Analysis and structuring of collaborations:  
the knowledge management perspective  

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Abstract  
The present paper examines the contribution of current knowledge management  
perspectives to the analysis and structuring of collaborations A 3 level model is  
developed to demonstrate that relevant knowledge management contributions take place  
at the level of collaborative strategy within the organisation, the level of strategic  
collaboration agreement between the involved collaboration partners as well as at the  
level of actual implementation of the collaboration. The overall mastery of the  
knowledge-related processes at these three levels and their interaction is what comprises  
the knowledge-oriented collaborative competence of an organisation.  

Introduction  
In an environment that is characterised by fierce international competition, it is  
becoming increasingly important that innovations are brought to the market relatively  
quickly, adequately and cost effectively and are able to establish themselves. Two  
concepts that help achieve these objectives have attracted increasing attention. One is  
the introduction of knowledge management for effectively utilising the internal  
resources of an organisation The second is the use of collaborations for combining the  
specific strengths of different partners. Both in research and practice there is a growing  
recognition that there are many cross-linkages between the spheres of knowledge  
management and collaboration management These linkages have so far been considered  
only in passing.  

The present paper attempts a systematic analysis of the existing cross-linkages between  
knowledge management and collaboration management. We first take a look at the  
relationship between knowledge management and collaboration management from  
different perspectives. We then develop a three level model for analysing and  
structuring collaborations from the perspective of knowledge management. Based on  
this, we expand upon the concept of collaborative competence. Subsequently we explain  
the relevance of the developed model for researchers and practitioners.
The Relationship Between Knowledge Management and Collaboration Management

The relationship between knowledge management and collaboration management can be viewed from two angles. On the one hand, knowledge plays a role in collaboration management; on the other hand, collaborations are an aspect of knowledge management. Collaboration management and knowledge management can thus be understood as complementary concepts.

Collaboration Management and Knowledge

In the following, collaboration is defined as an organisational form between „market“ and „hierarchy“, causing a conscious mutual interdependence between the collaboration partners, although they remain largely autonomous. The activities of a collaboration are usually outside the sphere of the normal business activities of the involved organisations (Specht / Beckmann 1996, p. 387, Rudiger 1998, p. 26).

The relationship between the collaboration partners may vary. Collaborations entered into with partners at the same level in the market chain are referred to as horizontal collaborations or as strategic alliances. If the partners are in preceding or succeeding market levels collaborations are referred to as vertical collaborations and if the partners are from different markets altogether the collaborations are referred to as lateral collaborations.

There are many reasons for entering into a collaboration. Collaborations facilitate a reduction in costs and risks, entry into new markets, setting of standards, increase in market power as well as access to fresh knowledge that is relevant for the organisation. It follows that collaboration objectives can be short term or long term in nature. Different criteria are used to assess the success of a collaboration depending on its objectives. These include adherence to cost, quality and time targets, the quantum of specific collaboration results, e.g. profit, but also the long term viability of the collaboration. Various studies have demonstrated the success potential of collaborations (Amelingmeyer / Gerhard / Specht 1997).

Thus collaboration management seeks to ensure the effectiveness and efficiency of the collaborative activities entered into by an organisation. One may distinguish between several typical phases. The initial decision forms the basis of the collaboration process in the wider sense. The identification, selection and tying up with a partner are all based on the initial decision. Once a suitable partner has been found, the organisational and legal aspects of the collaboration can be jointly configured. It is only in the fourth phase that joint activity, i.e. collaboration in the restricted sense, actually commences. The final phase is characterised by the conclusion or the dissolution of the collaboration (Specht / Beckmann 1996, p. 393-411).
The knowledge factor plays an important role in several aspects as regards collaboration management. In fact, the desire for access to a partner’s knowledge is increasingly the catalyst for entering into collaborations (Mowery / Oxley / Silverman 1996, p. 79; Freiling 1998, p. 24). This holds true for collaborations e.g. in which the partners intend to jointly develop new products as well as for collaborations in which the partner’s market knowledge is used to enter new markets.

At a higher level, knowledge about the collaboration partner and knowledge about the efficient and effective structuring of individual collaboration phases is an important prerequisite for the successful implementation of collaborations.

**Knowledge Management and Collaborations**

Knowledge management attempts to ensure the availability within the organisation of knowledge relevant for different processes, both present and future, thereby contributing to the organisation’s success. The concept ‘knowledge’ has a very broad scope in this context. In the following, knowledge is defined as every form of representation of parts of the real or imagined world in a tangible knowledge carrier (Bode 1997, p. 458).

Various types of knowledge come into play in different organisational processes. Thus knowledge may originate in various divisions or areas (technology, market), it may be available in explicit or tacit form, it may have general relevance or pertain specifically to the organisation. Potential knowledge carriers in an organisation are individuals (e.g. employees), collectives (e.g. teams, departments) and material knowledge carriers (e.g. books, computers, products).

For an organisation, the most important knowledge is that on which its core competencies are based, i.e. knowledge that has been generated in learning processes within the organisation. More often than not, this is bound to collective carriers and thereby has organisational specificity. Consequently it also has particular value, rarity and imperfect imitability by virtue of it being difficult for others to imitate or substitute (Prahalad / Hamel 1990).

Within the framework of knowledge management it is important to either develop lacking relevant knowledge or to acquire it, to support the actual use of available relevant knowledge in organisational processes and to secure this knowledge for the organisation. Here we can differentiate between processes of planning (e.g. setting knowledge goals, identifying knowledge), implementation (e.g. selecting and implementing activities in the areas mentioned) and monitoring (e.g. measuring knowledge).

From the perspective of knowledge management, collaborations are interesting for many reasons. On the one hand they represent an instrument for acquiring knowledge that was not previously available. At the same time, in the interests of safeguarding knowledge, it is necessary to examine to what extent collaborations may lead to an undesired knowledge outflow. On the other hand, the implementation phase of collaborations, especially, represents a potential sphere of activity for knowledge management since the effective and efficient utilisation of knowledge is often crucial for success.
Collaboration management and knowledge management as complementary concepts

As we have seen above, collaborations are both an instrument and area of activity of knowledge management, while knowledge is both a goal and a prerequisite from the point of view of collaboration management. There are thus many cross linkages at different levels between knowledge management and collaboration management.

Three Level Model For Analysing And Structuring Collaborations From The Perspective Of Knowledge Management

For a systematic analysis of the relationship between collaboration management and knowledge management it is important to distinguish between and individually analyse various possible levels. This enables a clearer analysis of the effective relationships and influences in each case. The three level model described below for structuring collaborations from the perspective of knowledge management is intended to serve this purpose.

Basic structure of the model

If we take a closer look at the inter-relationship between collaboration management and knowledge management as discussed above, we can identify three basic levels, each characterised by specific objectives, conditions, tasks and instruments. It follows that these levels can also be assigned to the different decision-making levels of organisational management.

The strategic organisational level focuses on the individual organisation. The significance of collaboration and knowledge is analysed with regard to their effect on the organisation, irrespective of actual collaboration partners. Thus at this level we can focus on aspects such as the integration of collaborations in the internal knowledge management of the organisation. This includes, e.g. the acquisition of external knowledge and the protection of critical internal knowledge.

The strategic collaboration level on the other hand, deals with the strategic structuring of the collaboration between the involved partners. At this level, the collaborative goals of the partners, for example, are harmonised. The interests of the respective partners are expressed in the structure and conditions underlying the collaboration.

Finally the operative collaboration level deals with the actual implementation of the collaboration. This level focuses on the achievement of various collaborative goals under the specified conditions. Additionally, knowledge management activities in ongoing collaboration projects are analysed at this level.

There are many linkages between these three levels. As a rule, the preceding levels provide the basic framework for the subsequent levels. At the same time, there are backward linkages from these levels to the preceding levels. The degree to which an organisation has mastered these three levels and the interaction between them is a measure of the organisation’s collaborative competence.

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Strategic organisational level

For an organisation, each collaboration represents an external interface requiring special attention within the scope of the organisation’s internal knowledge management. Thus within the scope of a knowledge-oriented analysis, the strategic organisational level focuses on the integration of collaborations in knowledge-related organisational processes, taking into consideration the specific conditions in an individual organisation. In this context, the following issues are of interest:

- Expansion of the knowledge base as an objective of collaboration
- Providing internal knowledge management support for collaborations
- Protecting internal knowledge during collaborations
- ...

Strategic collaboration level

Selecting a suitable collaboration partner from a knowledge perspective
Harmonising and defining knowledge-related collaboration goals
Knowledge requirements as an important aspect of collaboration agreements
...

Operative collaboration level

Making knowledge available to the collaboration
Supporting knowledge utilisation within the collaboration
Quantifying and documenting the knowledge results of the collaboration
...

Fig. 1: Basic structure of the 3 level model

- Which knowledge management-related objectives can be pursued through collaborations?

In what way can knowledge-related and other collaboration-related goals be supported by activities of an organisation’s internal knowledge management?

What protective measures may need to be adopted during collaborations to protect internal knowledge?

**Expansion of the knowledge base as an objective of collaboration**

One significant objective of collaborations is the expansion of the organisation’s knowledge base. In contrast to knowledge generation within the organisation, collaborations often enjoy the advantage of lower risk and shorter time frames for making knowledge available. Knowledge can also be acquired from the market (e.g. by purchasing studies or licences). Collaborations, however, enable access to knowledge that is closely inter-related to various internal processes within the organisation. In practice therefore, collaborations are usually sought that will ensure access to the required knowledge. On detailed examination, we may distinguish between three different intentions during knowledge acquisition.

Frequently, organisations lack the knowledge to solve immediate tasks. These tasks may be unique in occurrence and/or of low strategic importance for the organisation. In such cases, a collaboration may be sought which allows the temporary use of knowledge which is in the possession of the collaboration partner. Since the required knowledge is not related to the core competencies of the organisation, the decisive factor is the reliable availability of the knowledge at the right time. On conclusion of the collaboration, this knowledge is no longer available to the organisation.

If, however, the required knowledge is of primary importance for the organisation, e.g. because it can be classified as important for present or prospective core competencies, then collaborations are often entered into with the objective of acquiring that knowledge for the organisation, thereby becoming independent of any partners. Consequently, special attention is paid to potential learning processes. A prerequisite for such learning processes is usually also the acquisition of the relevant knowledge context. This primarily includes the specific characteristics of the environment in which the knowledge was generated and/or applied, e.g. the type of cooperation among employees (Müller-Stewens / Osterloh 1996).

Finally from a knowledge perspective, collaborations may also be entered into with the objective of undertaking a long term joint activity with the partner, which would be unprofitable in terms of effort/expense for the partners individually. This happens when an activity requires the presence of very diverse competencies, which can only be achieved by combining the skills of various partners. If on the other hand a clear improvement in efficiency can be achieved after exceeding a critical mass, then long term collaborations between partners with a similar service product mix may enjoy considerable market advantages vis-à-vis their competitors (Freling 1998, p. 27-28). In contrast to cooperative ventures having a legal form, collaborations have the advantage that they need concern only a particular area, while the organisations may continue to work independently of each other in other business areas.
Providing internal knowledge management support for collaborations

The support provided to collaborations by the organisation's internal knowledge management can be divided into two types of support – a) ensuring that the required internal knowledge flows into the collaboration, and b) creating the conditions for the organisation to subsequently absorb the knowledge generated during collaboration.

For providing the requisite knowledge it is necessary to identify knowledge carriers within the organisation and to suitably integrate them in the collaboration. This integration may take on very diverse forms depending on the type of knowledge and knowledge carriers as well as the agreed conditions for collaboration. For example, workers may need to be assigned, equipment may need to be made available, documents may need to be compiled etc. If the knowledge carrier is simultaneously required elsewhere in the organisation, priorities need to be laid down. In some cases it is necessary to create independent structures for the collaboration, e.g. internal projects, within the organisation.

In order for knowledge from collaborations to be assimilated, a suitable environment must be created within the organisation. If the knowledge is to be integrated in organisational processes, it must be ensured that the interfaces within the organisation are ready to assimilate it. In cases where the objective of the collaboration is to acquire knowledge, it is necessary to create a platform for learning within the organisation. In most cases, knowledge acquisition presupposes a minimum amount of own knowledge which enables relevant knowledge to be recognised as such and integrated in existing structures. This effect is described by the concept „absorptive capacity“ (Cohen – Levinthal 1990).

Protecting internal knowledge during collaborations

One of the important tasks of knowledge management is also to preserve the knowledge position once attained. Acquisition of critical internal knowledge by other organisations may lead to this knowledge losing its function as competitive advantage. It is thus important to limit an uncontrolled outflow of knowledge, especially to competitors. It should be noted that knowledge may be transferred through a multitude of channels arising from the many points of contact between organisations (Mansfield 1985, p. 221).

Thus in collaborations with other organisations it is important to consciously monitor what relevant internal knowledge is being provided. It follows that it is necessary to determine what knowledge exactly needs to flow into the collaboration to ensure its functionality. A further distinction lies in the form in which this knowledge is made available, e.g. it makes a difference if experts or documents are provided.

The organisation must also decide what knowledge is to be passed on during informal know-how trading. The expectation usually being that the knowledge recipient will reciprocate, or that some other advantage will accrue, e.g. the establishing of a standard (Hippel 1987, p. 297-301).
Knowledge that is not intended for the collaboration partner can be protected in various ways. This includes sensitising employees in direct contact with the collaboration partner to the need for secrecy. Critical documents may be kept locked and relevant equipment may be made inaccessible to the collaboration partner. Additionally, knowledge may be legally protected through patents. However, it should be noted that in many instances it is difficult to completely safeguard internal knowledge against a collaboration partner, especially if the cooperation is very close and takes place on the organisation's premises. In such cases it is important that a relationship of trust is built up with the collaboration partner.

**Strategic collaboration level**

The strategic collaboration level focuses on the actual negotiations with a potential or actual collaboration partner. These negotiations are important primarily during the inception of a collaboration, when the decision in favour of a particular collaboration partner is taken and when the conditions for collaboration are jointly specified for the first time. However, even in ongoing collaborations, decisions are constantly being taken at the strategic collaboration level, e.g. when set milestones are achieved or if the assumptions underlying the collaboration change.

From the perspective of knowledge management, the following questions are of relevance at the strategic collaboration level:

- From a knowledge perspective, which organisations are of interest as potential collaboration partners?
- How can the knowledge-related collaboration objectives of the partners be harmonised and defined?
- How should the basic conditions of the collaboration be framed so as to best take into account knowledge-related objectives?

**Selecting a suitable collaboration partner from a knowledge perspective**

The selection of a suitable collaboration partner is an important prerequisite for successful collaboration with regard to the identified knowledge objectives. Special attention must be paid to the existing knowledge resources and knowledge objectives of the potential partner and his market activities. It is therefore, important to acquire the relevant knowledge about the partner to be able to assess him correctly. This knowledge can be acquired through means discussed under competitive intelligence.

The first step is to ensure that the potential collaboration partner actually has the required knowledge resources. As far as special technologies or market-related knowledge are concerned, the prior market activities of the organisation can provide some indication about existing knowledge. It is more difficult to ascertain the presence of knowledge that is not directly reflected in the market activities of an organisation.

The next step is to verify if and to what extent the knowledge-related interests of the potential collaboration partner are compatible with those of the organisation. Thus not
only the status quo, but more importantly, emerging future developments should be included in the assessment of the potential collaboration partner.

Finally, the type of market activities of the potential collaboration partner may effect the potential success of the collaboration. This often happens if there is intense competition between the organisations in one area of their activities. This may lead to tensions within the collaboration, even if the collaboration itself is agreed upon in a non-critical area.

Harmonising and defining knowledge-related collaboration goals

Establishing joint goals is very important since these goals serve as a guiding principle for the duration of the collaboration. It is important for the continuation of a collaboration that a win-win situation exists in which both partners derive advantages from cooperating and are not required to make too many allowances.

The first step is to compare the significance of knowledge-related objectives within the collaboration for both partners. Once these knowledge objectives have been identified, the second step is to define what knowledge is to be developed jointly, what knowledge input can be expected from both partners and how the obtained knowledge results will be divided between the partners.

Of course, not all internal knowledge-related objectives need to be revealed to the partner. Especially in cases where knowledge objectives are not the primary objectives of the collaboration, it may be prudent not to explicitly mention possible learning goals in order not to provoke additional protective measures on behalf of the partner.

Knowledge requirements as an important aspect of collaboration agreements

The most important task at the strategic collaboration level is the concrete formulation of the basic conditions for collaboration taking into account knowledge-related requirements. These include specifying the legal, organisational and locational framework as well as agreements regarding the duration and type of collaboration.

With regard to the legal framework, two main types of collaborations exist: one in which the partners enter into an agreement regarding the substance of the collaboration, e.g. exchange of resources or results. This may take place in a coordinated or in an uncoordinated manner. The other type of collaboration involves some form of capital participation, e.g. joint ventures or enterprises set up for jointly utilising patents. The stronger the legal framework, the more most organisations are usually prepared to trust one another and to let critical knowledge flow into the collaboration.

As far as the organisational framework is concerned, it is important to clarify issues pertaining to the organisation of cooperation and resource allocation. The large majority of collaborations are project-based. This ensures a high degree of flexibility and dynamism. Such collaborations can be managed primarily through institutionalising the relevant hierarchies and fora (project teams, project leader, steering committees etc.) The methods for resource allocation between the partners range from a strict division of

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tasks with a corresponding division of resources to joint implementation of the same partial tasks and a pooling of resources. The choice of method depends on the respective capacities of the partners – where capacities are unequal, the general tendency is to go in for the first option, whereas the possibility of synergy effects would favour the second option (Freiling 1998, p. 26-27).

With regard to location, the partners need to specify the place at which members of both organisations are going to work together. One extreme is represented by physically distant activities with an exchange of results at specified intervals while the other would be joint activities at the same location. Often, at least partial physical separation is selected if the locations of the collaboration partners lie far apart (e.g. in the case of Euro-Japanese cooperation), or if a high priority is accorded to maintaining knowledge secrecy at the respective locations. In cases of physical separation, especially, a fundamental decision needs to be taken regarding the type and scope of information and communication technologies to be used. In this context it must be borne in mind that although these media facilitate a transfer of knowledge transcending space and time, there are several technological, data safety, standardisation, integration, cost estimation and acceptance problems associated with them (Specht / Abraham 1997, p. 84).

Finally, while defining the conditions for collaboration it is also important to agree on the planned duration as well as the means of ending the collaboration. While deciding the duration it is important to take into account that learning processes, especially, require time. A premature conclusion of the collaboration may hamper learning processes within the organisation, however it may also limit the outflow of knowledge to the partner. After a certain duration, however, the potential learning curve starts dropping. Normal end points of a collaboration are the achievement of the collaborative goals and/or the expiry of the agreed collaboration duration. However, even unplanned changes in the collaboration conditions, e.g. changes in the organisational strategy of one collaboration partner, decreasing capacity to collaborate of one of the collaboration partners, hindrances emerging during collaboration or a lack of resources can all result in the ending of a collaboration. A collaboration may end either with its termination, its becoming autonomous or with a take over by one of the collaboration partners. Termination will take place primarily if both the collaboration partners regard the knowledge generated as a secondary competence with low future potential. If potential does exist, but lies outside the partners’ sphere of interest, the collaboration may become autonomous. Lastly, if the collaboration results are valued differently by both partners, the resources related to the collaboration project are usually taken over by the partner whose core competencies they touch upon. This is what happens in the majority of collaborations.

On the whole, during the process of defining the basic collaborative framework, the knowledge-related requirements can be better incorporated the better the contacts and the more open the lines of communication between the partners are, and the more the decision-making processes, the organisational culture and the commitment of the partners are on the same wavelength.

*Operative collaboration level*

The operative collaboration level focuses on the actual implementation of the collaboration. Thus this level usually deals with target-oriented project management. The following questions are relevant for the operative collaboration level:

- How can the knowledge required for carrying out the collaboration objectives be made available?
- How can knowledge utilisation be supported for achieving collaboration objectives?
- How can the collaboration results be quantified and documented?

Making knowledge available to the collaboration

Very often, additional knowledge, which is not in the possession of either of the collaboration partners, is required for joint collaborative tasks. In such cases it is the responsibility of knowledge management to make this knowledge available to the collaboration. This can be achieved, e.g. by acquiring the knowledge from external sources or by developing the knowledge internally.

Knowledge can be externally acquired by involving experts (e.g. consultancy firms), procuring the relevant documents (e.g. procuring secondary statistical data, purchase of market studies) or by applying the appropriate products (e.g. specialised software).

On the other hand, knowledge can be generated within the organisation by conducting firsthand market and technical research, developing the required software, products, production processes etc. in-house, as long as these are not the object of the actual collaboration.

Supporting knowledge utilisation within the collaboration

The most complex and demanding task of collaborative knowledge management is usually to support the joint utilisation of knowledge within the collaboration. There are organisational, technical and cultural aspects to be considered in this context.

From an organisational perspective, the utilisation of knowledge within a collaboration is often restricted by existing organisational structures and processes. For example, „management by walking around“ is much more difficult to implement in collaborations than in one’s own organisation. At the same time, personal contact during various formal and informal occasions is limited. Thus in most cases it is necessary, that cooperation within the collaboration team is more formally structured.

From a technical viewpoint, knowledge utilisation is often influenced by the type of information and communication technologies available. Primary among these are the instruments for telecooperation, such as email, video conferencing, workflow systems etc. By making these instruments available, knowledge utilisation can be supported to the extent that an exchange of knowledge contents is possible despite locational (and sometimes even time-related) differences. However, it is precisely in this context that there are frequently acceptance problems on behalf of the users. In such cases it may be necessary to provide intensive motivational training i.e. a „want to operate“, rather than skills training („how to operate“).
From a cultural viewpoint, the problems in joint utilisation of knowledge faced by many collaboration projects can be traced back to the different cultural backgrounds of the involved employees. These cultural differences can occur at a national level, at an occupational level (e.g. technical personnel and marketing personnel), at an industry level and at the level of organisational culture. Differences in culture can be reflected in differing value systems and expectations, in varying preferences, different attitudes etc. The type of culture usually also determines which methods and instruments are preferred for knowledge utilisation and knowledge transfer (Smeds / Olivari / Corso 1999).

Quantifying and documenting the knowledge results of the collaboration

One of the concluding tasks of collaborative knowledge management is also to quantify the results of the collaboration in a target-oriented manner and to make this available within the framework of the collaboration as well as to the involved organisations.

The quantification of the knowledge results of a collaboration is significant especially when knowledge generation was an objective of the collaboration. In such cases the status of knowledge generation is an indicator for project monitoring (milestone schedules, conclusion of the collaboration project) and for the success of the collaboration. Knowledge reviews conducted at regular intervals by the project participants are a conceivable instrument to measure the knowledge status. In this context it is important that there is a consensus about the status of the project among the participants.

The main problem we face in knowledge quantification is the fact that large portions of the knowledge usually exist only in the heads of the project participants. Often the participants hesitate to pass on uncertain, imprecise and/or incomplete information. Frequently they find it difficult to assess if the generated knowledge has achieved sufficient maturity to require documentation. In addition, knowledge dissemination and documentation are often neglected due to power/ego clashes.

The binding of knowledge to persons can also cause problems if the involved organisations want to continue using the results in their internal processes. If they are not in a position to directly involve the project participants in the new projects, they are dependent on the knowledge having been saved in impersonal knowledge carriers during the course of the collaboration, e.g. project reports, measurement protocols, lessons learned, prototypes, product samples etc.

While measuring and documenting the results of the collaboration it must finally also be decided if patent rights need to be applied for and to what extent the collaboration partners will participate in these rights.

Overall mastery of the three levels as a success factor for collaborations

One significant factor contributing to the success of collaborations is the individual collaboration partner’s overall understanding and mastery of the complexities of the three levels, both in terms of the content-related as well as the personnel-related
linkages between the levels. Once this has been grasped by the organisation, it will be able to develop and extend its collaborative competence.

Content and personnel-related linkages between the three levels

There are numerous content-related linkages between the three levels of knowledge-oriented collaborations. At the strategic organisational level, the existing conditions influence negotiations with potential or present collaboration partners. The results of the negotiations at the strategic collaboration level in turn determine the conditions and approach for the operative implementation of the collaboration. Simultaneously, strategic organisational considerations influence the concrete way in which the collaboration is implemented. Conversely, the results at the collaboration related levels will need to be taken into account by internal knowledge management.

Often the three levels are linked not only in terms of content but also at a personnel-related level. In many cases very close linkages can be observed, e.g. when the envisaged project leader of a collaboration project participates in the collaboration negotiations. Better exchanges between the participants at all three levels will lead to a better implementation and integration of the collaboration in the organisation.

Building up of knowledge-oriented collaborative competence

For individual organisations, collaborative success depends increasingly on their ability to understand and master the knowledge processes involved at all three levels of collaboration, including the interactions between them. In this context, the ability to structure these three levels and their interactions in a target-oriented manner may be referred to as knowledge-oriented collaborative competence.

From an organisational perspective thus, one of the primary success factors behind successful collaborations is a clear awareness of the organisation's strengths and weaknesses in relation to knowledge-related issues. Added to this is the ability to cooperate with collaboration partners to jointly arrive at functional agreements regarding the structuring of the collaboration. Finally, it requires the ability to effectively and efficiently organise the project-oriented implementation of the collaboration.

One significant characteristic of knowledge-oriented collaborative competence is that it builds on the experience gained during the course of several collaborations. At a meta level this facilitates a knowledge-oriented management of collaborations of a high standard (see Lyles, 1988, for a similar discussion on joint ventures).

One important prerequisite for building up collaborative competence in an organisation is the presence of structures that persist beyond individual collaborations, thereby facilitating learning from experience. At a general level this includes e.g. ensuring the availability of resources, collaborative orientation of personnel management, open communications structures and an open corporate culture (Ritter - Gemünden 1998). Additionally, it is essential to have a coordination node or centre where the experiences of the organisation's various collaborations are collected, evaluated, documented and integrated into learning processes.

Relevance Of The Developed Model

The developed model is a conceptual model which is largely intended to describe and systematise reality. Thus the model as such is not falsifiable. Its usefulness for researchers and practitioners is the indicator of its quality.

For researchers the developed model is relevant for several reasons. For one, it enables the systematisation and classification of studies on the interaction between collaboration management and knowledge management that have so far remained on a conceptual and empirical plane. The model provides a basis for the compilation of results to provide a more holistic picture of this topic. The model can also be extended by other aspects that have not been taken into consideration so far.

Secondly, the model can serve as a basis for future conceptual and empirical studies. For empirical surveys especially, it can facilitate determination of the target group and provide information on areas that need to be considered. This would allow the studies to be better structured.

For practitioners the developed model serves as an orientation for structuring collaborations from knowledge management perspectives. The division into various levels corresponds to the actual division of tasks and responsibilities in practice.

In addition, the model provides indications on how organisations can improve their collaborative competence. It emerges that collaborative competence has different and distinct features at each of the three levels and that it is essential to create linkages between each level. It is also important for effective learning processes that a node or centre is created, in which the experiences of different collaborations can be aggregated.

Conclusions

Within the scope of the present paper we have discussed primarily bilateral collaborations, which currently comprise the overwhelming majority of all collaborations. However, it is expected that in future, collaborative networks shall play a larger role than before. Bilateral collaborations would then often be just a part of a much more complex collaborative network.

At the strategic organisational level, this development would lead to an organisation facing the task of coordinating its goals vis-à-vis multiple partners and allocating resources accordingly. In such cases, the interactions between the various partners would also have to be taken into account. Similarly, at the strategic collaboration level, the overall context of the network would need to be taken into account and a harmonisation of interests at various levels would have to be achieved. At the operative collaboration level, the participation of more than two collaboration partners would lead to project processes becoming increasingly complex. Thus any measures taken from an organisational, technical and cultural viewpoint would have to be even more closely coordinated.

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The building up of collaborative competence in bilateral cases is thus a significant prerequisite for mastering the future challenge of collaboration networks.

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