

13 Key Success Factors for Business Networking Systems

Rainer Alt, Elgar Fleisch

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13.1 Challenges in Designing Business Networking Systems

Relationships among business units have recently been gaining momentum in a broad variety of industries. Previous chapters have shown that Business Networking leads to process efficiency, such as reduced cycle times, reduced process costs, increased customer service, and new distribution channels (cf. Chaps. 5 and 6). The current figures for business-to-business EC, which forecast a growth from USD 43 billion in 1998 to USD 1,300 billion in 2003 [cf. Forrester 1998] witness to these strategic developments. In view of the major relevant management trends (cf. Chaps. 2 and 8) establishing networkability (cf. Chap. 1) is one of the most important determinants of a company's future competitiveness.

However, many businesses have concentrated on implementing and integrating internal information systems. In fact, they, possess only limited networking capabilities and modules for supply chain planning, electronic commerce (EC) and the like have only recently been added. Analyzing the current situation concerning the application of Business Networking systems (BNS), two main challenges can be observed: an adoption lag and the gap between business and IT issues. With a view to meeting both challenges, this Chapter proposes major success factors and techniques governing the implementation of BNS.

13.1.1 Adoption-lag of Interorganizational Systems

Information technology (IT) can only live up to its enabling role for Business Networking (cf. Chap. 1) if information systems are in place that provide the necessary functionality and will ultimately be used by the various parties involved. There is ample evidence that BNS did encounter adoption problems in the past. Relevant interorganizational systems, such as electronic data interchange (EDI) or EC applications have been available since the 80s, but only now are they finding wider acceptance in the business community [cf. DeCovny 1998]. In the first place, this was due to the fact that most companies were preoccupied with establishing integrated internal systems and considered extended supply chain and EC modules as consistent extensions. In parallel with the spread of EDI or EC, interorganizational systems have been evolving as more advanced technologies became available. As Figure 13-1 shows, both developments are in the process of converging and will, through a fundamental redesign of business, lead to what we have termed a 'networked economy' (cf. Chap. 1).

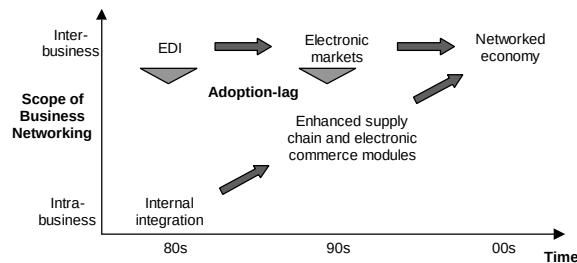


Figure 13-1: Evolution of Business Networking Systems

The evolution path depicted in the graph also reflects the degree of reluctance on the part of the business community to adopt either EDI or interorganizational systems. They were considered to be afflicted with high costs and a lack or insufficiency of functionality and participants/users. [Jimenez-Martinez/Polo-Redondo 1998] analyzed the diffusion and adoption lag of EDI in the European sector and identified several variables to be explained. According to [Kalakota/Whinston 1997, 379], there are five factors which determine the adoption lag of EDI: high costs, limited accessibility, rigid requirements, partial and closed solutions. Others (e.g. [Christiaanse et al. 1996], [Alt/Klein 1999]) found that electronic markets, such as air cargo community systems and electronic transportation exchanges, failed to catch on due to high costs, insufficient functionality and lacking network externalities on the infrastructure and application levels. Thus, attracting a critical mass (cf. Chap. 2.2.3) of partners continues to be one of the main challenges in the field of BNS.

13.1.2 Gap Between Business and IT Issues

In their empirical study, [Jimenez-Martinez/Polo-Redondo 1998] confirmed that strong hub companies and senior management support were critical factors in successful EDI implementations. The history of electronic market systems also indicates that cost structures, functionality and connectivity to other partners failed to match the requirements of businesses. We therefore deduced that the alignment of business and technological requirements is the key success factor for a wider acceptance of BNS.¹ In a horizontal study, senior executives and chief information officers (CIO) of 700 large enterprises throughout Europe and the US were asked what in their opinion were the main challenges CIOs are facing. 95% of all interviewees stated their IT organization was about to change dramatically. Only 2% (of the European companies) claimed to have a clear picture of their future IT and

¹ This is also borne out by an empirical research study undertaken by the Gartner Group (cf. [Gartner Group 1998b], [Gartner Group 1998c]).

business vision. The research study is divided into two sections: IT management and technology. The two categories were also used by [Schnedl/Schweizer 1999] to structure the main challenges from a historical (1995-1997) and a future (1998-2002) perspective. As far as IT management is concerned, the alignment of IT and business strategy has always been the researchers' foremost concern which, indeed overshadowed others, e.g. strategic IT planning, the Y2K/Euro-problem or the management of distributed computing. From the technological side, client-server architectures, Inter-/Intranet-technologies and eBusiness were considered the main challenges from 1995 to 2002, followed by data warehousing, network management and the integration of applications.

13.2 Characterization of Business Networking Systems

13.2.1 Types of Transaction-oriented Business Networking Systems

Systems that support the coordination among business units are referred to as Business Networking systems (BNS). In general, transaction- and knowledge-oriented BNS can be distinguished. The former concern operative business transactions and stretch from information to settlement activities (cf. Chap. 6). The latter focus on less structured and more subjective information and knowledge.

This notion allows us to specifically address inter-company relations and to include relevant existing concepts, such as EDI, EC and supply chain management (SCM). They invariably involve more than one organizational unit and often integrate business partners (customers, suppliers, etc.) with a company's information infrastructure. Prominent examples are systems for EC and SCM. Although Business Networking is now receiving growing management attention, various types of systems have evolved since the emergence of EDI in the 70s. As Figure 13-1 shows, we can distinguish two evolutions paths, an interorganizational one which encompasses EDI, electronic markets and interorganizational systems (IOS), and an intraorganizational one which describes internal systems that are enhanced with Business Networking capabilities. In general, BNS are designed to link up the internal systems of individual business units that have been integrated mainly in the 80s with standard packages from vendors, such as SAP, Baan or Oracle. Enterprise resource planning (ERP) systems aim at providing efficient transaction processing by using integrated applications and data (cf. Chap. 2.3.1). However, implementing connections to other businesses in the same system offers only little flexibility and is bound to quickly reach capacity limitations. This is the starting point for the three different types of BN systems that we propose based on the previously mentioned evolution paths (see Figure 13-2):

- *Master data sharing* systems support the consistency of data by linking individual applications. This is the function of EDI-systems and proprietary systems, such as SAP's application link enabling (ALE), and intermediate documents (IDOCs) [cf. Hofmann/Killer 1995].
- *Supply chain management* systems or advanced planning systems (APS) offer functionalities for supply network planning, demand planning and the like (cf. Chap. 9). Usually, they are linked to an existing ERP system and are operated by one of the two parties involved. Examples are SAP's APO and the products from Manugistics or i2 Technologies.
- *Electronic commerce* systems are applications which concentrate on information and contracting activities and complement supply chain systems focusing on planning, managing and controlling of material and financial flows (cf. Chap. 6). Although ERP systems are now extended with EC-functionalities, specific applications (e.g. Open Market, Intershop) as well as specific services (e.g. electronic malls, auction systems) have emerged which have to be integrated with internal systems.

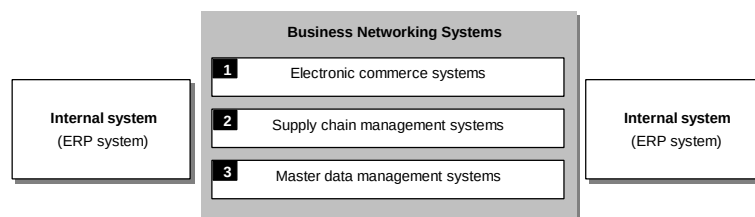


Figure 13-2: Types of Business Networking Systems

13.2.2 Specifics of Business Networking Systems

To describe the specifics of BNS we will use the three dimensions of Business Engineering that represents an approach geared to the business-oriented conceptualization of information systems. It combines various theoretical disciplines and "structures the organization, data and function dimensions at the business strategy, process and information systems levels" [cf. Österle 1995, 29].

As to the organizational dimension, BNS by definition support relationships between multiple organizational units. From a juridical standpoint, these may be internal, e.g. within a large conglomerate, or external, e.g. related to customers and suppliers. However, the blurring of organizational boundaries makes it difficult to clearly distinguish between the qualities of internal and external business networks. We therefore concentrate on the major organizational difference of BNS and (traditional) internal information systems (see Table 13-1). As interorganiza-

tional theory posits [e.g. Evan 1976], governance structures with authority, autonomy and dependency patterns are different in that interorganizational relationships permit less direct influence and inherit higher conflict potentials than traditional hierarchical relationships. In addition, there is usually only a lower level of knowledge about the business partner's processes which is also a result of the more frequent change in partners (lower stability).

	Internal Business Systems (e.g. Traditional ERP)	Business Networking Systems
Stability	High	Medium - low
Authority and Control	High	Medium - low
Autonomy of Partners	Low	Medium - high
Dependence	High	Medium
Conflict Potential	Low - medium	Medium - high
Process Knowledge	High	Medium - low

Table 13-1: General Specifics of Business Networking Systems

In the data and function dimension, BNS – just like any other business information system – transform business data (or objects) using some business functions (or methods). However, there are some specific requirements in both dimensions that are summarized in Figure 13-3. In the first place, Business Networking processes, such as collaborative forecasting, require single and homogeneous signals since multiple parties base their actions on them. This is well known from the financial sector where time lags in updating stock prices heavily influence investment decisions. An effect from the production field is the bullwhip effect described by [Lee et al. 1997].² Since business partners make their decisions upon the data they receive, e.g. an automotive supplier schedules his production depending on the planning data he receives from the manufacturer, accountability is a second requirement. Finally, information systems not only have to make sure that single, accountable data are available but also that they are visible to all relevant actors, i.e. they must be accessible to partners without any major additional effort.

In the functional dimension, we observe that BNS are built for real-time execution since business partners require immediate responses to keep their processes running without interruption and to maintain consistent data (see also [Bradley/Nolan

² First described by [Lee et al. 1997] and [Fine 1998] explains the bullwhip effect as a 'law of supply chain dynamics'. It describes a phenomenon whereby the volatility of demand and inventories in the supply chain tend to be amplified as one looks further upstream.

1998] or [Kelly 1998]). Real-time execution requires the integration of BNS and ERP systems among internal (e.g. APS or master data servers) as well as among external (e.g. electronic markets) systems. This n:m connectivity requires data and method standards that are accepted throughout a business network.³ They also represent an important basis for the coordination processes and techniques [cf. Riehm 1997] that clearly have to be more sophisticated than in internal environments. Research on intelligent optimization algorithms, which, for example, support the simultaneous coordination of multiple actors and given the computational capacity, will continue to be an important issue for BNS (e.g. [SAP 1998c]). The degree of fulfillment of these requirements of BNS, in terms of logic and capacity, is referred to as the performance.

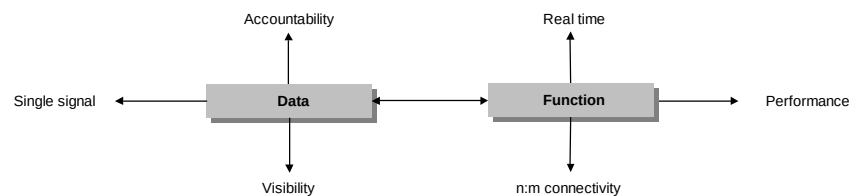


Figure 13-3: Business Networking Requirements for Data and Functions

Designing and implementing systems, to fulfill these requirements, are key challenges for the information management profession. Therefore, organizational, functional and data requirements have to be reflected in BNS concepts.

13.3 Key Success Factors in Designing Business Networking Systems

13.3.1 Cases for Business Networking Systems

To develop perspectives for closing the business IT gap and shortening the adoption lag, three different BNS-cases will be discussed. As Table 13-2 shows, each case has a different focus as it aims to highlight each BN type in a specific context, i.e. in interaction with internal and/or external business partners. Since all cases have been described in other chapters already, they will only be explained briefly:

³ For a detailed study of n:m issues of desktop purchasing systems see Chap. 10.

- *Commtech* (cf. Chap. 3.2.8) is a worldwide communication company that introduced shared service centers for some common areas in order to leverage economies of scale. Homogenized master data, process standards and integration scenarios were defined to ensure coordination among the participating units.
- *Riverwood International* (cf. Chaps. 5 and 14.3) is an integrated cardboard and packaging supplier located in Atlanta, USA. The company aimed at improving customer service by optimizing the flow of information to the customers. Small customers should be able to process orders and inquire order status whereas larger customers were offered global logistics strategies, such as vendor-managed-inventories (cf. Chaps. 4.3.2 and 14.3).
- *ETA SA* (cf. Chap. 6.3) is member of ‘The Swatch Group’ and manufactures watch movements. The main goal of the project (see [Alt et al. 1999], [Benz et al. 1999]) was to improve the management of information exchanged between ETA and its customers, i.e. mainly the Swatch group brands. Therefore, ETA redesigned their supply chain and introduced an EC solution.

Partners Type of System	Internal	Mixed	External
EC		ETA SA	
Extended Supply Chain			Riverwood International
Data Sharing	Commtech		

Table 13-2: Positioning of the Cases

In all three projects, similar steps were undertaken (see Table 13-3). The starting point was the identification of the main problem and the formulation of the project’s goal in customer workshops. This input helped to derive the type of BNS that appeared to be a most likely solution to start with. As the next step, this initial system design was verified and elaborated in more detail with partner profiling. This technique systematically supported the design of the coordination technique and yielded the main input for creating win-win situations. Since project situation and BNS have already been described, we will now concentrate on partner profiling and coordination techniques (cf. Chap. 13.3.2) and the creation of win-win situations (cf. Chap. 13.3.3).

	Commtech	ETA SA	Riverwood Int.
Goal: Improvement of	Availability of internal process information	Information management in customer process	Organization of customer relationship
Type of BNS	Data sharing	Electronic commerce	Extended supply chain
Partner Profiling			
Partner Setting	Internal / few partners (5)	Mixed / few partners (15 represent majority of revenues); many small partners (approx. 1000)	External / many partners (approx. 2000)
Type of Partner Profile	Not used	Used in the form of customer workshops	Used for all small customers, for large customers in the form of customer workshops
Coordination Technique			
Scope of Standardized Data	Broad (multiple master data)	Low (material data only)	Medium (material, forecasting and planning data)
Standardization Tool	Harmonization	Mapping	Mixed (harmonization of material and mapping of forecasting and planning data)
Degree of Data Standardization	High (same syntax, same semantics)	Low (different syntax, same semantics)	Medium (high for material, low for forecasts and plans)
Standardization of Processes	High (global processes)	Low (ordering processes only)	Medium (supply chain processes only)
Win-win Creation	Transfer payments: New project due dates, new project budgets	Transfer payments: Shorter and guaranteed delivery times	Transfer payments: Price reductions, free hardware and software

Table 13-3: Main Steps and Topics in the Cases Reviewed

13.3.2 Setting-up Partner Profiles

Once a type of BNS had been identified as a starting solution, the partner setting was analyzed. To ensure networkability among a large number of partners and to

limit the complexities of establishing and managing relationships, detailed partner profiles were designed at ETA and Riverwood for partner classification. However, for a small number of partners (as in the Commtech case) a qualitative description proved more efficient. Since business processes only communicate via business process outputs [cf. Österle 1995, 135], partner profiles aim at defining standardized outputs for coordination processes. These standard patterns are then tailored to specific partner requirements. Each individual profile contains the expected requirements in the organizational, functional and data dimensions. They can be represented as tables (see Figure 13-4) containing four components:

1. *Business relationship drivers* are generic factors influencing the design of business relationships. In terms of business engineering, a distinction is made between strategic, business process and information system drivers [cf. Österle 1995]. Figure 13-4 shows a customer profile as used in the Riverwood case. Detailed drivers were formulated which customers or sales reps were asked to simply mark them 'applicable' or 'not applicable'.

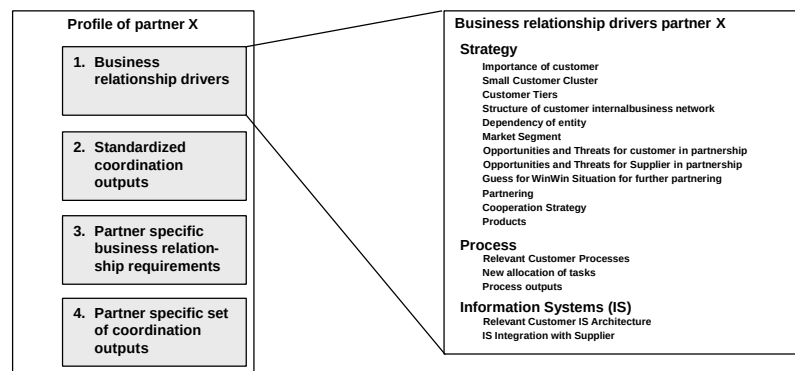


Figure 13-4: Components of Partner Profile

2. A catalog of *standardized coordination outputs* shows the possible components of a business relationship on the strategy, business process and information system level. Examples of coordination outputs are 'advance shipment notice' or 'order acknowledgement'. As shown in Table 13-4 for the three cases, outputs vary in scope and content. In addition, the catalog may also list some technical integration forms [cf. Riehm 1997], such as a partner accessing internal ERP data via the Internet.

	Commtech	ETA SA	Riverwood Int.
Data			
Accountability	Material, vendor, customer, ...	Material	Material, forecasts, plans
Visibility	Credit limits, head counts, costs, taxes,...	Inventory, order status	Production plans, sales forecasts, inventories
Single Signal	Master data	Inventory	Demand signals
Functions			
Real Time	Credit limit check, One bill to customer, Global contracts, drill-down in taxes	Delivery dates, order status	ATP, vendor managed inventories
N:m Connectivity	Master data management	Delivery dates	ATP
Performance	Performance of distributed transactions	Interfaces to ERP systems	Performance of ATP server

Table 13-4: Requirements on IS-level

3. *Partner-specific business relationship requirements* are the outcome, if partner profiles are used as structured questionnaires. They reflect the specific needs of specific partners in respect of their relationship, support active partner management, and serve as the basis for individualized coordination. In the ETA and Riverwood cases, modular and standardized types of customer relationships were defined for different customer segments.
4. Once business relationship drivers and standardized coordination outputs have been defined, the partner-specific requirements can be translated into a *partner-specific set of coordination outputs*. Both partners would implement the processes and systems needed to obtain the partner-specific set of coordination outputs. The processes and systems implemented by Riverwood and ETA were designed to produce such outputs as advance shipment notice, vendor replenishment, vendor managed inventory, ordering and order tracking via the Internet.

In structuring business relationship requirements on various levels, partner profiles provide the basis for conceiving a specific coordination technique. While we cannot elaborate on alternative coordination techniques here, we may point out two aspects that have emerged from the cases reviewed:

- Standardization of master data and processes were the main coordination techniques used in different scopes in the cases (see Table 13-3).
- Standardization of master data was achieved by data harmonization and by implementing mapping procedures. Obviously, the former reflects closer coupling among partners.

13.3.3 Reciprocity: Creating Win-Win Situations

Stringent standardization requirements, to be sure, are not readily reconciled with the need for organizational autonomy inherent in business networks (see Table 13-1). In all three projects discussed, it took a great deal of persuading to have partners participate. Where an unbalance of costs and/or benefits exists among the partners, the chances of successful implementation dwindle rapidly. Therefore, creating win-win situations was an important change management effort in these cases.

As a first step, the impact on setup and running costs and the benefits was explored for the networking partners. Following the concept of life cycle costs [cf. Schelle 1989], we distinguish between setup and ongoing costs and benefits. A partner's setup costs encompass his total project costs and the costs due to integration effects with other projects:

- Project costs fall into costs for designing new processes, change management, indoctrination of employees, data standardization and costs for implementing IT based relationships.
- Costs incurred by integration effects reflect the networking character of networking projects. Interdependencies between networking projects and other internal projects have to be closely watched since they tend to be a source of delays.
- Costs of the new process, especially costs for designing and implementing the new coordination tasks, are part of the running costs (for detailed process cost drivers, [cf. Braun 1996]).

Thanks to the impact of the networking project, win-win situations can be designed for any individual partner or any type of partner. The partner profile provides the basis of a win-win situation by specifying the partner-specific requirements and includes further specifics, such as feasible coordination techniques or investment power. A crucial element in creating win-win situations is to establish reciprocity and trust which are known to be essential enablers in implementing business networks [cf. Klein 1996]. In the cases under review, success was owed to two facts:

- Partner-specific profiles kept transaction and investment costs low and generated networking benefits which it was possible to quantify.
- Compensation for investment costs, costs due to interdependencies with other projects and protection against opportunism was achieved in the cases under review by providing transfer payments. Examples include price reductions for the new services or hardware and software offered for free. In networks with hierarchical elements, such as Commtech, extra budgets and schedule concessions granted for other projects proved effective in maintaining the priority of networking projects.

Win-win situations are easy to communicate when real-life examples can be cited to illustrate them. For each networking project, the case study companies defined a project nucleus permitting the benefits of the networking project to be assessed by the project partners within a limited time and cost effort. The fact that it was possible to quickly reach a critical number of partners proved vital for the success of the BNS.

13.3.4 Networking Projects are Business Projects

Networking applications and technologies enable new business processes and business strategies and support them. In order to use them correctly, the business must understand the essence of technical networking and, conversely, information management must understand the business. From an organizational point of view, the strategies and processes that can be implemented by means of networking applications are closely linked up with a great many other processes and strategies. In the Riverwood International example, a project for reorganizing the sales process affected the processes of distribution, inventory management, production planning, production, maintenance, procurement, controlling and accounts payable. The integration of these processes and the associated strategies, organizational structures, such as departments and above all human resources, take up a good deal of management time. Examples are the definition of new processes (procurement or sales) and/or strategic business areas (product/market mix), the coordination of marketing, sales, production and inventory strategies or communication of the solution to the partners affected. While information management can encourage networking projects and make major contributions to their success, the most effective dimensions of a network must, however, be evolved by the business for the business.

13.3.5 Nucleus and Rapid Diffusion: 'Grow by Chunking'

The quality and success of many networking projects will depend on the number of networked partners [cf. Shaprio/Varian 1999, 173]. Such projects must set

themselves the prime goal of fast growth in the number of users. Examples of how to achieve rapid diffusion are provided by Netscape, Hotmail or Compaq. In the initial phase they would make their software, services or hardware available free of charge and thus generate a fast growing customer base [cf. Kelly 1998, 50]. In order to accelerate growth, they would design services that operate according to the rules of increasing economies of scale [cf. Arthur 1990], i.e. marginal return and customer benefits tend to grow as the customer base expands.⁴

In addition to coordinated marketing strategies and the requirement for reciprocity, this goal is targeted in particular by the nucleus approach which addresses the design of 'nuclei' that are conducive to rapid growth.⁵

13.3.6 Standards and System Integration as a 'Conditio Sine Qua Non'

By providing external access to what were previously internal functions and information, EC solutions ultimately go a long way towards achieving the vision of the extended enterprise (cf. [Ashkenas et al. 1995], [Wigand et al. 1997]). Examples of such information are inventory levels, delivery dates, special terms of sale or order status which can be called up by external partners. Internal ERP/legacy systems, such as production planning systems, finance systems or order management systems, are responsible for this information. For this reason, networking applications can never be isolated solutions. It is far more appropriate to see them as a new front end to existing systems which outsources functionality to partners and makes new functionality possible. They process the information provided by other information systems and pass it on to partners without any human intervention. This leads to important requirements which the data and their standardization and/or integration will have to satisfy:

- All the information which a business unit wants to make available to its partners must be known to the business unit. This is contingent on a properly functioning internal organization and/or the internal integration of the information systems. The *integration* of new applications with internal and external information systems represents the greatest challenge for networking projects. The standards applied at the process and information system level play a major role in integration.
- Networking applications place a new and disproportionately greater emphasis on interorganizational process standards. Networking calls for the various

⁴ Further hints on the rapid diffusion of EC solutions are provided by [Kelly 1998, 47]. The most important of these are 'touch as many nets as you can', 'maximize the opportunities of others', 'don't pamper with commodities; let them flow' and 'avoid proprietary systems'.

⁵ 'Grow by Chunking' is one of the nine principles for managing complex adaptive systems (cf. [Kelly 1995, 469], [Stüttgen 1999]).

processes of various independent business units to be synchronized. Today, business units operate individual processes with a wide range of information systems and data models with different business semantics. A purchasing process, for instance, has to be synchronized with the supplier's sales process, the credit card institution's payment transaction process, the authentication process of the trusted third party and various processes within the business unit itself (authorization, accounts, etc.).

- Networking also builds on information standards. Dun & Bradstreet's SPSC standard for product categories (standard product & service codes), for example, prescribes a uniform metastructure for product catalogs. This standard thus helps to consolidate the catalogs of different manufacturers in a multi-vendor catalog. Further examples are standards for catalog interchange formats (CIF), access protocols (lightweight directory access), authorization (RSA procedures), payment transactions (OTP), security (SSL, IPsec, PPTP, Socks5, RSA, X.509), method calls (API), protocols (HTTP) and formats (XML) (e.g. [Dolmetsch et al. 1999], [Scheller et al. 1994, 20], [Neuburger 1994, 22]). For many companies, the main emphasis is on harmonizing and homogenizing master data, e.g. reorganizing the master data for products, customers and outline agreements.

13.4 Conclusions

Establishing networkability is a necessity for achieving and sustaining competitive advantage. It combines enhanced and individualized relationships with increased efficiency and flexibility. Since Business Networking inherently relies on sophisticated IT, aligning business and technological requirements is of foremost importance. Thus, BNS, which sustain networkability, are critical for the success of networked organizational entities. Evidence also shows that BNS require the participation of a critical mass (cf. Chap. 2.2.3) of partners. Therefore, the main issues of this Chapter were how to ensure the participation of partners and how to align business and IT issues.

Three types of BNS were presented and illustrated in three case studies. To offer the desired customer value and efficiencies the BNS have to be configured and tailored to the relationships. Partner profiling was presented as a successful technique to reach these goals. Profiles provide a transparent view of the current partner situation and form the basis for broad and systematic partner integration. As customer profiles, they are valuable marketing and customer retention tools. Especially, the modular design of coordination outputs and standard relationships reduced the time for setting up new relationships. In providing a technique for collecting information on partners, processes and systems partner profiling supported the alignment of business and IT issues.

All case studies dealt with how to convince business partners to use the new form of coordination. Creating win-win situations was a technique used to attain a buy-in from the stakeholders. Costs and benefits were calculated on the basis of quick wins that were derived from a first pilot implementation. As the Commtech case suggests, this is a major success factor for data sharing systems, such as EDI, and an important element in explaining the adoption lag of inter-business systems.

Both techniques, partner profiling and creating win-win situations, yielded valuable results for the design of application architectures in internal and external environments. Therefore, they should be an integral element in the management of Business Networking projects [cf. IMG 1998a].