The Dynamics of Soft Factors in Inter-Organizational Collaboration

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Abstract

The paper discusses the basic feedback structures underlying the dynamics of 'soft' variables in inter-organizational collaboration. An integrative system dynamics simulation model is used to generate insights into the dynamic processes taking place in the co-operation of two organizational entities. The model is based on a synthesis of results from different research perspectives on the various modes of collaboration. The model focuses on people-oriented, cultural, and knowledge-focused issues, since those are frequently described to cause the major dynamics influencing a co-operation's trajectory. The system dynamics model allows the simulation of different trajectories depending on the initial characteristics of the two collaboration partners, as well as on the actual management interventions during the process. It thereby creates insights into the possible outcomes of a co-operation, its chances and pitfalls, and thus offers a new approach for evaluating it from a dynamic soft issues perspective. Simulation results for three hypothetical scenarios of inter-organizational collaboration are discussed. The necessity of a soft-factor assessment of potential partners for collaboration is demonstrated.

Introduction: Dynamics and Diversity

The almost uncountable number of academic studies on settings of inter-organizational collaboration has provided academia with a rich and highly detailed body of knowledge. Research on the different modes of co-operations, e.g. in strategic alliances, joint ventures and mergers or acquisitions, reveals common structural characteristics underlying the dynamics and trajectories of such arrangements. Largely, collaborations induce dynamics in 'soft' organizational dimensions, i.e. they influence the employees' work motivation, change the organizational knowledge base or lead to a significant change in corporate culture. It can be assumed that different modes of collaborations share certain causal structures underlying the

observable dynamics in soft factors as, for example, Leonard-Barton (1995) suggests for the transfer of knowledge and Galpin and Herndon (2000) show for the dynamics in acquisitions and joint ventures. Thus, research findings on, say, cultural issues in strategic alliances can noticeably offer insights in potentially problematic dynamics also occurring in a joint venture or during post-merger integration. The present paper illustrates results from a simulation study that aims at the identification and explicit formulation of a generic causal structure underlying the observable dynamic behavior in inter-organizational collaboration.

The complexity of the soft issues of collaborative inter-organizational arrangements offers many starting points for research and has led to remarkable studies. But the insights derived from a large set of isolated studies are only limited in their applicability: Scholars usually have to focus on one organizational dimension and try to describe and analyse a particular aspect in high detail. A fragmented knowledge base makes it difficult to derive practical results from research. When evaluating only from a limited perspective, some beholders may consider a certain case of inter-organizational collaboration to be highly successful, whereas researchers or practitioners following another tradition observe enough difficulties and drawbacks to deem it a disaster. Therefore, the more detailed research on a specific object becomes, the less straightforward and manageable becomes the body of knowledge. Thus, integrative efforts to interconnect the individual insights with each other are necessary and highly desirable (Cooper 2001; Schoemaker 2001).

In the present paper we concentrate on a specific class of collaborative arrangements, namely those aiming at the generation of long-term benefits through the transfer of capabilities, i.e. “value creating” ones as Haspeslagh and Jemison (1991) name this class of acquisitions, or “learning alliances” in Gomes-Casseres’ (1993) terms. The value creation is considered to be achieved by a transfer of capabilities between the involved organizational entities (Haspeslagh and Jemison 1991). In the notion of our work “capability transfer” is seen as a combination of knowledge transfer—both explicit as well as tacit knowledge—and the transfer of tangible resources. Following Amit and Schoemaker (1993: 35) capabilities are “a firm’s capability to deploy resources, usually in combination, using organizational processes, to effect a desired end. They are information-based, tangible or intangible processes that are firm-specific and are developed over time through complex interactions among the firm’s resources.” Resources in this respect are “stocks of available factors that are owned or controlled by the firm. Resources are converted into final products or services by using a wide range of other firm assets and bonding mechanisms […], [*and consist*] of know-how that can be traded […], financial or physical assets […], human capital, etc. […]” (Amit and Schoemaker 1993: 35) Thus, the transfer of a capability can include only the shift of tangible assets enabling the other organization to deploy them, or may involve the transfer of intangible resources like explicit or tacit knowledge (Polanyi 1966) contributing to this deployment. In the latter case “capability transfer” can be used synonymously for “knowledge transfer” (Grant 1996). Collaborative arrangements aiming at such transfers are in need of an actual and active exchange of ideas through interaction of members of more than one organizational entity (Bresman, Birkinshaw, and Nobel 1999). Other organizational collaborations generate benefits mainly by taking advantage of an increased market size or effects of operative or financial consolidation (Haspeslagh and Jemison 1991). Supposedly, the latter cases do not lead to considerable dynamics within the organizational soft factors and, thus, they are not covered by this study.

Classification of research on organizational collaborations

A brief classification of research on inter-organizational collaboration appears to be useful to determine the scope of this paper. It distinguishes contributions to the field on three dimensions: the thematic focus of the study, the procedural stage of the investigated collaboration (comparable to a lifecycle) and the type of contribution the study wants to make.

On the thematic or "object" dimension six different categories can be differentiated: cultural aspects (Buono and Bowditch 1989; Gertsen, Søderberg, and Torp 1998; Nahavandi and Malekzadeh 1988; Zimmer 2001), knowledge or capability transfer (Bresman, Birkinshaw, and Nobel 1999; Håkanson 1995; Inkpen 1998; Kogut 1988a; Kogut and Zander 1992; Parise and Henderson 2001; Reid, Bussiere, and Greenaway 2001; Simonin 1999; Szulanski 2000), "people issues" like the employees' perception of the benefits gained from the collaboration (Bourantas and Nicandrou 1997; Cartwright and Cooper 1996; Risberg 2001), financial performance (Brealey and Myers 2003; Gaughan 1999; Healy, Palepu, and Ruback 1992), micro-economical market effects (e.g., Porter 2001), and finally legal aspects (e.g., Whalley 2000) of the arrangement.

As a second dimension, the distinction of separate process phases or evolutionary stages has become popular, both in M&A research (Håkanson 1995; Haspeslagh and Jemison 1991; Jemison and Sitkin 1986) as well as for strategic alliances (Das and Teng 2002). The majority of phase-oriented research suggests three phases of collaborations: (1) the pre-collaboration stage, (2) the actual arrangement at the closing time of the deal, and (3) the actual collaboration within the established arrangement, e.g. the post-merger phase (Jemison and Sitkin 1986). Arguably, a fourth category focusing on the dissolution stage has to be added: it covers studies focusing on the dissolution of collaborative arrangements, that is, for example, what happens if an alliance has been terminated by the partners or if it changes into an acquisitive modus (e.g., Hagedoorn and Sadowski 1999; Kogut 1988b, 1989, 1991).

The third dimension describes the kind of insights the study delivers. We distinguish between the two rather scientifically focused study results of (1) a description of specific phenomena or cases and (2) the attempt to explain the existence of such particular events or trends. In addition two classes of more practice-oriented outcomes can be identified, namely (3) suggestions for the design of policies, of organizational structures or of certain interventions, as well as (4) those studies even aiming at an optimization of policies and collaborations. Therefore, the higher classes are the more comprehensive ones and build on insights from previous levels, e.g. a design suggestion is not scientifically grounded without a study describing and explaining the focused problem.

Figure 1 shows the three-dimensional tensor formed by the combination of these categories. The scheme illustrates the diversity of possible research foci. The present paper chooses an integrative look at the organization-internal soft issues during the phase of active collaboration. It treats the emerging dynamics of people-oriented, cultural, and knowledge-focused issues when interaction actually takes place. In this stage, capability transfer is possible and employees experience a change in their organizational surrounding. Because of evaluation matters, it slightly touches the financial characteristics of the collaboration. Firm-external effects and a detailed financial analysis of the post-merger phase are not part of the analysis. Their omission is grounded in the assumption that those elements are not influenced extensively by the organization (in case of the market or the legal system), or are not the core elements of value creation (Haspeslagh and Jemison 1991; Kaplan and Norton 2004)

In summary, the study draws on descriptive and explanatory publications, combines them and attempts on this basis to derive policy suggestions. It does not aim at optimizing collaborations because, usually, organizational studies have to be too much abstracted to be still relevant, in order to allow calculating real optimal solutions. Thus, the scope of the paper is marked in Figure 1 as a shaded area.

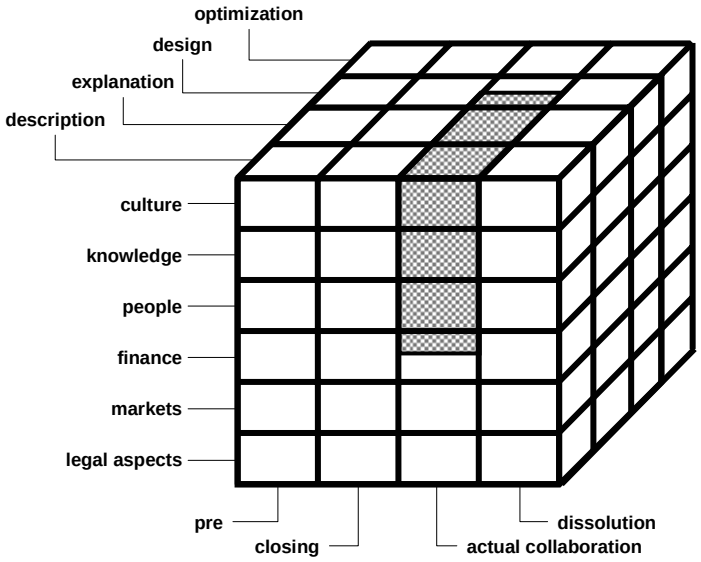

Figure 1: Tensor of possible fields for research on inter-organizational collaboration and focus of the simulation model (shaded)

Many studies, especially those combining insights cross-functionally over one or more stages of the collaboration's lifecycle (e.g., Birkinshaw, Bresman, and Håkanson 2000; Haspeslagh and Jemison 1991) mention conceptual and methodological problems arising due to the naturally high complexity of inter-organizational arrangements. They ascribe the difficulties either to the high number of interacting variables which are hardly to consider simultaneously, or to the long time span over which these variables have to be observed (e.g., Bourantas and Nicandrou 1997; Haspeslagh and Jemison 1991; van den Bosch 2001) or to the strong dynamics hardly to grasp for methodological reasons (e.g., Lane, Salk, and Lyles 2001). We suggest the application of the system dynamics method to overcome some of these difficulties by structured causal modelling and the possibility of conducting simulation experiments.

Methodology: System dynamics modelling and simulation

This paper presents results from a simulation model based on the system dynamics approach that describes and explains the rich and complex interaction between the 'soft factor' issues in collaborations. It allows the structured consideration of the manifold cross-influences between separately investigated phenomena which occur during inter-organizational collaboration and which are heavily interconnected and feed back on each other in a considerable manner.

The system dynamics methodology as a specialisation of the wider field of systems theory provides a clear perspective on such problems of complexity and dynamics. Collaborations frequently gain high parameter values on the three major dimensions describing a system's

complexity, which are its variety, its connectivity and its functionality (Milling 1981, 2002): In inter-organizational collaborations a large number of social and technical elements (*high variety*) are connected with each other multi-directionally (*high connectivity*), and these interrelations are not necessarily of linear nature but may be complicated, non-linear functions (*high functionality*). Thus, obviously a highly complex system is to be handled that needs specific methods for its representation. System dynamics offers such methods, for instance in the form of causal-diagramming. Problem analysis, the mapping of structural elements, and modelling without simulation, however, are insufficient for promoting an understanding of the system's characteristics because it is the connection of structure and behaviour that leads to understanding complex dynamic systems (Dörner 1996; Forrester 1994b; Richardson and Pugh 1983). Generating the behaviour of a system—to simulate—is a prerequisite for learning and understanding in complex systems (Sterman 1994). Therefore, system dynamics offers the opportunity to run simulations which allow investigating the behaviour of systems over time. Information from various sources has to be used in order to build a formal model that can be simulated (Forrester 1994a). Simulating a model does not only show a system's behaviour, but an analysis of simulation results usually points out inadequate or overlooked representations of the system structure and leads to revisions of the model. Only connecting structure with behaviour makes the development, testing and implementation of improved structures, policies, and decisions possible (Forrester 1994b).

In addition to that, simulation allows experimentation without being confronted with real world consequences. It enables us to carry out useful tests and experiments in a virtual environment, when such experimentation would often be too costly or—e.g. for ethical reasons—not feasible in a real world setting, or where the decisions and their consequences are too broadly separated in time. Other reasons for the use of simulations are the possibility to replicate the initial situation, and the opportunity to investigate extreme conditions without risk (Pidd 2004). Not only the model itself but also the complete process of building it is important in promoting an understanding of complex systems (Forrester 1985; Lane 1995).

Besides the emphasis on the simulation of formal models, some further characteristics can be considered crucial for the system dynamics approach:

- Feedback loops are regarded as building blocks of all economic and social systems because mono-causal reasoning abstracts too much from reality. Two types of feedback loops can be distinguished: positive (or reinforcing) loops and negative (or balancing) loops. Feedback loops often cause non-linear behaviour of the system in which they are present.

- There are stocks (or levels) in every system that accumulate past system's behaviour. These stocks can only be changed by corresponding flows; often, this process is influenced by delays.

- Qualitative or "soft" variables are not omitted from analyses but estimated as accurately as possible because omitting them would definitely cause an error: "In social investigation and measurement, it is undoubtedly more important to be vaguely right than to be precisely wrong" (Sen 2003: 6).

System dynamics aims at describing and explaining structurally determined dynamics and the general behaviour that a system generates endogenously. With the help of scenario testing, more robust policies and structures can be designed to improve systems performance. A prognosis of exact future numerical values or the identification of optimal values are not the primary aims of this type of models. Thus a quantification has to be reasonable, but even a

rough construct that allows to trace the variable's behaviour in connection to reality can be sufficient for a first model in a research field (Milling 1981).

Building and simulating a model can be considered useful from three perspectives: Firstly, during the model building process the externalisation of previously unarticulated (and maybe even unconscious) perceptions about the system's structure and causal relationships—so called mental models—can be achieved (Forrester 1971; Größler 2000). Secondly, simulation models further the understanding of the interferences of different variables with each other and the influence of particular structural premises on the system's behaviour. Thirdly, the formulation of an explicit model structure may reveal to what extent variables are directly influencing each other or are only indirectly connected with each other. The possibility of incorporating feedback structures allows both the modelling of direct as well as indirect reciprocal relationships and a complex and more realistic depiction of social, technical, and socio-technical systems (Forrester 1971).

The difficulties of classical empirical methods applied in management research for investigating and portraying dynamic phenomena can, at least partly, be alleviated through the application of system dynamics (Forrester 1961, 1971; Sterman 2000). The combination of insights gained with classical research methods into a dynamic simulation model allows the generation and analysis of dynamic patterns of behaviour through simulation. In addition, the lack of precision of many qualitative depictions of causalities, perceived complex structures and their dynamics is overcome by the formulation of unambiguous mathematical relations between the system's elements, which offer a clear basis for further discussions. Thereby, the lack of many quantitative descriptions not to identify causations but only correlations between observed variables is mitigated. System dynamics can thus be used as valuable complement to the classical research methods, for instance empirical studies (Sterman 2000).

In the modelling process for this paper, we conducted three important steps:

(1) Incremental definition: Explicit design of a consistent and complete qualitative model structure, generating insight into the (often previously unidentified) interconnections between research results and concepts, leading to an integration of the fragmented knowledge base within a clearly defined systems border. Deduction of model structure from literature with each directed interrelation representing a single hypothesis derived from literature (Miczka and Größler 2004).

(2) Parsimonious quantification. Precision of the hypotheses by formulation of mathematically precise relationships. Quantification is also based on literature review or, if no information on the strength of an interrelation is given, stated as simple as possible. Testing and validation of the structure and its basic behavioural modes, calibration to referential behaviour derived from literature.

(3) Simulation of scenarios. Setup of different parameter configurations representing theoretical or empirically identified characteristic scenarios. The virtual reality of the model allows approaching possible futures in a risk-free manner. Simulation results contradicting the model user's intuition or the evaluations of alternative, reliable tools induce a reflection process either leading to a redesign and improvement of the model (i.e. to an expansion of the knowledge base, which means to new explicit knowledge) or to the generation of new, previously unknown insights into the dynamics and the problem structure.

The results presented here are outcomes of step 3, using scenarios which are derived from literature.

Discussion of the model structure

Applying this mindset to the problems of inter-organizational collaborative arrangements, a dynamic simulation model has been set up that is based on essential contributions to the field and integrates them into a consistent structure (Miczka and Größler 2004). The model allows the simulation of the dynamics and outcomes of a specific cooperative arrangement, based on a description of its initial configuration in a set of parameters. It aims at the isolated valuation of the strategic option to team up with a particular partner organization from a soft-factors perspective. Therefore, it does not take into account which interferences possibly occur due to other, overlapping business decisions or because of external factors like parallel re-engineering projects, a worsening market environment etc. Thus, the simulation results indicate only one influencing element contributing non-exclusively to the actually observable organizational dynamics, especially in the long-term after the start of the collaboration when other strategic choices interfere with and overlap the effect of the partnership.

The organizational scope of the investigation has to be chosen carefully. Especially for the evaluation of cultural issues and the occurring knowledge transfer, the examination has to be well focused on the truly interacting organizational entities. If a detailed analysis is the aim, this appropriate level of analysis describes a population with a homogeneous social structure. In most cases this is to be found on the level of business units or single departments like R&D departments or sales units (Birkinshaw, Bresman, and Håkanson 2000: 403; Haspeslagh and Jemison 1991). For collaborations of large scope, this means in turn that either the model can be used to investigate the collaboration process only in a general and rather superficial way in one piece, or the simulation has to be conducted separately for every distinct organizational subunit that is combined with a counterpart. Thus, a large merger like the formation of DaimlerChrysler would call for a combination of multiple instances of the model used in this study, if a detailed and differentiated insight into the post-merger dynamics is desired. Otherwise, i.e. if the whole deal is simulated in one piece, only a general analysis can be achieved.

Figure 2 illustrates the major feedback structure of the model. The basic driver of successful collaboration is the generation of benefits for both organizational entities involved in the deal. As already denoted above, this kind of “value creation” is achieved by the transfer of capabilities from organization A to organization B and vice versa. Key element of this process is the vital interaction between A and B (Bresman, Birkinshaw, and Nobel 1999; Inkpen 1998; Kapmeier 2002; Khanna, Gulati, and Nohria 1998), either to share own capabilities or to soak up or “absorb” the capabilities of the counterpart (Cohen and Levinthal 1990; Lane, Salk, and Lyles 2001).[i] With a certain delay, the transferred capabilities are applied in the organizations and they start to increase organizational performance. The delayed perception of the beneficial character of the collaboration motivates the employees to increase their engagement and to interact more intensely with their counterparts. This motivational effect can potentially be increased through the implementation of performance-related reward structures. Additionally, management has possibilities to foster interaction, e.g. by starting specific workshop programs.

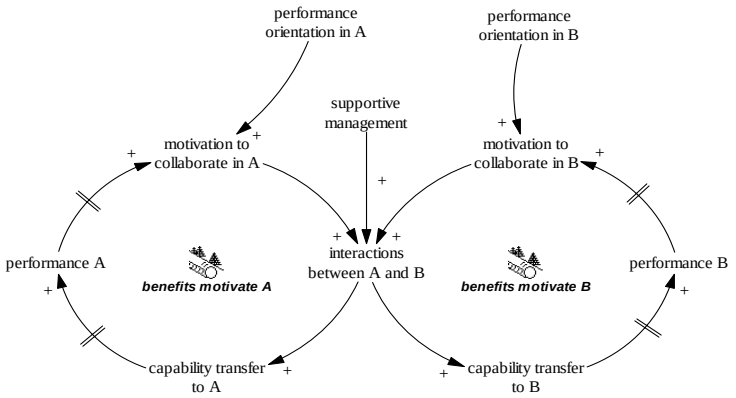

Figure 2: Basic feedback structure of the model, illustrating the dependency of a beneficial capability transfers on successful management in both organizations

This simple feedback loop already illustrates the importance of a balanced nature of the collaboration: If, say, A perceives the arrangement to be disadvantageous, this can lead to a critical lack in its employees' motivation to collaborate. Thus, the maybe beneficial capability transfer from A to B may be disturbed due to a blockade by A's employees to share their knowledge. Obviously, reciprocity is essential.

An extension by only one 'soft factor' shows the difficulty to oversee the dynamic behavior induced by a specific configuration from the outset. In Figure 3 the scope of the basic structure is expanded by a single feedback loop that describes the basic influence of an initial cultural difference between A and B on the system. Such a difference may result from the employees' possibly different ethnical surroundings in international collaborations (Gertsen, Søderberg, and Torp 1998; Hofstede et al. 1990), or just from a difference in the specific "way in which a firm conducts its business" (Barney 1986: 657) even in a similar societal framework (Buono and Bowditch 1989; Cartwright and Cooper 1996).

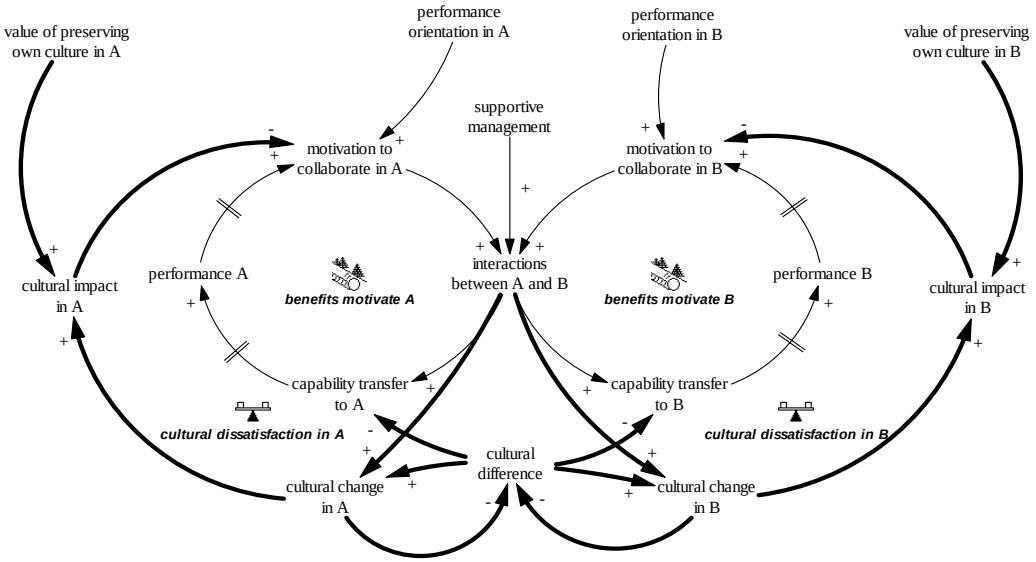

Figure 3: Basic feedback structure illustrating the potentially limiting effect of cultural changes on the beneficial, performance inducing capability transfers

The initially observable cultural difference is reduced through an assimilation process, a reciprocal diffusion of cultural elements between the two organizational entities. The significance of this cultural change to their self-conception is evaluated by the employees in both organizations. If a highly appreciated corporate culture experiences significant change, this will necessarily decrease the motivation to interact with the counterpart and thus reduce the number of interactions between A and B (Berry 1983; Nahavandi and Malekzadeh 1988). Therefore the interaction between culturally different organizations does not only represent a chance to share and obtain valuable capabilities from the partner, but also carries the opportunity for cultural misunderstanding, frustration and conflict that can hinder the beneficial capability transfer originally strived for (Cartwright and Cooper 1996; Haspeslagh and Jemison 1991; Nahavandi and Malekzadeh 1988). In direct contrast, advances in acculturation improve the progress of the capability transfer: Among other factors, the cultural difference includes discrepancies in the language, either the spoken language of the two organizations' home countries, as well as in the company-specific wording and use of technical terms. Therefore, a reduction of the cultural difference reduces the problems in the transfer of capabilities due to a lack of mutual understanding (Birkinshaw, Bresman, and Håkanson 2000). With some delay, this leads to an increase in the employees' motivation to collaborate and thus my offset the negative impact of cultural change in turn.

The complete model incorporates several other and also more complex feedback structures (Miczka and Größler 2004). For example, the central variable "number of interactions between A and B" is part of 69 feedback loops in the complete model structure. In total, the model consists of 75 interrelated variables and the exogenous parameter variables used to feed in the specific deal configuration. The variables as well as their directed interconnections have been identified by an extensive literature review. The model structure has passed the validation procedures suggested by Forrester and Senge (1980; also Sterman 2000) and has proved its technical quality and accuracy.

Each part of the model structure resembles a hypothesis presented in literature, sometimes also based on a combination of resources. Without claiming it to be perfect and final, the model thus represents a suggestion of a set of interweaved hypotheses that is supposed to serve as a basis for discussion about meaningful integration in the field of collaboration research.

Simulation of three collaborative scenarios

The simulation of three hypothetical scenarios is used to increase the confidence in the model and to demonstrate its ability to produce insightful simulation runs with reasonable results that match the empirical or theoretical results of other research contributions. Thus, in addition to the technical validity also a kind of theoretical validation shall be achieved. Figure 4 outlines the hypothetical storylines of the simulated partnerships to give a lively impression of the cases' different configurations. These plots are translated into respective parameter sets which are fed into the simulation model, resulting in the three simulation runs *alliance_11*, *acq_beloved_11* and *takeover_11*.

Scenario 1: STRATEGIC ALLIANCE "LARGE FISH, SMALL FISH" *(alliance_11)*

"Large Fish Pharmaceutical Inc." (A) wants to team up with "Small Fish Bio-Tech Ltd" (B), forming an alliance to develop a new treatment using Small Fish's unique technology and combining it with Large Fish's lab capacity. Key characteristics: Employee ratio 10:1, i.e. A has 1000 employees, but B only 100. Many highly skilled key people in both organizations. A is experienced in inter-organizational collaboration. High cultural difference and little attractiveness of A's conservative culture to B. Nevertheless high attractiveness to interact both ways, a little higher for A due to its tight competitive situation and the resulting high strategic relevance of the envisioned treatment. Collaboration includes significant traveling which is accepted by the employees. Major aim: Transfer of tacit capabilities from B to A, comparatively little transfer of mainly explicit capabilities the other way round. B's employees can act quite autonomously, no layoffs and immediate issuance of job guarantees. Collaboration is of high interest to top-management, which takes a very active part in communication.

Scenario 2: ACQUISITION BY THE BELOVED *(acq_beloved_11)*

Complementary market entry with a focus on rationalization: "A Inc." buys a sales partner "B Sales Ltd" in a neighboring country to improve its market presence. A is experienced in collaborating and has a reputation to be a fair partner. Collaboration is very attractive to B and with some, but only limited charm to A. A has 1000 employees, B has only 200. Relatively few key people in both organizations. Only few (partly tacit) capabilities are to be transferred from B to A, many explicit capabilities from A to B (standard procedures). Cultural difference is significant, but smaller than in Scenario 1. Low travel distance, traveling is well accepted. A's culture is highly attractive to both, just opposite to the one of B. A grants only very little autonomy to B. Comparatively high operational overlap. Job guarantees and layoffs are issues early in both companies and meet the experienced level.

Scenario 3: HOSTILE TAKEOVER BY THE BEHATED *(takeover_11)*

Complementary market entry with a focus on rationalization: "A Inc." buys a competitor's sales partner "B Sales Ltd" in a neighboring country to improve its market presence and to weaken its competitor. In contrast to scenario 2, A has the reputation to be aggressive in takeovers. Accordingly, layoffs are announced early, but affect B almost exclusively. Job guarantees are issued several months later. Only limited attractiveness for B's employees to cooperate with their counterparts in A, the cooperation faces a large cultural difference between A and B. Low travel distance, but traveling not favored by the employees.

Figure 4: Storylines of the simulated scenarios

Variables not explicitly necessary for the implementation of the depicted scenarios have not been changed in comparison to the base run presented in Miczka and Größler (2004). In addition, the basic characteristics of a performance-related incentive scheme developed therein have been reapplied. This policy does not make use of extrinsic incentives in the very early stage of the collaboration phase, but increases the performance relation on a diminishing scale over time (Figure 5).

In the following, the time series generated for essential model variables shall serve as a basis for interpretation to exemplify the dynamic insights, which can be gained from the model. Figure 6 shows the course of the transfer of desired capabilities between the two organizations and of their application. A decrease in the stock of 'desired capabilities' results from a successful transfer. With a certain delay, these transferred capabilities are applied and they generate benefits. The difference between the maximum level of applied capabilities to those originally desired results from a loss of capabilities in the collaborative process, for example, due to 'brain drain', i.e. the migration of key people owning unique capabilities. Figure 6a and Figure 6b clearly show that a significantly longer time span is necessary to transfer the large amount of tacit capabilities from B to A, compared to the time needed for the contrary transfer from A to B.

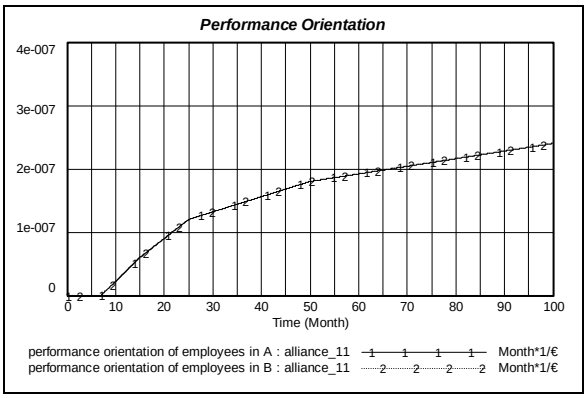

Figure 5: Performance-oriented motivation policy in A and B, used in all three scenarios

The two scenarios of acquisitive action illustrate the difference between a harmonic and a disharmonic starting-point for collaboration (Figure 6c and d). While the "acquisition by the beloved" leads to a comparatively fast capability transfer and early results from the application of the newly gained capabilities in the partner organization, the takeover case results in an extremely long process of value creation with late results. In addition, the loss of a large part of B's capabilities before they could be transferred to A—compare the peaks of the lines 2 and 4 in Figure 6d—accounts for a significant shortfall of potential for value creation. If an assessment of the originally identified and desired capabilities has been the basis for the valuation of B, then A might have overpaid heavily for the actually realizable benefits. Having said this, two aspects seem to be of particular interest in the following: on the one hand, the dynamics induced by the different parameter sets, which lead to these outcomes and, on the other hand, the monetary valuation of the three scenarios to derive a practically useful statement from the simulations.

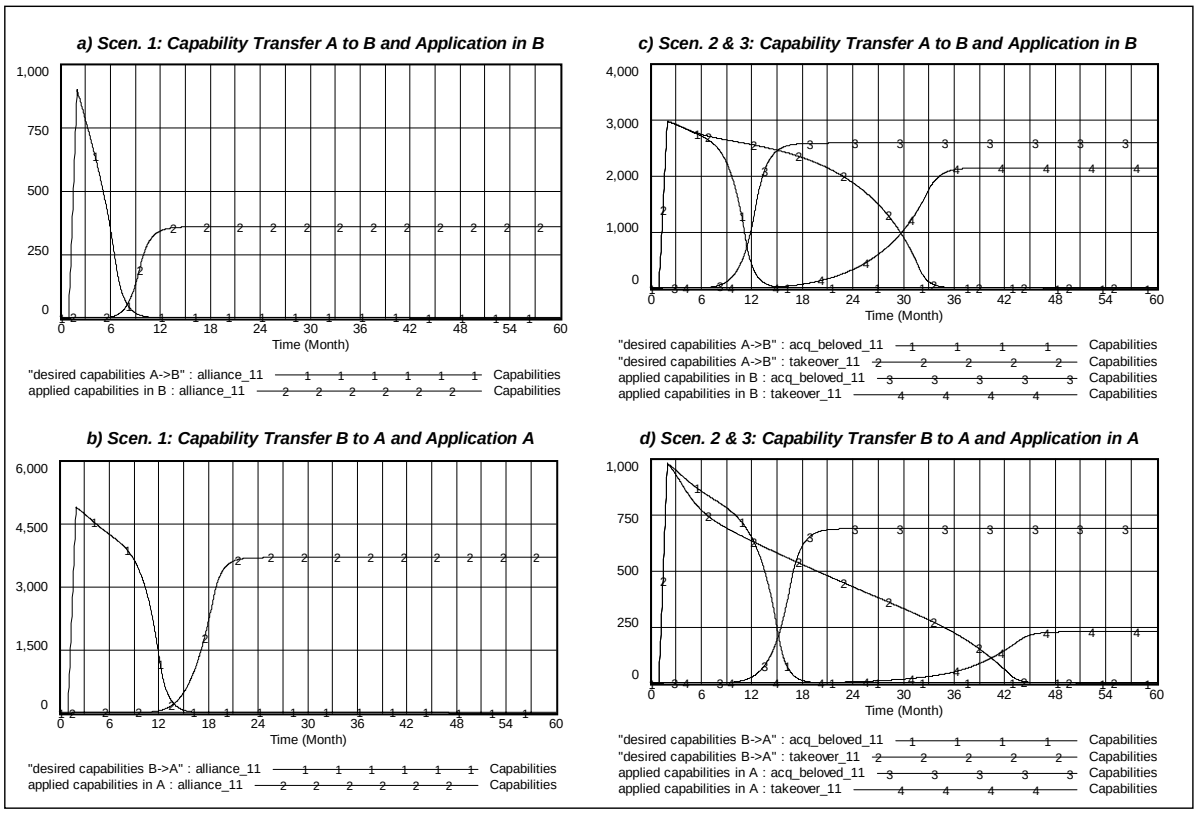

Figure 6: Reciprocal capability transfer and application between A and B

As already indicated in Figure 2 and Figure 3, the performance effect of the collaborative arrangement is a direct, even though delayed, result of the capability transfer. Therefore the amount of transferred capabilities as well as the time scheme of the transfer can be found again in the performance curves, compare Figure 7 and line 2 in Figure 6a and 6b respectively, as well as the lines 3 and 4 in Figure 6c and 6d.

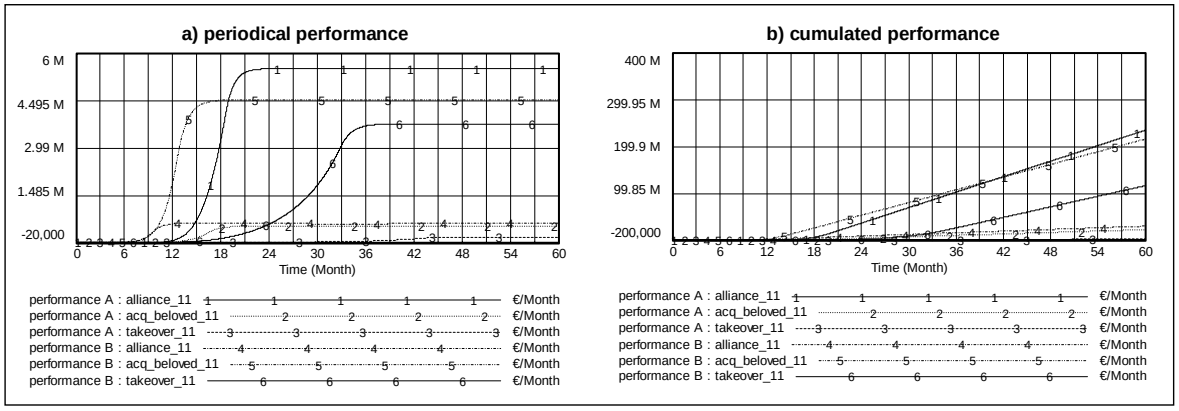

Figure 7: Internally generated simulation results for performance measures

This leads directly to the deal valuation by an assessment of the long-term performance effects. In addition to the periodical performance, i.e. the periodical net cash flows, Figure 7b exhibits the accumulated performance over time, which gives a direct impression of the value created by the deal. In the beginning of the collaboration a slightly negative performance can be observed (Figure 7a) for both organizations in all three scenarios. These operational losses occur due to the employees' interactions which are a direct consequence of the addressed internal soft factor dynamics. The initial interactions induce cost without leading to immediate benefit as interacting with an organizational counterpart stresses the workforce's capacity on top of the ongoing daily business. The value-creating capability transfer and the subsequent application take time, as we have already seen before. In the current simulations the valuation of the initially lost work time is kept rather low, and it is one of the parameters which needs targeted empirical investigation. Nevertheless, the basic direction of the influence is obvious. Taking into consideration that additional (exogenous) expenses may be related to the collaboration—e.g. travel expenses or overhead costs to manage the collaboration, which are kept exogenous to the modelled performance measurement structure since they are not influenced by the internal dynamics, but represent exogenous management decisions—both organizations should logically suffer from a clear worse-before-better in the overall performance.

As soon the capability transfer induces economical results we see a nuanced picture: The hostile takeover (lines 3 and 6 in Figure 7a and b) creates significantly less value compared to the two rather cooperative settings of the alliance case (lines 1 and 4) and the acquisition (lines 2 and 5). Both generate about the same total benefit for the combined organization, but the share for the respective entities is just reverse in the two cases: In scenario 1 (alliance) the large partner A gains a lot from the capability transfer and B does not benefit much, whereas B is the large winner and A does not a gain a lot in the "acquisition by the beloved" scenario.

For the acquisition case this unequal share of benefits is not directly of particular importance since both entities have been merged legally and economically. Therefore, if a performance-related incentive scheme is to be set up, also the combined performance of A and B can be used as basis for performance measurement, even if A and B are physically distant from each other. Without such a reward structure, the performance inequality should not be de-motivating to the worse-off partner, as long as a "uniting spirit" and a "we-feeling" can be held up until both organizations have been melted with each other in cultural terms.

In contrast, for the alliance case the observation raises an important issue: After the value-creating capability transfer to B has been completed, further cooperation is not beneficial anymore to it as it is no longer a receiver of new capabilities. B can apply the capabilities without any need for further collaboration and might logically—if no new reasons for further partnership have been identified—even terminate the agreement immediately with no regards to the progress of the capability flow to A. At that point in time A has not benefited from the collaboration. Therefore, the importance of a sufficiently detailed contract becomes obvious, covering the time span of the cooperation and possibly necessary monetary compensation for A in case of an early break up, as well as incentives for B to participate and collaborate also after a positive imbalance in the benefit situation has occurred. A has to share its tremendous surplus as a consequence of B's powerful position.

Looking at the dynamics in the further soft factors, the three scenarios also produce a differentiated picture. Figure 8 covers the cultural dynamics, showing the decrease of the initial cultural difference as well as the respective change in the two entities' corporate culture. Figure 9 depicts the time series for the motivation to collaborate, and the relative absorptive capacity, which is a scale for an organization's ability to absorb knowledge from outside.

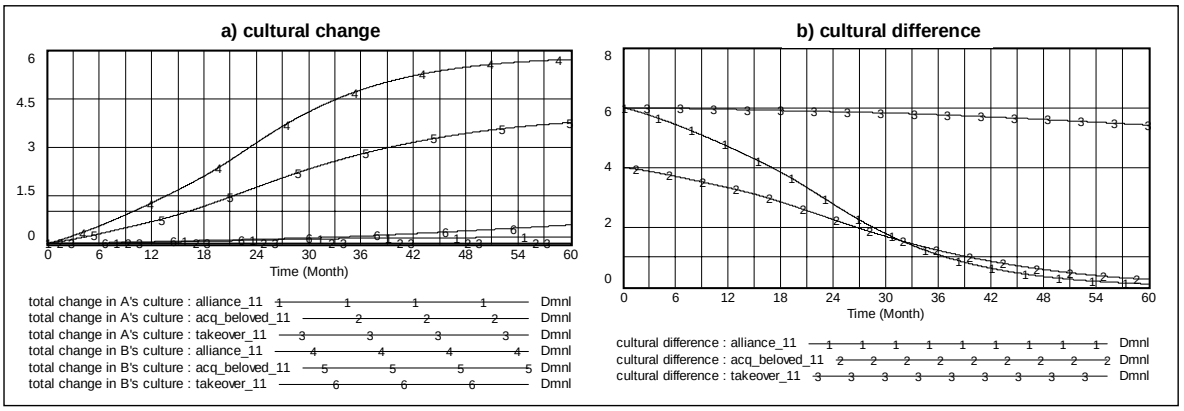

Figure 8: Cultural dynamics

Two insights can be gained from Figure 8: First, if acculturation occurs, the smaller partner B always has to bear the largest part of the change process. This is mainly due to the employee ratio of A and B, with A being five (in the acquisitive settings) to ten times (in the alliance case) larger than B. Thus A's culture is much more stable to influences from the smaller partner than the other way round. Second, the sympathy between the two partners is crucial: The fast cultural change in scenario 2 is obviously a result of the initial deal configuration saying A's culture is highly attractive to B. Similarly easy to understand is the takeover case which is essentially characterized by B's aversion towards A. Accordingly, B

proves resistance to change and almost no acculturation can be observed. The most interesting result is the fast and strong change in B's culture in the alliance case. The scenario description originally stated: "High cultural difference and little attractiveness of A's conservative culture to B. Nevertheless high attractiveness to interact both ways" (cf. Figure 4). Therefore, the simulation results imply a quite striking insight: Even if the partner's culture is not appreciated by B, the high attractiveness to collaborate leads to a significant acculturation. B's employees overcome their initial aloofness towards A in cultural terms since the interaction—which is the indispensable, but at the same time automatic source of cultural change—is perceived to be valuable. With the given employee relationship, B then has almost no chance to preserve its own culture. Figure 9a and 9b support this interpretation and the importance of the initial mutual interest in collaboration: At all times the motivation to collaborate is higher in the alliance case than in the other scenarios, which are not characterized by such a mutually high interest in teaming up.

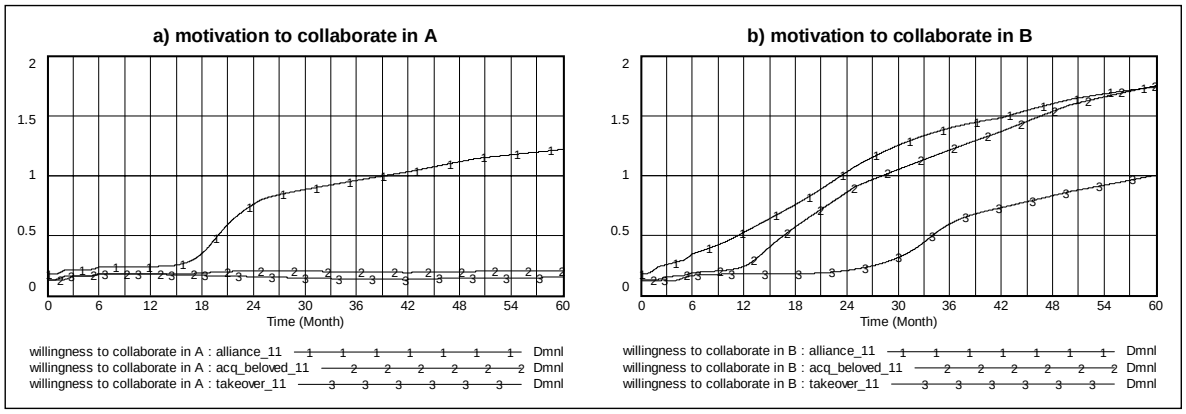

Figure 9: Motivation to collaborate in both organizations

In addition to that, Figure 9 illustrates the effect of the implemented performance-related incentive scheme: For those organizations benefiting from the deal significantly, the motivation to collaborate increases dramatically after first positive effects of the arrangements become obvious. The motivational effect shows how well this policy can foster the interaction. However, it also hints at a possible policy improvement: If extrinsic motivation is that effective, management should find a way to make use of it in the crucial period of the collaboration, i.e. during the capability transfer phase. A merely performance-oriented incentive scheme takes effect too late, when the thrilling part of the show is over. This result points at a future application of the model, namely the testing of different extrinsic reward structures for different deal configurations, as well as the need for a further step of validation of the model behavior with the help of empirical cases that are fed into the model.

Conclusion, implications & next steps

The presented simulation runs show results that allow a detailed evaluation of specific deal configurations. The diversity of the three artificially designed collaborative scenarios produces a correspondingly differentiated set of outcomes, which are both intuitively logical and in line with theoretical and empirical contributions to the field. The model shows its ability to serve as a means of risk-free testing the effects of possible partnerships and thinking through their dynamic implication in a virtual environment. The possibility of generating a

comprehensive description of possible chances and pitfalls for a specific arrangement is one of the major benefits of such simulations.

Beyond this descriptive insight, the system dynamics model also allows the structured, well-founded causal analysis and explication of the simulation results. The structural modeling clearly describes essential feedback loops determining the performance of a deal, taking the influences of soft factors into account explicitly and supporting a meaningful investigation of critical parameter configurations. It supports not only symptom-oriented learning by "trial and error" or gaming, but also a fundamental understanding of the reasons for failure or success. This is the basis for the derivation of policy improvements for both the definition of criteria for a "soft factor due diligence" prior to the establishment of an arrangement, as well as for policies to be applied during the phase of actual interaction to foster the generation of benefits for both partners. In addition, the model has helped to illustrate and explain moderating effects of previously only separately considered variables, what has hardly been achieved by statistical means (King et al. 2004).

Several concrete results can be deduced from the simulations for practice. The importance of a decent consideration of soft factors has been demonstrated in a very illustrative way. The necessity to assess a co-operation from the soft-factor perspective becomes obvious. Especially in terms of extrinsic motivation schemes and concerning the contractual compensation of a possibly worse-off partner, the model has delivered valuable insights. It has shown its quality to serve as a supporting tool for valuation of the strategic option to team up with a particular partner. Certainly, to increase its reliability it needs a broad empirical basis to allow a more precise calibration, compared to the rather theoretical one applied in the current version.

Up to now, the model can handle complex, multivariate scenarios and deliver reasonable results for different hypothetical scenarios. For gaining more confidence, it needs calibration based on larger empirical sample, i.e. on empirical data of the configurational parameters and of the corresponding output time series. Therefore, an empirical study is currently developed which should provide a broad empirical basis to increase the concrete, practical usability of the simulation model as a tool for decision support.

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[i] A basic problem in this regard is the quantification of capabilities: No manageable definition could be identified in literature. The solution applied in this model therefore is based on the simple question, "what do we want to learn to do from B?" The answer to this question has to be broken down as far as possible. For example, the capability to produce time-efficiently can be broken down into the capability of the effective transportation of input factors, an improved management of order releases leading to smaller lot sizes, the training of employees in new manufacturing techniques, and so forth. That means to learn time-efficient manufacturing implies to transfer at least three distinct capabilities in this abbreviated illustration.