Structurization and formalization of knowledge management in virtual organizations: the case of a medium-sized consulting company

Harald F.O. VonKortzfleisch
University of Kassel and New York University
harald.vonkortzfleisch@uni-koeln.de

Andreas Al-Laham
University of Dortmund and University of Toronto
uf-anda@wiso.uni-dortmund.de

Abstract

Regarding strategic management at the threshold of the next millennium from both perspectives, theory and practice, two central challenges for companies appear against the background of growing competition: the management of the firm’s knowledge basis in order to gain resource-based competitive advantages, and the development of network-oriented, (virtual) cooperative arrangements in order to maintain flexibility and innovativeness. In this paper, however we combine both challenges and investigate aspects of knowledge management in virtual organizations which marks an evident research gap at the moment. Following the resource-based approach, a company’s competitive position is determined by its bundle of resources which can be accumulated internally or acquired externally. We propose that a considerate policy of virtual organizing shows a third way between internal accumulation and external acquisition of resources. Especially, we will investigate the crucial role of the structurization and formalization of knowledge management. The findings of an in-depth case study show a range of special qualities of knowledge management in a virtual consulting organization: Firstly, the high degree of structurization and formalization is the basis for knowledge management in the investigated virtual organization. However, structurization and formalization are also the prerequisites for the use of ICT. Secondly, the high degree of structurization and formalization of knowledge management also limits the possibilities to reach a comprehensive level of organizational virtualness.

1. Resource- and knowledge-based view

The resource-based view is an attempt to explain and predict why some firms are able to establish positions of sustainable competitive advantage, and, in so doing, earn superior returns („rents“). Within this view the firm is perceived as a unique bundle of idiosyncratic resources and capabilities, which are difficult to imitate, trade, transfer, buy, sell, or substitute and which must have a systemic integration with other resources [3].

Recently there is a stream of research working on the deepening of the resource-based approach to constitute a knowledge-based perspective [14; 7]. The emerging knowledge-based view focuses upon knowledge as the strategically most important of the firm’s resources. Looking at the knowledge concept, it seems obvious that firms have different types of knowledge (e.g., explicit versus implicit; individual versus organizational; [13]). Each of the types of knowledge can provide the basis for a competitive advantage, but with radically different strategic implications and distinct ways a firm can deal with them [14]. Through integrating and managing knowledge, firms can build the capabilities, or competencies, that will sustain their advantage. Due to the „public good“ character of knowledge, firms are more efficient than markets to transfer and integrate knowledge [7].

We therefore follow the Kogut and Zander’s [11, p. 627] definition that sustains that “firms are social communities that serve as efficient mechanisms for the creation and transformation of knowledge into economically rewarded products and services“. Firms offer a privileged loci where individuals and groups develop a common comprehension of how to transform knowledge in the form of ideas into knowledge related to production and markets. The knowledge stock of a firm consists of codified and applicable knowledge as well as knowledge related to coordination of actions in the organization. What will determine the firm’s success is its efficiency in the transformation of knowledge as ideas into knowledge that can be applied, in comparison with the efficiency of other companies in this process [11].

2. Knowledge management

The main role of the firm is therefore to manage knowledge in order to improve organizational performance. Knowledge Management is understood as the process of identifying, developing, sharing and updating the strategically relevant knowledge of the firm, through processes within and across the firm’s boundaries. More precisely, the bundle of separable tasks which can be identified concerning knowledge management consists
of the two leadership tasks of setting knowledge goals and assessing the results of knowledge management with regard to these goals, and knowledge identification, acquisition, development, transfer, application, and preservation. [18]

A systematic, and strategic knowledge management should not only be restricted to the deployment of the operatively existing knowledge potentials. Rather, it is necessary to build up long-term knowledge potentials which can contribute to competitive advantage of a company also in the future. In this context knowledge acquisition and development and also knowledge transfer reach in importance. Not all of the necessary know-how can be built and developed by the firms on their own. In many cases it will become imperative to import knowledge from outside of the company, e.g. from customers, suppliers, or other partners within the value chain.

3. Networks and virtual organizations in the context of strategic knowledge management

Following Granovetter [6] the analysis of networks plays a key role for the understanding of economic performance, or as Perrow [16, p. 199] puts it: “We can best understand a particular organization if we understand the network it has to play in”.

3.1 Network characteristics

If we narrow the many definitions down to their common grounds [10, pp. 88-89], networks stand for economic exchange relations between legally independent but economically interdependent enterprises. They combine cooperative and competitive motives. Relations are flexible and connect usually several companies. However the relations are organized to a certain degree and they also comprise social dimensions.

Networks are aiming at realizing “collaborative advantage” [9]. This can take place in the form of realizing production and/or coordination costs advantages due to cooperation across boundaries, using resources of other companies or market access of these companies, getting standards through, or restricting economic risks [5, pp. 6-7].

Networks’ characteristics are often compared to distinguishing marks of the governance structures “hierarchy” and “market” [10, pp. 89-90]. Coming from a transaction cost theory perspective, authors like Williamson [25, p. 280] in the course of comparing characteristics of governance structures get to the result that networks’ distinguishing marks have middle coinings. However Williamson [25, p. 294] acknowledges that “[...] the hybrid form of organization is not a loose amalgam of market and hierarchy but possesses its own disciplined rationale”.

Another group of authors emphasizes the independence of networks as a governance structure by its own. Powell [17, pp. 303-305] for example identifies reciprocal patterns of communication and exchange, efficient information exchange, and the long-term perspective of cooperative arrangements as specific network attributes without ignoring the conflict areas of cooperations due to mutual dependencies.

Finally, networks can be seen as the dialectical synthesis of contradictions concerning its specific characteristics, rather than a comparison or combination of distinguishing marks of different governance structures [10, pp. 91-93]. Examples for contradictions are: the enlargement and narrowing of maneuvers, the combination of autonomy and interdependence, of cooperation and competition, of consensus and conflict, the combination of risk and trust, the balance between specialization and integration, and the combination of the stability of hierarchical relations with the flexibility and effectiveness of the incentives of market coordination.

3.2 Types of networks

Different types of networks can be distinguished according to the dimensions of time (stable versus dynamic) and control (hierarchical versus heterarchical), for example.

Strategic networks are lead by one or more focal companies. The focal company defines more than the other companies which are participating in the network what the relevant market is, which strategies have to be developed, which technologies have to be used, and how the network organizational structure has to be designed.

Regional networks consist of small and/or medium-sized enterprises which are regionally accumulated. Since there is no dominant leader in the regional network the organizational structure is more polycentric or heterarchical, respectively.

Finally, project networks exist only for a certain period; they are limited in time. However, very often the relations between the members of the network continue to exist for a longer than the project’s time. In practice, project networks are lead by a focal company, usually. Still one can imagine project networks with more heterarchically organized structures.

A special form of networks are so-called “virtual organizations” [23; 4]. Looking at the literature six characteristics of virtual organizations can be identified: (1) a common business understanding between the partners based on trust in order to cooperate without written agreements, (2) combination of core competencies in order to leverage resources, (3) one corporate identity so that the customers can be served from “one face”, (4)
prevailing renunciation of the implementation of additional central management functions with a view to prevent extra bureaucracy, (5) efficient information and communication technologies in order to reduce coordination costs, (6) a specific “mission” for a limited period of time. Characteristics (3), (4), and especially (5) stand for the main differences between networks and virtual organizations [22, pp. 17-21].

Venkatraman and Henderson [23; 24] point out that current models of organizational strategy and structure fail to meet the challenges of today’s knowledge-oriented competition. Based on a field study, the authors conceptualize a framework for virtual organizing that focuses on the importance of knowledge and intellect in creating value. Information technology lies at the heart of this business model. The authors’ approach incorporates three interdependent vectors:

- **market interaction** deals with new challenges and opportunities for company-to-customer interactions;
- **competency leverage** focuses on creating and deploying intellectual assets while sourcing physical assets from a complex business network;
- **work configuration** is concerned with opportunities for leveraging diverse sources of expertise within and across organizational boundaries.

Each of the vectors in turn has three stages. The vectors are interdependent in so far as the attainment of a stage within one vector produces the expected benefit only if the other vectors are also considered, properly.

**Stage one** focuses on task units such as customer service, purchasing, or new product development. The implicit objective of stage one is to improve efficiency by a closer integration of customers.

**Stage two** focuses on coordinating activities to create superior value. Implicitly, new organizational arrangements might come along with stage two.

Finally, **stage three** focuses on the interorganizational network to design and leverage interdependent communities for innovation and growth. Value in terms of new products and services has to be recreated on stage three.

The framework of Venkatraman and Henderson will be used in order to describe the case study and the specific findings further below.

### 3.2 Advantages of networks in the context of knowledge management

As to knowledge management inter-firm collaborative arrangements (e.g. alliances; networks; virtual organizations) have some significant advantages compared to hierarchies or markets. In order to discuss these advantages it becomes necessary to look more closely at the specifics of knowledge transactions because they supply direct hints as to efficient governance structures for knowledge management.

In the economic literature knowledge is concurrently marked as a “public good” or as comprising characteristics of public goods, respectively [12]. Public goods are different from private goods in so far as (1) consumption is not rival and (2) other users are not possible to be excluded from consumption. In the following we will have a look at some circumstances when markets fail and inter-firm collaborative arrangements are likely to be superior to either market contracting or internal integration. Following Grant/Baden-Fuller [8, pp. 19 f.], we point to four sets of circumstances for the market-failure of knowledge transactions:

- Problem of appropriability and failure of market transaction:

Firstly, appropriability refers to the ability of the owner of a resource to receive a return equal to the value created by that resource. Knowledge is a resource which is subject to uniquely complex problems of appropriability. Tacit knowledge is not directly appropriable because it cannot be directly transferred: it can be appropriated only through its application to productive activity. Explicit knowledge suffers from two problems of appropriability: first, as a public or nonrivalrous good, any one who acquires it can resell without loosing it, second, the mere act of marketing knowledge makes it available to potential buyers. If components of knowledge can be made explicit therefore no possibilities to exclude it from consumption exist, i.e. it will be difficult to define and monitor property rights. Therefore the risk of a fast and uncontrolled diffusion (imitation and expropriation) in market transactions exists. Thus, except for patents and copyrights where knowledge owners are protected by legally established property rights, knowledge is generally inappropriate by means of market transactions.

Secondly, inter-firm collaborative arrangements are more efficient than market transactions in the transfer and integration of explicit knowledge in cases where knowledge cannot be completely embodied within the product being exchanged. So, if the market transaction requires the transfer both of the product and the
knowledge involved in its production, then pure market contracts are unlikely to provide an efficient interface between the two bases of knowledge.

Thirdly, market transactions support the emergence of pre-contractual opportunism (cheating and adverse selection). If a buyer gets an information concerning the quality of the knowledge which will be transferred before sale within a market transaction, that means that this knowledge has to be revealed and described. The information or knowledge components respectively cannot been withdrawn from the buyer, independent of the fact whether the sale will be realized and the buyer will pay the price, or not. Under these circumstances the pure market transaction will be ruled out. Market-based solutions on the basis of contracts are not possible because it is true that the quality of the knowledge which has to be delivered is contractually arranged, but cannot be defined and monitored. The quality of knowledge cannot be described ex ante without revealing the knowledge itself. Contracts will stay incomplete and their observance before the court will not be possible. Furthermore an adverse-selection problem comes into being in such a way that the sellers will produce in a cheaper way, i.e. the quality of the knowledge transaction will be dropped down after conclusion of contracts.

In addition to that, market transactions of knowledge offer incentives for post-contractual opportunism (shirking and moral hazard). Shirking can appear for example if components of knowledge can be specified only to a degree that the difference between a complete and an incomplete delivery cannot be recognized. In this case, market coordination is not possible because price formation has no orientation with regard to the output, or opportunism cannot be avoided via the price, respectively.

Another problem occurs concerning knowledge components of which the use develops only after a time delay or in combination with other knowledge components or resources (e.g., basic research; technological know-how). In order to assess this kind of knowledge components, there is a considerable need for additional knowledge (knowledge of specialists), i.e. the value of the knowledge can only be determined accumulatively. Because mostly the needed additional knowledge cannot be sourced, the reputation of the seller becomes important. The reputation at least informs about the capacity of the transaction partner. In addition to that information about the trustworthiness of the transaction partner is necessary in order to estimate his or her capacity. These information can be obtained best from a long-term, experience-based coordination form. Within this context the mark of trust in the transaction partner gets central importance.

- Incongruent product and knowledge domains:

Because the scope of knowledge required by an individual product is very broad and because most knowledge is not product specific, few firms are able to achieve a close matching of their knowledge and product domains. The greater the incongruity between the product domain and the knowledge domain of the firm, the greater is the potential for inter-firm collaboration to increase the efficiency of knowledge utilization in order (a) to access and integrate knowledge which can be more efficiently provided by other firms, and (b) more fully utilize knowledge which is only partially deployed within the firm.

- The role of uncertainty and dynamic effects in knowledge-product linkage:

In industries where technology is changing rapidly, uncertainty exists over the future knowledge requirements of a product. Since acquiring and integrating knowledge takes time, the firm must make investments with uncertain returns. The greater the uncertainty which firms perceive, the greater the benefits of inter-firm collaboration compared to internalization as a mean to gain access and integrate additional knowledge. Considering the long time frame needed for knowledge creation and integration, inter-firm collaboration offers furthermore time specific advantages compared to internalization.

4. The case of a medium-sized consulting company

4.1 Research design

In a recent article of the Strategic Management Journal, Rouse and Daellenbach [19] point out that the dominant research design of strategy researchers, i.e. the use of large sample, quantitatively-operationalized research designs, has to be rethought in order to be able to isolate the sources of sustainable advantage that are theoretically predicted by the resource-based view, for the following reasons: “Firstly, since only firms with unique resources and competencies are assumed to have the potential for competitive advantage, the use of large-sample, cross-sectional analysis is unlikely to be able to disentangle the variety of effects associated with time, industry, environment, strategy, and the resource/capability of interest. Secondly, systematic methods for obtaining information are generally available to all competitors and new techniques diffuse rapidly [...]. Hence, most competitors are likely to react quickly to actions/resources/competencies discernible from secondary resources (annual reports, 10Ks, proxy statements, industry association newsletters, trade journals, etc.) and these could not form the basis of sustained advantage.
Valuable but commonly held resources and capabilities are sources merely of competitive parity. In summary, while strategic management research during the last two decades has shifted from a focus on environmental factors to intangible resource-based factors in the search for sustainable superior performance, the dominant research approach has not changed significantly” (pp. 488, 489). This holds especially also good for the field of information systems research, since information and communications technologies (ICT) can become core parts of resources.

Following the conclusions of Rouse and Daellenbach, and also following new qualitative-oriented research designs in information systems research [15], we used a qualitative, in-depth case study-oriented research design. Research instruments were several unstructured interviews with the chief executive officer (CEO) and the responsible chief knowledge officer (CKO) of the consulting company, analysis of the company’s documents, and participating observations of daily consulting procedures. The use of different instruments, also called “triangulation”, allowed to open diverse perspectives on the object of investigation, provided more information supporting the elaborated findings, made cross controls possible, and altogether offered more empirical substance than an isolated use of only one single instrument.

4.2 The virtual consulting company

The enterprise we investigated is a very successful medium-sized consulting company located in Munich, Germany. Consulting companies belong to the group of so-called “knowledge-intensive firms” [21] and are therefore best suited for a case study on knowledge management for the following reasons: The product they sell is knowledge in the sense that their customers shall become able to take action in a better way than they did before the consultation. In addition to that, most consulting companies sell “knowledge management” as a product, and finally, they implement knowledge management also for their own businesses, very often.

The company is specialized in consulting small family-owned firms with regard to business, legal, and tax-related questions. Due to at least two reasons the demand of these firms for consultation becomes obvious: Firstly, the qualifications of the firm-owners very often derive from an engineering educational background, i.e. in most cases they have only superficial business management knowledge even concerning the basics of business administration. Secondly, the question of regulating the succession due to generation change plays a dominant role for these firms, which normally turns out to be a major (political) and the existence of these firms risking problem. Though there is an obvious need for consultation of family-owned firms, they usually do not have the resources (in terms of money, time, people, for example) in order to finance in consulting services.

The investigated consulting company was founded in 1982 as an association. The legal structure as an association where also the clients become members was and still is necessary due to legal demands in order to consult not only in business but also in law and tax related problem situations. In addition to that, an association offers a frame within which a basic degree of trust is created due to the solidarity aspect of associations.

Behind the consulting company stands a virtual network consisting of the central unit in Munich, several regionally dislocated sub-units, and approximately 80 freelance consultants, completed by several experts, banks, Chambers of Commerce, administrative authorities, and politicians. The consultants can be distinguished between so-called “project consultants” and “care consultants”. These roles are connected with specific types of knowledge, i.e. more conceptual “consulting expertise” and more practical “implementation expertise”.

The network itself can be described as an open grouping of partners which agreed about the respective knowledge among one another and decided to set up a pool of potential members of a virtual consulting company. According to the typology of networks (see figure 1) it comprises characteristics of all three network types, i.e. strategic, project, and regional network.

The central unit of the network is not only responsible for a certain region but also for diverse services: research and product development, key account management, controlling, marketing, intranet development, mailbox-service, del credere, public relations, training and education, knowledge management, data base development, and strategic planning. The regionally dislocated sub-units are responsible for the project and care consultants in the respective region. They are either limited liability companies or stock corporations.

5 Structural configuration and knowledge management: empirical findings

Against the background of the framework provided by Venkatraman and Henderson [23] our empirical findings concerning the special structural configuration of knowledge management of the virtual consulting company are as follows.

The first vector deals with the relations between the company and its clients.

Concerning stage 1, remote product or service experience, in this case the main interface to the clients are the care consultants. Due to the regional structure of the network, they are virtually always present (either in person or remote via phone, fax, or electronic mail), and they are communicating with the clients on a very regular
basis. Physically they visit the clients minimum once a month. During these visits they follow a structured to-do-list. They are responsible for the transfer of the consultation knowledge into practice, following a detailed, highly formalized and structured catalogue of concrete steps which was elaborated by the project consultants.

The basis concerning stage 2, the product and service customization, is the so-called “program matrix”. The matrix can be understood as a bundle of pre-structured and highly modularized consultation knowledge products ready to be implemented for the customer solutions. Knowledge customization of this bundle of products follows according to two dimensions: the success of the respective small family-owned companies (successful; not successful) and their readiness or ability to change (ready to change; not ready to change).

Finally, with regard to stage 3, the shaping of custom solutions via active collaboration of clients, it has to be mentioned that the integration of clients’ knowledge for the purpose of finding problem solutions is restricted. Problems of small family-owned companies very often are not very complex from the consultants point of view. Problem solutions can be viewed as standard business knowledge in many cases, and for many problems (e.g. leading a bankruptcy through) “best solutions” already exist. This supports the assumption that the degree of shaping custom solutions is lower for the consultation of small family-owned companies compared to bigger enterprises due to the higher degree of structurization and formalization of the problems and the corresponding consulting knowledge. However, each consulting case needs its individual problem solutions in terms of that every situation at one point is different from another, though comparable situation, here: especially during implementation of consulting knowledge together with the clients.

The second vector concerns the different possibilities to acquire resources or knowledge, respectively and to develop new, innovative knowledge.

Following the three stages, on stage 1, efficient sourcing of standard components, the consulting company predominantly gets back to the knowledge which is represented by the network itself in the case of a consulting project. This includes the knowledge of the consultants, and of other experts or institutions of the network. It also includes the knowledge which is incorporated in the program matrix or in project documentations and reports, for example.

Concerning stage 2, effective asset leverage in terms of designing new solutions for clients, it has to be mentioned that from a strategic point of view the network and the knowledge it represents has to be stable, which is for the most part the result of the high degree of structurization and formalization of knowledge. Only this kind of stability guarantees fast analysis and findings of problem solutions which is necessary due to the small amount of money which can only be charged for consultation services in the case of small companies. As mentioned further above this does not mean that there is no need for individual consulting knowledge solutions. In order to develop individual solutions for clients’ problems, the project consultants have to individually customize the modules of the products of the program matrix.

Finally, concerning stage 3, creating new competencies through alliances, the creation of innovative solutions is limited by the need for stability of the knowledge network. However, in the near future it is intended to use the possibilities which the network provides in order to create new innovative products by using the knowledge of the many experts and institutions which are affiliated with the network and/or can be flexibly integrated.

The third vector focuses on the way how the knowledge work is done.

On stage 1, maximizing individual expertise, a high degree of knowledge processing time efficiency is possible due to the many highly structured and formalized aids concerning all consulting activities, from the analysis to the development of solutions. Aids in this sense are the modular structure of the consulting products represented by the program matrix, diverse report forms and examples, checklists, working papers, and special software, e.g. for the analysis of the liquidity. In addition to that so-called “special information” introduce special business related topics, like leasing for example. Finally, diverse aids in form of special information on branches or telephone lists are available, too.

On stage 2, organizational knowledge is harnessed due to the possibility to get back to the knowledge base of the consulting company, i.e. project documentations, project reports, and documented client information. This is heavily supported by ICT on the basis of a Novell-LAN, in which a Microsoft Access data base is integrated on basis of a Windows NT-Server. Microsoft Exchange is used for the communication.

Finally, on stage 3, leveraging community expertise, the network’s knowledge is developed by external experts giving seminars for all members of the network (including also clients) which takes place about two times per year.

The structural configuration of knowledge management in the investigated consulting company shows two specialties with regard to the framework of Venkatraman and Henderson. Firstly, both authors investigate only changes toward organizational virtualness which are due to the use of ICT. In our case study, not ICT but the high degree of structurization and formalization of knowledge management is responsible for the coining of the single stages of the three vectors. However, structurization and formalization in general are the prerequisites in order to program software for the use of ICT. Secondly, the high degree of structurization and formalization of knowledge
management is also responsible for the fact that both vectors, one and two do not reach the full level of virtualness. This means that the level of organizational virtualness at least depends on the degree of standardization and structurization of knowledge incorporated in products and services.

6. Conclusions

In this paper we had a look at knowledge management in virtual organizations which marks an evident research gap at the moment. Knowledge management was explained against the background of the resource- and knowledge based view. Virtual organizations are a special group of networks which show significant advantages concerning the transfer and development of knowledge products compared to markets and hierarchies. This was theoretically proven by using transaction cost theory arguments.

In order to investigate knowledge management in virtual organizations we used the framework of Venkatraman and Henderson concerning organizational virtualness. Our case study findings showed that the high degree of structurization and formalization is the basis for knowledge management in the investigated virtual organization on the one hand side, on the other side it also restricts a higher level of organizational virtualness.

Our study is in the status of preliminary research. Other findings have to be integrated in our conceptual ideas. For example, there are indications of the conjecture that more market mechanisms are implemented into the virtual network over time. In order to establish a “knowledge market” the central unit of the network takes over the role of a “knowledge broker”, for example. Also, as the cooperation is evolving, asymmetrical incentives to allocate resources for the purpose of learning of the participating network partners are occurring. Therefore the implementation of a market-induced incentive systems is planned in order to control the knowledge development and transfer. Finally, further empirical research is needed to put our findings on a broader basis.

References

