

# NETWORKABILITY OF ORGANIZATIONS AND BUSINESS NETWORKS

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## Abstract

*Technological enablers such as interorganizational information systems (IOS) and business strategies such as supply chain management or virtual organizations facilitate the diffusion of business networks. The efficiency of joining and switching networks becomes an important competitive necessity and has been referred to as an organization's networkability. Several researchers have already suggested performance measures which assess a company's networking abilities regarding information systems, processes, people and the like. This perspective focuses on a specific organization and does not consider that networks might also differ in their abilities to integrate new partners. Business network performance has been introduced to address network processes and their characteristics. The following research aims to gather more evidence that supports the notion of a network's networkability and which adds to the measurement of performance on the network level. Based on a survey of the relevant literature a framework for researching the relationship between organizational and network networkability is proposed and applied in two case examples, one being a network from the finance industry and the other a network from the computer retail industry.*

**Keywords:** Business Network Performance, Networkability, Network Design.

# 1 INTRODUCTION

Networking among enterprises is key to the division of labor as introduced by Adam Smith and recognizes that specialization has a positive impact on the productivity of individual organizations as well as entire economies. Many authors have shown that the relationships between the individual actors may vary from arm's length to close partnerships and that information technology (IT) may support market-like, hierarchical as well as cooperative arrangements (see Glassberg & Merhout 2007 for a summary). A generic but nevertheless vital requirement for all networks along the market-hierarchy-continuum is to establish processes that ensure timely deliveries as well as competitive products and services (Iacono & Wigand 2005). From the customer's viewpoint neither the processes within a network nor the actors participating in a network are important. It is the overall network and supply chain performance rather than the individual performances of the network participants (Ganeshan et al. 1999, Kleijnen & Smits 2003). Prior research in the area of interorganizational systems (IOS) has shown the need to distinguish multiple levels of analysis which complement each other, i.e. organizational performance requires attention as well as network performance.

A large body of literature describes dependencies among network participants on a dyadic level, i.e. an organization experiences lock-in or entry barrier effects when high levels of asset specificity are present. As these emanate from investments in organizational structures, people, processes, as well as IT, the notion of networkability has been created which denotes an organization's cooperative capabilities in total (Wigand et al. 1997). Networkability is high, when organizations are able to efficiently establish and disband relationships to business partners in terms of time and cost. Although this also reflects the open or closed nature of the business network, organizational networkability does not provide an explicit measure for the performance of the network as a whole. The main characteristics on the network level have been discussed in literature from economics and strategic management. A dedicated industry or network perspective has been added to the views on industry structure, organizational processes and information systems (IS). It has been used to capture network effects such as network externalities and critical mass effects.

Initial work in the direction of network performance has been undertaken by Straub et al. (2004) and shows that shifting between networks entails significant investments and sunk cost. This is the case for suppliers in the automotive and electronics industry which usually have to cope with the requirements of dominant manufacturers. Another example is a small Swiss bank which changed from one back-office network to another and as attributed some 18.4 million Swiss francs only for leaving the existing provider community (Gallarotti 2004). It is the objective of this paper to broaden this initial evidence regarding networkability at the network level. For this mainly exploratory purpose a combination of literature review and case study analysis has been chosen. The second chapter reviews literature on the development and shaping of business networks and aims to find evidence for networkability at the network level. Chapter 3 illustrates networkability at the network level by giving two examples, one business network case in IT retail and distribution and one in the banking industry. The paper concludes with a summary and recommendations for further research.

## 2 FROM ORGANIZATIONAL TO NETWORK NETWORKABILITY

To develop a framework for the networkability of business networks, this chapter reviews existing research in four domains. First, IOS research indicates that networking activities may occur on various levels (chapter 2.1), second, prior work from network theory contributes to the objectives and scope of business networks (chapter 2.2. and 2.3), third, research from information systems summarizes the knowledge on networkability and business network performance (chapter 2.4). Finally, chapter 2.5 presents a framework for structuring and analyzing networkability on the network level.

## 2.1 Level of networking activities

Network structures encompass a number of relationships between the actors involved in a network. These interorganizational relationships are complex in nature, since they not only involve the actors themselves but also the political atmosphere in which interactions are occurring as well as the organizational and technological conventions. Early research on interorganizational relations based on a dyadic perspective only focuses on the relationship between two companies (e.g. Håkansson 1982, Skytte 1992) and was enhanced to include network aspects such as network externalities (e.g. Håkansson 1989). Consequently, initial work on the configuration of IOS by Klein (1996, p. 92) recognized that “inter-organizational arrangements have to be interpreted as complex, multi-layer configurations of organizational parameters”. As these parameters are not mutually exclusive, a set of networking activities is needed when designing an IOS. For example, an organization’s position requires the definition of the position in the market and within the network, as well as the position of the network in relation to other networks. The same applies for the transaction attributes which have to be defined on an institutional, an operational and a technical layer. Following Parolini (1999) a multidimensional design approach allows to concentrate on each level, e.g. total value creation process without being dependent on the internal changes in each firm. She also suggests that activities across the network need to be addressed first and activities focusing on the actors only in a second step.

To understand and explain the adoption of IOS, the industry level theory proposed by Johnston and Gregor (2000, 2001) distinguished activities regarding individual firms, the industry group (consisting of the firms and the system of relationships between firms), the IOS, and the remote environment (such as government policies, economic conditions, competing industries, etc). Finally, Reimers et al. (2004) propose four levels of analysis for studying the adoption and diffusion of IOS as well as the emergence of networks. These are the firm level (coordination mechanisms, process rules, structure, etc.), the industry segment level (IOS designs, value propositions, product standards, etc.), the industry segment value system (rules, business customs regarding vertical and horizontal interaction, EDI standards, etc.), and the remote environment (all social constructs that require collective action, including national law, national standards, etc.). To address the design variables on each level the following assumes that networking activities are necessary not only on the organizational and the dyadic level, but also on the network and the industry level. As indicated by Iacono and Wigand (2005) the levels external to a specific company are more difficult to influence and even industry leaders are not immune to unintended developments.

## 2.2 Objectives of networking

In general terms, networking activities aim at aligning a dynamic set of actors and relationships towards a common goal and bringing together core capabilities of different organizations to accomplish business improvements (Delparte-Vermeiren et al. 2004). Among the motives are resource pooling, risk sharing, utilization of relative advantages as well as the reduction of supply chain uncertainty (Kumar & van Dissel 1996). An important theme in the literature relates to whether the advantages of networking outweigh their disadvantages. For example, Barringer and Harrison (2000) summarize six widely used theoretical paradigms that explain the formation of interorganizational relationships. Each paradigm focuses on a specific set of business objectives (reduce costs, control resources or increase power etc.) and the authors conclude that each paradigm alone is insufficient to capture the complexities of interorganizational structures and relationship formation.

Stabell and Fjeldstad (1998) relate ‘network objectives’ to ‘network structure’. They distinguish between three network forms: chains, shops, and networks. Each form or structure relates to specific network objectives and determine the main ‘technology type’ in the network (long-linked, intensive, or mediating technology). Chains create value by transformation of inputs into products, shops by (re)-solving customer problems, and networks create value by linking customers. This suggests that networkability of a network will be higher if network objectives are shared and if the required

technology types are available. For reasons of simplicity, this research distinguishes between two network types, based on the objectives of network formation. The first type is the transformation network, aiming to operate an interorganizational transformation process to reduce costs and/or to improve customer services. The second type is the service network aiming for network promotion, contract management, service provisioning and infrastructure operation.

### **2.3 Scope of networking**

Business networks are value creating systems where actors (suppliers, business partners, allies, and customers) collaborate to produce value (Normann & Ramirez 1993). Depending on the type of network (e.g. internal, stable, dynamic) some actors play a lead role in the network (Snow et al. 1992). For example, these focal actors analyze customer orders on its service requirements and allocate the business activities necessary to fill this order to other network participants (Delparte-Vermeiren et al. 2004). Due to their influence, focal actors are important to the open or closed character of a network. E.g., they may either impose accepted (industry or market) or proprietary standards for the use within the network. To assess the scope of networking, Andersen et al (1994) use the concepts *network horizon* (i.e. 'how extended is an actor's view of the network') and *network context* (i.e. the part of the network within the horizon that the actor considers relevant). The scope of networking is determined by the network horizons and contexts of the actors that play a role in fulfilling customer orders.

Another structural element is the nature of relationships within the network. As elaborated by Straub et al. (2004) these may be direct ties between nodes in the network as well as indirect ties. The direct ties are dyadic relationships with other firms which may serve as sources of resources and information, whereas indirect ties may be compared to the firm's connected relationships (Ritter et al. 2004) serving as sources of information (Windahl & Lakemond 2006). Structural holes refer to the degree to which a firm's partners (the direct ties) are interconnected and expand access to information but also increase exposure to potential malfeasance. In fact, the number of direct and indirect ties correlates positively with network performance (Ahuja 2000), whereby the impact of indirect ties seems to be moderated by the number of direct ties. The existence of structural holes seems to have a negative impact on network performance. In summary, the scope of networking is determined by the structure of the total network and the relationships between the focal actor and interdependent external actors that are directly or indirectly linked.

### **2.4 Networkability and network performance**

Although networkability often refers to the connectivity and interoperability of a technological network (e.g. Whitworth et al. 2006), this research uses the term from a business perspective. It was introduced in this domain by Wigand et al. (1997) as "both the internal and external capability of organizations to collaborate with each other at the level of both business processes and underlying ICT infrastructure". High networkability denotes an organization's ability to quickly and efficiently establish relationships with many business partners and to support a broad set of transactions (procurement, replenishment, sales, etc.) (Alt et al. 2000). As shown in table 1, it may be operationalized along several dimensions or design objects which may be influenced via coordination mechanisms that govern the dependency between the design objects in networked organizations. Among the examples are modularization, digitalization and standardization as well as the use of network-wide IT-platforms, so-called 'business buses' (Alt & Fleisch 2000).

It is the assumption (e.g. Wigand et al. 1997) that networkability is positively correlated with business performance. However, networkability is a complex measure and business performance including competitiveness may still be high, if the networkability of one design object compensates for lower scores in the other. For example, low levels in the IS design object may be offset by networkability of process, products, people and/or organization (Smits et al. 2006). Similar to transaction costs, networkability can be measured both quantitatively and qualitatively for each design object (Österle et

al. 2001). Quantitative measures include time and costs, whilst qualitative measures address the quality of change. As shown in table 1, the networkability assessment uses a questionnaire (67 questions) where each design object is assessed by answering a number of questions on an ordinal scale of 0-5, where '0' indicates low networkability and '5' indicates maximum networkability. The score for each dimension is the average of the scores for all questions in the dimension.

| Design object            | Networkability of design object                                                                             | Coordination mechanisms for design object                                                      | Number of questions to determine networkability score  |
|--------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Products and services    | Rapid and inexpensive individualization of products and services                                            | Modularization<br>Standardization<br>Digitalization                                            | 6                                                      |
| Processes                | Rapid and flexible establishment and use of appropriately coordinated processes                             | Standardization of processes<br>Integration of processes                                       | 10                                                     |
| Organizational structure | Flexible organizational structures which enable participation in several different networks                 | Virtualization<br>Modularization<br>Distributed responsibilities                               | 12                                                     |
| Employees and culture    | Cooperation-promoting company culture and employees with the capacity for internal and external cooperation | Relative openness;<br>Identification and control of goal conflicts;<br>Trust-creating measures | For employees: 9<br>For managers: 12<br>For culture: 9 |
| Information system (IS)  | Rapid and inexpensive establishment of an individual communication link between information systems         | Standardization of communication and data<br>Integration of systems                            | 9                                                      |

*Table 1. Networkability at the organizational level (based on Österle et al. 2001)*

Business network performance refers to the performance of a business network and the degree of being effective and efficient in matching seller's offerings with buyer's preferences (Delporte-Vermeiren et al. 2004). Straub et al. (2004) adopt the network level as the primary unit of analysis and use eight indicators for network performance (productivity, timeliness of information, operating costs, resource control, flexibility, improved production planning, improved asset management, and reduced workflow). Windahl and Lakemond (2006) investigated how network relations affect performance in terms of the creation and offering of integrated solutions by a business network. Factors that influenced successful development of integrated solutions were the strengths of the network relationships, the positions of the firms in the network, and the network horizon. This implies a discussion of trade-off between multiple key performance indicators (Kleijnen & Smits 2003).

| Dimension                    | Questions for assessment                                                                                                                                                                                                      |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Level of networking       | What are the firm level coordination mechanisms for network activities?<br>What are the coordination mechanisms at the network level?<br>What are the social constructs at the national or industry level?                    |
| 2. Objectives of networking  | Is there a shared network objective?<br>Is the network a chain or a service network?<br>Does the network compete with other networks?                                                                                         |
| 3. Scope of networking       | What is the size of the network?<br>What are the numbers of direct and indirect ties?<br>Is there a focal actor in the network?<br>Are there structural holes in the network?<br>Are there explicit ties with other networks? |
| 4. Performance of networking | Do performance indicators exist at network level?<br>Are these indicators shared among firms?                                                                                                                                 |

*Table 2. Dimensions of network networkability and questions for assessment*

## **2.5 Framework for network networkability**

The elements of the literature discussed above are now included in a framework that aims to structure networkability at the network level (Table 2). First, activities at the firm, network and national level may influence a network's networkability. Second, networkability depends on the objectives at the network level, e.g. these may differ when the network is in close competition with another network. Third, structural elements existing beyond dyadic relationships, determine the scope of networking. A final hypothesis is, that performance indicators at the network level which are shared among the network participants sustain network performance.

## **3 CASES FOR NETWORK NETWORKABILITY**

In the following two cases are described to illustrate networkability at the network level and to analyze networkability on two levels using the dimensions described in chapter 2 and table 2.

### **3.1 Case of Swiss Cantonal Banks**

Cantonal banks are regionally operating retail banks in Switzerland. They are owned by the county governments (the cantons), have a total of about 17'000 employees and a share of approx. 15 percent of total assets held by all Swiss banks. Despite competitors such as Credit Suisse and UBS are larger by order of magnitude, the cantonal banks have a strong base in the domestic market with an estimated 90 percent of their revenues coming from business within Switzerland. This is mainly due to their origins which date back one hundred years. They were founded to provide mortgages to small- and medium-sized regional enterprises and over time have broadened their portfolio of products and services. As each of the 24 cantonal banks focused on their 'cantonal turf' they usually feature unique knowledge of their regional market and close ties to their customers.

As other banks, cantonal banks face important changes in their competitive environment. For example, foreign banks are increasingly penetrating the Swiss market with competitive offerings, a growing number of knowledge intensive products (e.g. structured products) or regulatory requirements (e.g. Basel II, MiFID or SEPA) need to be supported. Therefore banks are aiming to improve their cost-income ratios, to develop new business models (such as offering services to other banks), to outsource specific functions (such as IT operation and application provisioning) and to replace their legacy core banking systems. Compared to other industries such as electronics or automotive, banks are still highly vertically integrated. A recent survey conducted among 63 bank executives in German-speaking countries showed a strong misfit between the perceived core competencies and the activities the banks still handled internally. Although most banks seek differentiation mainly in distribution and sales, in-house production prevails in virtually all business processes. Outsourcing is limited to IT functions such as IT operation and application provisioning.

Dealing with these challenges is not new to the Swiss cantonal banks and they have a long tradition in business networking. An important enabler is the group of Swiss cantonal banks, an umbrella organization of all cantonal banks headquartered in Basel. Within this group a total of 21 collaborations or shared services have been launched in the past. Among the examples are joint funds products under the Swisscanto label, services for processing card transactions (Viseca), and four initiatives for the operation and development of IT platforms. Use of these services is not mandatory as the group organization has no influence on the individual cantonal bank's strategy.

The first IT shared service to emerge was RTC (Real-time Center) in 1973. Headquartered in Bern, RTC developed IBIS, a core banking system, which was implemented by the cantonal banks of Berne, Jura, Aargau and Basel as well as several Swiss regional banks. Another initiative driven by 8 cantonal banks was launched in 1987: Named AGI, 4 smaller banks (Glarus, Appenzell Innerhoden, Obwalden, Nidwalden) and 4 larger banks (St.Gallen, Thurgau, Luzern, Fribourg) teamed up to develop and operate a joint core banking system. Founded in 1992 and headquartered near Lausanne, Unicile

provides IT services to cantonal banks in French speaking regions (Waadt, Geneva, Wallis, Neuenburg). Finally, the cantonal banks in Schaffhausen, Schwyz and Uri initiated a service provider called Finis. Other cantonal banks (e.g. Zurich, Tessin) were not part of any of these networks but remained autonomous.

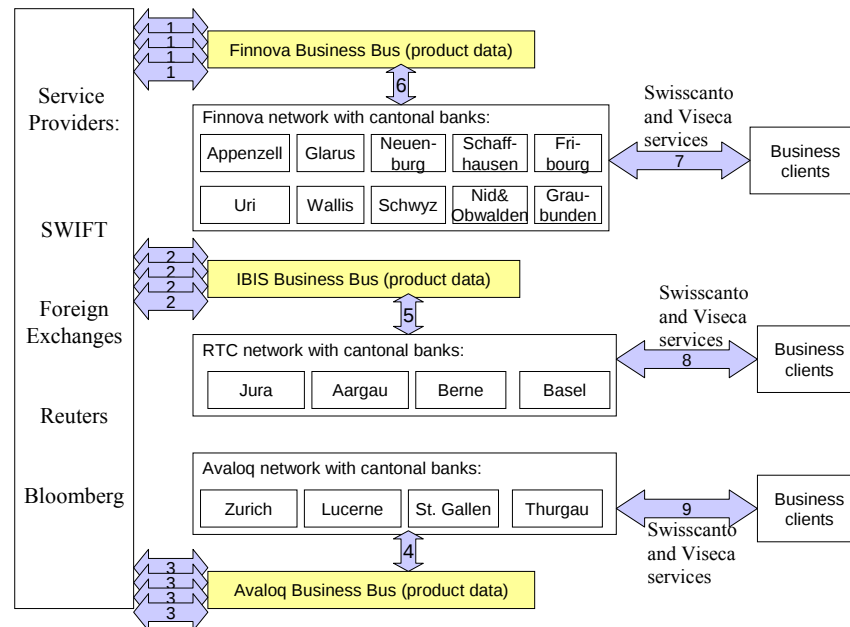


Figure 1. Business network structure of Swiss cantonal banks. The arrows indicate IOSs (see text)

The transformations in the industry as described above had important impact on these four networks and led to the emergence of three dominating networks today (Figure 1). The platforms operated by AGI, Unicible and RTC were regarded as inflexible and costly (Anonymous 2003). Within AGI the smaller banks have decided in 2004 to leave the network in 2006 and to join the Finis, now called Finnova, network. Among the reasons cited were that Finnova was a standard core banking solution being used by three cantonal banks already (Schwyz, Schaffhausen, Uri). For the remaining AGI banks this implied increasing IT costs of 10%. On the other hand the cooperation became more homogeneous which enabled an even closer collaboration between the remaining banks. In the following these banks, as well as the cantonal bank in Zurich, decided to join another network called Avaloq, a company that has become the dominant provider of core banking systems to private banks in Switzerland. The RTC network remained relatively stable, but invested some 60 million Swiss francs to update their platform towards easier and more efficient integration of third party systems and services. Figure 1 provides an overview on the three networks from a cantonal bank perspective, i.e. the individual communities are larger since non-cantonal bank members are not shown.

Currently, members of all three networks are negotiating a closer collaboration within their network mainly on a process level. Redundant services such as maintenance of security master data, membership and electronic linkages to exchanges, and compliance checks should be provided by a single network member and provided to the community. For example, Avaloq introduced the 'Business bus' concept and Finnova the similar 'Lead bank' concept. However, these discussions are limited to each community (internal services in Figure 1) and providing services to members of cantonal banks of other networks requires individual interfaces to be developed. If, for example, the cantonal bank of Zurich offers back office services to Avaloq banks, the same service can be provided to Finnova banks only at a significantly higher cost.

### 3.2 IT retail network case

A second case is taken from the IT retail industry in the Netherlands. As shown in Figure 2, it consists of the network relations between Aces Direct (AD) as the focal actor, Tech Data Netherlands (wholesaler) original equipment manufacturers (OEMs) HP, IBM, Microsoft, Toshiba, business clients, and three third party service providers (Icecat, DHL, and Onetrail). AD was established in 1996 and has grown to a small enterprise of 17 employees and € 20 million turnover (2006). AD is one of the biggest B2B-suppliers of hardware, software and supplies in the Netherlands, offering more than 140'000 articles within 24 hours, including financial services (lease) and installation and maintenance services. As indicated by the arrows in Figure 2 AD uses several IOS: Arrows 1 and 4 indicate linkages between AD and the business buses offered by Icecat and DHL. Arrow 6 is the dedicated, XML based system of AD with Tech Data, and arrow 7 the CRM web interface.

Founded in 1974, Tech Data Corporation (NASDAQ name: TECD) is a leading wholesaler of IT products, with more than 90'000 customers in over 100 countries, generating some \$20 billion in sales (2005). The Dutch branch Tech Data NL is a large wholesaler organization (€ 400 million sales per year in the Netherlands), serving four types of resellers (web-shops like Aces Direct, without any stocks, and stockholding e-tailers and retailers), SME-accounts and corporate accounts. While the trade of hard- and software is showing lower margins, Tech Data aims to enter new markets by offering LCD TV's and photo cameras. Tech Data also offers pre- and post-sale training, technical support, financial services, configuration services and e-commerce solutions. It is facing increasingly critical resellers, e.g. quality focused resellers such as Misco (a competitor of AD) continuously measure Tech Data's performance. Tech Data is able to deliver 99.6 percent of the ordered items in stock within 24 hours and aims to improve customer relations. Tech Data's IS were built around SAP R/3, linking the Tech Data web-site with XML connections to retailers like AD, MISCO, and service providers like Onetrail, Icecat and DHL.

ICEcat, Onetrail and DHL provide key network services. ICEcat.biz offers a growing part of its product catalogue for free, as more and more top OEMs participate in Open ICEcat, the open market standard for client-driven rich product content distribution. AD and Tech Data plug in to this business bus (arrows 3 and 4) by using XML based linkages and proprietary semantic standards. Onetrail presents itself as a business bus for retailers, wholesalers, and OEMs. Until 2006, there was no supply chain wide standardization on a semantic level: e.g. the meaning of "delivery time" varies from OEMs to retailers. Onetrail offers a business bus for order processing between network partners in the IT, the automotive and government sectors. Onetrail consolidates, normalizes and translates information to support client's administrative and logistic processes at all levels. DHL is another service provider in the network, offering distribution services including tracking and tracing, which are used by Aces Direct and Tech Data (arrows 1 and 2 in Figure 2).

The IT sector in the Netherlands includes four large wholesalers with about the same yearly turnover (€ 400 million). They differ in width and depth of their product offerings and in the multinational OEMs they relate to. While the market between retailers and customers is relatively open, the wholesalers' profitability is mainly related to its buying price. OEMs such as HP, IBM and Microsoft deliver to one or more of these wholesalers and dominate the market by dictating delivery conditions to the wholesaler and stimulating their sales by offering discount percentages connected to turnover targets. The same power relations influence the buying party between wholesalers (like Tech Data) and resellers (like AD). AD in turn is able to choose between four parties.

Ordering is the main network process. Customers may use Internet, email, or telephone to connect to the dedicated account manager. If the account manager, supported by on-line customer information, accepts the request, the client is informed about customer-specific terms (discount percentage) and the order is confirmed. AD then selects the wholesaler with the best price/ performance ratio. Next, the order is transferred via direct XML-linkage to the preferred wholesaler and is executed the same day. The wholesaler offers the order to the parcel service (DHL and the IOS in arrow 3). As client orders

may include several parts to be delivered by different wholesalers, the parcel service collects the parts from all wholesalers and delivers the complete order, labelled as an AD order. The billing process is executed in parallel, as soon as the client order has been accepted, with known creditability and – if needed - a lease company may be invited to intervene. The AD ERP-system links the goods flows to the accounts payables and receivables.

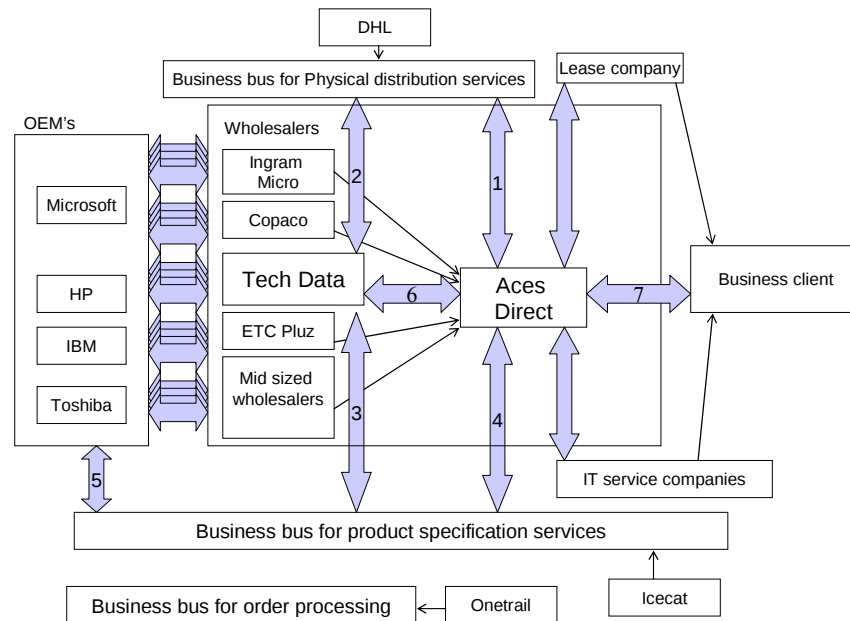


Figure 2. Business network structure of IT retail in the Netherlands. The arrows 1-7 indicate IOSs.

Over the years, the order size in the network has decreased, combined with an increase in order frequency, despite wholesalers stimulating the retailers by pricing strategies to order in large quantities. AD is performing well in service and after sales and is capable to efficiently and effectively manage information on 5,000 relatively small B2B-customers. B2B-clients prefer AD because of short lead times and a broad assortment. 80% of the clients use additional financial services. On request AD is also an intermediary to third parties for installation and maintenance of the acquired hard- and software. Changes in the networkability of the IT retail network are discussed in section 3.3.

### 3.3 Networkability at the network level in the two cases

Both cases were analyzed using the questions summarized in table 2. Regarding the levels of networking, the cases support the relevance of this dimension. On the firm level, the AD case shows more coordination since standardization and modularization is undertaken for products, services and processes. In the banking case, most products and processes are customized for the individual banks and with (external or backoffice) services being standardized. The case also reveals that while broad standardization is present regarding the technological infrastructure (i.e. the application package and partly the application service provider), coordination of business activities remains comparatively weak. The latter is performed mainly on a dyadic basis supported by regular meetings of the cantonal banks within each provider community.

The networking objectives also underline the differing nature of both networks. While the AD network is a typical supply chain network, the banking case features less vertically integrated supply chains and a shared back-office service platform. Both cases indicate that high network networkability is not intended on behalf of the focal companies. In the AD case this is AD, a member of the supply chain, and in the banking case it is the platform provider (Avaloq, Finnova or RTC). However, the network

participants and service providers are interested in low network specificity and switching costs as they are competing with other networks in their specific domain (computer products, banking platforms).

| Dimension                                                   | Aces Direct network case                                                                                                  | Banking network case                                                                                              |
|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>1. Level of networking</b>                               |                                                                                                                           |                                                                                                                   |
| - Firm level coordination mechanisms for network activities | - Standardization and modularization of products, services, and processes; IOS used to standardize data and communication | - Standardization of services and processes due to shared core banking system within each network                 |
| - Network level coordination mechanisms                     | - Product standardization regarding OEMs used across different retail networks (AD, Misco and others)                     | - Standardized products and interfaces regarding external service providers and shared services (e.g. Viseca)     |
| - Social constructs at national or industry level           | - Based on national standards for lease and IT use                                                                        | - Mainly driven within cantonal bank group organization                                                           |
| <b>2. Objectives of networking</b>                          |                                                                                                                           |                                                                                                                   |
| - Shared network objective                                  | - Objectives differ per layer, but focus on fulfilling IT services                                                        | - Similar, but separate objectives – focus on back-office services                                                |
| - Chain or service network                                  | - Chain for hard- and software products including financial and maintenance services                                      | - Network is non-sequential and aims at offering services                                                         |
| - Competition with other networks                           | - AD network competes with other networks like Misco                                                                      | - Avaloq, Finnova and RTC communities compete                                                                     |
| <b>3. Scope of networking</b>                               |                                                                                                                           |                                                                                                                   |
| - Size of the network                                       | - Approx. 20 companies in AD network                                                                                      | - 4 to 11 cantonal banks (plus non-cantonal banks in each network)                                                |
| - Existence of focal actor                                  | - AD is focal actor since it translates customer needs                                                                    | - Networks are provider-driven without focal business actor                                                       |
| - Number of direct and indirect ties                        | - 7 direct and over 20 indirect ties                                                                                      | - Direct ties with shared services (e.g. Viseca); indirect ties with group of cantonal banks and between networks |
| - Structural holes in the network                           | - Lacking link between Tech Data and Onetrail                                                                             | - Lacking links between networks                                                                                  |
| - Explicit ties with other networks                         | - Ties emerging with camera and TV sector and with the financial services sector                                          | - Ties with external services (e.g. foreign exchanges, Reuters/Bloomberg, Swift)                                  |
| <b>4. Performance of networking</b>                         |                                                                                                                           |                                                                                                                   |
| - Performance indicators on network level                   | - Network firms evaluated by customers and suppliers (financial, quality, products)                                       | - Network networkability not desired between network providers                                                    |
| - Shared performance indicators                             | - End-customers evaluate network performance indicators (e.g. price, reliability)                                         | - Network participants evaluate network performance (e.g. price, reliability)                                     |

*Table 3. Indicators for networkability at the network level in two case examples*

Concerning the scope of networking, both networks feature focal companies which are substantially smaller than the network participants and which offer bundled services within their community. AD customizes product offerings of large OEMs and large wholesalers with additional services being added in the form of physical distribution, tracking and tracing information, information on previous purchases, as well as installation and maintenance services. Providers in the banking case offer a range of back-office services which vary for each participating bank. As shown in Figure 1, all networks connect to the same external services. Services for shared product data (security master data) and the like are not specific to individual networks and may be shared across the network. In addition to the explicit external and the direct ties, both networks comprise numerous less formalized indirect ties.

Finally, the performance of networking is not an explicit measure in both cases. While providers often desire efficient ‘onboarding’ procedure for new network participants, measurements are not made available outside of the network. However, the usual performance indicators such as price and reliability are applied from end-customers or other network participants (see table 3).

## 4 CONCLUSIONS

This research aimed to provide theoretical and practical evidence to develop indicators for networkability on the network level. In fact, cooperative or collaborative capabilities at the network level have been addressed from various perspectives in the literature regarding the level, the objectives, the structure and the performance of networking. Based on these contributions from prior research a framework has been proposed that allows for a more systematic analysis of network networkability. Two cases studies from diverse domains supported the evidence. These business networks offered products and services which used to some extent the same suppliers and service providers via collaboration infrastructures ('business buses'). From this analysis the following hypotheses may be derived as input for further research.

First, the level of networking suggests that available coordination mechanisms for organizational networkability (e.g. standardization, modularization) may also be applicable for networks as a whole. Relevant standardization may occur on the firm, the network as well as the national level and include technological and/or business (e.g. semantic, process) standards. In general terms, more standardization on more levels will make networks more networkable. Second, as the objectives of network members will differ, network networkability needs to distinguish partner profiles, e.g. for supply chain partners, business or IT service providers. The more standardized partner profiles exist for these roles, and the more these standards are accepted outside the network, the more networkable the network becomes. Although rivalry among networks might also make proprietary solutions and entry barriers attractive, competition among providers may be dominated by interests of business partners who value more open networks. Third, regarding structure of a network, a large number of network members might indicate some acceptance in the marketplace and therefore a better networkability as well as the number of explicit or direct ties. On the other hand a high number of indirect ties make the integration of additional partner more difficult.

This initial research has limitations not only due to the small empirical basis but also due to the missing link to measurement of network networkability and network performance. Both will require more in-depth research. Ultimately, network networkability should provide more guidance for organizations when selecting and designing business networks.

## References

- Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45 (3), 425–455.
- Alt, R. and Fleisch, E. (2001). Business networking systems: characteristics and lessons learned. *International Journal of Electronic Commerce*, 5 (2), 7-27.
- Alt, R., Fleisch, E. and Werle, O. (2000). The concept of networkability - how to make companies successful in business networks. In *Proceedings 8<sup>th</sup> European Conference on Information Systems* (Hansen, H.R. et al. Eds.), pp. 405-411, Vienna.
- Anderson, J.C., Håkansson, H. and Johanson, J. (1994). Dyadic business relationships within a business network context. *Journal of Marketing*, 58 (4), 1-15.
- Anonymous (2003). Veraltete IT-Systeme der Kantonalbanken. *Neue Zürcher Zeitung*, Oct. 21, 27.
- Barringer, B.R. and Harrison, J.S. (2000). Walking a tightrope: creating value through inter-organizational relationships. *Journal of Management*, 26 (3), 367-403.
- Bensaou, M. and Venkatraman, N. (1995). Configurations of interorganizational relationships: A comparison between U.S. and Japanese automakers. *Management Science*, 41 (9), 1471-1492.
- Davenport, T.H. and Brooks, J.D. (2004). Enterprise systems and the supply chain. *Journal of Enterprise Information Management*, 17 (1), 8-19.
- Delparte-Vermeiren, D., Vervest, P. and Van Heck E. (2004). In search of margin for business networks: The European patent office. *European Management Journal*, 22 (2), 167–182.
- Gallarotti, E. (2004). Tieferes operatives Ergebnis der Bank Linth - Eine Reihe belastender Sonderfaktoren. *Neue Zürcher Zeitung*, Feb. 21, No. 43, 27.

- Ganeshan, R., Jack, E., Magazine, M.J. and Stephens, P. (1999). A taxonomic review of supply chain management research. In *Quantitative Models for Supply Chain Management* (Tayur, S. et al. Eds.), pp. 839-879, Springer, Berlin.
- Glassberg, B.C. and Merhout, J.W. (2007). Electronic markets hypothesis redux: Where are we now? *Communications of the ACM*, 50 (2), 51-55.
- Gregor, S. and Johnston, R.B. (2001). Theory of interorganizational systems: industry structure and processes of change. In *Proceedings 34<sup>th</sup> HICSS*, IEEE.
- Gunasekaran, A., Patel, C. and McGaughey, R.M.E. (2004). A framework for supply chain performance measurement. *International Journal of Production Economics*, 87 (3), 333-347.
- Håkansson, H. (1982). *International marketing and purchasing of industrial goods: An interaction approach*. Wiley, Chichester etc.
- Håkansson, H. (1989). *Industrial technological development: a network approach*. Routledge, London.
- Hoogewegen, M. (1997). *Modular network design: assessing the impact of EDI*. PhD thesis, EUR.
- Iacono, S. and Wigand, R.T. (2005). Information technology and industry change: view from an industry level of analysis. *Journal of Information Technology*, 20 (4), 211-212.
- Johnston, R.B. and Gregor, S. (2000). A theory of industry level activity for understanding the adoption of interorganizational systems. *European Journal of Information Systems*, 9 (4), 243-251.
- Kleijnen, J. and Smits, M.T. (2003). Performance metrics in Supply Chain Management. *Journal of the Operation Research Society*, 54 (5), 507-514.
- Klein, S. (1996). The configuration of inter-organizational relations. *European Journal of Information Systems*, 5 (2), 92-102.
- Kumar, K. and Van Dissel, H. G. (1996). Sustainable collaboration: Managing conflict and cooperation in interorganizational systems. *MIS Quarterly*, 20 (3), 279-300.
- Normann, R. and Ramirez, R. (1993). From value chain to value constellation: Designing interactive strategy. *Harvard Business Review*, 71 (4), 65-77.
- Österle, H., Fleisch, E. and Alt, R. (2001). *Business networking, shaping collaboration between enterprises*. 2<sup>nd</sup> ed., Springer, Berlin.
- Parolini, C. (1999). *The value net*. Wiley, Chichester etc.
- Porter, ME (1985). *Competitive advantage: creating and sustaining superior performance*. Free Press, NY.
- Reimers, K, Johnston, R.B. and Klein, S. (2004). The shaping of inter-organizational information systems: Main design considerations of an international comparative research project. In *Proceedings 17<sup>th</sup> Bled eCommerce Conference*, Bled.
- Ritter, T., Wilkinson, I.F. and Johnston, W.J. (2004). Managing in complex business networks. *Industrial Marketing Management*, 33 (3), 175- 183.
- Skytte, H. (1992). Developing and sustaining competitive advantages through inter-organizational relations between retailers and suppliers. *International Review of Retail, Distribution and Consumer Research*, 2 (2), 151-164.
- Smits, M.T., van den Heuvel, W.J. and Huisman W. (2006). The tacit liaison between networkability and supply chain performance. In *Proceedings 39<sup>th</sup> HICSS*, IEEE.
- Snow, C. C., Miles, R. E. and Coleman, H.J. (1992). Managing 21st century network organizations. *Organizational Dynamics*, 20 (3), 5-20.
- Stabell, C.B. and Fjeldstad, O.D. (1998). Configuring value for competitive advantage: on chains, shops, and networks. *Strategic Management Journal*, 19 (5), 413-437.
- Straub, D., Rai, A. and Klein, R. (2004). Measuring firm performance at the network level: a nomology of the business impact of digital supply networks. *Journal of Management Information Systems*, 21 (1), 83-114.
- Whitworth, B., Fjermestad, J. and Mahinda, E. (2006). The Web of System Performance. *Communications of the ACM*, 49 (5), 93-99.
- Wigand, R.T., Picot, A., and Reichwald, R. (1997). *Information, organization, and management*. Wiley, Chichester etc.
- Windahl, C. and Lakemond, N. (2006). Developing integrated solutions: The importance of relationships within the network. *Industrial Marketing Management*, 35 (7), 806-818.