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Supply Chain Management Based on SAP Systems

Architecture and Planning Processes

With 77 Figures
and 11 Tables

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Foreword by Prof. Hasso Plattner

The accelerating pace of globalization today poses increased challenges for Supply Chain Management (SCM). To offer just one product to the customer, sometimes hundreds of companies must collaborate along the value chain. Understanding and optimizing this logistical complexity can be a competitive advantage if it is handled effectively with state-of-the-art IT systems. This is why SAP has been intensively engaged in developing powerful SCM applications for about a decade.

Since SAP SCM is one of the most challenging systems in our portfolio, we have turned to the best experts we know on the subject matter for insight – our customers. They articulated industry-specific needs and challenged our development teams with their visions of real-time enterprises and market-driven supply chains. Many powerful features have been developed in close cooperation with these customers.

SAP has responded by assigning some of its most talented system architects and programmers to SCM development. To ensure that these solutions work in the real world, SAP has devoted significant resources towards building components and integrating them into large, realistic system landscapes. For instance, we have invested a great deal of effort in achieving short response times, which are crucial for customers' acceptance of IT systems, even in the case of very large data volumes.

The authors of this book combine the latest research findings and practical experience with SCM systems striking a balance between managerial overview and practical detail. I especially appreciate the perspective on SAP's most recent development strategy, which enables Small and Medium Enterprises (SMEs) to service-enable their business processes, leveraging the ecosystem provided through SAP. The new component-based application platform together with the principles of SAP's Enterprise Service-Oriented Architecture provides the necessary foundation for the next generation of products. Our newest product, SAP Business ByDesign, underlines the paradigm shift in enterprise software towards Software-as-a-Service (SaaS), which will increase the competitiveness of SMEs by allowing smaller and smaller companies to participate in global value chains.

Prof. Dr. h.c. mult. Hasso Plattner
Chairman of the Supervisory Board and Co-Founder, SAP AG

Preface

Since the publication of the first version of this highly successful book in 2000 it has become obvious that Supply Chain Management (SCM) is not just a buzzword or a fashion, as are so many other subjects in management and IT. Some "mega-trends" in the world of business and economy, such as globalization and growing technical specialization of product and process development, result in a complex division of labor at national and international levels and in reduced net value added within single firms.

To coordinate all these elements of development, procurement, production, sales, distribution, and recycling functions, SCM has become a mandatory approach. Successful SCM must be based on powerful IT systems that combine traditional ERP systems with specific SCM functionality, including sophisticated Operations Research heuristics and algorithms.

With respect to their leading position in the market, SAP systems are highly relevant in the management of supply chains. Because of the extensive progress of SAP SCM™ systems in recent years, the English book published in 2002 has had to be totally rewritten. The text was finished in spring 2008 and refers to SAP SCM™ 5.0.

Gerhard Knolmayer, Peter Mertens, and Alexander Zeier, who authored earlier versions of the book, are deeply grateful to Jörg Thomas Dickersbach, who has joined the authoring team and brought with him his profound knowledge of and detailed experience with SAP SCM™ systems.

The book has also gained from our cooperation with several top SCM specialists working in globally operating companies such as Colgate-Palmolive, Danfoss, Henkel, Hilti, and Nestlé, who describe the implementation, usage, and experiences with SAP SCM™ systems and share their views on the future of SCM in Chapter 5.

This book is also among the first to discuss the impact of SAP's new Business ByDesign System on SCM™. We are much indebted to Wilhelm Zwerger and Dr. Bülent Akinto of SAP for contributing this information in Chapter 6 of the book. We also appreciate different types of support from members of our teams, in particular Dr. Dina Barbian, Lukas Helfenstein, Gabriela Loosli, Jürgen Müller, Manuela Stolz, Daniel Stucki, and Thomas Wermelinger.

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Chapter 1

Introduction

In the last decade, in conjunction with extensive reorganizations of business structures and processes, the concept of "Supply Chain Management" (SCM) has gained rapidly importance. Many companies have realized reengineering projects; they often reduced the degree of vertical integration, thus obtaining ever more products and services from external suppliers. With concepts such as virtual companies, extended enterprises, strategic alliances, and company networks, the legal and business limits of companies are becoming blurred. Consequently, the co-ordination of business processes beyond the elementary organization units gains particularly in importance. Whereas "lean management" tries to counter various forms of waste within a company, SCM aims at avoiding waste all along the value chain (cf. Plenert 2007). And the turbulent changes in economic environments ask for agile supply chains and real-time transfer at least of selected data.

The more companies are involved in producing services and products, the better they can concentrate on their core competencies. This, however, also increases a number of interfaces between them. Consequently, overall planning, scheduling, monitoring, and controlling activities of inter-company processes gain in importance.

Problems resulting from poor SCM, such as production or shipment delays, may have a severe impact on the market value of a company: A large event study has shown that SCM-related glitch announcements result in an abnormal decrease in shareholder value by more than 10%. An example of this effect is shown in Fig. 1.1 (Hendricks and Singhal 2003; Singhal 2003).

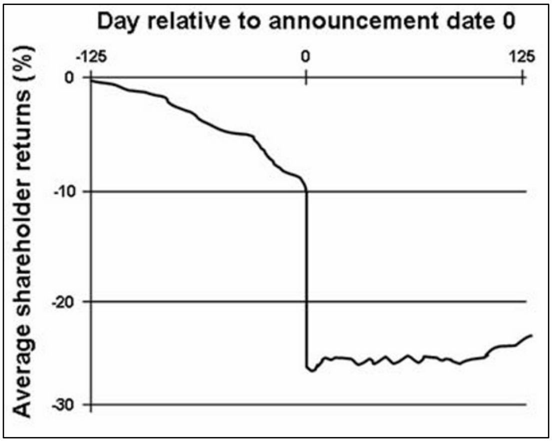

Fig. 1.1 Stock quotation before and after announcement of an SCM glitch

An impression of the importance of SCM in our global economy can be gained from the two following examples from different industries:

High-technology parts for power generation gas turbines are produced along a 5,000-mile-long supply chain. A blade for a gas turbine may be cast in the United States, transported from the east coast to England for machining, to Italy for coating, for laser hole drilling back to England, and for rotor assembly to Switzerland. The rotor may be transported to Germany for assembly with stationary parts of the turbine. The assembled product, weighting about 150 tons or 300,000 lb, may be transported by ship down the Rhine and reloaded onto a seagoing vessel for transport to the customer.

The development and production of a personal computer hard disk typically also involves several continents (de Souza and Khong 1999). A Seagate disk may be developed in the United States, and the wafer for the read/write heads in Northern Ireland. The heads are cut out of the wafers in Malaysia or Thailand and mounted on metal-arms in Thailand or China. A Japanese supplier produces aluminum disks, which are prepared for coating in Northern Ireland. Coating is done in California or Singapore. The final assembly takes place in China, Thailand, or Singapore. And the supply chain may change if new products or production processes are introduced.

In the last decade, the theory of SCM has advanced in many directions. Logistical issues have been reformulated under an SCM perspective; the need to consider environmental aspects has become obvious; risk management in supply chains has gained much interest; contracts have been analyzed as a means of risk sharing; and the effects of such major trends as globalization and outsourcing have been studied from viewpoints won through game theory, with the role of information technology (IT) in SCM becoming accentuated even more than before.

SCM would not be possible without the advances in IT and information systems (IS). Unfortunately, the two strands of conceptual research and research on the present state of IT systems for SCM remain largely unconnected. For instance, the six perspectives on SCM formulated by Otto and Kotzab (2003) do not even mention IT systems. In this book we try to close the gap that exists between the issues regarded as relevant for successful SCM and the support IT systems are offering for SCM today.

Just 10 years ago, specialized vendors of SCM systems were at the forefront of SCM innovation. Today, most companies running SCM systems rely on the vendor of an ERP system that is already installed (cf. the Hilti and Nestlé case studies in Chapter 5). Given the market shares, it makes sense to focus on the SCM offerings of SAP AG and compare the state of its SAP SCM™ system (as of Release 5.0) with requirements for a good IT support of SCM.

The remainder of this book is organized as follows: Chapter 2 discusses the scope of SCM, focusing on collaboration issues, and defines requirements and wishes that we derived from our study of the research literature on SCM and from our discussions with SCM managers. We propose an SCM pyramid to structure the tasks related to different levels of SCM and discuss the impact of industry-specific issues on IT support for SCM. In Chapter 3 we give a short overview of the process landscape as seen by SAP. This process map is further detailed in Chapter 4, which provides a description of selected functionalities available in SAP's SCM applications:

- SAP Advanced Planning and Optimization (SAP APO™),
- SAP Forecasting and Replenishment (SAP F&R™)
- SAP Inventory Collaboration Hub (SAP ICH™), recently renamed as SAP Supply Network Collaboration (SAP SNC™)
- SAP Event Management (SAP EM™).

In this book we will not deal with SAP's fifth SCM application, the SAP Extended Warehouse Management (SAP EWM™).

A comparison of SCM functionalities from different viewpoints shows that a broad spectrum of business requirements is already covered by SAP's SCM offerings, but also that some areas exist that are still uncovered and in which further improvements may be worthwhile. In Chapter 5 we describe experiences of several firms during their implementation and using of SAP SCM™ systems; we are highly appreciative that the following companies contributed information for this section:

- Colgate-Palmolive
- Danfoss
- Henkel
- Hilti
- Nestlé.

In Chapter 6 we pick up a very recent development in the SCM market and provide first-hand information on SAP's new Business ByDesign™ product and its perspectives for supporting SCM in medium-sized companies.

1.1 Definitions and Terminology

Supply Chain Management tries to improve the flow of

- materials,
- information, and
- financial resources

within the company and among companies collaborating under long- or medium-term agreements by

- sharing information,
- concerted planning and scheduling,
- coordinated execution, and
- collaborative monitoring and controlling

to improve the competitiveness of the entire supply chain.

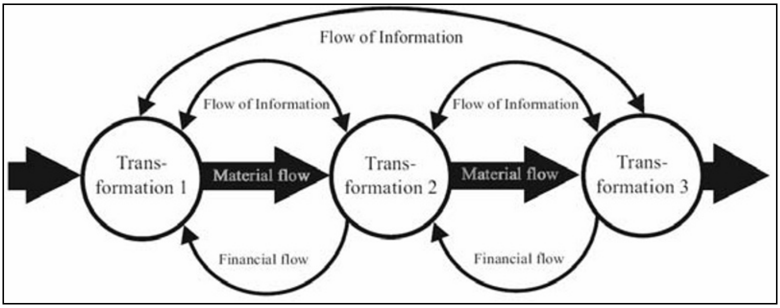

Fig. 1.2 Material, information, and financial flows as core elements of SCM

Fig. 1.2 shows the typical directions of flows; however, in the case of return shipments or refunds different flow directions result.

Supply chains may consist of independent companies, but can also be made up of organizational entities that legally belong to one group. Whereas the literature concentrates on inter-company collaboration, most SCM projects in practice concern intra-group systems and collaboration within a group; the case studies in Chapter 5 confirm this.

The constitutive term "chain," on which SCM is based, provides an incorrect view of business realities. Typically, many business relationships are relevant in producing a certain product or service. The idea of a "Supply Network," a "Supply Web," a "Value Net," or a logistics network would be more appropriate, because a company typically belongs to several supply chains (cf. Fig. 1.3). However, only the main business relationships demand close collaboration, and the partnering companies should be selected with much care. For less important supplies, short-term, unstable procurement decisions that result from auctions may be more adequate. In this book we do not refer to such relationships as "Supply Chains," and we refer to SCM also in network systems.

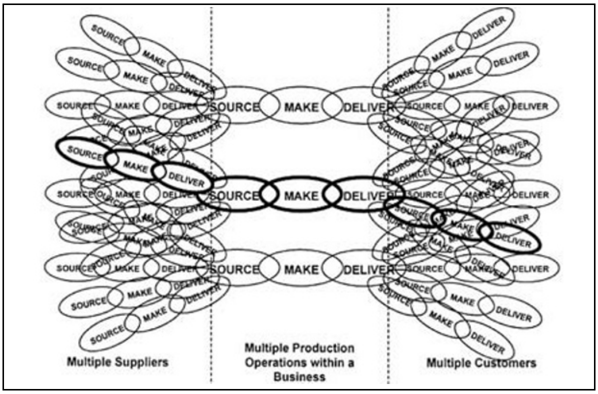

Fig. 1.3 Supply chain as part of a supply network
(based on earlier material from the Supply-Chain Council)

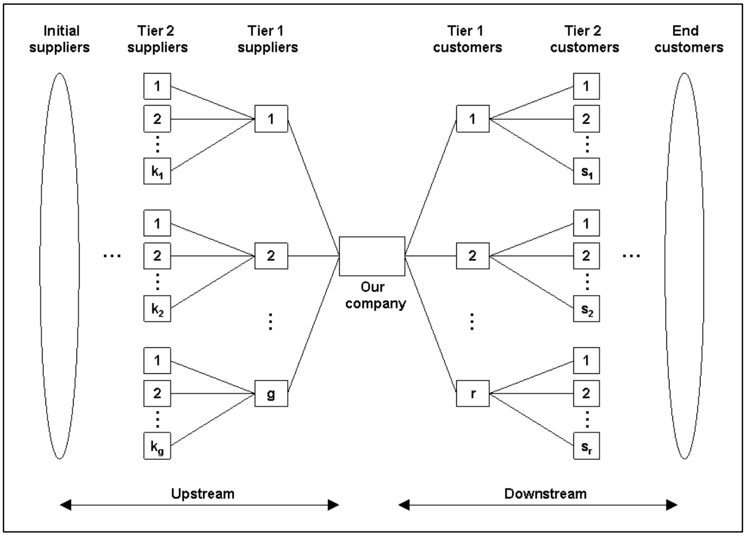

Fig. 1.4 Visualization of different tiers in the supply chain

From a certain position in the supply chain it is possible to look "upstream" (toward suppliers) or "downstream" (toward customers). Thus, SCM encompasses not only the supply side, but also the demand side is subject of SCM. Depending on the "distance" from the company considered, tier 1, tier 2, up to "tier n" suppliers and customers are distinguished (Fig. 1.4).

1.2 Benefits of Supply Chain Management

In the definition of SCM, we emphasized that it should make the supply chain more competitive. SCM may be viewed as an approach to improving the long-term competitive position and short-term profitability of the collaborating companies. To improve the competitive position, the entities of the supply chain could, for example,

- coordinate investments,
- share the use of resources,
- avoid redundancies, e.g., in quality control,
- collaborate in R&D and forecasting,
- incorporate customers and suppliers in design processes and value analyses,
- redesign structures and processes, and
- reposition functionalities (e.g., managing inventories) between the partners.

Profitability may be raised by higher revenues and/or lower costs. The widely recognized DuPont scheme for explaining the Return on Investment (ROI = profit/capital) shows that SCM has several points to contribute to a higher ROI (cf. Schnetzler and Schönsleben 2007):

- Higher profit (i.e., increasing the numerator of the ROI formula)
  - by realizing higher revenues, e.g.,
    - by reducing time-to-market by better coordinated design processes, or
    - by better service levels resulting from repositioning inventory;
  - by selling products with bigger margins, made possible (e.g.) by more cost-efficient procurement, manufacturing, and logistics processes.
- Reducing locked assets and capital (i.e., decreasing the denominator of the ROI formula), e.g.,
  - by reducing inventory or fixed assets by more efficient procurement, production, and distribution planning or
  - by shortening the cash-to-cash cycle time.

From another perspective, the benefits of SCM systems can be categorized as follows:

- Benefits resulting from better planning, e.g., from
  - better design of the supply network (including locations, modes of transport, and selection of suppliers),
  - more precise capacity determination of factories, warehouses, and transport systems, and
  - logistics-oriented product and packing design.
- Benefits of integrating operative systems.
  Benefits of support for day-to-day decision making by providing optimization algorithms or heuristics, e.g., for assignment of decisions with respect to available products or capacities (cf. ATP and CTP in Section 4.2.5) or for short-term adjustments of capacities.
- Benefits of better information, e.g., information exchange between supply chain partners or information about events in another entity in the supply chain passed on by IT systems, perhaps with a diagnosis of why this event occurred and what its consequences may be.
- Benefits of systems that audit the compliance with regulations and contracts and may generate early warning signals by applying efficient forecasting techniques, data mining, or filtering mechanisms.

The benefits of SCM systems are difficult to quantify owing to the large numbers of influential factors. Analytical models give some impression about potential benefits in highly simplified environments. As supply chains are often too complex to be studied analytically, several researchers have tried to identify the impact of shared information by using discrete-event simulation models. An overview of results obtained with such models is given by Schmidt and Knolmayer (2006). Unfortunately, the results of the simulation studies do not coincide. A reason for this phenomenon may be that the assumption of a normally distributed demand in upstream companies is violated; causes of this violation are lot sizing and unintended effects of temporal coordination (Schmidt 2007).

In an event study on the impact of SCM systems on corporate performance, Hendricks et al. (2007) recognize that on average adopters of SCM systems experience positive stock market returns, as well as improvements in productivity. Statistically significant improvements are observed in both the implementation and the post-implementation periods.

Consultancies often distinguish between "best-in-class" and average companies. The Performance Measurement Group (2006) claims that companies that are characterized as high SCM performers show the following advantages:

- Service and reliability performance
  - Best-in-class performers have an on-time delivery performance advantage of about 13–25% (the request date) and 8–10% (the commit date) over their peers.
  - While typical companies realize forecast accuracies of 75–80%, best performers exceed 95%.
- Responsiveness and flexibility performance
  - Best performers fulfill their customers' orders 5 times as fast as average companies.
  - Best performers also operate in a more flexible way in supply chains that are able to respond more quickly to unanticipated swings in demand. Their production ramp-up lead times are 8 times as fast as those of average performers.
- Cost and asset performance
  - Best performers consistently have lower operating costs (less than 50% those of average companies).
  - Best performers operate their supply chains with inventory levels that are 65% lower than those of their counterparts. This gives them a significant advantage in the overall performance of working capital, as reflected in the cash-to-cash cycle time.
  - Best performers achieve higher returns on their fixed assets, which drives better shareholder return and revenue growth.

Table 1.1 Improvements in Key Performance Indicators by implementing supply chain functionalities

Company	KPI	KPI value before implementation	KPI value after implementation
Colgate	On-time delivery for Vendor Managed Inventory (VMI)	70%	98%
Colgate	Perfect customer order fulfillment rate	80%	95%
Colgate	Overall order cycle time	9 days	5 days
Coca Cola de Mexico	Forecast accuracy	70%	95%
Coca Cola de Mexico	Truck fleet scheduling accuracy	90%	98%
Hylsa	Forecast accuracy	40%	80%
Cerveceria National	Stock-outs (beer) Stock-outs (soft drinks)	12% 17%	3% 7%
Cerveceria National	Days of inventory (beer) Days of inventory (soft drinks)	7.5 days 10.6 days	5 days 8.3 days

Already for early releases of mySAP SCM remarkable improvements of Key Performance Indicators (KPI) are attributed to the implementation of the system (cf. Table 1.1, based on Chatterjee 2001; Gassmann 2001; SAP 2000).

Goodyear, the world's largest tire company, implemented SAP APO™ to coordinate its three SAP R/3™ systems in Europe. Goodyear achieved better transparency within its entire supply chain and reduced

- transport and stock keeping costs by 20–30%,
- order processing times by 25%, and
- erroneously processed orders by 80% (IDS Scheer 2005).

1.3 Risks and Obstacles of Supply Chain Management

The business literature, vendors of SCM systems, and IT consultancies are focusing primarily on the potential advantages of SCM; only a few authors bring up arguments against the prevalent euphoric paradigm (Eßig 2006; Bretzke 2006):

- The SCM literature, trade press, and consultancies are criticized for describing a logistical utopia. Reasons for this viewpoint are:
  - Most collaboration efforts occur between organizational entities that belong to the same group and not between legally independent companies.
  - Typically only two (and not several) entities collaborate intensively.
  - Many companies are part of several (polycentric) supply chains, as otherwise they could not realize economies of scale.
  - Supply chains look different from the viewpoints of the supplier and the customer.
- Close collaboration with supply chain partners may result in inflexibility. The advantages of market mechanisms, the "economics of substitution," and the consideration of aggressive suppliers offering an innovative product spectrum get lost and result in opportunity costs. Can the integration benefits attributed to SCM compensate for waiving these mechanisms? Especially in dynamic environments, the adaptation of plans to accommodate unexpected changes becomes time-intense for organizational (and not primarily IT) reasons. It has been argued that the trend to e-Business and B2B marketplaces makes switching between several business partners easier and that this could lead to an "end of the supply chain" (Singh 1999).
- Egoistic or unethical behavior of participating companies may result in
  - (at least temporarily) pursued goals of a partner that conflict with the objectives of the supply chain,
  - dissemination of biased data,
  - circulation of partners' information to third parties,
  - strategies for profiting from shared data at the expense of the partner supplying this information, and
  - withdrawal from the supply chain at an inappropriate point in time.

- Companies typically behave in a risk-averse manner. Such behavior in a particular supply chain entity may negatively influence results that would otherwise be favorable for the supply chain as a whole. Therefore, Supply Chain Risk Management has to consider means helping companies to take more risk in the interests of the supply chain, by promising and providing support to this company if the high-risk situation should come about. Means include contracts that arrange buy-back procedures, revenue sharing, and cost sharing (Simchi-Levi et al., 2008).
- SCM may highly improve the shareholder value of one company and only marginally improve or even reduce the value of another cooperating company. In the latter case, the company faring less well will only participate in the supply chain if agreements are in place that make the cooperation attractive for every member of the supply chain. However, rules for such a redistribution of values may be difficult to agree upon and to implement. One of the rules would have to compensate opportunity costs resulting for a supplier that could sell its products to third parties at higher margins but has to deliver to the supply chain partner.
- One advantage of close collaboration between partners is seen in the option to reduce time and inventory buffers. However, buffered systems are less vulnerable to structural changes (such as an economic boom, which may result in production and delivery constraints that were inconceivable a few years ago) and to unexpected events. Buffers also allow less extensive exception management, because the number of exceptions to emerge drops.
- Small and medium-sized companies (SME) with inadequate personnel and/ or financial resources could be forced into Supply Chain systems by larger business partners even if their resources are insufficient for this type of collaboration.
- Special properties of some industries may be difficult to represent in industry-neutral software systems for SCM. Software vendors are trying to overcome these problems by service-oriented architectures.
- The implementation of (e.g.) a conventional ERP system is an intra-company project for which "only" units belonging to the same management hierarchy need be coordinated. In contrast, SCM requires that project portfolios, resources, priorities, and plans are coordinated between several, possibly independent, entities. Unwillingness or delays in one company can affect the activities of the partners.
- The development and implementation of SCM software is a major undertaking, with all the risks relating to the observance of design goals, deadlines, and costs.

If SCM obstacles are "solved" with myopic fixes, unintended reactions may result (cf. Table 1.2, based on Lee and Amaral 2002).

In summary, the benefits and risks of SCM have to be critically evaluated. The case studies in Chapter 5 show that in many companies this evaluation results in the decision to improve SCM and to invest in IT systems that support SCM.

Table 1.2 Unintended consequences of myopic fixes of supply chain problems

Example of supply chain problems	Myopic fix	Potential unintended consequence
Late customer shipments	Preferentially expedite "critical" orders	Production disruptions and delays resulting in even more "critical" orders
High material costs	Source from low-price suppliers	Increased scrap and return rates resulting in customer dissatisfaction and high costs
Poor incoming material quality	Hold additional buffer inventory for inbound materials	Higher storage, inspection, and obsolescence costs
Unmanageable proliferation of Stock Keeping Units (SKU)	Increase product commonality	Lower product distinctiveness differentiation leading to lost market share

Chapter 2

The Scope of Supply Chain Management

2.1 Collaboration in Supply Chains

2.1.1 Insufficient Collaboration Results in the Bullwhip Effect

The key feature of SCM is close collaboration between two or more business partners. One of the goals aspired to is to smooth processes and to avoid unpredictable ordering behavior of the main customers; more specifically, to avoid the upstream demand amplification already studied in System Dynamics models (Forrester 1961) and popularized as the bullwhip effect (Lee et al., 1997a, b). The first company to report this phenomenon was Procter&Gamble, which it observed in its diaper supply chain. The most prominent model showing the bullwhip effect is the Beer Game (Sterman 1989). Delays in transferring order information and in fulfillment (due to lead times) and the absence of information sharing are main reasons for the bullwhip effect.

To reduce the bullwhip effect, the members of the supply chain may try to improve their information systems and/or their physical systems. Since the speed of data transfer technology has been dramatically improved in recent years, the assumptions prevalent in the Beer Game about the delays in information transfer can only stem from administrative processes in order management. Data is typically not transferred in real-time, and the coordination effort resulting from the using of different systems may also contribute to time-lags. Furthermore, if the demand is static and normally distributed, there is no reason to order distinct volumes at different time points. If the retailer ordered steadily, the other companies would not have to react nervously to unexpected order volumes. Thus, the bullwhip effect is at least partially homemade.

The main implication of studying the demand amplification is that transferring Point-of-Sales (POS) data to the other partners in the supply chain will considerably reduce the bullwhip effect. However, the question arises why a retailer should share its POS data with other members of the supply chain. One argument is that the supply chain is becoming more competitive, by realizing smoother planning, scheduling, and execution processes. The retailer may also agree to provide the POS data if it assumes that this supportive behavior will result in lower purchase prices or, at least, improve its bargaining power. Furthermore, data about capacity, capacity usage, and inventory may also be shared and be beneficial for the downstream companies. Simulation studies show that the information exchange typically is more important for upstream than for downstream companies (Chatfield et al., 2004).

With respect to collaboration, several maturity levels of supply chains have been defined:

- Stage 1: Functional Focus: Operating discrete supply chain processes with functional management of resources. Supply chain processes and data flows are well documented and understood.
- Stage 2: Internal Integration: Company-wide aligned and integrated supply chain processes continuously measured and steered to achieve common objectives.
- Stage 3: External Integration: Collaboration with strategic partners (customers, suppliers, and service providers) including joint objectives, shared plans, common processes, and performance metrics.
- Stage 4: Cross-Enterprise Collaboration: Information Technology and e-business solutions resulting in real-time planning, decision making, and execution of customer requirements (Roussel and Skov 2007).

The data recorded in the course of the survey shows that only a few companies realize collaboration beyond stage 2; thus, today collaboration between independent legal entities is not very common. However, it should be recognized that the evolution does not necessarily follow this sequence and that some stages (in particular stage 2) may be skipped.

SCM and sourcing decisions are closely related. The number of suppliers may be reduced when a supply chain is designed. In an idealistic view, single sourcing would be appropriate for parts that are offered by supply chain partners. However, risk management may contradict a single sourcing policy. Globalization has a huge impact on achieving supply chain goals. Sometimes offshoring decisions are based on rather myopic views on direct production costs, neglecting such matters as the total cost resulting in the supply chain and the impact on lead times.

2.1.2 Types of Collaboration

2.1.2.1 Information Exchange

Information access and data transfer are highly recommended in SCM systems. Information exchange is bidirectional, while information transfer may be unidirectional. As the company delivering data may not know whether the data transferred or exchanged is relevant for the recipient, the terms data exchange and data transfer would be more suitable. Transfer or exchange of data does not necessarily imply that the recipient is using this data. Therefore, data transfer does not imply that the planning processes of the supply chain partners are based on consistent data. A simplified morphological box distinguishing different types of data exchange is shown in Table 2.1.

Table 2.1 Types of data exchange

Data characteristics	Occurrences			
Source of data	Last element in supply chain (retailer, OEM)	Tier-1 supplier	Tier-2 supplier	…
Recipient of data	Next organization upstream	Next but one/two … organizations upstream	Next organization downstream	Next but one/two … organizations downstream
Category of data	Actual data	Forecast data	Planning data	Meta data
Amount of data	All data	Selected data, defined statically	Rule-based selected data	—
Granularity of data	Elementary data	Aggregated data	—	—
Type of provision	Data access (pull)	Data transfer (push)	—	—
Timeliness	Time-point	Period	—	—
Up-to-dateness	Real-time data	Delayed data, delay time-based	Delayed data, delay rule-based	Delayed data, delay resolved ad hoc

Actual data may be about (e.g.)

- sales volumes at POS,
- inventories,
- warranties,
- capacity usages,
- events, and
- compliance issues.

Planning data concern (e.g.)

- strategies,
- investments in physical systems and information systems,
- events such as promotions, announcements of end-of-life products, or of new product introduction,
- procurement,
- production,
- scheduling,
- distribution, and
- financial matters.

Meta data may be exchanged to coordinate

- quality control, and
- the use of IS, in particular the
  - customization of IS,
  - data models,
  - process models, and
  - numbering systems.

Another type of data transfer tries to improve the capabilities of the suppliers, for example with respect to product quality.

Mini case: Nestlé supports sustainability in the supply of agricultural raw materials and agricultural best practices. To translate its words into actions, Nestlé employs over 800 agronomists, technical advisers, and field technicians. Their job is to provide technical assistance to more than 400,000 farmers throughout the world to improve their production quality, as well as their output and efficiency. They do this on a daily basis in as many as 40 countries. This specialist team has pioneered the development of sustainable local fresh milk and coffee production (Nestlé 2006).

2.1.2.2 Collaborative Forecasting

Collaborative forecasting is based on data exchange or transfer, but does not necessarily result in collaborative planning. This distinction is also emphasized in the CPFR model (cf. Section 2.1.2.4). The goal of collaborative forecasting is to find a consensus on future data that may be used in local planning or in collaborative planning efforts.

The Delphi method is a well-known procedure for collaborative forecasting of future trends. Results show that divergent opinions of experts converge some way toward a consensus when those involved are informed about opinions expressed by other experts. However, the result of applying the Delphi method is not a forecast accepted by all concerned. The Delphi method is typically not used in routine forecasting of operative data but in forecasting future trends. Application of the Delphi method can be supported by specific IT systems.

Achieving a common forecast of quantitative data, for example about future demand for certain products or product groups, is a difficult task. Planning typically means considering distinct scenarios that differ in the assumptions and data underlying them. A company may look at several scenarios, and the common forecast may be just one of several considered. An agreement to use only a consensus forecast may reduce the value of local planning processes considerably and cannot be enforced.