

Socio-cultural aspects and barriers of industrial symbiosis – the good, the bad and the ugly: which ones matter and why?

URŠKA FRIC

Institute for Processes and Analyses
Faculty of Information Studies in Novo mesto
Ulica talcev 3, 8000 Novo mesto
SLOVENIA
urska.fric@fis.unm.si

Abstract: Industrial symbiosis as a relationship between two or more social actors involved in exchange of material resources, where each actor follows its own interests and at the same time contributes to the prosperity of others and of the whole society, opens numerous opportunities for multi-disciplinary research. Industrial symbiosis takes place in the social milieu and representing the best practice in industrial and non-industrial areas. Our review article includes socio-cultural aspects of industrial symbiosis. It focuses on the presence of socio-cultural aspects in the concept of embeddedness and their role in the afore-mentioned networks. In light of socio-cultural aspects, it represents identification of key socio-cultural aspects and barriers for establishing industrial symbiosis networks and facilitates the research on social environment of industrial symbiosis. For an social actor involved in industrial symbiosis network, recognizing or knowing socio-cultural aspects and barriers serves as guidance in recognizing socio-cultural, ecological and economic aspects and provides two-fold effects. On the one hand, knowing these aspects allows social actors to recognize and apply socio-cultural, ecological and economic effects of industrial symbiosis. On the other hand, this knowledge supports social actors in decision-making processes for their symbiosis-related activities and in forming strategies for realization of industrial symbiosis.

Key-Words: industrial symbiosis, industrial symbiosis networks, socio-cultural aspects, socio-cultural barriers, inter-organizational trust, cooperation, motivation, flexibility, creativity

1. Introduction

Industrial symbiosis represents a multi-disciplinary research environment, the primary research field of which belongs to ecology, economy as well as sociology. Some authors [1, 2, 3] define industrial symbiosis as an approach to industrial ecology; as synonymous to industrial ecology [4]; as subset of industrial ecology [5]; as activity within industrial ecosystem [6]; as eco-industrial symbiosis representing circular economy on local and regional levels with sustainable effects and approaches to environment [7] or as one of the three levels of industrial ecology research [7]. Industrial symbiosis exists in the social milieu and is studied through its opportunities for exploration as well as ecological, economical and social synergies.

The advantages of industrial symbiosis for social actors and society alike apply to ecological, economical, and social areas. In ecological sense it is carried out through joint reuse of used material resources; in economical sense it applies to joint savings from purchasing new material resources and correct disposal of used material resources; in social sense it is visible through joint social concern in

terms of established approaches in environmental management and informal networking between social actors, bringing new knowledge and best practice into all other fields of management. Socio-cultural aspects have a key role in industrial symbiosis – without them, exchange as the main activity of industrial symbiosis would be hindered. Within the domain of key socio-cultural aspects, which we classify as part of sociological field of expertise, we should emphasize cooperation, trust, motivation, flexibility, and creativity. Despite the crucial role of these socio-cultural in practical implementation of industrial symbiosis, these aspects can also become obstacles, reasons for their hindering effect being diverse.

Exploration of socio-cultural aspects of industrial symbiosis for us, researchers, poses many challenges and dilemmas due to the lack of explicit research methodology. One such dilemma involves preparation of an appropriate research program and plan, the purpose of which is to guide the researcher. The following dilemma poses a question of how much we should combine qualitative and quantitative research paradigms – or whether we should combine them at all. These dilemmas further

open questions on appropriate sampling; selection of methods for data collection; data processing method; potential problems incurred during research, and how to solve them efficiently. It is these dilemmas and questions that represent key motivation in our research.

2. Conceptual approaches in the literature – industrial symbiosis and industrial symbiosis networks

Industrial symbiosis is defined as a collective approach, which includes physical exchange of materials, energy, water, and byproducts between social actors in different industries with the intention of gaining a competitive advantage [8]. On the other hand, industrial symbiosis is defined as mutually-dependent relationship between two social actors, which exchange material resources and energy for their mutual benefits, where the intention of each partner is to increase their own benefits as well as the benefits of the other partner [9]. Social or economic actors in the exchange of material resources, water or energy are represented by industrial as well as non-industrial companies. Beside companies, social actors are also local communities, local authorities, educational institutions, research centers, ministries, and government and similar agencies on a national and international level. The general rule for defining industrial symbiosis says that at least 3 economic or social actors must be involved in exchange of at least 2 material resources [1]. There are four flows connecting the actors: material, information, financial and knowledge flow. Material flow begins with the partner selling the material resources and ends with the partner buying them; financial flow usually runs in the opposite direction. In practice, financial flow can be excluded when only material exchange occurs between the partners. Knowledge flow is a very important and multi-directional aspect, enabling social actors to exchange know-how and experience. Chertow also states geographical proximity of partners as one of the conditions for industrial symbiosis [8]. Industrial symbiosis networks can be seen as virtual networks, which are present and active on regional, national or international level, where industrial symbiosis can be carried out in accordance with the geographical proximity criterion.

In cases, where several companies or social actors, involved in industrial symbiosis, are located in the same geographical area, they can be connected through clusters and industrial districts. Clusters are defined as geographical concentration of inter-

connected companies and institutions from different or related industries in a certain geographical area [10]. We are speaking of cooperation between companies, which are not connected formally, but which use clusters to increase their own competitiveness and that of all involved companies in order to achieve significantly better results than competitive companies – those, which are not connected into clusters [10].

Industrial district, on the other hand, represents the concept of clusters. It is often seen as a synonym for agglomeration, localization and connection, and often represents the concentrated location/area of companies, which – according to Marshall – operates outside its local level [11]. Characteristics of industrial districts are strong territorial identity, collective entrepreneurship, flexible specialization, and simultaneous existence of competition and cooperation with the development of competitive and cooperative advantages, proactive spread of information and innovation, economic and social cohesion, and collective identity [12].

Since industrial symbiosis brings about positive effects in terms of ecology as well as economy and can help solve challenges related to environmental protection, energy, sustainable development and resource efficiency, countries can incorporate it into their strategy of smart specialization, which is part of the country's industrial policy. In Slovenia the strategy of smart specialization represents a strategic document to be used as foundation for investing development resources into research, development of and innovation in those areas, which could have the largest impact on Slovenia's economy [13]. Smart specialization was based on global social challenges – sustainable energy, mobility and construction, health, food and environment, safe and inclusive society, and resource efficiency [13]. In relation to smart specialization, industrial symbiosis is linked to green growth of the economy and effective use of resources [13].

Industrial policy falls under government policies and represents a combination of government activities, which impact the growth, productivity and competitiveness of a certain industry. Industrial policy is defined as state-regulated measures, which use different instruments to interfere with macro- and micro-economic factors and increase the efficiency of dynamic, internal allocation in the national economy [14]. Another option is to view industrial policy in its wider perspective, where it not only deals in industry, but

primarily serves as a means of improving the standard of living for its citizens [15].

Uzzi [16] focuses on 3 typical characteristics of industrial symbiosis networks: trust; exchange of information and knowledge; and joint resolution of problems. Therefore, industrial symbiosis networks connect social actors, which cooperate in carrying out industrial symbiosis in order to fulfil their own economic, ecologic and social goals. Like other networks, they consist of nodes and connections. Social or economic actors will represent the nodes of industrial symbiosis networks and cooperation between these actors will represent the connections between the nodes. The connections are represented by four flows: information, material, financial, and knowledge flow. Material flows are carried out on local and regional levels; whereas industrial symbiosis networks exist on a national or international level.

3. Socio-cultural aspects and barriers of industrial symbiosis

3.1 Inter-organizational trust

Trust between social actors in industrial symbiosis networks decreases transaction costs, risks, and exchange insecurity and is crucial for creating cooperation structures or cooperation [17, 1, 18, 19 in 20]. We will focus on inter-organizational trust, which applies to trust between several social actors. In modern-day business, known for its high level of complexity and insecurity, operations would be much harder to maintain without inter-personal and inter-organizational trust [21]. Cummings and Bromiley [22] believe that inter-organizational trust is mainly about individual's expectations – expecting that another individual or group will act with good intentions and in accordance with their obligations. In industrial symbiosis, inter-organizational trust is connected to inter-organizational cooperation and can also result in inter-organizational cooperation (or vice versa), which is the foundation for the exchange of material or other resources.

3.2 Inter-organizational cooperation

Cooperation can be defined as any adjustment, which has developed even partially for the purpose of reproductive success between social actors [23]. In light of cooperation we focus on inter-organizational cooperation, i.e. cooperation between several social actors. Young and Wilkinson [24] say that industries, organizations and chains are not able

to develop and become competitive on the market without inter-organizational cooperation. The inter-organizational cooperation can be defined as joint, harmonized actions of several organizations, the purpose of which is achieving common goals [25]. Fhionnlaioich [26] thinks wider: he says it is a process in which organizations take part simply because it would take them longer to achieve the benefits of inter-organizational cooperation on their own. Industrial symbiosis demands cooperation between organizations, i.e. inter-organizational cooperation [27] as the basis for all primary activities of industrial symbiosis.

3.3 Inter-organizational motivation

Motivation is a desire to achieve a goal or specific level of competence, which lead to targeted behavior [28]. Here, we focus on inter-organizational motivation, where motivation between social actors must exist to enable primary industrial symbiosis activities to take place. Motivation between social actors can be defined as joint interest in collective ventures and inter-organizational cooperation between social actors [29]. Inter-organizational motivation must therefore exist to incite industrial symbiosis in the sense of material exchange, i.e. for inter-organizational cooperation. It is almost a pre-condition for material cooperation. Inter-organizational motivation is therefore needed to stimulate the idea of industrial symbiosis and inter-organizational cooperation (as well as inter-organizational trust).

3.4 Inter-organizational flexibility

Regev and Wegmann [30] define flexibility as capability to adjust to changes. Inter-organizational flexibility is thus the capability of organizations, i.e. social actors, to respond to stimuli coming from business networks, which they belong to, or their own organization [31]. In industrial symbiosis networks, inter-organizational flexibility means that social actors are able to efficiently respond to external and internal influences, which (could) have an effect on implementation of industrial symbiosis. External influences, which require inter-organizational flexibility, can be influences from other social actors, which are part of industrial symbiosis networks, or external responses from other social actors. In case of external influences, which concern several social actors and their operations, inter-organizational trust is required to help with inter-organizational flexibility, whereas inter-organizational cooperation must be self-evident.

3.5 Inter-organizational creativity

Inter-organizational creativity is defined as common use of new ideas and approaches for business operations, the purpose of which is inter-organizational cooperation [32], while creativity in general is developed within a single organization or social actor. In industrial symbiosis, inter-organizational creativity is closely linked to inter-organizational cooperation, since cooperation is required for improvement of industrial symbiosis by taking into consideration and implementing novelties and new approaches in this area. Inter-organizational creativity can also have an important role in promoting industrial symbiosis in general – to potential social actors, which might become involved in industrial symbiosis networks – and in presenting industrial symbiosis to individual/interested groups.

4. Socio-cultural barriers of industrial symbiosis

On the one hand, the aforementioned social factors have a key role in practical implementation of industrial symbiosis; on the other hand, they can complicate it. Reasons for it becoming obstacles are diverse. We are aware that other social factors are also important beside those we have already mentioned; however this review article will focus on these five factors. Because these socio-cultural aspects can also represent barriers in industrial symbiosis networks, it is important for us, researchers, to be aware of this fact. We have observed that these barriers can be momentary, temporary or constant. Another important point is that socio-cultural aspects depend on and are impacted by other aspects. Inter-organizational trust is very important, but it is also very hard to create and maintain [33]. If inter-organizational cooperation in an industrial symbiosis network depends on inter-organizational trust, this represents a barrier, as inter-organizational cooperation will only take place in the essential form of industrial symbiosis – material exchange. This will result in a poorly (or not at all) developed inter-organizational creativity, which can present itself as another barrier, as it can impede the development of industrial symbiosis. Also, the level of inter-organizational motivation will be under-developed. Another potential barrier is the belief of individuals from social actors that inter-organizational cooperation is a pre-condition for inter-organizational trust, and the belief that an established inter-organizational creativity

automatically implies an established inter-organizational flexibility. Limited and unlimited barriers can have a dramatic impact on the practical implementation of industrial symbiosis and even hinder it, which is why this field is an interesting choice of research. Relevant research results could help those interested social actors, who wish to become or are already part of industrial symbiosis networks.

5. Future research perspectives of industrial symbiosis networks' socio-cultural aspects

Further research on industrial symbiosis is going to be focused on the latter's embeddedness in the social milieu of pertinent industrial symbiosis networks. The corresponding goal is to conceptualize a framework of regional, national and international industrial symbiosis networks that could be studied on three levels: micro-, meso- and macro-level. Micro-level denotes the basic structural layer of industrial symbiosis networks, which can be represented in the form of interlinked nodes, where nodes designate specific social actors (i.e. companies, local communities, educational and R&D institutions etc.) and series of connections between them outline the observed cooperation. Resultant relationships that form industrial symbiosis networks as a whole constitute the meso-level, while on the macro-level also the layer of outermost societal interrelationships is included.

Overall research objective is to gain insight into current state of industrial symbiosis on an international scale, including as many countries as possible, in addition to our native country, where industrial symbiosis is at present still in its infancy. Initial evidence in the case of Slovenia, based on secondary company-specific data available online, suggests there are three prototypical groups of companies engaged in industrial symbiosis, which can be identified on the micro-level. The first group is made up of companies that actively participate in industrial symbiosis and also explicitly designate such activities as eco-symbiosis, industrial eco-symbiosis and alike. Companies, which are a part of industrial symbiosis networks and maintain, use or provide some kind of industrial symbiosis activities that are on their part not directly associated with industrial symbiosis, form the second group. The third group contains companies that are still deliberating entering industrial symbiosis relationships, but see it as inevitable social practice in the future.

Analysis of the current state of industrial symbiosis within and across observed countries will be based on identification and mapping of industrial symbiosis networks, construed from relevant data on connections and cooperations between social actors. Four major stages form the backbone of the proposed research methodology:

1. conceptualization of a general industrial symbiosis network framework;
2. identification of socio-cultural aspects, relevant for industrial symbiosis networks;
3. analysis of socio-cultural aspects and their structural impact on industrial symbiosis networks;
4. classification of socio-cultural aspects according to their importance and how they are perceived by social actors in industrial symbiosis networks.

Research program under development will be designed as an international research study with a strong interdisciplinary orientation, including natural and social sciences as well as practical applications. The object of our research are complex dynamic networks and pertaining social, technical, computer and natural subsystems, whose processes span across their respective borders and interconnect multiple social actors. Definition of appropriate approaches and analytic methods for acquiring new insights into industrial symbiosis and its socio-cultural antecedents will be followed by developing a theoretical model, which could be also utilized in alternative research streams dealing with industrial symbiosis.

The proposed program envisages two phases. First phase, which is currently under way, involves systemic review of literature and potentially applicable analytic protocols. Viable analytical techniques will be evaluated and examined for potentially required modifications to achieve a fit between the applied methodology and field-specific research domain, scope and objects. Network analysis and visualization algorithms will be applied to delineate inter-connected social actors, complemented by exploratory qualitative research to address existing research gaps, gain new insights and suggest further research directions. In the second phase the selected and modified analytical techniques will be applied to an international dataset referring to the previously defined variables, as specified by the theoretical industrial symbiosis model. Thus the newly developed techniques could be tested with respect to their validity and robustness in analyzing networks at different stages of industrial symbiosis development. Ultimately, the interdisciplinary approach of combining

mathematical theory with sociology, computer science and ecology should enable a more effective identification, modelling and analysis of industrial symbiosis, as it is also inherently a multi-faceted phenomenon: as much socioeconomic as it is eco-technological.

The issue of socio-cultural aspect of industrial symbiosis network dynamics hinges on how social actors and their cognitive frameworks impact industrial symbiosis network structure and relationships within the network. Here, fuzzy-set analysis will be applied as a qualitative method to examine the inter-dependence between social networks, social actors, their cognitive frameworks and as to how they define their respective industrial symbiosis networks. Data for this part of the research will be collected using focus groups, semi-structured interviews and questionnaires in the form of online surveys and polls. Contribution originality may be justified by the interdisciplinary approach and treatment of a relatively new topic, which is gradually gaining an increasing interest from the research community. As such it thus holds the potential of going beyond the state-of-the-art and impacting further development of the research domain.

6. Conclusion

At the heart of industrial symbiosis networks lies the idea of building collectively aligned flows of tangible and intangible resources that seamlessly expand or complement multiple locally bounded life-cycles. They exist to exchange material goods and by-products, assets and services via closed and overlapping life-cycles, supporting sustainability of business operations. Cooperation of collocated actors through industrial symbiosis networks leverages the economic and environmental performance in a multilateral fashion through the use of wastes and byproducts, harnessing of energy outflows across individual entities and efficiency gains in production and distribution. Nevertheless, despite showing great potential, in most cases industrial symbiosis networks are underdeveloped and the framework of their proper management poorly understood, which discourages policy-makers and other social actors to more actively pursue the implementation and maintenance of such relationships. In this context the role and importance of socio-cultural aspects is two-fold: i) they determine the willingness and capabilities of actors to participate in industrial symbiosis relationships and ii) they determine to what degree a certain industrial symbiotic network is accommodated and accepted within the underlying social milieu. The

first phase of our research that is geared towards the development of a theoretical model of industrial symbiosis networks fleshed out five socio-cultural aspects that can act as success factors or conduits of industrial symbiosis relationships: motivation, flexibility, creativity, trust and cooperation. The aim of our future work at this stage is to gain more understanding of how are these aspects perceived by social actors on an interorganizational level, what are their mutual inter-dependencies and how they affect individual social actors in an industrial symbiosis network and the functioning of an industrial symbiosis network itself as a whole. Conversely, the barriers to industrial symbiosis are an area which will require at least the same amount of attention as it can be examined from two perspectives: i) implicitly derived from socio-cultural aspects as weak or absent positively contributing aspects or ii) explicit inhibitors of industrial symbiosis.

References:

- [1] Chertow, M. R., *Uncovering Industrial Symbiosis*, School of forestry and environmental studies, Yale University, 2007, pp.12-13.
- [2] Howard-Grenville, J. & Paquin, R., *Organizational Dynamics in Industrial Ecosystems: Insights from Organizational Theory*. Ruth, I. M & Davidssdottir, B. (Eds.), *Dynamics of Industrial Ecosystems*, Vol. 1., Edward Elgar, 2008, pp. 157-175.
- [3] Gingrich, C., *Industrial Symbiosis: Current understanding and needed ecology and economics influences*. Policy engagement, Centre for Engineering and Public Policy, 2012, pp. 44-49.
- [4] Phillips, P. S., Barnes, R., Bates, M. P. & Coskeran, T., *A Critical Appraisal of an UK County Waste Minimisation Programme: The Requirement for Regional Facilitated Development of Industrial Symbiosis/Ecology. Resources, Conservation and Recycling*, Vol. 46, Elsevier, 2005, pp. 242-264.
- [5] Chertow, M., & Lombardi, D., *Quantifying Economic and Environmental Benefits of Co-located Firms. Environmental Science and Technology*, Vol. 39, No. 17, 2005, pp. 6535-6541.
- [6] Rui, J. & Heijungs, R., *Industrial Ecosystems as a Social Network*. Knowledge Collaboration & Learning for Sustainable Innovation ERSCP-EMSU conference, Delft, The Netherlands, 2010, pp. 1-11.
- [7] Hartard, S., *Industrial Ecology and Industrial Symbiosis: New Concepts or New Branding?!* Trier University of Applied Sciences – Umwelt-Campus Birkenfeld, 2008, pp. 1-8.
- [8] Chertow, M. R. *Industrial Symbiosis: Literature and Taxonomy, Annual Review of Energy & the Environment*, Vol. 25, No. 1, 2000, pp. 313.
- [9] Manahan, S. E., *Industrial Ecology. Environmental Chemistry and Hazardous Waste*. CRC Press LLC, 1999, pp. 58.
- [10] Porter, M. E., *Clusters and the new economics of competition Harvard Business Review*, Boston, 1998. pp. 77-90.
- [11] Belussi, F. & Caldari, K., *At the origin of the Industrial District*: Alfred Marshall and the Cambridge School. International Workshop: Marshall and Marshallians on Industrial Economics, Mercury Tower, Hitotsubashi University, Tokyo, 2008, pp. 1-30.
- [12] D'Arcy, E. and G., B., *Local economic development changing the parameters. Entrepreneurship & Regional Development*, 1996, pp. 159-178.
- [13] Ministry of Economic Development and Technology, *Strategija pametne specializacije 2014-2020*, 2013
http://www.mgrt.gov.si/si/delovna_podrocja/evropska_kohezijska_politika/razvojno_nacrtovanje_in_programiranje_strateskih_in_izvedbenih_dokumentov/strategija_pametne_specializacije_2014_2020/ (17. 1. 2015).
- [14] Dmitrović, T., *Industrijska politika v državah Srednje Evrope*. Ljubljana: Ekonomska fakulteta, 1998, pp. 21.
- [15] Genovesse, F. C., *An Examination of Proposals for US. Industrial Policy, American Journal of Economics and Sociology*, Vol. 47, No. 4, 1988, pp. 442-452.
- [16] Domenech, T. & Davies, M., *The Role of Embeddedness in Industrial Symbiosis Networks: Phases in the Evolution of Industrial Symbiosis Networks, Business Strategy and the Environment*, Vol. 20, 2010, pp. 284.
- [17] Ashton, W., *Understanding the Organization of Industrial Ecosystems: A Social Network Approach, Journal of Industrial Ecology*, Vol. 12, No. 1, 2008, pp. 34-51.
- [18] Baas, L., *Industrial Symbiosis in the Rotterdam Harbour and Industry Complex: Reflections on the Interconnection of the Techno Sphere with the Social System, Business Strategy and the Environmental*, Vol. 17, 2008, pp. 330-340.
- [19] Ehrenfeld, J. & Gertler, N., *Industrial Ecology in Practice: The Evolution of Interdependence at Kalundborg, Journal of Industrial Ecology*, Vol. 1, No. 1, 1997. pp. 67-79.
- [20] Domenech, T., *Social Aspects of Industrial Symbiosis Networks*, doctoral thesis, Bartlett

- School of Graduate Studies, University College London, 2010, pp. 19-22.
- [21] Lane, C., Introduction: Theories and issues in the study of trust, in: Lane, Chris and Bachman, Reinhard (eds.): *Trust within and between organizations, conceptual issues and empirical application*, Oxford University Press: Oxford, 1998, pp. 1-30.
- [22] Cummings, L. & Bromiley, P., The organizational trust inventory (OTI): development and validation, in: Kramer, Roderick Moreland and Tayler, Tom R. (eds.), *Trust in Organizations: Frontiers of Theory and Research*, Thousand Oaks Sage: USA, 1996, pp. 302-330.
- [23] Gardner, A., Griffin, A. S. & West, S. A., *Theory of Cooperation*. Encyclopedia of life sciences, John Wiley & Sons, 2009, pp. 1-8.
- [24] Young, L. & Wilkinson, I. F., The role of trust and cooperation in marketing channels. *European Journal of Marketing*, Vol. 23, No. 2, 2006, pp. 109-122.
- [25] Anderson, J. C. & Narus, J. A., A model of the distributor's perspective of distributor manufacturer working relationship. *Journal of Marketing*, 1986, Vol. 48, No. 4, pp. 62-74
- [26] Fhionnlaioich, C. M., Interorganizational Cooperation: Towards a Synthesis of Theoretical Perspectives. McLoughlin, D. & Horan, C. (Eds.), *Proceedings of the 15th Annual IMP Conference*, University College, Dublin, 1999, pp. 1-22.
- [27] Saloluoma, M., *Developing of supportive context for eco-industrial networks in Finland*, Master's Thesis, Lappeenranta University of Technology, Department of Industrial Engineering and Management, 2014, pp. 13-34.
- [28] Baver, T. & Erdogan, B., *An Introduction to Organizational Behavior*. <http://2012books.lardbucket.org/pdfs/an-introduction-to-organizational-behavior-v1.1.pdf>
- [29] Dulaimi, M. & Bajracharya, A., Organizational Motivation and Interorganizational Interaction in Construction Motivation in Singapore. *Construction Management and Economics*, Taylor & Francis (Routledge), 2003, pp. 4.
- [30] Kumar, K. & Narasipuram, M. M., *Defining Requirements for Business Process Flexibility*. BPMDS'06, 2006, pp. 137.
- [31] Kopanaki, E. & Smithson, S., *Examining Organizational Flexibility in an Interorganizational Context*. Ninth Americas Conference on Information Systems, 2003, pp. 547.
- [32] Wang, Q., Bradford, K., Xu, J. & Weitz, B., Creativing in Buyer-seller Relationships: The Role of Governance. *International Journal of Research in Marketing*, Vol. 25, 2008, pp. 110.
- [33] Sydow, J., Understanding the Constitution of Interorganizational Trust. Lane V. C. & Bachamann R. (Eds.), *Trust Within and Between Organizations: Conceptual Issues and Empirical Applications*, Oxford University Press, 1998, pp. 31-63.