

Contingencies for the Emergence of Efficient Symbiotic Arrangements

by

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1. Introduction

There is an increasing variety of concepts dealing with organizational forms between pure markets and pure hierarchies, e.g. relational contracting (MACNEIL [1974], WILLIAMSON [1985]), hybrid forms of organization (WILLIAMSON [1988]), symbiotic contracts (SCHANZE [1991]), strategic alliances and cooperations (SCHRADER [1993], STRAUTMANN [1993], HARRIGAN [1986]), and strategic networks (AOKI [1984], SYDOW [1991]). These and similar modes of interorganizational coordination are characterized by the following properties:

- long-term orientation (open-ended or limited for a long duration),
- incomplete contracts,
- mutual dependency in the “symbiotic field” while guarding the autonomy of both sides in terms of property rights,
- mutual adjustment of behavioral rules and culture.

It is the purpose of this short paper to present general contingencies for the emergence of such symbiotic arrangements (2.) and to give guidelines for the selection of concrete forms of symbiotic arrangements according to the respective form of resource interdependence (3.). A short outlook (4.) will exemplify the use of these economic concepts in practical design of organizations and in consulting.

2. General Contingencies for Symbiotic Arrangements

2.1 Specificity

Following standard transaction cost theory (e.g. WILLIAMSON [1985], PICOT [1991], PICOT and FRANCK [1993]) division of labor calls for

- classical market contracts, if highly standardized (i.e. non-specific) inputs (goods or services) have to be coordinated,

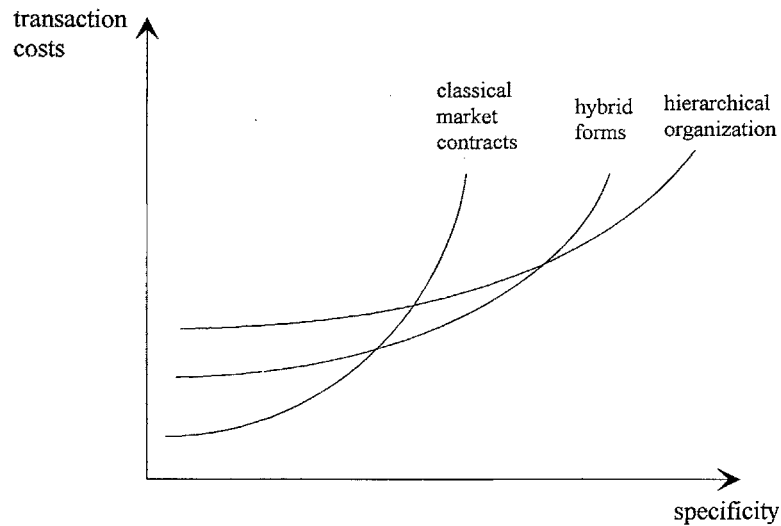


Figure 1

- hierarchical organization, in particular employment contracts, if highly specific (i.e. non-standard) inputs are at stake,
- hybrid forms of organization (relational contracts, alliances, cooperation etc.) if inputs with a medium level of specificity have to become part of the down-stream output.

Figure 1 depicts the relation between specificity, transaction costs and coordination mode (WILLIAMSON [1991]).

This theory implies that

- increasing specificity also increases transaction costs,
- the more integrative the organizational mode the less costly (in terms of transaction costs) is the management of specificity,
- in a competitive economic environment high levels of transaction costs as a consequence of highly specific tasks can only be justified if these specific activities contribute to the unique entrepreneurial performance or, in other words, to the potential competitive advantage of a firm.

The latter argument underlines that vertical integration, i.e. make-options should only be used for highly specific and strategically critical business activities. Strategically relevant activities or inputs imply high specificity by which a firm differentiates itself in a dynamic competitive world. Semi-specific inputs cannot yet be substituted by standard goods or services mainly because they must be adapted to the highly specific core activities of the firm. Therefore, they

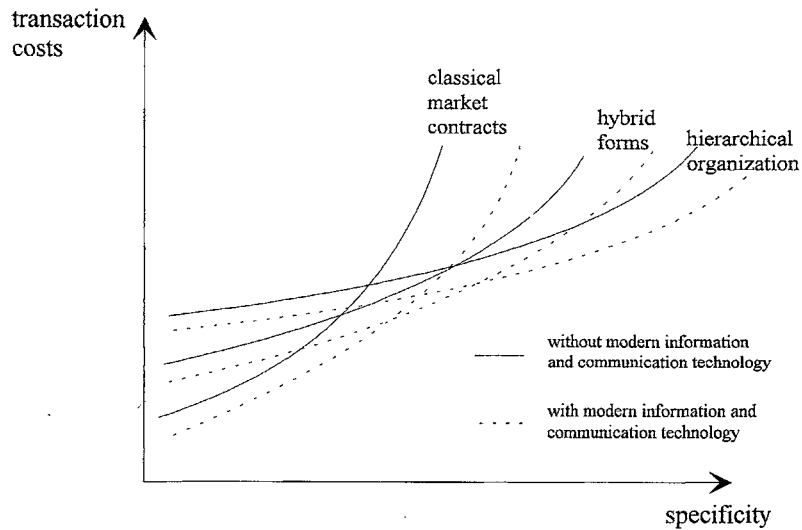


Figure 2

have to be coordinated with external suppliers in a symbiotic arrangement. Such an arrangement offers not only safeguards against mutual opportunism, but also an adequate framework for mutual task-related understanding and communication.

2.2 Technology

Transaction costs can be interpreted as costs of information and communication that have to be taken into account in order to come to a consensus on an equitable exchange. Costs of information and communication relate to all activities within a transaction such as search for alternatives, negotiation of conditions, management of task performance and exchange, checking of qualities, quantities, and prices, as well as adaptation to changes during fulfillment of the transaction. To the extent that information and communication technologies can economize on exchange related costs, transaction costs will decrease with adoption of such technologies (e.g. PICOT [1989]). It is widely accepted that information and communication technology reduces many costs of information and communication. Telecommunications as well as information technology facilitate contacts, negotiations, and data exchange, they support management processes and allow for cooperation even over long spatial distances than without such technologies. Suppose that telecommunications and information technology lead to a reduction of fixed and variable costs of transacting, figure 1 will be transformed as shown in figure 2.

As can be seen the critical amount of specificity for switching from one organizational mode to another is shifting to the right. This means that an increase in specificity can in these instances be handled by markets or symbiotic arrangements. Information and communication technology facilitates interorganizational cooperation and therefore opens options for new outsourcing opportunities and for new forms of coordination within the value chain. Not only information and communication technology in the narrow sense of the word but also other technological innovations in organization, distribution and production, especially creation of technical standards, construction of new contractual arrangements such as franchising, allow for a broader scope of interorganizational arrangements. Examples are just in time-supply of specific goods, CAD/CAM cooperation between independent firms, electronic data interchange between organizations as basis for new forms of intercompany logistics.

So far, semi-specific inputs seem to be the main contingency for symbiotic arrangements between organizations. This tendency is even fostered by new technologies that support actual activities. However, there are at least two qualifications to this standard view of transaction cost theory as will be shown in the following two paragraphs.

2.3 *Uncertainty*

The above outlined contingencies for the emergence of symbiotic organizational arrangements presuppose a low or "normal" degree of environmental uncertainty. As soon as environmental uncertainty increases and continues to prevail on a high level the arguments must be modified in favor of interorganizational arrangements even for rather high specific inputs. High uncertainty means that the economic actor must permanently take into account numerous potential changes in demand, technology, prices, products, competition etc. Qualitative as well as quantitative properties of these changes are fuzzy and cannot be predicted in any exact way. This also implies that the economic duration of specific investments tends to become shorter. Under such circumstances investing in highly specific and strategically important activities is even more risky than it is under "normal" uncertainty. Thus, the investor looks for opportunities of risk-bearing and risk-sharing. He or she will intensify the search for standardization and outsourcing of specific activities, which also will result in more relational contracting with the outside world than before. Furthermore and perhaps even more important he or she is now more willing than before to engage in quasi-integration with others even in fields of highly specific entrepreneurial activity. Thereby the parties involved can also benefit from the economies of scale and scope that one party alone could grasp only at very high risk. Symbiotic arrangements in highly specific and strategically important activities can be found under high uncertainty especially in the field of research and development projects, but they can also be observed in other fields such as

production and marketing. It must be noted, that such symbiotic arrangements will normally not result in classical full-scale mergers or acquisitions, because this would lead to an accumulation rather than to a dispersion of risk. Symbiotic arrangements will ensure the property rights autonomy of each party by dividing the overall entrepreneurial task and by dealing with numerous partners thereby diversifying the risk.

Increasing environmental uncertainty with the implication of shortened product life cycles is a typical characteristic of the economic situation in many industries during the recent past. This is a result of intensified global competition and of the augmentation and diffusion of knowledge. Therefore it is not surprising that symbiotic arrangements such as strategic alliances, joint ventures, long-term cooperations in special fields, can be found more often than before. Of course, availability of transaction cost reducing technologies supports the use of these organizational options.

2.4 Entry barriers

The afore-mentioned increase of dynamics and uncertainty creates still another strategic problem: as conditions for entrepreneurial success tend to change more rapidly devaluation of those highly specific competencies that used to form the strategic core of the firm, becomes more probable and occurs more frequently. Thereby the firm's existence is endangered. In order to overcome that challenge firms will build up, improve or even substantially differentiate competencies as a future basis of existence in the market. In other words: the capability for organizational learning gains even more critical importance for a firm's viability in a competitive environment. Assuming that strategic management can identify vital fields for future success – which is not at all self-evident – the question arises whether one should try to create the necessary knowledge by internal means (training of existing employees, hiring of qualified personnel, internal diffusion of knowledge, pilot projects etc). In many cases (e.g. switching from mechanical engineering to electronic design and systems integration) this option turns out to be too costly and too slow. Very often, due to the implicit and tacit character of such knowledge, acquisition and application of relevant know-how depends on specific external experiences and conditions that cannot be transferred and reconstructed rapidly enough nor at acceptable costs.

Entry barriers to new knowledge are always high. However, they are often lower if one tries to directly cooperate with those external organizations that already use at least parts of that particular knowledge. In order to allow that external knowledge to penetrate into one's own organization some sort of symbiotic arrangement may be required. Joint projects between the firm and external, experienced partners (research organizations, firms in the same or in other industries) are therefore suitable arrangements for a quick and reliable

transfer of knowledge. Of course, such arrangements must rely on reciprocity and on a maximum of mutual trust and fairness.

Thus, symbiotic arrangements become a strategic instrument for the development of future core competences of a firm. With increasing market dynamics this form of organizational learning becomes even more important. It must be stressed that this kind of symbiotic arrangement occurs not only once or twice for one firm, but calls for various cooperative agreements with all sorts of external organizations that contain some aspects of the targeted fields of experience and knowledge. It can be observed that companies which act in the described way gain a leading edge in a new field more quickly than others (PRAHALAD and HAMEL [1990]).

3. Analysis of Resource Interdependence as Basis for the Selection of Concrete Modes

3.1 Resource Interdependence

Specificity, technology, uncertainty, and entry barriers seem to form the main determinants for the emergence of symbiotic arrangements in industrial organization. However, this intermediate result does not answer the question as to what concrete organizational form of symbiotic arrangements should be chosen. Should it be more integrative (e.g. mutual holding of minority shares of equity) or less integrative (e.g. licensing agreement)?

An analysis of the prevailing resource interdependence between the parties involved can help to guide the design of hybrid forms of organization. Important insights into this relationship have been provided by TEECE [1986]. This section elaborates more deeply on this subject, relying to a large extent on DIETL [1993]; see also PICOT, DIETL and FRANCK [1994].

An economically viable symbiotic arrangement requires at least some participating parties dedicating resources thereby producing higher benefits viewed from a separated use. Thus, resources relevant to the symbiotic arrangement may be called interdependent. It is the prevailing characteristic pattern of the respective resource interdependence that shapes the efficient design of a symbiotic arrangement. There are three different characteristics of resources that have to be taken into account: dependency, potency, plasticity.

Dependency of resources is given if this resource yields higher results in combination with a resource of another firm as compared to a separated use (e.g. knowledge unfolded in a team compared to isolated use of knowledge).

A resource can be called possessing *potency* if other resources depend on this resource but not vice versa (e.g. the continuation of a business may depend on the prolongation of a bank credit). If a resource is dependent but not potent, then there exists a one sided dependence.

Table 1

		A's resources		
		dependent	potent and with low plasticity	potent and with high plasticity
B's resources	potent and with high plasticity	1) integration of resources (acquisition or merger)	3) B holding (minority) share of A	5) joint venture
	potent and with low plasticity	2) licensing	4) consortium	6) A holding (minority) share of B

Plasticity of resources (ALCHIAN and WOODWARD [1987]) relates to the fact that the kind of use of some resources can hardly be predicted. The more difficult it is to assess the kind of use of some resource the more plastic is that resource (often knowledge workers may be viewed as plastic resources).

3.2 A Framework for Designing Efficient Symbiotic Arrangements

Given these resource characteristics and assuming that two firms (A and B) are to form a symbiotic arrangement we may distinguish between several typical situations. Following DIETL [1993] each situation demands a particular form of efficient symbiotic arrangement (table 1).

Only one of the two firms may possess dependent resources (i.e. one sided dependence). Furthermore one may distinguish between situations with potent resources on both sides (i.e. mutual dependence) and low or high plasticity of resources respectively. Thus, six potential combinations can be discerned.

ad 1. If firm A's resources depend on potent and highly plastic resources of firm B, this one sided dependence is permanently endangered by hold-up risks and moral hazard. Assume that firm A owns production facilities whose economic benefits heavily depend on implicit engineering knowledge embodied in firm B. Due to that agency situation firm A will have considerable difficulties in monitoring firm B's use of knowledge. The only efficient solution to this situation lies in establishing a unified management of resources based on integrated property rights (e.g. through acquisition of majority shares or through merger).

ad 2. If firm B's potent resources are characterized by low plasticity (firm A's resources still being dependent) the efficient solution looks different. Now necessary inputs from B can be satisfactorily defined and transferred within a more or less complex contract, e.g. within a licensing agreement. Of course, such contracts are to some degree incomplete, i.e. relational. They need accom-

panying mutual communication, understanding, trust and advice. However, the economic core of the symbiotic arrangement can be formulated in contractual terms and be monitored by checking whether predefined goods, services, or information have been supplied or not. Licensing agreements for production of steel, chemicals, or trucks with companies in third world countries may serve as illustrations.

ad 3 and 6. If both sides dispose of potent resources, mutual dependence is given. However, the firm whose resources are more plastic has a strategic advantage over the other because the monitoring of its contribution to the common undertaking is more difficult. The resulting problem of moral hazard needs to be reduced. An efficient solution to that situation is a share of equity held by the firm with higher plasticity of resources in the symbiotic arrangement. This capital investment serves as a security for the side with less plastic resources. This security will not lead the other party to an opportunistic exploitation of its degrees of freedom offered by the higher plasticity of its resources. In many cases a minority share will suffice in order to economically stabilize such arrangements. An example is the cooperation between airlines and hotel chains or rental car cooperations. Such arrangements are often founded on minority shares held by the airline.

ad 4. In the case of mutual dependence with equally low plasticity of resources a consortium turns out to be the efficient form of arrangement. Both parties commit themselves to a common implementation of rather well defined projects thereby benefitting from synergies of resources and reduction of risk. Examples are consortia in the field of large engineering projects or consortia for the issue and sale of financial securities.

ad 5. If both parties dedicate potent and highly plastic resources to the cooperative arrangement this situation opens up opportunities for moral hazard behavior on both sides. As the respective contributions cannot be adequately monitored by the other side (this is at least the case in the beginning of the cooperation) each party may be induced to perform less than contracted. A party that behaves opportunistically, can grasp the cost advantages of such behavior, whereas the resulting reductions of benefit are shared by both. This problem can be most efficiently restrained if each party transfers its potent and plastic resources into a common cooperation, a joint venture. A commonly owned organization with integrated resources facilitates mutual monitoring, reduces inducement for opportunistic behavior, furthers development of mutual understanding and common culture, and, thereby, supports the achievement of the common goals. Examples can be found in research and development joint ventures that are equipped with qualified personnel and technical resources of both sides representing the respective implicit knowledge.

So far we have only looked at the design of symbiotic arrangements between two parties. The arguments made can also be extended to arrangements with multiple partners thereby explaining the efficient design of networks and keiretsus.

4. Using Theory and Practice

Many parts of the above theoretical arguments, especially those discussed in section two, have been used in consulting projects. Only a part of that experience is published (e.g. PICOT [1991], PICOT and GOEKE [1993], PICOT and WOLFF [1994], BAUR [1990], STRAUTMANN [1993], GERHARD, NIPPA and PICOT [1992]). In most cases the starting point for those projects was a differentiated make-or-buy analysis using a transaction cost framework (PICOT [1991]). From there only a few steps are needed in order to find and design those activities that need to be organized in some form of symbiotic arrangement.

Beginning with a systematic list of all relevant functions, activities, processes, or competencies of a firm, each item of that list has to be evaluated in terms of the theory presented. This is mainly done by intensive individual interviews or in group workshops. Of course, the theory has to be operationalized so that practitioners can recognize the relevant issues and associated problems. This turns out to be less problematic than initially assumed. Resulting recommendations that reflect the aforementioned theoretical arguments have been widely accepted and implemented. It seems that the new institutional economics of organization offers a valuable foundation not only for the understanding and explanation of a broad variety of organizational modes but also for practical advice in management decision making on organizational structures.

References

- AOKI, M. [1984], "Aspects of the Japanese Firm," pp. 3–43 in: M. Aoki (ed.), *The Economic Analysis of the Japanese Firm*, Amsterdam.
- ALCHIAN, A. A. and WOODWARD, S. [1987], "Reflections on the Theory of the Firm," *Journal of Institutional and Theoretical Economics*, 143, 110–136.
- BAUR, C. [1990], *Make-or-Buy-Entscheidungen in einem Unternehmen der Automobilindustrie. Empirische Analyse und Gestaltung der Fertigungstiefe aus transaktionskostentheoretischer Sicht*, München.
- DIETL, H. [1993], "Institutionelle Koordination wirtschaftlicher Abhängigkeit," working paper, University of Munich, Institut für Organisation.
- HARRIGAN, K. R. [1986], *Managing for Joint Venture Success*, Lexington.
- MACNEIL, I. R. [1974], "The Many Futures of Contracts," *Southern California Law Review*, 47, 691–816.
- PICOT, A. [1989], "Zur Bedeutung allgemeiner Theorieansätze für die betriebswirtschaftliche Information und Kommunikation: Der Beitrag der Transaktionskosten- und Principal-Agent-Theorie," pp. 361–379 in: W. Kirsch and A. Picot (eds.), *Die Betriebswirtschaftslehre im Spannungsfeld zwischen Generalisierung und Spezialisierung*, Wiesbaden.
- [1991], "Ein neuer Ansatz zur Gestaltung der Leistungstiefe," *Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung*, 43, 336–359.
- , GERHARDT, T. and NIPPA, M. [1992], "Die Optimierung der Leistungstiefe," *Harvard Manager* 3, 136–142.

- and FRANCK, E. [1993], "Vertikale Integration," pp. 179–219 in: J. Hauschildt and O. Grün (eds.), *Ergebnisse empirischer betriebswirtschaftlicher Forschung: Zu einer Realtheorie der Unternehmung*, Stuttgart.
- and GOECKE, R. [1993], *Untersuchung zur geeigneten Rechtsform und Organisation der Datenverarbeitung in Mecklenburg-Vorpommern*, unpublished survey.
- and WOLFF, B. [1994], "Institutional Economics of Public Firms and Administrations – Some Guidelines for Efficiency Oriented Design," *Journal of Institutional and Theoretical Economics*, forthcoming.
- , DIETL, H. and FRANCK, E. [1994], *Organisation*, forthcoming.
- PRAHALAD, C. K. and HAMEL, G. [1991], "The Core Competence of the Corporation," *Harvard Manager*, 13, 66–78.
- TEECE, D. J. [1986], "Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy," *Research Policy*, 285–305.
- SCHANZE, E. [1991], "Symbiotic Contracts: Exploring Long-Term Agency Structures Between Contract and Corporation," pp. 67–103 in: Ch. Joerges (ed.), *Franchising and the Law: Theoretical and Comparative Approaches in Europe and the United States*, Baden-Baden.
- SCHRADER, S. [1993], "Kooperation," pp. 221–254 in: J. Hauschildt and O. Grün (eds.), *Ergebnisse empirischer betriebswirtschaftlicher Forschung: Zu einer Realtheorie der Unternehmung*, Stuttgart.
- SYDOW, J. [1991], "Strategische Netzwerke in Japan – Ein Leitbild für die Gestaltung interorganisationaler Beziehungen europäischer Unternehmungen?" *Zeitschrift für betriebswirtschaftliche Forschung*, 43, 238–254.
- STRAUTMANN, K. P. [1994], *Ein Ansatz zur strategischen Kooperationsplanung*, München, forthcoming.
- WILLIAMSON, O. E. [1985], *The Economic Institutions of Capitalism. Firms, Markets, and Relational Contracting*, New York.
- [1988], "The Logic of Economic Organization," *Journal of Law, Economics and Organization*, 4, 65–93.
- [1991], "Comparative Economic Organization: The Analysis of Discrete Structural Alternatives," *Administrative Science Quarterly*, 36, 269–296.

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