

2 Enterprise in the Information Age

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2.1 Challenge of the Information Age

Business is undergoing a transformation from the industrial to the information age. Information technology (IT) opens up possibilities for new business solutions; it offers exceptional opportunities for fast innovators and harbors fundamental risks for laggards.

This transformation poses a gigantic challenge for both business and society. Success stories alternate with news of project failures. New companies, such as Amazon, Siebel or Yahoo!, have been growing at rates of 100 percent a year and more and achieve quite incredible levels of market capitalization within a few years of their existence while others, such as banks or travel agencies, introduce drastic cutbacks in staff every year or disappear from the market.

Enterprises and individuals are under great pressure to act. At the same time, the feeling of uncertainty has never been as great as it is now. The high volatility of shares in innovative companies is indicative of this mood. Sensational success stories in management journals, recipes for success from IT prophets, buzz-words, such as virtualization, and finally the abundant superlatives employed in announcing new IT products, provide a confusing picture of the information age, while many companies already have their hands full dealing with restructuring, mergers and acquisitions, globalization, Y2K, the Euro, technically outdated applications and other operative problems.

Information technology makes new business solutions possible. This might mean new or improved products and services (e.g. automobile and navigation), additional sales channels (e.g. Internet banking), more efficient forms of procurement (e.g. global procurement by means of electronic markets), new ways in which suppliers and customers can cooperate (e.g. collaborative planning), new services (e.g. virtual communities), more effective management (e.g. through the automatic measurement of key performance indicators) or new information services (e.g. product catalogs).

Transformation means innovation in existing enterprises (e.g. direct selling by an insurance company), but above all the establishment of new enterprises. Start-ups include software houses, such as iXOS, consultancy firms, such as Cambridge Technology Partners, industry analysts, such as Ovum, network providers, such as Tobit, providers of Internet services, such as Yahoo!, outsourcers, such as Debis, information services, such as all-hotels.com and market services, such as Harbin-ger.

Changes are becoming increasingly more radical. Corporations are being broken down into components and reassembled along different lines. New business ideas are being tried out in start-ups and where successful frequently rolled out globally by large corporations with a suitable customer base.

The ability to identify chances at an early stage and see them through to implementation is opening up a world of opportunities akin to an industrial revolution. Entrepreneurs are looking for a business model of the information age which will allow them to identify real options and to assess the consequences of their decisions. The Institute of Information Management at the University of St. Gallen is working on a business model of this kind within the framework of a research program entitled 'Business Engineering HSG' (BE HSG) in collaboration with representatives from the business world with the objective of

- Identifying new IT based business solutions at an early stage,
- Understanding the rules of business in the information age and,
- Formulating procedures to ensure a successful transformation.

Some of the results of this work are presented here in order to provide a holistic picture of Business Networking from the entrepreneur's point of view.

2.2 Imperatives of Business in the Internet Age

Imagine a scenario in which every employee, every customer, every business partner, every appliance and every computer has immediate access to each other's data at any time. That is exactly what the Internet is about to make possible within a few years. What will your business be like by then?

We summarize the most important rules within the framework of the business model of the information age and explain them with the aid of the example of the process car ownership in Figure 2-1.

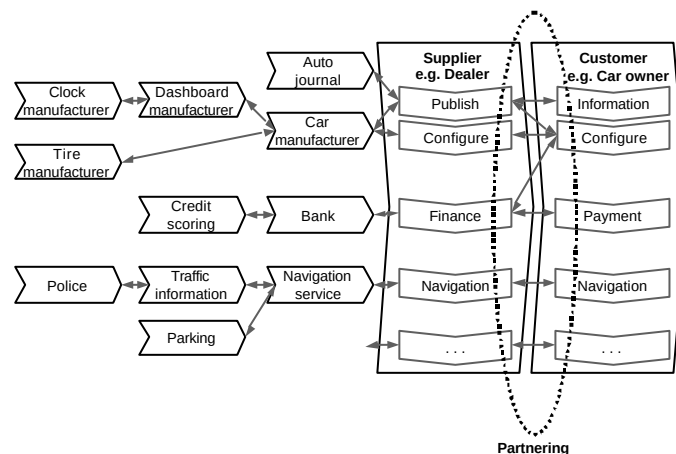


Figure 2-1: Enterprise in Business Networks

2.2.1 Coverage

Networking makes it possible to offer all products and services for a customer process on a coordinated basis and from a single source. It is not the customer but the supplier who is the specialist in the process car ownership. The car dealer takes on the task of helping the customer with car selection, obtaining the test reports, financing, navigation, resale, etc. This applies equally to the stages upstream of the car dealer, e.g. completeness of a car journal's services, perhaps including online research in earlier issues or access to sources. The credit scoring institute provides not only the customer's credit rating but also concrete information on delays in payment or loan insurance, the tire dealer supplies not only the tires but also the CAD data (computer aided design) and test reports as well as batch quality data, etc.

2.2.2 Partnering

Cooperation is not limited to a shopping relationship but becomes true collaboration, i.e. the processes work together. Customers give the car dealer data on vehicle use (e.g. garage bills), data from the on-board computer and of course the ongoing communication data on their interests, their purchasing behavior and their preferences. The supplier develops detailed customer profiles which allow him to give customers targeted information in the sense of one-to-one marketing, to remind customers when a service is due, etc. The bank, on the other hand, can give the car owners credit software which enables them to consider the credit for the car as an integral part of their overall financial planning. The car dealer will try to tie in his financing service. Partnering can lead to customer lock-in and thus create a high entrance barrier for competitors. The result is a customer support process which is closely meshed with the customer's car ownership process.

2.2.3 Critical Mass of Customers and Suppliers

In view of the fact that there will be competition by services, the costs of establishing and marketing integrated customer solutions will be enormous. As the solutions will require little manual intervention, the costs of the individual transactions will be virtually negligible. The objective will therefore be to allocate the development costs to as many transactions and thus customers as possible.

In the example of the car dealer, he will try to gain a maximum market share. For this purpose he will form alliances with car magazines, insurance companies, etc. He will also endeavor to globalize his offering as the Net will drastically reduce the marginal costs for entering new markets. Furthermore, he will try to have his

services incorporated in those of other suppliers, such as used car dealers or insurance companies.

Customers prefer car dealers who can offer, on the one hand, the most comprehensive range of products and services and, on the other, the biggest selection of suppliers for each category of product and service.

Suppliers, i.e. car journals, car manufacturers and navigation services, will concentrate on car dealers who can provide them access to the largest number of customers, particularly in the case of exclusive agreements or adherence to specific standards.

Every additional supplier, every additional service and every additional customer strengthens the position and the profitability of the car dealer. Therefore some speak of the law of increasing revenues. As a result of the economies of scale, the benefits for the customer and last but not least branding, the above mentioned developments are conducive to the establishment of entrance barriers and/or monopoly-like positions.

2.2.4 Position in the Business Network

Like the car dealer, all the suppliers in the network, from the bank to the tire manufacturer, must find their position in the business network (supply chain) and apply the rules indicated above to their customers, their products and their services as well as their skills. Standards and other entrance barriers lead to competition not only of individual suppliers but also of complete supply chains. Each company must analyze the possible business networks and try to establish a position of maximum influence in the networks offering the greatest potential. If a bank succeeds in securing its presence as a credit solution amongst as many car owners as possible by means of a credit software and special services, it will also find access to a large number of car dealers and thus expand its position. Current experience shows that early entrance into a business network improves the chances of assuming a dominant role.

2.2.5 Focusing

Networking promotes specialization. If cooperation with a South American tire manufacturer runs just as smoothly as with a European manufacturer, if the credit rating is performed better externally than inside the bank and if external payroll accounting costs less than doing it inside the company, then the appropriate supplier will be selected. A process of deassembly and reassembly is initiated in which companies consider each of their processes and decide whether it is better to operate them themselves or to buy them in. If the suppliers to the car dealer can

sell their products and services directly to the car owners they will bypass the car dealer (disintermediation); if the car dealer creates additional benefits for the customer by integrating services, the car dealer can act between customer and supplier (intermediation).

However, each one will focus on the processes which it can do best (worldwide): the bank on credit handling, the car journal on information relating to the car, the car dealer on the car owner process and the integration of services. All other processes will be outsourced to specialists.

New kinds of services which are purely electronic and in some cases cover very small tasks will intensify the focusing. One example would be automated information on the traffic flow in a highway tunnel. A traffic information service could easily integrate this information into a route specific information for one driver.

2.2.6 Process Efficiency

If no monopoly situations arise which cut out the market, the Internet will always promote the selection and combination of the most efficient processes. That means processes with high reliability, low price, short cycle times and high flexibility.

A high level of process competence and properly planned and executed processes will become the foundation for business in the information age. This will be based as far as possible on integrated application systems for the planning, execution and control of intraorganizational and interorganizational processes. Networking presupposes efficient processes, it does not replace them.

2.2.7 Networkability

Today, business relationships on the Internet are almost exclusively 1:n in the form of online shops or online purchasing. This means that a supplier has a relationship with several customers or a customer communicates with several suppliers. One (1) company sets the rules and the formats (standard), the customers or suppliers (n) have to accept it (or leave it). Even the marketplaces on the Net rarely go beyond this constellation. This can be compared to a rail network with different gauges and power supply systems. If you want to use it, you have to accept the standards.

The breakthrough for business-to-business networking will occur when the car owner works with bank A today and bank B tomorrow without any additional cost involved, e.g. for the installation of new software (multi-bank capability), and conversely when the bank can communicate with all car owners using the same standard. We call this the m:n capability.

On the one hand we still have a long way to go before we arrive at m:n capability, on the other it is not necessarily in the interests of dominant market participants. A company will try to see that its solution becomes embedded in the market as standard or latch onto the standard with the greatest chances of dominance.

Eventually, a set of standards will enable the m:n capability. Some standards will apply for specific business networks, others will be generally accepted.

Networkability as described in Chapter 1 is not merely a question of IT, but to a far greater extent one of business alliances. Networkability is of strategic importance for every business wishing to become part of a business network.

2.2.8 Change Management

The development towards the information society will take at least another 30 years. Until then, all building blocks of an enterprise will remain in a state of flux. Businesses must sharpen their skill in recognizing developments and above all in mastering change. An important consequence will be the need to install change management alongside operative management. Shareholder value is a catalyst of change. It not only forms the basis for evaluating the company and for acquiring capital but also helps in the systematic analysis of factors determining the success of change - with the aid of value drivers - and in controlling them by means of key performance indicators.

2.3 Seven Trends

Seen by a business point of view the numerous IT developments are responsible for seven fundamental trends in business transformation.

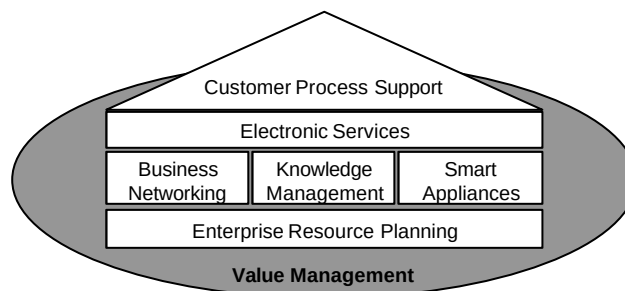


Figure 2-2: Seven Trends on the Road to the Enterprise of the Information Age

- *Enterprise resource planning*, i.e. the operational execution of business, runs almost imperceptibly in the background. Integrated applications for administration as well as for product development and technology make it possible to concentrate on business rather than on administration.
- *Knowledge management* supplies each task within a process with the necessary knowledge about customers, competitors, products, etc. and above all about the process itself.
- *Smart appliances* take information processing to the point of action. Traffic information is supplied via the satellite navigation system (GPS) to the motorist, point of sale information from the cash register to the product manufacturer and machine faults via sensors to the service engineer.
- *Business Networking* makes collaboration between two companies so simple that they appear to be one enterprise. Information on sales of the end product is immediately available to all the companies in the supply chain.
- Many subprocesses which companies still operate individually at the moment will be available from the Net as *electronic services*. One example could be customer profiling. In addition to the supplier, a third party online-database provider and the customer him or herself can take over the responsibility of his or her profile and offer it via an electronic service.
- Companies will not simply be selling products or services but will be supporting entire *customer processes*. Transport businesses will take on the logistics process, doctors will support the whole therapy process and insurance companies will handle the claim processing instead of the customer.
- Corporate management will no longer merely focus on financial results but also on factors contributing to these results. Financial management will become *value management* which keeps an eye on key performance indicators for the success of the business.

2.3.1 Enterprise Resource Planning

Over the past thirty years, companies have used IT primarily for improving internal processes. Between 60% and 90% of IT investments were aimed at internal supply chain processes, such as purchasing, production and distribution, at support processes, such as finance, human resources and IT as well as at the management process. Computer aided design and manufacturing round off this picture for development and production. This assessment applies to service companies (banks, travel agencies, etc.) along similar lines to those seen in manufacturing.

Operative strength is decisive for the competitiveness of many companies. This explains why a mid-sized textile mill, such as Getzner Textil AG, in a country

with high labor costs, such as Austria, has succeeded in attaining a leading position in the EU market for top-fashion fabrics. Consistent process development based on the standard software R/3 enabled this company to reduce time expenditure in administration from 233 person years p.a. to 177 and order cycle time from eight to six weeks, within the space of five years. This was achieved in spite of a tripling in the number of orders and articles during this period. The customer focus, which is so critical for the competitiveness of the company, calls for a wide spectrum of variants, small lot sizes and short time-to-market, from the customer-specific design through to delivery. Getzner Textil AG acquired these capabilities on the basis of a highly integrated software.

Transactional systems for materials management, sales, finance, etc. manage operating resources, such as orders, articles, and customers (see Figure 23). All activities belonging to business processes (e.g. procurement, production, distribution and management) plan, execute and monitor the use of resources. The transactional systems give staff the tools for performing activities, e.g. the transactions order entry and price change. A company can make transactions, such as stocking or ordering directly, available to the customer or supplier for the processes of sales or purchasing.

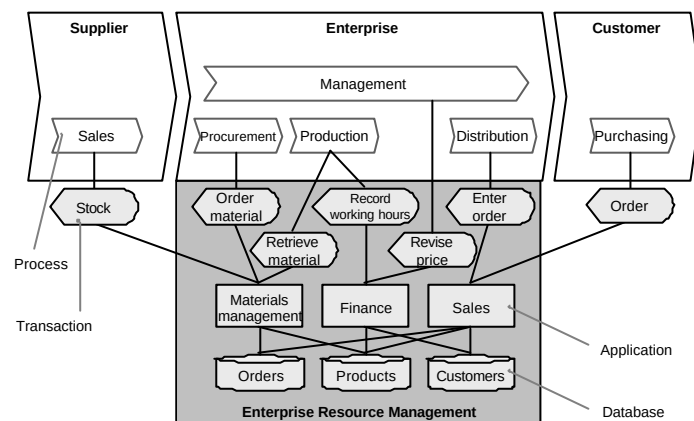


Figure 2-3: Transaction Processing and Business Process

Transactional systems are usually referred to as enterprise resource planning (ERP) systems. More precisely we would talk about enterprise resource management, since these systems support all phases of the management cycle, namely planning, execution, and control. SAP's 'solution maps' provide a good overview of the modules which an ERP system typically comprises today.

In the context of banks and insurance companies, ERP systems are usually termed back office or processing systems and include transactional systems for e.g. funds

transfer, securities settlement, the administration of insurance policies or customer profiling.

We say that an ERP system is integrated if all process activities have real-time access to the same state of the same data (see Figure 2-3) and if the required relationships between data exist. So controlling must be in a position to determine the effective costs of a customer order, customers must have access to the manufacturing progress of their orders (order status tracking) and it must be possible for sales to assess the consequences of squeezing in a rush delivery.

Processes are determined by business strategy. Ideally, the ERP system will support every organizational solution. In other words, it is business strategy and not the software manufacturer which should decide questions, such as whether a member of the sales staff registers customer orders or whether the customers place orders themselves by means of electronic commerce, whether the company manages its own raw materials store or the suppliers offer consignment stock (vendor-managed inventory) and whether staff pay is performance-related. The transactions stocking and ordering in Figure 2-3 point to the fact that these organizational variants merely require a little additional functionality but access the same databases.

Needless to say, the functionality of the modules, and in particular the database structure of the ERP systems limits the scope for organizational design. However, most companies utilize only a fraction of the possibilities available to them.

The business processes, the customizing of the ERP software and, last but not least, the packaged software represent corporate strategy as it is practiced. They determine how the business is actually run and how much strategic room to maneuver is possible. Many companies still have a long way to go before this fact is properly recognized [e.g. Rodin 1999, 156].

In future, ERP systems can be expected to take on a role similar to what we have seen up to now in the case of operating systems, database management systems, Internet browsers and office suites:

- Companies invest huge amounts in one particular product.
- One or few products survive in the market.
- Innovative add-on products are oriented towards the dominant product and its environment.
- Integration is more important than best-of-breed. Linking up two software products is expensive, involves a great deal of effort with each new release and precludes many solutions due to the incompatibility of concepts.
- Only a basic innovation is able to replace a dominant product. In the past, for example, such innovations were the personal computer and the Internet. In the case of ERP systems, message-based modular packages could replace data-

integrated monolithic packages (see item on Business Networking). Nothing more than first pilots can be expected over the next five years. In the area of customer relationship management (e.g. Siebel) we are more likely to see such powerful systems arising outside the traditional field of ERP packages. CRM systems have the potential to take over parts of the dominant role from ERP systems.

Seamless processes based on integrated operative transactional systems form the foundation for the enterprise of the information age. They will continue to tie up a large proportion of resources as a result of:

- New software and hardware functionality (new releases),
- The improvement and adaptation of business processes (continuous process improvement),
- The opening up of the ERP system for business partners, customers and suppliers,
- The restructuring of businesses: globalization, acquisitions, mergers, deregulation, outsourcing.

Consequences

Networking presupposes operatively independent and efficient units. Intraorganizational integration is the prerequisite for interorganizational networking. The following tasks remain to be solved, depending on the status of a company's operative processes:

- *Coordination of strategy, process and transactional system.* The company must utilize the opportunities provided by integrated transactional systems in its strategy and set the objectives for the processes on the basis of that strategy.
- *Wall-to-wall support of processes and business units.* Business Networking and other innovative solutions are based on a productive, integrated ERP system. Missing pieces may limit these solutions drastically.
- *Process optimization.* Many companies have been quick to replace their old transactional systems with standard software with the objective of achieving Y2K compatibility. In many cases this has not included process redesign. Competition will force them to build up process competence, to bring processes into line with customer needs and to increase their efficiency. Key performance indicators from the ERP systems make the level of maturity of processes transparent.
- *Process standardization.* Globalization, supply chain management and restructuring demand proven processes with clear interfaces. Standardized sub-processes, which are critical to coordination, are the prerequisite.

- *Internal software standardization.* Each additional software platform (additional software supplier) generates additional complexity.
- *External standardization.* Irrespective of whether this is emotionally desirable, the operative basis of an enterprise must be aligned with the standards which are going to be the most workable in the long run. And in the case of software, these are molded by the market leaders and by market expectations.

The dawning of the next millennium, coupled with the introduction of the Euro in Europe, caused many companies to speed up their investments in ERP systems. This has produced an unprecedented boom in the software product and software consultancy market. While it may come as no surprise that growth rates in this market segment are not continuing at the pace of the past few years, it is all the more amazing to note that sales revenues have persisted at the same high level and have not slumped. The many observers who conclude from the present stagnation in sales that the ERP philosophy is in crisis may have overlooked the context mentioned above. Forecasts for this software market are in fact assuming an annual growth rate of between 10% and 20% over the next five years [Cole et al. 1999, 7]. “Smart companies view enterprise application purchases as an essential investment. [...] a strong IT infrastructure aligned with core business processes is the key to competitive advantage“ [AMR 1998].

2.3.2 Knowledge Management

Knowledge is increasingly determining the value of a company. The value of a company, particularly on the stock exchange, is no longer based on its physical and financial assets but on its ability to operate a particular business profitably in the future [cf. Stewart 1997]. This ability depends on knowledge about technologies, products, services, processes, customers and other market participants (cf. Chap. 7, [Davenport/Prusak 1998], [Probst et al. 1999]). In a networked economy, every company will specialize in a limited number of products and processes but in view of globalization will have to attain world class in those products and processes.

Knowledge management is not fundamentally new. Organizational development, organizational learning, artificial intelligence and other approaches were all pointed in the same direction. So how can investments in knowledge management be justified? What barriers to classic knowledge management does IT remove? The answer is that multimedia technology eliminates integration breaks by substituting paper; every form of documented knowledge becomes available electronically. Networking removes transport times and thus makes knowledge globally and concurrently accessible.

ERP systems have taken on the job of structuring, processing and storing the formatted data (transaction processing); knowledge management systems perform

structuring, processing, editing and storage of multimedia documents (referred to as weakly structured data). Multimedia documents include text files, spreadsheets, presentation graphics, images, video and audio files and links to other documents. Together with the formatted data of the transaction systems, the electronic documents represent what is termed explicit knowledge.

However, multimedia and networking do not just make existing knowledge available, they also allow new forms of presenting knowledge and above all new forms in respect of creating, searching for and utilizing knowledge. Examples are groupware systems, search engines, expert maps (for utilizing implicit knowledge) and discussion forums as well as multimedia and interactive explanations of products, to name but a few.

Companies are given the possibility of making any documented knowledge available to all employees for the tasks they perform in processes, a precondition for a world-class performance. Knowledge management, therefore, does not mean creating new, additional business processes but equipping existing business processes with knowledge. In addition to the transactions of the ERP system, employees also receive computer support for the utilization and processing of knowledge (functions like revise drawing, print brochure and view product in Figure 2-4).

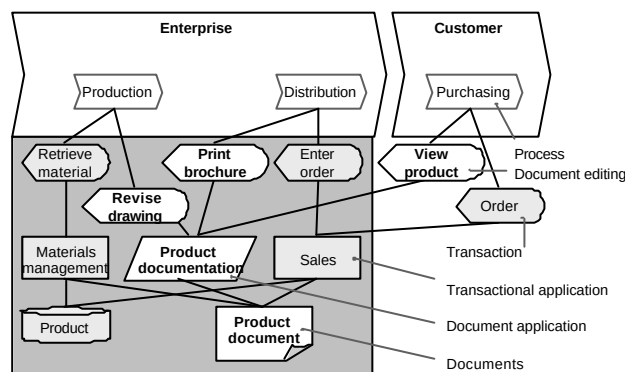


Figure 2-4: Document Processing and Business Process

In the simplest case, this can mean that employees and, where necessary, customers have access to the latest product information. Examples are a travel service, such as TIScover, which provides detailed information on travel destinations from hotels and sports activities to the latest weather report, or aircraft documentation which Boeing makes available to its staff and to customers via an Intranet.

The LGT Bank in Liechtenstein has built up systematic knowledge management for its customer advisory service, based on the model of business knowledge management [cf. Bach/Österle 1999] (see Figure 2-5). They first determined which external and internal knowledge (financial data, product information, etc.) was

necessary and available for the advisory process, structured it (knowledge structure), then formulated and implemented the processes and responsibilities for setting up and maintaining this knowledge. Finally, they created the technical infrastructure in the form of an Intranet which integrates heterogeneous systems, such as Reuters or an object management system and documents (systems and documents). The system paid for itself within a year through the cost reductions in paper-based documentation and external information services alone. The main goal, i.e. improvement in the quality of advisory services, is being consistently tracked on the basis of key performance indicators, such as the hit rate for new accounts [cf. Kaiser et al. 1998]. A detailed description of LGT can be found in Chapter 7.2.

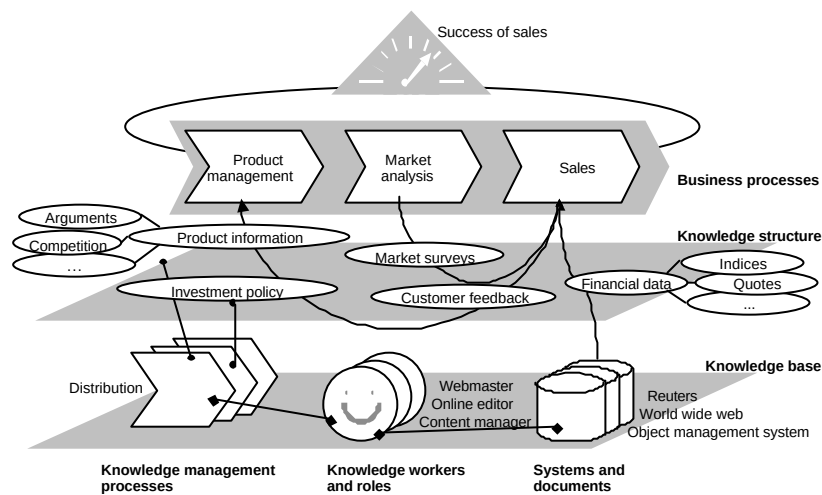


Figure 2-5: Knowledge Management in the Sales Process of the LGT Bank in Liechtenstein

A major component of the business knowledge management model is the systematic maintenance of the knowledge through clear responsibilities and processes (knowledge workers and roles as well as knowledge management processes). Just as master data maintenance is critical for a successful transaction processing, knowledge management is dependent on reliable maintenance of the electronic documents. Tasks include the authorization of a product description to be released to customers or removing documents which are no longer applicable.

A flood of information services from newspapers and magazines (e.g. Wallstreet Journal and AutoBild) through search engines and portals (e.g. Yahoo! and Point-Cast) to scientific information services, such as Brint, credit inquiry agencies (e.g. Experian), patent databases and stock exchange information services, such as Charles Schwab, are shifting the focus of information management away from internal sources and very strongly in the direction of external sources.

Knowledge management is not only beneficial in the process of customer advisory services and care. Other important fields of application are the processes of product development, organizational development and training. In the case of organizational development it is a matter of knowledge about business strategies, processes and systems, as systematically built up and maintained by consultancies nowadays. The corporate universities of large organizations cover conventional training activities on the one hand, but on the other have a much wider remit to collect and impart corporate knowledge.

Consequences

- *Knowledge utilization.* It is not the collection of knowledge but the utilization of knowledge which creates value for the enterprise. The business process determines what knowledge is required.
- *Knowledge value measurement.* Knowledge management must be based on the value for the process and must measure it by performance indicators.
- *Knowledge structuring.* Knowledge management starts with the recording and structuring of internal and external knowledge, based on its use in the business process.
- *Utilization of existing knowledge.* The most important task is to utilize the (explicit) knowledge which is already documented electronically in business processes. Only then will previously implicit knowledge become explicitized. A consultancy firm, for example, will first make use of the documentation from completed projects in new projects before urging project managers to document the most important findings from a project in addition.
- *Documentation of implicit knowledge.* The explicitization of knowledge is particularly successful if it leads to instructions (methods) and reusable documents or templates. A service technician needs an assembly instruction and not a database containing general experience with the functioning of components.
- *Knowledge management as part of business processes.* Knowledge management is the task of business managers and not the task of a new staff position. However, the organization/IS department must take on the same tasks for document processing as it has already done for transaction processing.
- *Strategic knowledge management.* It is the task of management to recognize the opportunities provided by knowledge management and to drive implementation forward.

2.3.3 Smart Appliances

Today, smart appliances, such as digital cameras, machine-tool control systems, electronic organizers, game computers, pace-makers or car engine management, are already taken for granted. The miniaturization and the fall in prices of processors and memories are contributing to the rapid growth of application areas, such as clearance monitoring in cars. However, there is a new feature of these appliances that will visibly change life at home and at work: the networking capability (cf. [Norman 1999, 62], [Davis/Meyer 1998], [Strauss 1998]).

The car navigation system (GPS), the mobile telephone (GSM), the pager, the TV set top-box, road-pricing systems, Internet-enabled maintenance computers on machines, the electronic book and the electronic tagging of prisoners are examples of networked appliances which are already in use. Video cameras, photographic cameras, audio and video systems are increasingly becoming digitalized and have also found their way to the Internet - in some cases via the PC. Smart cards are a special form of smart appliance used for a wide spectrum of applications, from authorization to electronic cash. All these appliances offer a specially adapted form of access to the Internet and/or to the networks of individual companies from the home or while on the road (see Figure 2-6).

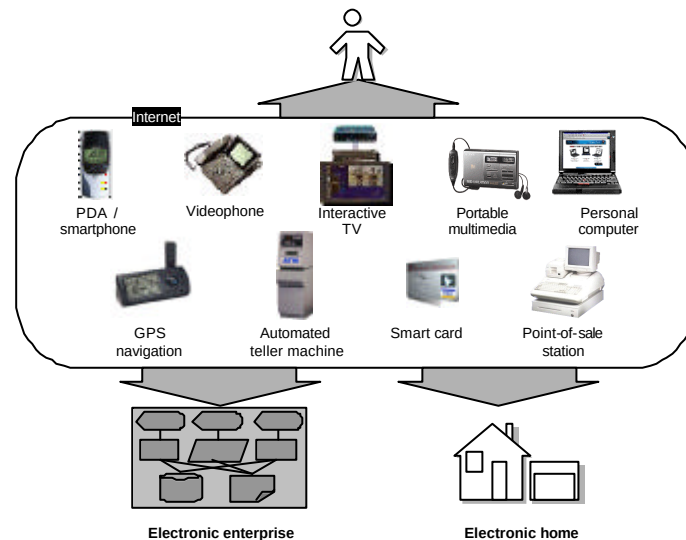


Figure 2-6: Multi-mode Access Through Smart Appliances

The business flight of the future might proceed as follows: the passenger books his flight via the Internet or through a call center. A few hours prior to departure, the electronic organizer of the passenger's mobile phone reminds him to confirm his flight and, once authorized, forwards confirmation to the airline. In the event of a delay, the airline sends the passenger an SMS message or a voicemail to his mo-

mobile phone. On approach to the airport, the GPS tells him where parking spaces are available in the airport's multi-story car park and guides him there. The road-pricing system automatically charges the parking fee. The automatic airport check-in registers the passenger's presence through the arrival of his mobile phone within the zone of the airport. An SMS message, tells him at which gate he can board and the number of his seat. When boarding the aircraft the passenger identifies himself with his customer card (smart card). Once on board his mobile phone and PC have Internet access which allows him to work just like in the office.

Airlines already have many of the features described in this scenario in the pipeline. Similar scenarios are to be found for patient home care, service engineers performing machine maintenance, entertainment with audio, video and games as well as in other areas.

The parcel service FedEx supports its order tracking system with PDAs (previously Apple Newton, now PalmPilot) [cf. FedEx 1999]. This allows customers to call up the status of their parcel deliveries at any time via the FedEx web site. As well as improving customer service, FedEx is also reducing costs through savings in staff who provide information on the telephone.

The Palm VII Connected Organizer via the proprietary network Palm.Net provides access to news channels like BBC News, financial information like Bloomberg, or a hotel guide like Fodor's, it locates the nearest three cash machines or gas stations, connects to a translation service, and allows access to existing travel itineraries.

The company Grenley-Stewart Resources (GSR) sells diesel fuel to over 1,200 gas stations in the USA. Customers are the owners of truck fleets who obtain fuel at a significantly reduced price than at normal gas stations through a contract with GSR. The high consumption and large distances covered by a truck mean that even relatively low differences in the fuel prices of various suppliers can add up to large sums.

Diesel prices fluctuate on a daily basis and vary from one place to another. In order to inform truck drivers on the current prices at GSR gas stations, GSR publishes its latest prices on its own web site which can be accessed by the fleet owners free of charge. As distributing the information by telephone is too involved, GSR offers its customers access via PalmPilot as an additional service. Drivers can investigate local diesel prices whenever they wish and can also request graphic route plans to take them to the required gas station [cf. Korzeniowski 1998].

A few technical developments have made all this possible (e.g. [Davis/Meyer 1998], [Bill 1998]):

- *Digitization.* Digitization makes it possible to communicate all information, be it music, measured values from sensors or images, by simple means.

- *Internet.* The Internet has provided an extremely low-priced method of globally available networking.
- *Low-priced processors.* The drop in processor prices has made it possible to equip appliances with additional functionality, a simple user interface and access to the Net.

Where appliances are concerned, a trend can be observed towards both the integration of functionality and specialization (cf. [Burrows/Reinhardt 1999], [Kuri 1999]). On the other hand, mobile phone manufacturers, for example, are packing more and more functions, such as planners, e-mail, SMS messages, address database, Internet browser, remote control for any appliances and video communication into their products with the aim of creating a universal PDA (Personal Digital Assistant). On the other hand, there is a tendency for game computers, TVs, refrigerators, heating systems and machine controls to be equipped with their own specialized processors, network connections and control units.

At the same time there is a fully fledged battle going on between operating system manufacturers for a standard application platform: Windows CE versus Java versus PalmOS versus EPOC. More decisive for the networking of smart appliances is the competition between middleware, such as UPnP, Jini or WAP and alternative networks. The most important versions here are peripheral access devices (cable connection, e.g. IEEE1394, USB), telephone line (Phone Line, e.g. HomePNA), power line (Power Line, e.g. CEBus, X-10), radio and/or infrared in the local area (e.g. HomeRF, Bluetooth, IrDA) and long-distance radio (e.g. GSM, CDMA). In the end, a combination of technologies, each with a dominant market standard will win through. In addition, we can expect to see whole series of new broadband standards gaining wide diffusion in the next few years, including UMTS (universal mobile telecommunication standard) for mobile communication or ADSL (asymmetric digital subscriber line) for linking households to the Internet. In view of its huge volumes, consumer electronics technology will also provide the standards for businesses, as was already the case for personal computers.

The following general scenario is possible within a few years:

- Every machine has access to all the information which any computer keeps on the Net. In other words, the navigation system has access to road maps, traffic reports, weather reports, hotels, restaurants, car repair garages, etc.
- Consumers and employees have real-time (with no delays) and global access to all private and business information. They use the most suitable appliance in each case (multi-mode access, see Figure 2-6).
- Data entry takes place at the point of action. The smart card and the point of sale cash register record the payment transaction, the purchased articles, the time and the location. The bank, department store and department store supplier have real-time access to these data.

- Use of these appliances ensures general computer literacy. Communication with computers and an understanding of computer functions become a matter of course.

According to IDC [cf. Hwang et al. 1998], 18 million consumer information appliances will be sold for home use in the year 2001, topping personal computers for the first time. Datamonitor [cf. Hofer 1999] states that in the year 2001 consumers will purchase 8 million games consoles alone (USA and Western Europe only). In addition, 34% of the population in the USA and 13% in Europe will then have a personal computer with access to the Internet according to a study by Forrester Research [cf. Sawyer 1998]. If we include additional categories of appliances (GPS etc.) we begin to get an idea of the potential which smart appliances represent.

Consequences

The consequences of smart appliances are still difficult to assess. Who would have thought three years ago that the MP3 format developed by the Fraunhofer Institute in Erlangen, which allows the compressed digital storage of music, in conjunction with the Internet would succeed in restructuring the complete music sector within a few years [cf. Gomes 1999].

- *Appliance and software manufacturers.* The greatest challenge of all is that facing the manufacturers of appliances and software. This ranges from the electronically monitored label printer and the escalator to the office coffee machine which sends information on coffee consumption to the service company for replenishment purposes. MP3 (more precisely: MPEG Audio Layer-3) and other multi media standards (e.g. SDMI) are leading to the creation of a new generation of appliances for audio/video storage and reproduction. They will revolutionize not just the appliances (players etc.), but the music industry and the music distribution channels as a whole.
- *Service providers.* Networked smart appliances are usually only meaningful in conjunction with a special service. In the air travel example, this would be check-in and boarding, in the case of FedEx order tracking, with MP3 the music distribution service and with Grenley-Stewart the diesel price information system.
- *Suppliers of conventional products and services.* Smart appliances are changing business in many areas. Entrepreneurs must ask themselves the following questions:

Which information and electronic services generate added value at the point of action for consumers, employees or machines (e.g. a personal telephone directory on the Net, a regional weather forecast via the mobile phone)?

Which information can smart appliances provide at the point of action (e.g. sales data from point of sale cash registers)?

Which market participants are in a position to offer our products and services by better or more economical means (e.g. business news from the point of view of a daily newspaper)?

Despite the fact that this technology - compared to ERP systems for instance - is still far from mature, it points the way to serious transformations in business processes and in the private sphere. In some countries at least this is giving rise to widespread fears of technology and big brother taking over.

2.3.4 Business Networking

Business in the information age is a network of processes. During the past ten to twenty years, business process redesign has created integrated processes within companies; database systems have made this integration possible. During the next ten to twenty years, Business Networking will link processes above and beyond company boundaries and serve consumers directly; networks, such as the Internet, will provide the means. Interorganizational coordination will change business far more fundamentally than intraorganizational integration has done.

The result will be a worldwide network of specialists, each of which will play its part in value creation with its core competence. The path will lead via the disassembly of existing enterprises into independent processes and via reassembly of enterprises and supply chains [cf. Wigand et al. 1997, 2]. Business is at the start of a dramatic transformation and Business Networking is a main driver.

Experiments in the automotive industry with new forms of supply chain networks should be mentioned as a reference for the many reorganizations in the financial sector, in the pharmaceutical industry, in tourism and in other areas. With Micro Compact Car (MCC) [cf. van Hoek/Weken 1997], DaimlerChrysler realized an enterprise which largely performs the coordination of processes which it has outsourced to specialists. Ford is currently in the process of handing over parts of its final assembly to specialists and transforming itself into an enterprise for consumer goods and services [cf. Burt 1999].

A few examples allow us to identify the types and principles of Business Networking (see Figure 2-7):

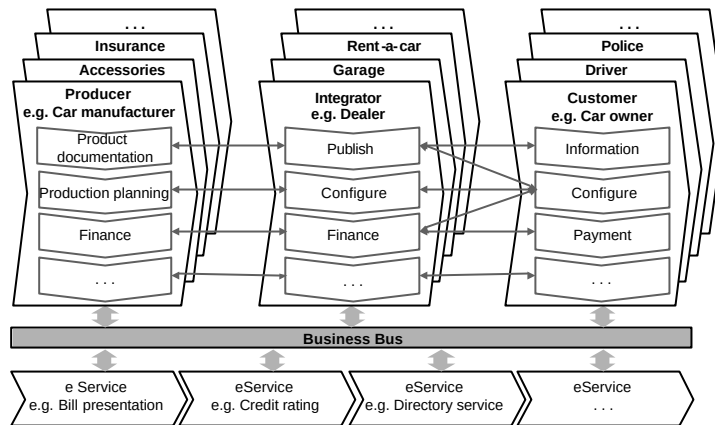


Figure 2-7: Model of Business Networking

- Electronic commerce.** The most commonly known form of Business Networking is the Internet shop. In sell-side electronic commerce or eSales (cf. Chap. 4.3.1), manufacturers, banks and many others use the Internet as a new sales channel to corporate customers and consumers [cf. Barling/Stark 1998]. Customers, in the example shown in Figure 2-7 the car owner, perform their subprocesses information, configure, payment etc. jointly with the subprocesses publish, configure, finance etc. of the intermediary, in this case the car dealer. The car dealer retrieves the customer's address data from an electronic directory service, the credit information from an electronic service for credit rating and settles payment through a payment service. The role of the intermediary (integrator) in the supply chain is to group products, services and information together to form a package, to allow the customer to compare the offerings of many manufacturers side by side (eBay, Yahoo!, e-Steel, eTrade, Dell, etc.), and, if needs be, to match supply and demand (in an auction e.g. buy). The value added by the intermediary is the integration [cf. Klein 1999].

At the heart of the Internet shop is the electronic replacement of the conventional ordering process using paper-based catalogs and fax [cf. Kalakota/Whinston 1997, 3]. ETA, for example, a manufacturer of watch movements within 'The Swatch Group', has arranged for its customers (i.e. watchmakers) to order movements and spare parts through an Internet shop (cf. Chap. 6). This rapidly gives rise to an intermediary which expands its range by including other non-related articles, additional services (e.g. maintenance) and information (e.g. sales forecasts), such as Dell or Cisco. Cisco makes 40% of its turnover, i.e. USD 3 billion, via the Internet.
- MRO procurement.** While the examples mentioned up to now have related to the sell-side, MRO procurement focuses on buy-side electronic commerce (cf.

Chap. 4.3.1). The process of procuring indirect goods (MRO: maintenance, repair and operations) is built around the customer process. UBS, one of the world's leading banks with 30,000 staff, has set up an Intranet shop with 10,000 articles for the procurement of MRO products (office stationery, furniture, information technology, etc.) [cf. Dolmetsch 1999, 13]. External suppliers maintain a warehouse and supply to some 3,000 authorized purchasers in the organization. Now, six months after introducing the system, 2,500 different articles are processed on a daily basis. The benefit lies in a drastic simplification of the ordering process, plus volume discounts and reduced inventory. MRO procurement starts from the customer's procurement process, creates multi-vendor product catalogs with the intermediary, links the suppliers, utilizes electronic services for logistics, payment, product catalogs, etc. (cf. Chap. 10).

- *Supply chain management.* The goal of supply chain management is to optimize purchasing, production, inventory management, and transport across all the elements in the supply chain network [cf. Handfield/Nichols 1998, 2]. From the boutique (customer) via the garment manufacturer (integrator) and the textile manufacturer back through to fiber production (producer), supply chain management exchanges sales forecasts, effective sales, inventory levels, delivery dates, customs papers, payments, etc. For this purpose it uses electronic services for credit ratings, payment and transport organization (logistics). It creates an additional service 'available to promise' which takes on scheduling tasks for all the participants in the supply chain. Most members in the supply chain act as producer as well as integrator and customer (cf. Chaps. 4.3.2, 6.2 and 9).

Riverwood, a packaging material manufacturer, has closely linked its production and distribution planning with that of its customers (e.g. Miller Breweries). This has enabled Riverwood to drastically increase delivery speed and accuracy, and to achieve a quantum leap in customer relationships (cf. Chap. 5).

- *Shared services.* Large corporations group together subprocesses, which occur in a similar form in several business units, to form shared services. BP Amoco, for example, has turned its processes tax, auditing, legal services, human resources as well as purchasing and materials management into shared services which all business units in the group can access. In this case the shared services are producers of services, the group is the integrator and the business units are the customers. This type of organization is dependent on electronic services for master data coordination, transporting messages, charging services, etc. However, shared services can also be bought in from independent companies. ADP handles the payrolls for 425,000 customers, which means over 30 million wages and salaries [cf. ADP 1999].
- *Online service.* Companies, such as Intel and Cisco, offer their customers the choice of a broad spectrum of information and services for the use and opera-

tion of their products online. Nowadays, the customers of technology companies have come to expect Internet services of this kind, the quality of which is considered to be a major differentiating factor [cf. Association 1999]. 80,000 registered users take advantage of Cisco's online service [cf. Rodin 1999, 213].

The speed at which Business Networking will change the face of business will largely depend on the following technical and business factors:

- *Intermediary.* Customers will only place a large proportion of their purchases via the Net if an intermediary packages a large number of suppliers, products and services in such a way that they conveniently cover the customer's needs in a particular process. Any company can act as intermediary without having to invest much effort. However, the competition between intermediaries is going to be phenomenal. Only few intermediaries will survive worldwide in each business area (customer segment, customer process and range of articles). Standard software for intermediaries, which is currently developing under the heading of customer relationship management (e.g. Siebel), will further increase the dynamics in this area.
- *Electronic services.* Payment transactions, credit ratings, multi-vendor product catalogs, trust, etc. are services which are needed time and again in many forms of Business Networking. The more of this type of service that is available and accepted by a large number of market participants, the easier it will be to set up an electronic business relationship.
- *Business bus.* The Internet is a technical standard for data communication (TCP/IP) and presentation (HTML, SGML, XML) around which a rich infrastructure of products and services has formed. By analogy, the business bus is the term used to describe the totality of technical, applications and business standards on which software solutions, electronic services, etc. are based. These include EDIFACT, cXML (commercial XML), RosettaNet, OAGIS (open application group integration specification) and OAMAS (open application group middleware api), de facto standards for business objects, such as those in the SAP environment (incl. the BAPIs as methods) or those of Microsoft's BizTalk [cf. Microsoft 1999a], process standards like CPFR, and finally 'laws' for Business Networking, e.g. generally valid rules for dealing with delays in delivery as now agreed in some cases between the participants in a supply chain. An example of the business bus in a banking sector is the order transport management system from PricewaterhouseCoopers. The business bus produces the m:n capability of Business Networking. Today, virtually all business networks are either 1:n (e.g. Amazon) or 1:1 relationships (e.g. Riverwood). As a result, the effort involved in setting up and operating every additional business relationship is too high. The availability of standards which improve the m:n capability will more than anything else

determine the speed with which business becomes networked. Ideally, the business bus will supply a standardized socket and the plug to go with it.

- *Networked enterprise resource planning.* Today, ERP packages are structured like classic enterprises. They only support new forms of networked businesses in part, if at all. The distribution of the human resource process between a shared service and the outsourcing company, the coordination of production planning in one company and the supply chain planning in another, the matching of an order with an MRO supplier with the purchaser's order, etc. must first be developed step by step. While it should be considerably easier to expand proven ERP solutions by network versions of the processes than developing complete ERP systems based on network solutions, there is still a great deal of development work to be done here.

On the basis of these considerations it is possible to sketch out the following scenario:

- *Technical infrastructure.* A broadband, low-cost communication infrastructure will shortly become available (UTMS, ADSL etc.).
- *Business bus.* "An infrastructure designed around information flow will be the 'killer application' for the twenty-first century." [Microsoft 1999b]. The large corporations in this market are fighting an intense battle for domination of the business bus. Major players are Microsoft with its development environment, in particular BizTalk, and with Microsoft Network, Oracle with Oracle Exchange, SAP with mySAP and above all with network-compatible ERP functions (BAPI, APO, etc.), Siebel with customer relationship management software, portal providers, such as AOL, Yahoo! and PointCast. Outsiders, such as Commerce One with an electronic service for multi-vendor catalogs (MarketSite.net), should also be watched (cf. Chap. 3.2.5).
- *Killer application.* MRO procurement could prove to be the killer application of Business Networking. A lot of large corporations take advantage of the possibilities for savings when purchasing secondary materials, at the moment frequently using solutions which they have developed themselves. If Ariba, for example, was able to dominate as a supplier of procurement solutions and catalog services, then its data structures and semantics would be able to establish themselves as a de facto standard. When a company masters the processes and applications for the procurement of part of its articles, the tendency is to extend this solution to cover other articles. As customers like Ariba introduce the corresponding sell-side solution onto the market in addition to the buy-side solution, the same applies for the sell-side. Once a company has established a Business Networking software platform for the purchasing process, it will want to use it to network other processes.
- *ERP and CRM.* Enterprise resource planning and customer relationship management (CRM) are variously described as possible, separate directions for

the development of enterprise software. In a Forrester Report, [Cole et al. 1999] come to the conclusion that the wide range of isolated solutions for CRM are growing together and will form their own platform with an interface to ERP systems. As the CRM applications access the same data as the ERP applications, however, the systems will have to be integrated. The question is whether the CRM package will be extended to include the ERP functionality or vice versa. If we look back at similar developments in the past, there is a lot to be said for concluding that the core of networked units (e.g. the operating system Windows and travel booking system SABRE) will dominate and not the Net. However, this only applies if the ERP systems acquire Business Networking capability fast enough. Inadequate cooperation between companies which function well on their own is more probable than perfect cooperation between units with inadequate internal processing.

Consequences

In many cases the question is not whether investments in Business Networking will pay in the short term but whether the customer will be prepared to accept a supplier who does not offer its product catalog and associated services electronically. In accordance with the model of Business Networking shown in Figure 2-7, a company has a series of options:

- *Products and services.* Which new products, but above all which services will be feasible via the Net? A configurator for products, support for troubleshooting or a chat room for customers are examples. Which internal services can the company also offer in the marketplace? Does the company perform internal services which it could offer as an electronic service without too much effort? One example would be the soil database of an agrochemical manufacturer which documents the quality of the soil according to region and which the manufacturer has used up to now to sell its fertilizer but could possibly be sold more profitably as a service via the Net.
- *Customer segment.* Business Networking creates an additional channel to existing customers but also access to other customer segments. In particular, it extends the geographical scope to the whole globe.
- *Supply chain.* In which supply chain is the company involved? Which networks will establish themselves on the market? Which positions can the company hope to occupy in these networks? Which alliances should be forged? Can the company organize a supply chain or does it act as a supplier and customer?
- *Procurement.* Is the company familiar with the products and services which are offered via the Net and does it use them as a customer? Does it make use of the global access to suppliers? Which processes need to be redesigned? What about market research?

- *Outsourcing of processing.* When communication between companies no longer involves much more effort than communication between departments within a company, a company can gain striking power by concentrating on strategic processes and buying in all the others from outside. A financial institution, such as the German MLP, for example, specializes in providing a comprehensive financial service for a narrow customer segment and purchases all handling processes, such as credit scoring, collection, securities settlement, payment, etc. from specialized financial service providers. A pharmaceutical corporation may understand the management of its complex research and development process plus marketing and distribution as core processes and outsource all the others, such as the performance of research, the testing of substances and production, to specialists.
- *Critical mass.* Business Networking presupposes a critical mass. The customer will purchase from the online bookshop with the biggest selection of books. In the case of an exclusivity clause, the supplier will supply to the bookshop which has the largest number of customers. The investments for setting up (development and marketing) an electronic bookshop are very high, the marginal costs extremely low. Being able to allocate the investment costs to as many transactions as possible will decide profitability. What is true for the bookshop applies by analogy for the investment service of a bank, for training or for the marketing of construction materials.
Many networking solutions, while useful in themselves, are not even begun if the path to reaching the critical mass is either too long or too uncertain. The best example is the introduction of new technologies, such as DVD (digital versatile disk), which do not establish themselves until long after they become technically available when all the participants in the network believe in the success of the technology.
- *Networkability.* Networkability is a core competence for every enterprise of the information age. In addition to concrete interorganizational processes, an enterprise must build up the capability to offer new services quickly via the Net and to integrate new customers and suppliers with minimum effort. This includes not only the standards of the business bus, but also the networkability of the enterprise's own applications and last but not least a functional, integrated enterprise resource planning.

Business Networking will change more in business than the ERP systems have done. The potential is so huge that many are talking of a new industrial revolution. Despite the initial euphoria, there are nevertheless many factors exerting a braking effect, first and foremost that of standardization. Interorganizational solutions do not come about unless all the necessary participants stand to benefit and the solution will achieve the critical mass within a foreseeable time span.

2.3.5 Electronic Services

Road traffic has paved the way for complete business sectors: police, road construction, maintenance, repair workshops, snow clearance, traffic information, navigation, etc. Business Networking will give rise to a new business sector for electronic services: Net access, directories, payment, portals, etc. Electronic services either perform coordination tasks (e.g. payment transactions) or they are subprocesses which many companies require in a similar form and therefore purchase in electronic form. A huge business sector is growing up around Business Networking. Figure 2-8 classifies electronic services and names examples:

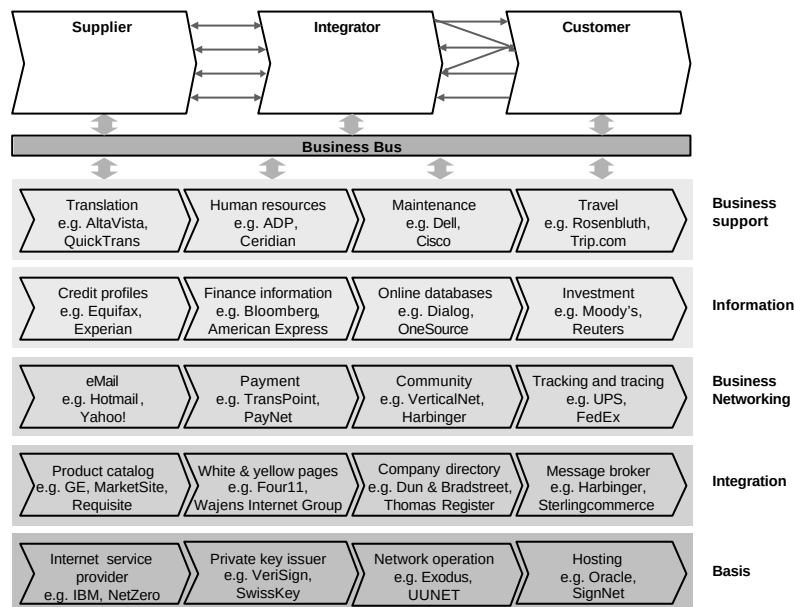


Figure 2-8: Examples of Electronic Services

- **Basic services** provide the technical infrastructure on which all other services are based.
- **Integration services** are services which support the coordination of processes across enterprises. They ensure the safe transfer and logging of messages to and from selected network participants (messaging, routing), help in the search for and identification of market participants (directory services, e.g. customer Meier from Buttwil), products, etc. (multi-vendor product catalogs), assist in the reconstruction of a failed web transaction involving several participants and link objects from different data pools (e.g. all producers of products containing genetically modified corn). In other words, integration services do the same as a database management system does within a company for

the integration of applications and processes. At the moment, the form integration services will take is only identifiable in outline. While directory services, for example, have been introduced for telephone subscribers, multi-vendor product catalogs are still in their infancy (e.g. in the case of General Electric) and in terms of the infomediaries, as designed by [Hagel/Singer 1999, 21], only exist as a vision.

- *Business Networking services* are services which almost every company needs when working with other companies and which are therefore to be found on most of the more highly developed web sites [cf. Giaglis et al. 1999].
- The Net offers a vast maze of *information services*. The content might be news or research reports, stock exchange prices or credit ratings for business partners. The information may enter the company's own portal as a channel, be pushed internally as a clipping service or - for example in the case of financial data - be directly included in calculations (e.g. current price in a foreign currency). Classical media companies will be transformed in broad variety of specialized and integrated media services [cf. Hess/Schumann 1999].
- *Business support services* include processes which companies outsource and can largely purchase in electronic form. This can be an automatic translation service or payroll accounting.

Electronic services have the following in common:

- They permit collaboration between companies, and/or between companies and consumers.
- They are largely electronic, i.e. with no manual intervention.
- They are accessible via computers or smart appliances.
- They can be used individually or as a package.
- Their service components are highly standardized.
- In the majority of cases they are charged according to use.

Most of the services mentioned above do not exist in the pure form, i.e. service providers try to cover customer needs as comprehensively as possible by bundling services and thus keep the entry barrier for competitors as high as possible.

After a period in which many start-ups created innovative services, such as Hot-Mail, a free email service, which proved to be successful, only very large companies which can absorb high investments with long pay-back periods and have global access to a broad customer base can now keep pace with the packaging and establishment of services, despite the fact that large opportunities still remain in niche markets.

This can be explained by an example. Paper-based correspondence between consumers and insurance companies, banks, public administrations, schools, travel

agencies, etc. involves a large time and effort on both sides. Files and records in private households are not only cumbersome but usually also inadequate. Strack-Zimmermann, the CEO of iXOS AG, has designed a document exchange and filing service, the value of which is immediately obvious to all concerned [cf. Strack-Zimmermann 1998]. Despite the fact that a service of this kind could operate highly profitably, the barriers confronting the establishment of the service are difficult to surmount: the companies will have to accept the standard stipulated by the service provider, a sufficiently large number of consumers must be online and able to operate the service and ultimately be prepared to dispense with the tangible medium of paper.

For every type of service only a limited number of suppliers can survive per customer segment as all participants have an interest in having only one supplier for each task or process, just as they only have one power or telephone connection. In addition, service customers want to have integrated services so that they will not have any interface problems. The reader should consider the question of how many private key issuers or payment services are possible worldwide. These considerations form the background to the exorbitant increases in 'Internet shares'.

Consequences

Companies can draw the following conclusions from these considerations:

- *Development of own services.* If a company has leading know how for a specific service and has opportunities for establishing that service globally - e.g. through alliances and branding - then, this is a highly attractive economic proposition.
- *Utilization of services.* Business Networking means taking advantage of a broad spectrum of electronic services. Each of these services represents part of the standard of the business bus. It is not the best service but the combination of services with the greatest market penetration which will establish itself. Investments based on the wrong standards are expensive and delay the development of the networked business.

2.3.6 Customer Process Support

Customer process support utilizes all the developments mentioned above to service the customer's problem-solving needs comprehensively and from a single source.

Customer centricity has long been a guiding principle for many businesses. However, this is usually limited to marketing existing products and services with as strong a customer focus as possible (cf. Chap. 7). Corporate strategy remains basically product-centered. The web sites of most companies provide the best evidence of this fact.

The enterprise of the information age focuses on the customer process. Networking, multimedia and high IT functionality at the customer's end make it possible to place the emphasis on the customer's problem rather than on the product [cf. Kühn/Grandke 1997]. Innovative companies have already gone over to supporting the complete customer process, i.e. the process which a customer goes through in order to satisfy a need. They offer customers every product, every service and every piece of information they need from a single source and guide them in this process. They become service integrator and specialist for this process.

With its help desk, the Zürich insurance company is pursuing its goal of supporting the customer throughout the complete process of handling a claim. Ideally, the insured party calls the help desk, e.g. following a car accident, which from that moment on assumes responsibility for the process. The help desk takes care of vehicle repair, the provision of a substitute vehicle and the settlement of claims, etc. Zürich is pursuing a dual aim here: firstly, its many years of experience in the field and its trained network of specialists enable it to handle the claim much more efficiently than the client can; this reduces the claim costs. Secondly, Zürich is relieving the client of tiresome tasks. This service becomes possible when Zürich can handle claims with a large number of partners so efficiently by means of information technology that it costs less than the conventional solution.

An example of a customer process which has already proved highly successful is logistics. Companies, such as Kühne & Nagel, Danzas or FedEx, offer their customers not just transport services but also a large number of additional services, such as e.g. order tracking or inventory management. In extreme cases they even assume responsibility for the customer's complete logistics process. Automatic communication between the logistics service provider and customer management, order entry and production as well as with the financial accounting at the customer's end make this solution fast and economical.

Another example with considerable effects on the whole branch of industry is the process 'car ownership'. Car manufacturers, car dealers (AutoByTel), car magazines (AutoBild) and Internet shops (CarPoint) are starting to offer not just car sales, but all products, services and information from the selection and running of a car through to its disposal, from a single source (as already indicated in Figure 2-7). In the past, customers had to take care of every partial task in the process 'car ownership'. They read the test reports in the car magazines, visited the dealer, studied brochures, obtained a loan, registered the car with the appropriate authority, kept an eye on service intervals, obtained road maps, planned travel itineraries, obtained traffic reports, navigated, placed an ad for their used cars, etc. In other words, the car owner had to act as an expert for the process without actually being able to become one, and was compelled to communicate with a large number of service providers, resulting in considerable time and effort both for customer and supplier.

The special feature of the development in the automobile trade is the fact that new providers are entering these markets by means of the Internet - portal providers and a car magazine. These are not tied to a particular brand of car, in fact their very strength lies in their independence. They begin with a topic portal which merely represents a loose collection of information and services, develop into a business community in which the participants of this network work closely together (e.g. exchange of quality problems) and finally try to offer not only all information, services and products for the process of car ownership but also to manage the process.

Avnet Marshall (cf. Chap. 3.2.3) is a leading US distributor of electronic components and appliances (with 2,300 employees). Avnet Marshall supports - as embedded in its strategy [cf. Rodin 1999] - the customer process procurement of electronic components. In 1998 their web site was voted world best business-to-business site for a second time by the online magazine 'Advertising Age' (ahead of Cisco Systems, Dell Computers and Compaq Computers). This corporation is a typical intermediary which sees its position in the supply chain network in the age of electronic commerce and supply chain management as being to enrich the pure trading in products and services to such an extent that the corporation becomes attractive to both suppliers and customers. With this in mind, Avnet Marshall set about shifting its activities to electronic platforms in a big way in 1993. Today, Avnet Marshall offers a product catalog covering a large number of suppliers, a news service, online seminars, a supply chain service and numerous other services around the product 'electronic components' on the Net (see Figure 2-9) in addition to electronic commerce. Avnet Marshall's customers outsource part of their procurement process to Avnet Marshall.

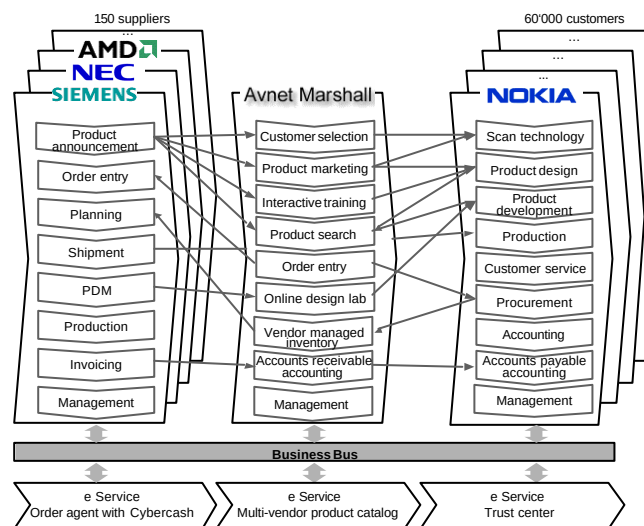


Figure 2-9: Service Integrator Avnet Marshall

An example of support for the complete customer process from the software sector is SAP. Over the past few years this software company has expanded its sale of software to include a large number of services and is pursuing the goal of supporting customers in all aspects relating to the optimization of their business processes. The focus, of course, is on introducing the software. SAP offers process management using the ASAP method, reference processes for reorganization (SAP Solution Map), templates for customizing, training for business engineers and users, remote consulting for specific questions, online information services regarding errors, plus newsgroups and list servers for communication between user companies. SAP provides remote maintenance (early watch) for system operation and even outsourcing of the operation [cf. Muther 1998]. Prior to and following introduction, SAP offers aids, such as e.g. key performance indicators and benchmarks [www.mysap.com], to assess potential and monitor achievements.

Further interesting examples of service integrators on the Net, which attempt to cover the customer process as widely as possible are Quicken, Charles Schwab, eTrade, Consors, Pointcast and SmartMoney for financial services or Travelocity and TIScover for tourism. These portals are also referred to as process portals. [Mertens et al. 1998, 18] analyze the products and services provided by 15 so-called virtual enterprises and end up with a similar picture of the networked enterprise [cf. Mertens et al. 1998, 64].

The following features can be identified from the examples given:

- *Specialist for customer process.* Service integrators master customer processes better than the customers themselves as, unlike the customers, the service integrators make these processes their strategic core processes.
- *Customer resource life cycle.* Customer centricity is based on the customer process. It attempts to resolve the process and thus the customer's problem in the sense of the customer resource life cycle [cf. Ives/Learmonth 1984] and to combine as many products, services and information as possible for this purpose.
- *Virtual community.* The extended form of the service integrator also comprises a virtual community which provides customers on the one hand with organized access to all the knowledge of relevance to them and their processes, and on the other hand makes direct communication possible between customers and also between customers and suppliers of the individual services [cf. Hagel/Amstrong 1997, 57].
- *Customer data.* The support for the complete customer process makes it possible to collect detailed data on customers and on their utilization and purchasing behavior [cf. Hagel/Amstrong 1997, 128]. For data protection reasons, but equally for reasons of integration, a large part of these data could be located at the customer's in the form of a personal or business profile which

they could make available to business partners on a selective basis, depending on the application.

- *Service packages.* Service integrators typically offer multi-vendor product catalogs, product search, configurators, order registration and processing, payment, logistics, industry news, access to information services, seminars, discussion forums, help desks and product-related services, such as support for the assembly of electronic components.
- *Globalization.* Service integrators rapidly break free of conventional regional boundaries and become global providers.
- *Outsourcing of process elements.* Customer process centricity begins with the support for a few services and can go as far as complete outsourcing.

A service integrator offers the customer considerable added value (Figure 2-10):

- *Everything.* The customer obtains all products, services and information from a single source and only needs one business relationship.
- *One-stop.* The customer can complete his transaction in one stop. He never has to wait for the supplier - with the exception of the physical transportation of goods.
- *Anyhow.* The customer receives process support by the method she prefers.
- *One-to-one.* Communication with the supplier is tailored to the requirements of the customer (customer profile), from marketing to after-sales service.
- *Everywhere and non-stop.* The customer receives the services at any time and any place in the world.

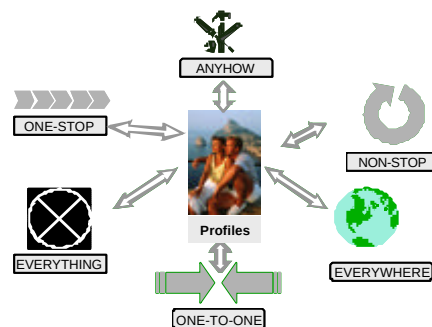


Figure 2-10: Characteristics of Customer Process Support

A service integrator, such as Avnet Marshall, uses the whole spectrum of IT applications outlined in connection with the five previous trends. The following should be emphasized however:

- The low-cost networking of all market participants via the Internet,
- The simple and cheap availability of multimedia solutions to communicate any form of knowledge,
- A broad spectrum of systems under the heading of 'Customer Relationship Management' (e.g. Siebel). A collection of customer care tools is to be found in the tool database of the Institute of Information Management of the University of St. Gallen [www.ecc.ch].

Consequences

Over the next three years, many companies will try to establish a strong market position as service integrator. Classic corporations will try to extend their offerings in this direction, new companies will want to establish themselves in this form. The most important tasks along the way will be:

- *Customer process.* The provider must not only understand the customer process but also build up superior know how relating to the customer process.
- *Role in the business network.* A business has to decide the customer services for which it can itself act as service integrator, the service integrators to which it is going to deliver and/or the customers to which it is going to sell directly.
- *Critical mass of customers.* The service integrator needs a high market share, on the one hand in order to allocate the high investments involved in setting up the business to a sufficiently high number of transactions, and on the other in order to convince the suppliers that it is offering the right network. Service integrators may well compel suppliers to enter exclusive agreements [cf. Hagel/Singer 1998, 169].
- *Critical mass of suppliers.* Providers must convince the suppliers of the required services to offer these to the market through them. Customers will work with the service integrator in which they have the greatest confidence on the basis of the name and who offers them access to the greatest number of suppliers [cf. Hagel/Singer 1998, 169].
- *Business community.* The greater the number of cooperating processes between the members of a business community, the greater the derivable benefit from the network and the greater the level of attractiveness for the participants.

Avnet Marshall consider the following factors to be critical for success in their sector: customer service, product range (extent to which customer needs are covered), degree of product availability, price, technical information (knowledge) and value-added services.

2.3.7 Value Management

Shareholder value is the catalyst in the transformation from the industrial to the information age. It drives entrepreneurs to look for new business solutions on the basis of IT, serves as a standard of valuation for investments, ensures the supply of capital for risky innovations and controls implementation. Shareholder value will dominate in turbulent times of change, but in a networked world it is dependent on other dimensions of stakeholder value (see Figure 2-11).

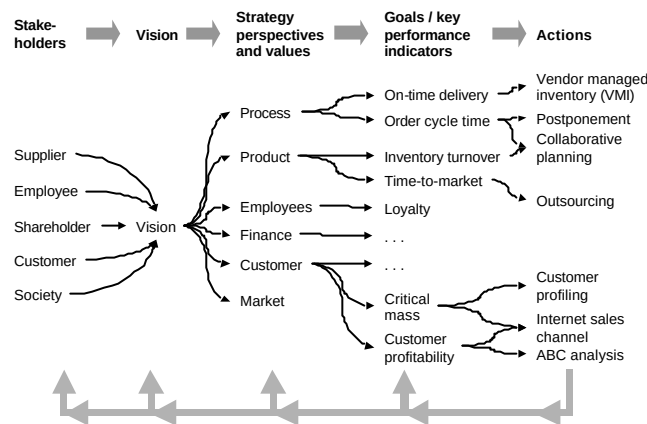


Figure 2-11: Dimensions of Stakeholder Value

The vision of the enterprise is gaining in significance. The resulting corporate strategy determines the areas which will be critical for success. In the information age there will be a new emphasis: on the customer base, employee values, know how, services, processes and networking.

Strategy defines goals and the key performance indicators. The information system supplies objectivized and updated actual values for all managers. It links the key performance indicators to the employee compensation scheme.

The classic enterprise is dominated by unidimensional, financial management. Sales revenues and, at most, contribution margins determine planning and controlling and performance-related remuneration. At Avnet Marshall, Robert Rodin realized one of the most radical changes in the management of a trading company: he dispensed with every form of commission for the complete management and subsequently for the entire sales force, and introduced fixed salaries. He then went on to develop a 'performance matrix' for assessing personnel according to their skills and performance in the areas which were critical for success (key performance indicators). In retrospect, Rodin describes this step as the most important prerequisite for mastering the transformation from a classic retailing business to an Internet intermediary of the information age [cf. Rodin 1999, 104, 238].

The characteristics of value management are (see Figure 2-11):

- Stakeholders have a common vision. This is the basis for the shareholders, for employee loyalty and for customer confidence. It determines values.
- Strategy concretizes the vision; it determines the areas critical for success (perspectives, critical success factors, value drivers) and formulates goals and measures.
- Management in the information age is therefore multidimensional. It sets objectives for financial performance, objectives for process quality [cf. Österle 1995, 105] and objectives for transformation of the enterprise.
- Management becomes future-oriented. Financial indicators document the past, while order cycle time considers customer satisfaction and thus the financial results in the future.
- Management becomes more direct. Sales revenues and costs represent aggregated information which tell the individual employee little about what she can do better. Customer returns, customer profitability, etc. are applicable to day-to-day business.
- Measures have to be adopted to implement strategy. The planning, execution and control of measures are at the heart of transformation.

What is new in all this? Strategic management, critical success factors, balanced score cards, key performance indicators and scoring systems have been around for some time and have triggered various management trends - and nevertheless only been partly successful. So what is different in the information age?

- *Process measurement.* The ERP and CRM systems track all business transactions in detail. For the first time in the history of business management theory it is possible to record the key performance indicators for all areas which are critical for success automatically and objectively - and not just the financial performance indicators from accounting and costing - and to distribute them to employees on a daily basis [www.img.com/pmb]. The Internet and smart appliances provide a flood of new data on customers, purchasing behavior, etc.
- *Knowledge management.* Knowledge management now makes not only transaction data, but also less formalized knowledge from sources within and outside the business readily accessible.
- *Data warehousing.* ERP, CRM, process measurement and external sources of information provide an unprecedented flood of data. Data warehousing provides the tools which make it easier to structure data, to store them separately from the operative systems and to generate evaluations to suit exact requirements.

- *Transformation management.* During the transformation - and this will take at least 30 years - change management will take on special significance. Management en route to the information age therefore means operative management of the business on the one hand and transformation management on the other.

Consequences

The information age, but above all the road which leads to it, demands new management skills and tools. Important steps in this direction include:

- *Vision and values.* The management team develops a common vision and common values which permit this vision to be realized.
- *Multidimensional management.* Management must be easy to communicate. It must focus on a limited number (less than ten) key performance indicators [cf. Brecht et al. 1998] and concretize these down to the goals of the individual employees.
- *Compensation scheme.* Performance indicators must be reflected in employee assessment and compensation.
- *Transformation management.* Transformation management requires its own system of performance indicators, from project portfolio management, via migration planning and project management through to continuous improvement.
- *Management process.* It is not the all-embracing data collection but the management process which determines what management will be based on and which data will be needed.