

ELECTRONIC COMMERCE AND SUPPLY CHAIN MANAGEMENT AT ETA FABRIQUES D'EBAUCHES SA

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ABSTRACT

Electronic Commerce (EC) and Supply Chain Management (SCM) are fundamental strategic concepts when businesses are forging links with their suppliers and customers. This article analyzes the complementary nature of both concepts. ETA SA, part of 'The Swatch Group' in Switzerland, has redesigned the distribution of spare parts to brand manufacturers by pursuing an integrated approach of EC and SCM. The article describes the interaction of SCM and EC from a conceptual and a practical perspective and develops some implications for designing and implementing EC and SCM solutions using the Business Engineering method.

1 Introduction

1.1 Transformation of the 'Old Economy'

On the evolution from the old to the 'new economy', many mature industries are being transformed. This is reflected in the deconstruction of value chains [Evans/Wurster 1999], the rise of new intermediaries, such as Amazon in book retailing [Hagel/Singer 1998, Giaglis 1999], new business rules [Kelly 1998], and new requirements to meet customer demand in terms of speed, availability, cost and service [Rodin/Hartmann 1999]. Over the last two years a large number of market forecasts have been undertaken which underline the growing relevance of electronic processes in procurement and distribution. For example, a Goldman Sachs study estimates the share of electronic procurement and distribution to increase fivefold from \$114 billion today by 2003 in the business-to-business segment [Cohn 2000]. Although many electronic transactions will be effected by start-ups, this article argues that the majority of EC transactions will involve already existing (brick and mortar) companies. Thus, transformation is key for companies of the so-called 'old economy'.

This transformation effort is addressed by Business Networking which aims at (re)designing relationships among business partners [Österle 2000]. Electronic Commerce (EC) and Supply Chain Management (SCM) are two major concepts in Business Networking. They are closely interrelated since integrated business transactions are recognized to yield substantial value to sellers and customers. We believe that pursuing integrated strategies which include both areas is vital for the expectations in the 'new economy' to materialize. Prominent examples are computer maker Dell and Cisco Systems, provider of telecommunication equipment. Both have achieved to sell a large part of their products electronically and to link upstream and downstream business partners into their supply chain system. Although neither EC nor SCM are new concepts, there is still a need for contributions and examples which focus on a combination of both. Conceiving and implementing an integrated EC/SCM solution is an intricate task, since EC and SCM have evolved from different backgrounds: the former from sales and marketing and the latter from physical logistics, production and materials management [Kalakota/Whinston 1997].

1.2 Goals and Organization of Paper

In this paper we will present the transformation of an 'old economy' company which redesigned its business network for the 'new economy'. The main elements of the solution, a direct order entry channel and a direct delivery channel, have been conceived by pursuing an integrated EC/SCM approach. In describing this solution our analysis emphasizes:

- *Combination of EC and SCM.* Based on a description of the core processes from established literature in EC and SCM, we focus on identifying the interrelationships among EC and SCM. Business Networking will be presented as a strategy which combines EC and SCM.

- *Industrial physical goods.* Established products within the 'new economy' are immaterial goods (e.g. news, software) as well as some physical goods (e.g. CDs, books, computers). We focus on industrial physical goods since they represent a major share of business-to-business transactions and are only little electronically supported.¹
- *Existing business networks.* Contrary to start-ups, companies from the 'old economy' face the transformation of existing business networks. The third goal of the paper will be to present an approach for introducing EC/SCM in an existing business network.

In a first step, chapter 2 explains the concept of Business Networking. Two main strategies within Business Networking, EC and SCM, will be presented. This involves the description of processes from the existing literature as well as the identification of conceptual interrelationships. Chapter 3 presents a case study from ETA SA, which has implemented a combined EC / SCM solution. This will include a description of the solution and an evaluation of the major benefits for the participants. From this project important lessons for designing Business Networking solutions emerged which will be presented in chapter 4. Finally, chapter 5 offers some conclusions for managing the interrelationship between the two concepts.

2 Electronic Commerce and Supply Chain Management in Business Networking

2.1 Business Networking

Business Networking is a concept which aims at shaping and managing relationships among business partners. As described by Venkatraman [1990] it extends the scope of successful Business Process Redesign methodologies, which have had an emphasis on processes within organizational units [Ellram 1991]. Improved intraorganizational processes are an important basis for Business Networking which analyzes entire networks of (internal and external) business partners and emphasizes distributed processes of the extended supply chain, such as procurement, distribution and planning. Business Networking assumes that production occurs not within large vertically integrated companies but in networks where different partners concentrate on their core activities. Important goals are to offer integrated solutions via integrating modular services from partners and to reach high performance of production and cooperation processes [Kalakota/Whinston 1997]. For example, this results in reduced and guaranteed cycle times at reduced costs as well as improved efficiencies in setting-up partner relationships. Companies, such as Amazon, focus on managing the customer relation and pursue intense networking with suppliers (publishers) and logistic partners. Thus, Business Networking addresses new strategic options (e.g. new electronic sales channel, positioning in the digital value chain), new possibilities for processes (e.g. selection of products, order entry, direct distribution, payment) as well as the technical issues (e.g. integration of ERP with EC and SCM-systems, interface standards etc.).

As described by Österle [2000], EC and SCM are two main strategies in Business Networking. In the following we will describe both strategies and elaborate their complementary relationship, i.e. each EC solution has a relationship to a supply chain and vice versa.

2.2 Electronic Commerce: Building the Links

Although first EC systems have been developed back in the 1960s (e.g. Videotex, Computer Reservation Systems and Electronic Data Interchange) significant momentum was lacking until the emergence of Internet-technologies. Today, EC is omnipresent and attributed considerable economic impact. This is also reflected in the definitions which see EC "as the entire collection of actions that support commercial activities on a network" [Adam/Yesha 1996] or as „any form of economic activity conducted via electronic connections“ [Wigand 1997]. To identify the main EC processes, a transaction-oriented perspective is widespread in the literature. Transactions link the activities of buyers and sellers and can be broken down into various phases [Malone 1987, Schmid/Lindemann 1998, Chesher/Kaura 1998]:

- *Information.* At the beginning of a transaction is the identification of vendors and products. Typically, EC encompasses fixed and flexible price transaction scenarios. The former include catalog-based buying from single-vendor or multi-vendor catalogs and the latter electronic auctions.
- *Contracting.* Once vendor and product have been determined, negotiation and decision-making concerning a specific product occurs in the contracting phase. Allocation rules are used, e.g. hit-and-take in catalog-based transactions and price-time priority in auction-based transactions.
- *Settlement.* Based on a legal contract, the finalized order is entered and delivery and payment of the selected goods are initiated.

¹ For related research covering immaterial goods see e.g. <http://www.mediamanagement.org/>

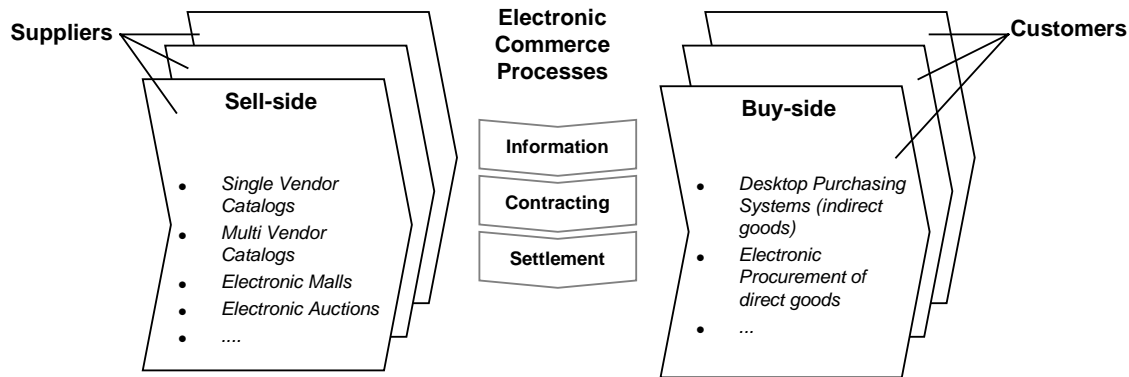


Figure 1: EC Processes and Application Areas of EC

As shown in Figure 1, EC shapes transactions between business processes. Most EC solutions have evolved to support sales and procurement transactions. Sell-side EC primarily comprises electronic product catalogs which permit browsing through, configuring and ordering of goods from one or more vendors. Well-known systems are from Intershop, Openmarket or Broadvision. Solutions for buy-side EC (or eProcurement) are designed to bundle catalogs according to conditions that are pre-negotiated with a supplier. Well known systems are from Ariba, Commerce One or SAP. In the following, we will focus on single-vendor catalogs as a form of sell-side EC systems. We will mainly consider business-to-business transactions in this context – intraorganizational EC or business-to-consumer EC solutions are outside the scope of this article.

2.3 Supply Chain Management: Building the Chain

Similar to EC, the SCM concept has its roots in earlier concepts, i.e. logistics. While overall logistical concepts have been around for many centuries [Christopher 1998], SCM did not make its appearance in the literature until the last decade. For a long time, logistics was a concept limited to the military sector and it is only since the middle of the 20th century that logistics has come to be accepted in the business sector. Today, SCM may be described as the “integrated management approach for planning and controlling the flow of materials from suppliers through the distribution channel to the end user” [Ellram 1991, Klaus 1998]. SCM emphasizes the management of upstream and downstream relationships and the role of supply chain optimization to increase customer value at less cost [Christopher 1998, Handfield 1999]. Examples for SCM strategies are just-in-time (JiT), zero inventory (ZI), efficient consumer response (ECR), vendor managed inventory (VMI) or continuous replenishment (CR) [Kalakota/Whinston 1997].

To identify the main SCM processes the SCOR model² will be used, which is well-established in industrial environments. It provides a standardized language for the description, analysis and measurement of supply chains and builds supply chains using four generic processes (Figure 2):

- *Plan*. Processes for demand and supply planning include assessing supply resources, aggregation and prioritization of demand requirements, inventory planning, distribution requirements as well as managing the plan infrastructure, e.g. supply chain configuration, long-term capacity and resource planning.
- *Source*. Processes for sourcing and material acquisition specify how to obtain, receive, inspect, hold, and issue material. They also include the management of the sourcing infrastructure, i.e. vendor certification and feedback, vendor contracts and vendor payments.
- *Make*. Production processes are material request and receipt, manufacturing, and product hold and / or release. Managing the make infrastructure includes facilities and equipment, shop scheduling and sequencing and short-term capacity planning.
- *Deliver*. Among the main delivery processes are order management (order entry, product configuration, accounts receivable, invoicing), warehouse management (packaging, labeling, consolidation, shipping), and transportation management (traffic management, import/export management).

² The Supply Chain Operations Reference Model (SCOR) is a process reference model and was first published as Version 1.0 in November 1996 by the Supply Chain Council (SCC), an American industry association with close to 500 members. SCOR’s mission is to provide a standard language for intra and inter-company communication with supply chain partners. For further information see <http://www.supply-chain.org> and SCOR (1998).

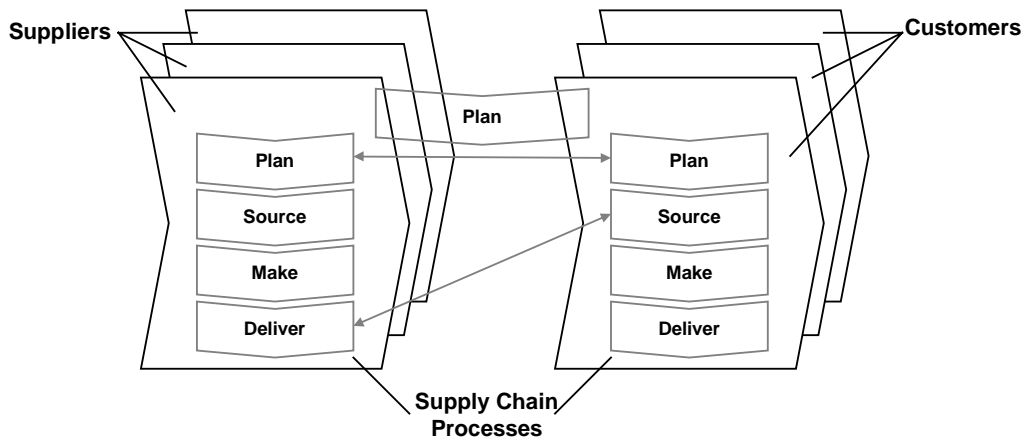


Figure 2: SCOR Supply Chain Processes

The link among organizations is reflected in two areas: First, source and deliver activities are located at the interface of internal and external organizational units. Second, SCOR envisages a planning hierarchy, i.e. the planning in two organizations can be linked via an additional planning activity which oversees and coordinates the individual plans. It is placed between two organizations in Figure 2 since this function can be performed by either organization A and B or by a third party which controls the supply chain.

2.4 Comparison of Concepts

The theoretical analysis of EC and SCM reveals a complementary nature of both concepts. We will discuss two aspects of the complementarity: process and scope of design.

- Process.* It is clear that SCM focuses on the business processes of a specific company, i.e. plan, source, make, and deliver. Transaction processes link individual business processes and are often referred to as the glue within business networks. This is illustrated using a sourcing scenario in Figure 3: A customer's sourcing process is initiated when demand emerges from an ERP or is determined manually. Based on this demand, the customer selects and negotiates the desired product from an EC system (catalog, auction etc.). After the contracting phase, orders are entered in the customer's ERP system for payment and warehouse reception. On the supplier side, the deliver process is dominant: products are configured, quotations are generated, and orders are entered in the ERP system. A link in the information phase to the plan process enables the 'Available to Promise' (ATP) check to be performed. ATP checks have become an important feature of SCM systems from i2, Manugistics and SAP. It is equally important that these systems make use of the information on EC transactions in determining demand forecasts.

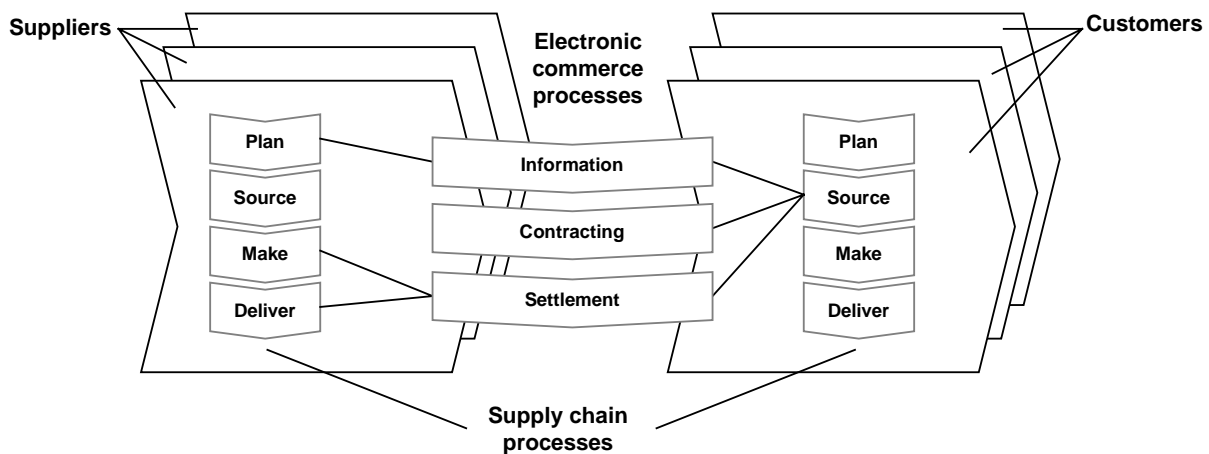


Figure 3: Complementary Relationship between EC and SCM

- *Scope of design.* EC takes a transactional perspective and aims at improving processes at a certain stage in the value chain, e.g. between a manufacturer and his dealers. We believe that EC's transaction perspective is a starting point for determining the entire customer process for a customer and needs to be extended to the customer resource life cycle [Ives/Learmonth 1984]. Contrary to the transactional perspective of EC, SCM takes a flow perspective which is geared towards the optimization of flows along entire value chains (consisting of source-make-deliver-source chains) and not only at certain stages.

An analysis of EC and SCM concepts reveals a complementary relationship with some overlapping (Figure 3). EC concentrates on shaping information and contracting activities (e.g. design of electronic catalogs and allocation rules) whereas SCM is primarily concerned with planning processes and the organization of processes internal to the business partners. From an EC perspective, SCM provides techniques and methods for efficiently designing, implementing and operating settlement processes.

3 Case Study: EC and SCM at ETA SA

3.1 Description of ETA SA

'The Swatch Group' is a globally operating producer of watches for Swatch brands, such as Blancpain, Omega, Rado, Longines, Tissot, Certina and Swatch. The group consists of a number of individual companies, which among others, focus on finished movements for watches, component production and research and development. Producing watches for the individual brands involves various group companies. ETA SA Fabriques d'Ebauches in Grenchen, Switzerland, employs more than 10.000 people worldwide and supplies the movements for watches to all Swatch brands which themselves organize production and distribution of the finished products. As the world's third largest manufacturer of movements, ETA SA has over 15 production sites in Switzerland, Germany, France, Thailand, Malaysia and China. In 1998, ETA's revenues exceeded one billion Swiss francs.

Together with the Institute for Information Management at the University of St. Gallen (IWI-HSG), ETA SA has conceived and introduced a solution for the distribution of spare parts, which corresponds to the goals described in chapter 1.2.:

- The case combines EC and SCM. An electronic catalog which includes all major spare parts of ETA SA enables a direct order entry facility. For the direct distribution of the spare parts to the customers the delivery chain was redesigned.
- The products are physical goods which have been produced on stock. Due to their size, the spare parts are shipped in small boxes.
- The solution was introduced in a traditional industry with a long tradition. ETA SA was founded in 1793 and relationships to customers are well established.

3.2 Description of Solution

3.2.1 Initial Problems at ETA SA

When ETA SA started the project 'Business Network Redesign' in 1996, there were three main problems that were considered to be of strategic importance: 1. the redesign of the introduction process for new movements, 2. a new distribution strategy for movements and spare parts as well as 3. the installation of a new distribution channel for spare parts and movements. A number of customer workshops and a customer relationship analysis were conducted in order to explore the networking potentials and the major problems [Benz 1999]. The main problems reported were:

- Customers, i.e. mainly the different brands within 'The Swatch Group', were lacking information on the interchangeability of (spare) parts (one article may be used in several movements) and comprehensive up-to-date technical documentation for the assembly, the required storage, etc. of movements and spare parts.
- Low level of customer service (ETA-CS) performance due to long cycle times and frequent misunderstandings in the order entry process as well as long delivery times for spare parts.
- Rudimentary information on ETA customers, their sales history concerning spare and sales parts as well as their preferences.

After an analysis of these problems, the implementation of a new distribution channel for spare parts was attributed the highest potentials. It was decided to pursue a EC/SCM solution which consisted of an EC solution for creating a direct order entry channel and a new supply chain for direct deliveries to the customers.

3.2.2. Introduction of EC Solution for Spare Parts

As explained in chapter 2, the main activities of EC are within the design of information and contracting processes. Figure 4 describes the design of both processes at ETA SA. In the traditional solution brands, wholesalers, country organizations, watchmakers or retailers would send their orders via fax, mail or telephone to ETA-CS. The main problem was that consistent information on available products (e.g. catalogs) was lacking and orders often were for just '40 gears with 14 teeth'. Translating this order into processing terms, i.e. finding out the relevant article number, was very time consuming for ETA-CS and it could take hours to identify the relevant article. After this matching process the order was finalized and entered into ETA's ERP system.³ Obviously, incorrect matches would result in wrong parts being delivered.

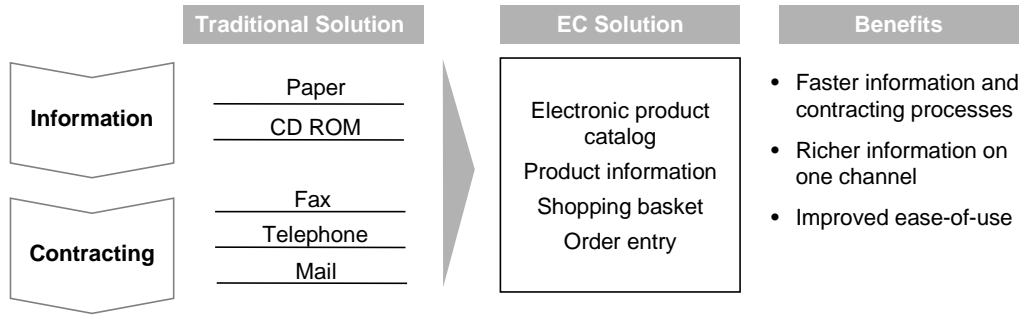


Figure 4: Information and Contracting Processes at ETA SA

As shown in Figure 4, the first attempt to improve information processes was the introduction of a CD-ROM catalog which contained article numbers, part descriptions, and pictures. However, maintenance of this solution involved additional effort and order entry was still relying on conventional media, i.e. mail, fax, or telephone. Therefore, an EC solution was conceived which enabled the integrated support of information and contracting activities via the Internet. The ETA Online Shop (<https://products.eta.ch>) mainly is an electronic product catalog which supports the selection, the distribution of important product information⁴, as well as the ordering of the products. Once registered in the EC solution, customers can browse the electronic catalog and obtain specific information about (new) products, prices, discounts, etc. Selected components are added to a shopping basket and the total order amount will be calculated. After choosing a specific payment method (e.g. credit card payment) the order process is completed. An (electronic) order acknowledgement is sent and order tracking is possible throughout the entire order cycle.

In the first stage customers are able to order spare parts and in the further roll-out primary sales products ('Flatline' and 'Normflatline' movements) will be added as well. ETA Online Shop has started in April 1999 with Swiss pilot customers and has become productive to all 1.500 global customers in December 1999. The main benefits to be gained from the EC solution are:

- *Efficiency of information and contracting processes.* With the EC solution customers obtain all relevant information on existing and new products (prices, technical descriptions, sales conditions, interchangeability) via the same channel as order entry is done. Since the site is maintained centrally, ETA-CS can easily assure that information is up-to-date and benefits from cost savings in producing and distributing catalogs, price lists and technical documents.
- *Improved level of customer service.* With ETA Online Shop additional, previously unavailable, features have been introduced. These increase service levels and include electronic order payment options (credit card payments were unavailable before), technical document downloads and electronic order tracking. Additional functionalities are currently conceived and will include customer profiling, individual customer homepages, customer communities, frequently-asked-questions databases (FAQ), online complaint management as well as auctions to sell refurbished or old parts.

³ ERP stands for Enterprise Resource Planning (ERP) and characterizes a company's integrated transaction and administration system. Prominent examples are systems from Baan, SAP, Peoplesoft etc.

⁴ This includes information on the interchangeability of spare parts (e.g. in which movements has a specific gear been used?), and technical information on the components of a specific movement.

- *Efficiency of order processing.* With the EC solution, order processing efficiency has increased remarkably. This has been mainly due to the homogenization of master data which reduces matching efforts and, consequently, eliminates misunderstandings as well. Increased efficiency allows ETA-CS to cope with an increased order volume and enables the personnel to concentrate on intensifying customer relationships (e.g. acquisition of new customers, answering individual questions).

3.2.3. Re-Engineering the Supply Chain for Spare Parts

As shown in Figure 5, the distribution of the spare parts involves a complex network of warehouses both in-house and outside. Swatch Group, Non-Swatch Group and wholesalers order spare parts from ETA-CS and deliver them to their customers, e.g. 'The Swatch Group'-country organizations (CO), local watchmakers or retailers. The former receive the parts from ETA-CS and store them in their own warehouses. After analyzing the existing supply chain, it was found that for a significant number of transactions direct deliveries would be feasible to the brand's customers. These would lead to major advantages:

- *Concentration of inventories at ETA SA.* At their headquarters, ETA SA had about 12 different levels of in-house warehouses which were scattered over the production process. A new high-bay warehouse has been installed to eliminate the need for small warehouses. Concentration of inventories not only reduced overall inventories at ETA SA but also enabled more efficient stock-keeping, i.e. quicker retrieval of necessary parts.
- *Elimination of warehouses at brands and wholesalers.* With spare parts delivered directly to the brand's customers, warehouses at the individual brands and wholesalers may become obsolete in some cases⁵ and outphasing them will result in reduced inventory costs and improved capacity utilization.
- *Delivery guarantees for customers.* Eliminating warehouses also entails reduced bufferage within the distribution system. Brands that were reducing their warehouse capacities insisted that ETA should guarantee specific times for delivery. ETA-CS will establish two (direct) distribution channels, distribution A & B with cycle times of 24 and 120 hours, respectively.

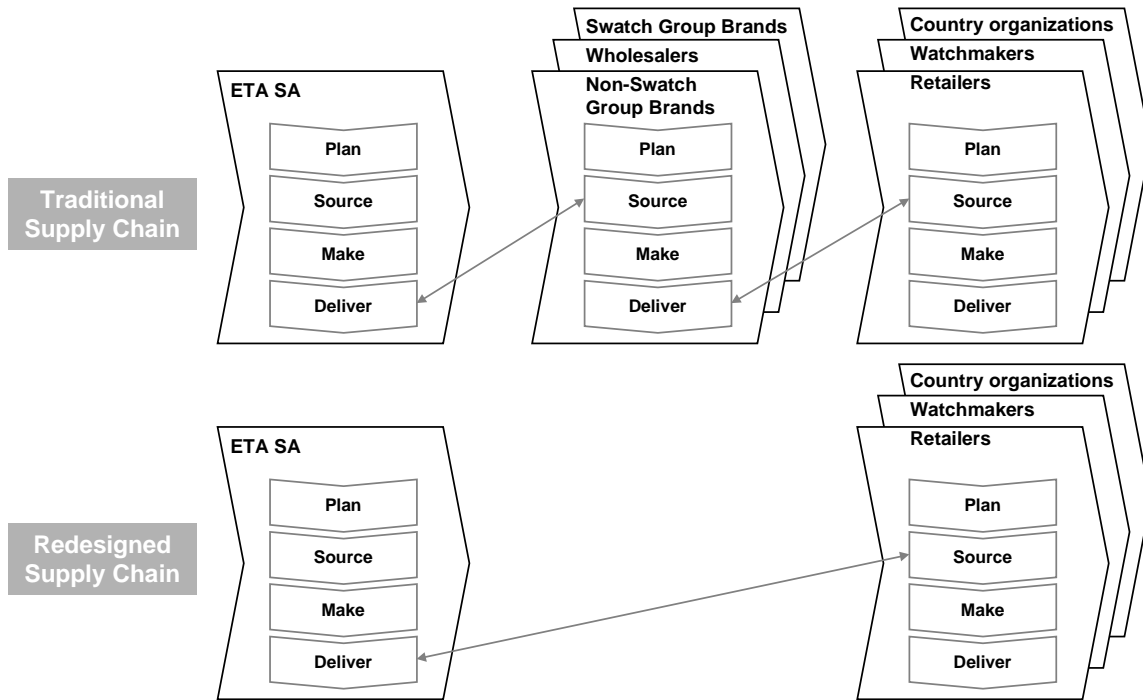


Figure 5: Re-Engineering of Spare Parts Supply Chain at ETA SA

⁵ This is true especially for Swatch Group brands since customers are often not known from non-Swatch Group brands and the wholesalers' advantage of having a broad product portfolio as well as old parts on stock.

3.3 Complementarity of Concepts at ETA SA

Although the ETA Online Shop is the element which has the highest visibility to customers, including SCM has been important. First, supply chain performance was used as a 'selling proposition' for ETA Online Shop. All customers ordering via ETA Online Shop are given higher priority and delivery guarantees of 24 / 120 h. Before, the complex warehouse structure and incoherent master data prevented quick and reliable deliveries. Although ETA SA is a company from the 'old economy' with a long tradition, distribution structures which are known from 'new economy' companies, such as Dell and Cisco, could be obtained with the new electronic channel. Second, an analysis of the financial flow resulted in an additional payment method being introduced, i.e. credit card payments. Third, logistic services from third party-distributors will be introduced to track orders through the entire order cycle and to calculate prices including the accurate shipping costs.

Table 1: Traditional and redesigned solution of spare parts distribution at ETA SA

	Traditional solution	Redesigned solution
EC	<ul style="list-style-type: none"> Consistent product catalogs unavailable Inefficient order entry (Fax, Mail etc.) and order processing 	<ul style="list-style-type: none"> Electronic product catalog which is easy to maintain and easy to use Order entry via same channel
SCM	<ul style="list-style-type: none"> Long delivery times Manual integration of ERP systems, a.g. via manual re-entry of orders Multiple warehouses 	<ul style="list-style-type: none"> Delivery guarantees Direct link planned between EC solution and ERP system Concentration of warehouses Less complex fulfillment chain due to smaller number of business partners

Table 1 compares the traditional and the redesigned solution. The improvements also highlight the criteria which were discussed in chapter 2.4. for the complementarity of EC and SCM.

- Process.** Improved information and contracting processes as well as direct customer contact has been accomplished with the EC solution since customers are able to directly browse ETA's catalog and use the same platform for order entry. Clearly, the main areas of EC were the design of the catalog and the order entry channel. At the heart of SCM were order processing, physical delivery, and payment. Therefore, from the perspective of an EC transaction, SCM at ETA SA took place within the settlement phase. From the SCM perspective, EC provides an efficient link of the internal supply chain processes deliver (ETA SA) and source (customers).
- Scope of design.** With ETA Online Shop a new solution for transactions between ETA-CS and customers was introduced. A product catalog and additional functionalities made the interface to the customers more efficient. Currently, the transaction perspective is enhanced to cover an entire customer process from marketing to after sales. Supply chain activities encompassed the order flow from ETA Online Shop to ERP systems, the flow of physical goods to the customer, as well as the flow of financial goods from the customer. This clearly underlined the flow perspective of SCM.

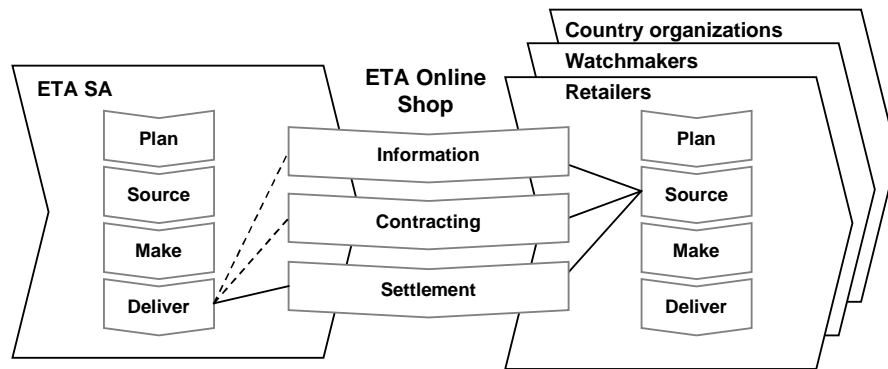


Figure 6: Complementarity of EC/SCM at ETA SA

Figure 6 shows the complementarity of EC and SCM for ETA SA. The main focus of SCM was to analyze the design of deliver and source processes. This was a major part for the settlement phase within ETA Online Shop. With EC, information and contracting processes were redesigned at the interface to the customer.

4 Implications for Designing EC/SCM Solutions

Based on the experiences made at ETA SA, we will present three important implications for designing EC/SCM solutions. The first addresses the integrated view on strategy, processes and systems by applying principles which have proved successful in BPR projects. The second is master data management which has become the backbone for the EC solution. The third is shaping win-win situations to foster the adoption and diffusion of the elaborated solution.

4.1 Business Engineering Perspective

Reengineering the business network and networking processes at ETA SA clearly showed the importance of established BPR concepts. In the project, the Business Engineering approach of Österle [1995] has been used and extended. Business Engineering combines various theoretical disciplines and “structures the organization, data and function dimensions at the business strategy, process and information systems levels”. Figure 7 shows the elements of Business Engineering for the ETA case and illustrates the three levels:

- On the *strategy* level the cooperation between independent business units, i.e. ETA’s relationships to the brands, country organizations and the end customers, was discussed. Informal dimensions [Hedberg 1997, Jarillo 1995] regarding the perceived benefits, security etc. of the redesign were important for bringing the partners ‘on board’. Shaping win-win situations has been reported as important success factor and will be discussed separately below (see Chapter 4.3).
- The *process* level focuses on the interaction of processes and the objects being exchanged between the business partners. Although Figure 6 presents the processes only on a very aggregated level, it shows that EC and SCM processes are jointly modeled. This enables a close coordination of SCM and EC processes.
- On the *systems* level a network of information systems supports the process network. Figure 6 depicts the system architecture of the ETA Online Shop. Technically, ETA Online Shop consists of an individually developed product catalog and is based on the Microsoft Site Server, Site Server Commerce Addition (Version 3) and a Microsoft SQL-Server database (Version 6.5). As indicated by the dotted lines in Figure 7, the Web server has not been integrated with the ERP systems and the inventory system (ProConcept). This was decided deliberately to ensure a quick availability and a smooth start of ETA Online Shop. However, integration is planned with the ETA ERP system.

4.2 Master Data Management as ‘Hidden Success Factor’

Both strategies, SCM and EC, were dependent on the standardization of processes and master data. This involved identifying the applicable standards for handling orders via the customer counter of ETA-CS and possible modifications of the existing master data scheme. It led to a far-reaching standardization and maintenance initiative in the area of product and customer master data which was almost finished in early 2000. As explained earlier, the most time-consuming part of order processing was the conversion of an order into ETA’s article numbering system. This concerned mainly the processing of interchangeability information, consolidation of pricing information (for single originally packaged quantities) as well as the integrity of article and technical descriptions. Neither EC nor SCM includes this standardization activity in their scope, but without master data management the described benefits would not have been possible. Therefore, master data management has been recognized as a ‘hidden’ success factor.

4.3 Communication of Win-Win Situation

Contrary to EDI systems which large companies imposed upon their suppliers, it was clear from the beginning that customers would have to be convinced with (positive) incentives. For example, a win-win situation or reciprocity is not achieved until both supplier (e.g. ETA) and customers are able to increase their ROI [Kelly 1998]. Well-balanced win-win situations increase the adoption of a Business Networking system and need to be laid down in a business model which can be easily communicated to the relevant partners. As described by Alt/Fleisch [1999], win-win situations have three main elements for the partner: set up costs, running costs, and benefits.

To determine the optimal mix of these factors at ETA SA, pilot partners were involved early on in the project. The first activity was to communicate the current status of development work to these partners. This provided a early picture of the required scope of the solution and enabled ETA SA to determine the necessary as well as critical benefits for the customers. To elaborate a convincing win-win scenario, various workshops were conducted. The win-win situation consisted of an improved effectiveness (guaranteed delivery times, higher information level, transparent order tracking information, interchangeability information for customers of the EC solution) and higher efficiency

(lower order fulfillment costs for ETA SA and cost saving potentials for the brands local warehouses). A main strategic element was that the 'selling proposition' for the EC solution should mainly be superior supply chain performance, rather than price incentives.

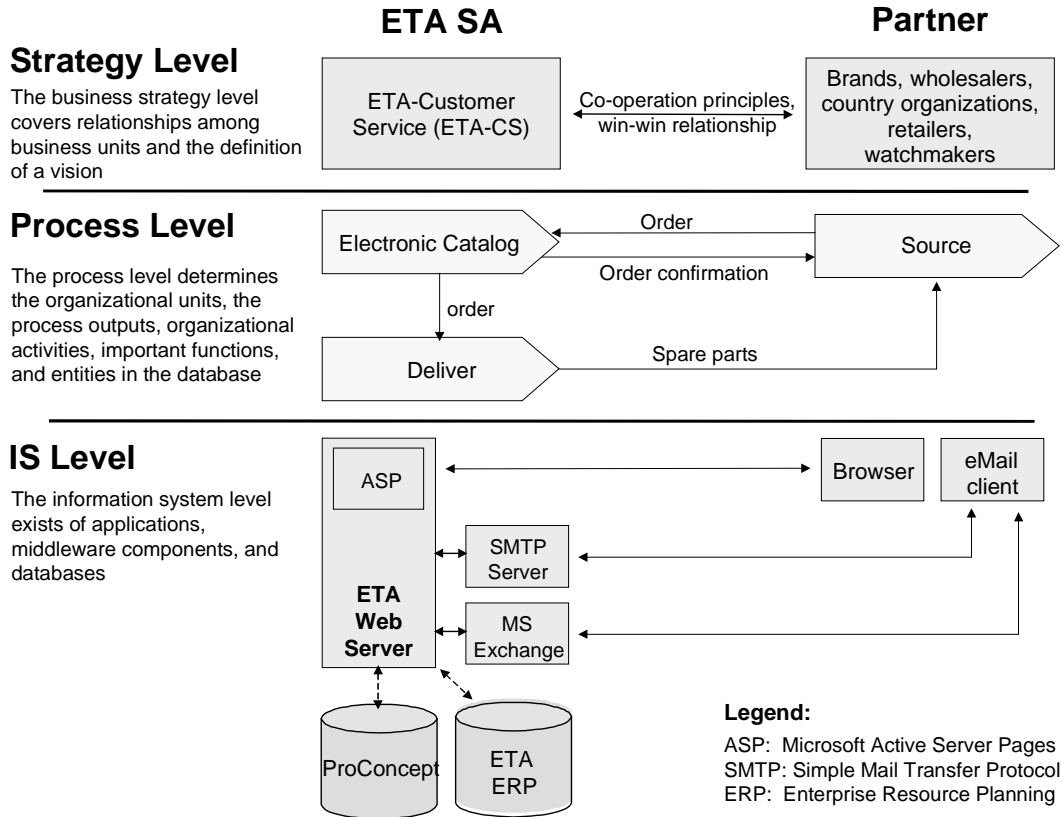


Figure 7: Levels of Business Engineering Applied at ETA SA [Benz 1999]

The experiences at ETA SA underlined that win-win situations are easy to communicate when real examples illustrate them. During the pilot operation of ETA Online Shop, the pilot customers could observe their benefits. These were used by ETA SA to attract further customers during the roll out and to foster the adoption of the solution among its customers.

5 Conclusions and Next Steps

The article presented the implementation of a business-to-business EC solution based on a redesign of the supply chain for physical industrial products at ETA SA. When the EC solution was implemented, the supply chain proved critical and direct delivery and direct order entry facilitated a direct link to the customer. The performance of the supply chain was, in fact, used to foster the diffusion of the EC solution. At the same time, the EC system improves supply chain activities, such as order entry and payment. There are many other aspects that underline the complementarity of EC and SCM, i.e. the flow perspective of SCM versus the transaction perspective of EC. We support Kalakota/Whinston [1997] who state that: "The integration of electronic commerce and supply-chain management is changing the way businesses work internally and work with each other."

In addition, some important research questions could be addressed. First, the project underlined the importance to distinguish different levels within Business Networking: although the existing partner network remained unchanged, redesign activities took place on other levels of business engineering, i.e. the process and the IT level. Second, the success factors in Business Networking such as master data harmonization are often not directly related to EC. Third, the ETA project clearly emphasized that Business Networking needs an integrated view on EC and supply chain issues.

The next steps are the improvements of the functionalities to strengthen existing customer commitment. Another step is the further development of the ETA Online Shop to a 'ProcessPortal' [Österle 2000] for the watchmaker industry. This means not only to include spare parts but also watchstraps, watch glasses, watch cases, etc., different specific information around the product, chat rooms and, of course, transport and financial services. Further steps are to formulate a more extended framework for developing EC systems in existing business networks and to establish an electronic distribution channel for movements.

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