamics and entrepreneurial capabilities. We base our own theoretical work on a broad review of network literature published the last years.

Results: We state that there are three channels of knowledge transfer: (1) through direct market observation, (2) through observation of the network connections, (3) through direct communication with the members. Using evolutionary economics we develop criteria for the efficient use of the three channels. In that framework it could be shown that one of the main determinants can be seen in the dynamics of the concerned markets and in the institutional setting. Therefore the distribution of entrepreneurial capabilities in the network plays a crucial role.

Implications: The paper gives new insights to organizational problems of networks from an evolutionary point of view. Regarding issues of organisation managers of networks can benefit from the presented criteria in order to employ flexible tools respecting market dynamics and the distribution of entrepreneurial capabilities.

Value: Our paper provides a deeper insight into how the relevant market knowledge can be identified, communicated and used in networks.

Keywords: networks, knowledge, communication, entrepreneurship, cooperation, evolutionary economics.

I. Introduction

Inter-organisational networks face the problem that processes of communication and decision-making take place on different levels of the cooperative arrangement. These processes on the one hand can be found at the formal bodies of the network (focal firm or strategic head) but on the other hand also at the level of network participants as institutions and individuals. Thus, we can observe a very complex disaggregation of entrepreneurial action i.e. the functions of entrepreneurship are therefore no longer limited to a single firm but are divided into different parts within the cooperative network. This divided entrepreneurship is leading to another source of frictions and to additional potential for conflicts. However, those firms who are engaged in long-term or permanent cooperation need to gain the vertical market knowledge of their partners, to process this knowledge in their organizational routines and to align the market knowledge in a coordinated manner to the common objective of the cooperation.

In context of division of knowledge (analogue to division of labour) the network can be regarded as a hinge between different markets (that can be under different degrees of market dynamics) with the general potential to process the market knowledge of a turbulent environment in a very efficient way. However, the question occurs to which extent the division of knowledge should be defined.

In this paper we are going to answer the question how an established network arrangement can be used in terms of knowledge processing and we intend to sketch out first managerial implications. In doing so we address the question how the required knowledge of the market can be perceived and incorporated. Furthermore we want to identify different influence parameters (like heterogeneity of the network participants, competence gap or market phase) and we intend to answer the question how they can affect the institutional network design.

The theoretical approach of this study builds on the evolutionary economic literature (for an overview see Nelson, 1995; Nelson/Winter, 2002). Talking about evolutionary economics raises the question what particular evolutionary approach is used. The field of evolutionary economics is wide and a lot of different approaches are published under the umbrella of „evolutionary economics.“ Witt (2007) tried to analyse those approaches considering the ontological creeds on the one hand and the differences in heuristic attitudes. The only agreement seems the understanding that evolution means systematic change over time (Witt 2007, p. 4). Our approach (see for a detailed analysis Brunner, 2006) emphasizes the uncertain economic environment. Given that it is clear that each participant in e.g. a market tries to gain advantage over his competitors. Therefore the evolutionary aspect is that each entrepreneur is capable to create novelty and therefore self-transforms himself and his company respectively. This process of self-transformation or innovation process helps to gain advantage. After such an innovation the novelty disseminates in the market system through imitation. Therefore evolutionary economics can be seen as the process of endogenous generation of novelty and the subsequent dissemination. Thus, our evolutionary-oriented analysis of network management addresses two critical points: the respect of market dynamics and hence the importance of flexibility regarding the object of cooperation.

Our methodical approach is based on the idea of theory building by the means of case study research (Eisenhardt, 1989; Yin, 2003), which allows explorative insights into a new field of research. First implications have been drawn from a case study research that was conducted in 2006. It has been evident that the communication processes between network members are crucial for the success of the processes of innovation (Brunner/Voigt 2007). Even though we will not present our empirical findings in great detail for lack of space the case study can be seen as a starting point for the theoretical considerations in this paper.

This paper is organized as follows:

In the next section (2) we carry out a literature review with special regard to the described aspects like knowledge communication, decision-making and market dynamics. In section 3 we present an own notation of the central problem of knowledge in inter-organizational cooperation. Section 4 is dedicated to an introduction of three channels of knowledge processing whereas section 5 contains a more detailed analysis of knowledge management by using these channels. Finally, the last section (6) contains a short summarize and some conclusions.

II. A Review of Network Literature

For more than 20 years inter-organizational cooperation and networks are fashionable topics (Jarillo, 1988). Over the decades an impressive number of studies have been accumulated (for detailed survey: Osborn/Hagedoorn, 1997; Oliver/Ebers, 1998). In the following we are going to reflect this body of literature with special regard to six questions of analysis that shape the methodological approach of our study:

- (1) What types of cooperative arrangement/ network are analyzed?
- (2) Which criteria of efficiency are employed?
- (3) What is the scope of decision-making (when, who and frequency)?
- (4) To which extent are communication processes taken into account?
- (5) Are the impacts of market dynamics taken into consideration?
- (6) Is the analysis based on a fixed or convertible object of cooperation?

In doing so we distinguish four streams of network literature:

A very important starting point for considerations on networks and inter-organizational cooperation are transaction cost economics and the question to which extent a firm ought to get integrated into the market. This discussion started with Coase (1937) differentiating markets and hierarchies as principle mechanisms of coordination. Based on the more filed transaction cost analysis (Williamson, 1975; and especially Williamson, 1985) 'cooperation' is recognized as a third choice of action besides 'make' or 'buy'. In this regard transaction cost based analyses of inter-organizational network arrangements started with Thorelli (1986) who focussed on international operations whereas Jarillo (1988) addressed strategic networks in general. In the context of R&D cooperation Brockhoff (1992) analysed the relationship between the perception of transaction costs and the perceived success of the cooperation, whereas Olk and Young (1997) examined performance and conditions regarding membership as determinants of the decision to stay or leave an R&D consortium. Windsperger (2004) analysed network structures of franchising firms applying transaction costs theory in order to show the degree of vertical integration in the Austrian franchise sector. Michael (2000) investigated the balance of bargaining power between franchisor and franchisee with respect of transaction costs and discusses possibilities to decrease conflict and litigation in a franchise system. Other typical objects of investigation in the network literature are joint ventures. In this connection Kogut (1988) studied the strategic behaviour in explaining the motivation to establish a joint venture whereas Hennart (1988) distinguishes between 'scale' and 'link' joint ventures, both using the approach of transaction cost.

In this stream of literature based on transaction cost analysis all types of cooperative arrangements are observed. Core of interest is the question whether cooperative arrangement should be founded or if a single firm should join an established cooperation. The recommended action of decision-making is related to potential initiator or participant firms of a network and is determined by arising transaction costs (ex ante cooperation activity). Processes of communication are not explicitly focussed but are also considered regarding general arising transaction costs. The same is true for the inclusion of market dynamics. However, this affects the transaction costs just at the time when the single decision of joining the network arrangement or not (quasi static approach) should be made. Finally, the object of cooperation is related to predefined tasks in order to conduct a transaction cost related basis of decision. Therefore, this stream of literature cannot be considered to be open regarding the cooperative outcome.

There is a different large research area in the field of network research that combines the logic of transaction cost economics with considerations of the resource-based view of the firm (Pisano, 1990; Tsang, 2000; Oerlemans/Meeus, 2001; Chen/Chen, 2003; Glaister, 2004). When aspects of joint resources become the crucial point, there is a clear predominance for examining alliances (Kale/Singh/Perlmutter, 2000; Hitt et al., 2000; Das/Teng, 2000; Peng, 2001; Chen/Chen, 2003; Oxley/Sampson, 2004; Park/Mezias/Song, 2004) in this stream of literature instead of networks in general, whereas joint ventures (Tsang, 2000; Glaister, 2004) are analyzed more sporadically. Interestingly, examinations focussing on joint ventures assess both perspectives as complementary rather than substitutive views (Tsang, 2000; Glaister, 2004) whilst Chen/Chen (2003) found distinctive differences in the explanatory power of both concepts in respect of strategic alliances.

Regarding the decision whether or not to engage in inter-firm cooperation scholars of the field of research are supporting primacy to resource concerns instead of minimizing the costs of organizing (Combs/Ketchen, 1999). One of the main questions is how firms select appropriate partners (Porter/Fuller, 1998; Gulati, 1998; Hitt et al., 2000; Reid/Bussiere/Greenaway, 2001) which is concentrated on the level of attractiveness to exploit and develop their cooperative resources and using their technological capabilities (Singh, 1997; Mowery, 1998). Besides the rapid and efficient pooling of resources alliance partners face the problem to maintain open knowledge exchange sufficiently to achieve alliance objectives while controlling knowledge flows to avoid unintended leakage of valuable technology in longer-term considerations (Oxley/Sampson, 2004). Thus, we can identify *ex ante* and *ex post* decision-making in this stream of network literature. The objective of cooperation is clearly not open but predefined in the way of increasing the participants' capabilities and endowments (Combs/Ketchen, 1999), combining and recombining the existing resources in future directions (Gadde/Huemer/Håkansson, 2003) and simply to gather know-how and capabilities from their alliance partners (Kale/Singh/Perlmutter, 2000). Processes of knowledge-intensive communication are not within the general focus but arouse more interest in alliances as a mode of knowledge acquisition and exchange (Reid/Bussiere/Greenaway, 2001) and in the context of developing alliance capabilities (Kale/Singh, 2007). In contrast to the first stream of network literature resource-based approaches are able to capture aspects of market dynamics as far as the joint resources are incorporated in the future opportunities that are for example, when fusion technologies as complementary resources meet with converging markets of tomorrow.

The first stream of literature widely neglects the influence of the balance of power between the network partners. Power is only considered as far as it causes transaction costs. However, network participants may be confronted with intensively increasing transaction costs when paying little attention to their power in order to influence the cooperative performance and to opportunistic behaviour of their network partners. In the second stream the aspect of control is purely related to the access and utilization of internal and external resources (especially Pfeffer/Salancik, 1978) and the network partner (White/Lui, 2005) or discusses the need to protect themselves from the opportunistic behaviour (Williamson, 1985) of their partner to retain their own core proprietary assets (Kale/Singh/Perlmutter, 2000). Of course, this question is to a certain extent determined by the contractual arrangement of property rights and the principle of "resource attraction" (Hamel, 1999). However, we can identify another stream of literature which deals with power relations between network partners regarding the institutional structures. These have been partly analyzed (Greenwood et al., 2002; Oliver, 1997; Sydow et al., 1998) but there have been fewer discussions regarding the processes (Marchington/Steven, 2004). Studies emphasizing the aspect of the power relations between the organizations within a cooperative arrangement have been carried out for consortiums by Olk/Young (1997), for joint ventures (Pearce, 1997) and franchise systems (Fladmoe-Lindquist/Jacque, 1995; Michael, 2000). The focus shifts from a single time-fixed decision to the general question of governance and decision-making in cooperative arrangements especially regarding enforcement power of cooperative decision-making and the question of the direction of dominance. Thus, communication processes within the context of bargaining are in the centre of analysis whereas aspects of market dynamics are completely excluded because of their internal perspective.

Ahuja (2000) argues that the propensity of inter-firm cooperation can be explained by two factors; those of inducement that are in the focus of the two previous streams of literature and opportunity factors which draw on a less fixed objective of collaboration. Galbraith (1998) gave us a clear hint on the necessity of openness for the evolution of networks when stating that "The network organization is held together by constant negotiation". This emphasis on flexibility of the object of cooperation in repeated cooperation (Ring/Van De Ven, 1992) and the opportunity of each network partner to take influence, is the most explicit distinction from transaction cost and resource-based economics of network research.

The last stream of literature is somehow grounded on the asymmetric distribution of power and interest in a cooperative network but is less focussed in resulting incompatibilities and the motivation to engage in conflict (Kochan/Huber/Cummings, 1975) and their solving approaches. This fourth stream of network literature is strongly influenced by sociological ideas especially the Social Exchange Theory (Thibaut/Kelley, 1959; Emerson, 1976) and empirically tested (Schrader, 1990; Anderson/Narus, 1990). Coming from the fundamental view of the third stream some authors investigate the interactions between institutional characteristics of the network

arrangement regarding decision processes and those of individual decision-makers (Ballardini/Sobrero, 2003). Thus, a very distinctive difference from there can be seen in the emphasizing of inter-personal relationships (Kim/ Mauborgne, 1998; McAllister, 1995; Bouty, 2000; Olk/Elvira, 2001; Lui/Ngo/Hon, 2006). In the context of exchange of knowledge in an interpersonal perspective between agents within a network structure Cowan/Jonard (2004) examined the relationship between network architecture and diffusion performance. Olk/ Elvira (2001) analyzed the meaning of interpersonal relationships for development of strategic alliances and draw from social network and organizational control research how friendship level in alliances affects the alliance structure and outcome.

In large part the mechanism of coordination in this stream is not a hybrid order between make or buy, not primarily determined by resources or the formal decision body about interpersonal relationships of trust (Kim/Mauborgne, 1998; Gulati/Westphal, 1999; Bouty, 2000; Huemer, 2004; Wever/Martens/Vandenbempt, 2005). Trust is considered in its efficiency in combination with contractual safeguards (Luzi/Ngo, 2004) as well as in its roles in contrast to contracting issues (Blomqvist/Hurmelinna/Seppänen, 2005) in asymmetric collaboration situations. Furthermore, the question was treated in which extent trust building can be influenced in terms of commitment (Korsgaard/Schweiger/Sapienza, 1995) and identity (Beech/Huxham, 2003). Within interfirm boundaries the research area of boundary spanning (Ibarra, 1993; Kellogg/Orlikowski/Yates, 2006; Luo, 2006) studies interactions of individuals like gatekeepers (Katz/Tushman, 1981; Katz/Tushman, 1983) with external groups or like network champions (Gupta/Cadeaux/Dubelaar, 2006) with other network participants.

In the last stream of literature there is no focus on one certain type of cooperative arrangement but in general on aspects of social network. In comparison to the third stream the object of cooperation is less fixed and is rather changeable as a result of the knowledge exchange. Communication processes are in the centre of analysis as well but rather at an interpersonal level than in the formal body of decision-making. In his stream of literature market dynamics are not explicit included because of the inner perspective of interpersonal conflicts and exchange boundaries.

In comparison to this reflection our study is not limited to a special type of cooperation (1), we emphasize on dynamic efficiency (2) in contrast to a static approach (transaction cost and cooperation rent efficiency) and we focus on institutional decision-making processes (3) in an established network. In the core of interest are communication processes (4) as well as influence of market dynamics (5) on network development and performance. Finally, we also assume the object of cooperation to be generally convertible and open (6).

III. The Problem of Division of Knowledge in Networks

In this section we want to renew and reflect the problem of disaggregation of entrepreneurial action (as stated in the introduction) in the context of knowledge processing. In doing so we try apply the idea of 'competition as a discovery procedure' (Hayek, 1971; Hayek, 2002) to network economics. Thus, we have to identify a mechanism (in analogy to competition on the market level) that discovers single decentralized particles of knowledge that are widespread in the network structure.

Take a cooperation of at least two companies. These build a so called cooperation vehicle. The legal form of this vehicle is not important for the subsequent discussion. However, the vehicle has to meet the following requirements: The vehicle must gain a certain economical autonomy. It is not necessarily completely independent from the involved companies but there has to be an entrepreneurial tolerance (e.g. regarding production programme, the range of goods or the market attendance). Furthermore, there must be a real division of labour between the concerned cooperation partners. This may be gained, for instance, by shifting certain aspects of market treatment to purchasing associations or in case of a virtual business by assigning certain tasks regarding distribution or services only to appointed partners. The result of this assumed division of labour is a division of knowledge. The question to solve in this paper is to find out, how this divided knowledge is coordinated and how the concerned entities make their decisions.

If there is no cooperation the structure of the companies and the concerned markets may be presented as shown in figure 1: there are n companies denoted by U_i each with a market side M_i

and M_2 for the procurement market and delivery area, respectively. The arrows (\leftrightarrow) represent the market relations of the companies.

$$M_1 \leftrightarrow U_n \leftrightarrow M_2 \quad (1)$$

The relationship of the cooperation, however, may be depicted as in figure 2. The complete cooperation including the whole cooperative association shall be denoted by κ . M_1 and M_2 stand for the respective markets the concerned parties are active in; the market relation is represented by the arrows (\leftrightarrow). The double arrow between the vehicle CV and the companies U_1, \dots, U_n depicts the special relation between the company and the vehicle which on the one hand consists of the exchange processes (supply, provision of services, etc.) and on the other hand of the company law relations (member of the executive committee of the vehicle). The latter have to be notionally supplemented by informal institutions.

$$M_1 \leftrightarrow \underbrace{CV \leftrightarrow U_1, \dots, U_n}_K \leftrightarrow M_2 \quad (2)$$

From this follows, that there are particles of knowledge from each entity as well as from every relation. In detail one may extract the following particles:

Market knowledge: This refers to knowledge about market M_1 and M_2 (and any other markets) as well as the knowledge about the handling of these markets (concerning product design and pricing, business practice, etc.) Thus, it may be assumed, that the knowledge about M_1 is most likely to be located within the vehicle CV , whereas the knowledge about M_2 is most likely to be found within the companies U_1, \dots, U_n . However, we have to add, that in the latter case there will also be a division of knowledge as not every entrepreneur shares the same view on the identical market M_2 . Hence, a certain heterogeneity of knowledge must be assumed.

Exchange processes: The exchange processes between the vehicle and the involved companies is expressed by supply, rendering of services, etc. The vehicle and the involved companies may accumulate knowledge on extend, quality and other features of these exchange processes.

Corporate governance: Corporate governance of the entire cooperation relation refers to formal and informal institutions which are necessary to build and run the complete cooperation κ . This includes statutory organs such as board of directors and the supervisory board, company general meetings etc., and informal institutions as for instance ad hoc research or study groups, etc.

Knowledge on production and organisation: Apart from the knowledge about relations, there is also the knowledge about production engineering and the knowledge about a smart organisation of the added value. We may assume, however, that this normally applies to entities only and does rarely permeate the company wide organisation and system boundaries. Each entity therefore is specialized in its own organisation and production.

Because of decentralisation of decision-making and the disaggregation of entrepreneurial action there is no chance to concentrate the appropriate market knowledge at a single point in network organisation. In fact, using the cooperation vehicle as an instrument of knowledge processing means to align the decentralized particles of knowledge to the common objective of cooperation. Each network participant is able to gain a complete picture of knowledge regarding the part he is engaged in but not necessarily of the complete relevant market.

IV. Three Channels of Knowledge Processing

In principle, each party of the cooperative alliance (CV, U_1, \dots, U_n) has three possibilities to acquire knowledge about issues as listed above which are primarily important for it. We refer to these channels as to the *three channels of knowledge processing*. It is assumed that the own

market as well as the own company has been adequately accounted for. In the following we deal with knowledge processing concerning the market beyond the network partner. For the cooperation vehicle this is the market M_2 .

Channel 1: Direct observation and market research

The first channel comprises the information the concerned party acquires directly from the market that is by observing of the market. This could be achieved for instance by getting involved in the market via a subsidiary company. However, it can be assumed that this is normally not the case. This means, that the concerned parties depend on observing the market while not becoming active in the market themselves. Methods of observation could be general market research, trend research etc. If this channel of knowledge processing is adopted, there is no need for communication between the partners of the cooperation and the vehicle. In other words each network participant conduct its aquisition of knowledge autonomously.

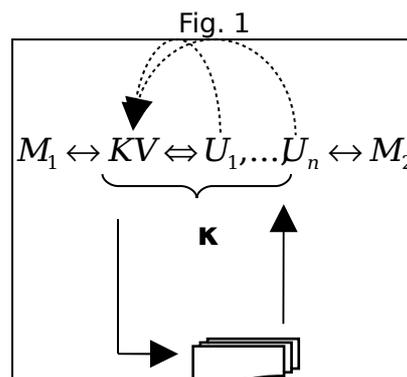
Channel 2: Exchange processes

A second channel may be defined as the acquisition of information through the concerned parties by observing exchange relations. For that purpose changes for instance in the use of services or the development of shares certain commodities have in an assortment are assessed. From the observed trends it is hypothesised how the market may be assessed from the other party. This knowledge may be acquired without external activities as only exchange processes on the basis of internal information systems such as accounting, controlling and other information systems are investigated.

Channel 3: Direct communication

Finally, a third channel implies that the parties concerned acquire their information directly from their partners; that is they acquire their knowledge within the framework of institutionalized (bodies such as advisory board, etc.) or informal talks which inform them on market observation and market assessment and the development the market will take in future. Initial point for activities on the third channel may be observed changes between the relations, that is - according to our terminology - the second channel.

The market knowledge merges via these channels into the cooperation vehicle where it may be concentrated and assessed. In a next step the partners may be provided with this knowledge. Thus, a certain cycle of information collection and concentration is created which allows the partner firms to question and comment on consequences and measures the cooperation has taken. Finally, such a feedback enables each party to assess whether the cooperation not only deals fairly and adequately with the information the member has contributed but also applies this information to its interest. In this respect information processing and forwarding of information concerning cooperation and partner is interdependent and may be depicted as in figure 3.



In rare cases only one channel will be employed. Often various channels will be engaged at the same time. However, the question is why a certain channel is more frequently employed in specific situations than the others. Basically and essentially costs of channel utilization (extend of efforts and expenses) have to be set off against the expected benefit. It has also to be taken into account that the channels may not be employed autonomously. Thus, findings from market research (channel 1) may lead to talks with partner firms (channel 3). It may also be assumed that these talks (channel 3) lead to an observation of the relation with the cooperation vehicle. Therefore, we may state that the utilization of the channels is interdependent.

From an evolutionary point of view channels 2 and 3 are characterized by their attempt to merge particle of knowledge which have been accumulated externally and to assess this information in regard to the construct cooperation. Thus, channel 2 and 3 may be described as having a much more indepth aspect of knowledge processing than a marketing research department on the cooperative level. However, we have to consider, that certain forms of information processing (marketing research, assessment of market data and data from the environment) ask for certain know-how as well as certain methods. As these will not always be available on the level of member firms, it may make sense to shift these duties and responsibilities to the cooperative level.

A dynamic world causes additional problems concerning knowledge. Within a turbulent and dynamic environment the importance of channels 2 and 3 increases as they are based on numerous activities in the fields of market and trend research which have not been organised centrally. Thus, channels 2 and 3 are superior to centralized information accumulation and processing.

V. Management of Knowlegde by using the Channels

If the cooperation should be aligned with the entrepreneurial moment as smart as possible, we have to ask whether and how the three channels will be employed and which composition of channels should be aimed at in order to support the entrepreneurship most effectively. The aspects of channel utilization will be the subject in this section.

In principle, numerous potential parameters for channel utilization may be introduced. However, not until we have presented basic and extensive reflections on that issue, a simplification and characterization of the channels will be carried out. Applying notation (2) the following elements and parameter may determined:

$M_1 \leftrightarrow$ On the market side of the cooperation vehicle the impetus of the competition has to be considered: Market phase, market form, intensity of competition etc. In other words the well known and well researched aspects of current industrial economics may be mentioned. In this respect we refer to the literature published in these fields of research.

\Leftrightarrow As stated in section 3 the double arrow represents an exchange of commodities as well as the rendering of services between the partners and the involved firms and the cooperation vehicle on the one hand and institutional arrangements on the other hand (legal form, precepts, contracts, advisory board, etc.). Concerning the trade-off one has to turn the attention to qualities of a commodity and the changes it has experienced during a certain period of time. The more it can be standardized, the more it is likely that channel 2 is adopted. The same applies to the frequency cooperation services are engaged. If the commodity or service are subject to changes through new product development and/or other innovation processes, or generally needs explanation, the communication between the partners has to be considered more intensively.

Great importance is attached to institutional arrangements as their definition either supports or prevents information processing. So a rather dominant trend may complicate communication processes as the dominating parties might reduce their engagement. A dominant trend may occur easily if entrepreneurial competencies are not evenly distributed among the parties concerned. Apart from this, the number of parties which have to be involved in the communication process has to be considered. If the number of U_1 increases, the degree of anonymity increases and it becomes more complex to arrange cooperation processes. Finally, the degree of economic independence of the parties con-

cerned plays an important part. The less the parties depend on each other, the more they will withhold their knowledge in order to avoid a loss of knowledge which might be critical for the business.

To sum it up we may state, that institutional arrangements offer fairly enough room for entrepreneurship. It becomes obvious, that well defined cooperation purposes and sophisticated contracts may – if bent on it – get in the way of entrepreneurial gentle cooperation.

↔ M_2 The market on the side of the partner firms may be looked at analogically to M_1 . In addition, the effects of the members' interactions have to be pointed out. These are in a certain action-reaction connection if they appear on the same markets and do not operate on completely disjunctive markets. This connection or in other words this stress of competition of the players among themselves leads to additional implications. The interaction of the firms occurs on two levels: On the one hand there is the level of cooperation where a certain loyalty to the organisation is required in order to safeguard the cooperation purposes; on the other hand there is the interaction on the market level, where a certain competitive relation between the players might develop. Thus, the cooperation vehicle acts as diffusion catalyst but may also challenge or reduce the cooperative performance considerably if the partners to the network compete with each other and the intensity of competition is increased by knowledge diffusion.

To simplify the analyses, we examine the inner structure of each firm that is each entity separated from the organisational environment. These we divide theoretically into several aspects: Each firm has a market environment as well as an environment within the cooperation. This way we may postulate for the utilization of the three channels as follows:

Hypothesis 1 *The more static the particular aspect of the environment, the more channel 2 will be employed.*

or in other words:

Hypothesis 2 *The more dynamic and turbulent the particular part of environment, the more the entity concerned has to revert to channel 1 or channel 3.*

According to these hypotheses an experienced behaviour (like order processing, repetitive activities) between CV and U_1 would call for a utilization of channel 2. Here also applies that concerning these controlling aspects a utilization of channel 2 is more attractive than the utilization of the other channels. Standardizations, e.g. of a product, show a similar effect: The more standardized the exchanged goods, the more channel 2 may be reverted to. This is demonstrated for instance in regard to trading for simple goods such as foods or banking services, etc. However, if the exchanged goods have to be negotiated anew just the contrary is the case. A virtual business for software development asks for a high degree of coordination among the players. Channel 2 does not provide enough information for new business or future actions. In general, we may state as follows: If the information processing via channel 2 is insufficient one has to switch to channel 1 or 3. The importance of channel 1 increases the more the gap between different levels of competence between CV and the participating firms widens. If, for instance, the CV with strong entrepreneurial competence is confronted with a number of U_i with a low degree of entrepreneurial competence, the CV will rather observe the market directly than revert to direct communication with its members.

The dynamics or statics of one aspect of the business environment is also understood as the changes of preferences of the consumer, innovation on the side of the member firms or other market participants, changes of delivery conditions of the pre-supplier, etc. Our hypothesis is based on the cost benefit analysis of the channel utilization as described above. The more static, the more routinely a certain aspect of the environment, that is the more repetitive a certain issue becomes, the more channel 2 may be employed as the most cost-effective channel. Based on these considerations we derive the following hypothesis:

Hypothesis 3 *The more the environment changes within a certain period of time, the more a direct communication (channel 3) between the players becomes necessary.*

However, it has to be considered that communication of knowledge is limited. Especially, if the concepts or the knowledge overlap only slightly the more communication is necessary. This again incurs costs. It should be taken into account that the CV ranges on completely different market phases than the participants to the network. Thus the experiential knowledge of the competitive situation overlaps only slightly and an exchange asks for increased and intensive communication.

Another important aspect is that knowledge depends on a certain platform/context. However, platforms cannot be transported with communication. Knowledge becomes information. The more knowledge depends on a platform, the more cost-intensive the communication. If we return to a characterization of the channel utilization by examining the dynamics and if we assume that the environment of the concerned player either shows low or high dynamics and that the U_i are homogeneous U_u or heterogeneous U_d , we derive at 24 cases indicating a utilization of the channels 1, 2 or 3 in various degrees of intenseness ++, + as described in fig. 2.

Fig. 2

				Channels			
				I	II	III	
<i>CV</i>	↑	U_u	↑	1		+	++
			↓	2	++		+
		U_d	↑	3	++		+
			↓	4	+	+	+
	↓	U_u	↑	5	+	+	+
			↓	6		++	
		U_d	↑	7		+	++
			↓	8		++	+

Finally, it should be mentioned that there are two important problems regarding knowledge communication: The cooperation must resolve which aspect should determine strategic decisions or in other words if either the market development on the part of the firm should come to the fore or entirely different aspects. In order to solve this problem we suggest that the cooperation should centre the aspect which to all players (firm and CV) is most decisive for the overall performance. It is obvious that this decision asks for separated communication processes and can only be reached per definition via channel 3.

Another important problem is conflict resolution. It is impossible to reach a mutual consent on the right path anytime – especially if we are talking about larger cooperations. If these conflicts cannot be solved, we have to ask which conflict resolution mechanisms should be applied. On the one hand, in the case of doubt the concerned firms should make the final decision but on the other hand conflicts could be solved by looking for alternative ways. Thus, the competition of ideas could unfold itself and after a certain period of time experiences and alternatives could be deliberated upon again. It should be clear, that institutional arrangements of the cooperation should provide mechanisms for conflict resolution at any rate. These should help to take corrective actions especially if there is a dominant trend (e.g. of the CV) to avoid that dominated partners will be outvoted and in consequence leave the cooperation.

VI. Conclusion

The leading question of our paper is how in cooperations the needed knowledge is acquired and used. We have presented three channels for the communication of knowledge. We presented several parameters which influence the mixture of the used channels. From an evolutionary per-

spective the dynamics of the business environment seems crucial for the success of the processing of the relevant knowledge. Therefore we argue that given a dynamic environment it is more likely to use the direct observation (channel 1) and direct communication (channel 3) instead of observing the exchange processes. Furthermore, the cooperation's institutions should provide rules for settling disputes. Nevertheless the presented framework for analyzing the processing of the market knowledge should be supported by empirical studies. Based on these studies one could draw recommendations for organizing cooperations.

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