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Digital economy and structural change



Software houses: Changing from product vendors into solution providers

- The big, international software houses are currently **expanding their offerings well beyond their original core activities**. Strategies that span both the **system software** and **application software** segments are particularly attractive. Modularisation of the software enables a comprehensively integrated concept to be constructed.
- For manufacturing companies and modern service providers, the software houses are changing from being product vendors into **providers of comprehensive solutions**.
- A broader product range opens up new potential markets. Between now and **2008, software product sales** are forecast to rise by nearly **7% p.a.** to EUR 125 bn in the **US**, by a good **5% p.a.** to EUR 21 bn in **Germany** and by over **12% p.a.** to EUR 4 bn in **Eastern Europe**. **Global software sales** during the same period are forecast to rise by **6% p.a.** to EUR 270 bn.
- However, when software houses expand their range of activities this also **intensifies the competition** between them. The takeovers recently completed clearly illustrate this trend in the software market.
- The goal of customer relationship management (**CRM**), enterprise resource planning (**ERP**) and supply chain management (**SCM**) is to achieve efficient business processes. But the applications are predominantly confronted by the problem that IT structures in companies have expanded over time in most cases as stand-alone solutions and **have seldom been coordinated**.
- So CRM, ERP and SCM applications, that actually aim to improve efficiency, in some cases generate major inefficiencies when they interact with the complex overall system already in place. The **inefficiencies of the complex IT architecture** hinder broader acceptance of software applications as a whole.
- **Web services** are currently the focus of increasing attention among users. They allow existing systems to be integrated within tight budgetary limits. **Cost-efficient integration will** thus become the dominant trend in the software market.
- The big **US software houses** that specialise in standard software can further **consolidate their dominant positions** thanks to their economies of scale and the network effect arising from the broader base of users of their software.
- Contrary to many a forecast, the opportunities open to typical **European competitors** will be limited to **niche segments** only.

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Software houses: Changing from product vendors into solution providers

The use of innovative software applications and a seamless working relationship with software houses remain essential components of every successful business model, even after the dotcom crash. The continuing digitisation of the economy and the increasing networking of its participants go hand in hand with the transformation of traditional competition patterns. As technical advances are made, traditional horizontal competition between companies in the same segment of the value chain is being replaced by competition between entire value chains.

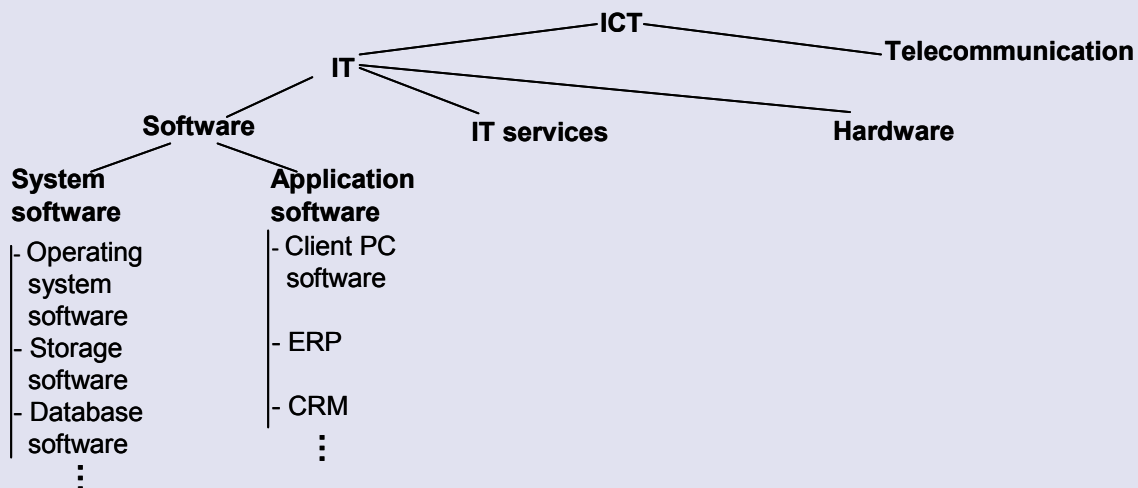
As providers of software products, software houses have always operated in highly dynamic markets. The survival of individual software houses in the marketplace is linked more directly to their willingness to constantly upgrade their products and services than is the case with other sectors of the economy. The takeovers completed recently by the big international houses provide striking evidence of how global competition in the software market is hotting up.

First of all this study adopts the user's point of view in outlining the key trends in the product ranges of the software houses – from system software to application software. Because of its external vantage point this study does not address new approaches in software development, such as open source software¹ or Model Driven Architecture (MDA)², nor does it deal with the convergence of information and communications technologies (ICT), for example in the shape of voice over internet protocol (VoIP)³. And to round off, we quantify the market environment for software houses on an international comparison.

Entire value chains competing against each other

Software houses have always operated in very dynamic markets

Subsegments of the information and communications technology market



Source: DB Research, 2005

¹ See Hofmann, Jan (2002): Free software, big business? Open-source programs tightening their grip on industry and the public sector. Deutsche Bank Research, E-economics No. 32, Frankfurt am Main.

² See Heng, Stefan (2004): More than "pretend competition" in German telecommunications. Deutsche Bank Research, E-economics No. 37, Frankfurt am Main.

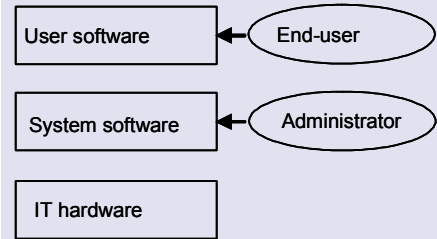
³ See Heng, Stefan (2004): *ibid.*

Standardisation: The current software trend

Software helps the decision-makers in a company to optimise the flow of information and material along the value chain. The efficient organisation of business processes requires software to be tailored to current needs. The big wave of IT investment linked with the euro changeover and the Y2K problem was accompanied in most cases by a changeover to standardised software with a broader range of applications.

The software houses are reacting with revised strategies tailored to this major trend towards standardisation. Currently the big international software houses in particular are increasingly adopting integrated approaches with much wider scope than their original offerings. These include especially those strategies that link both system software (which operates at the interface between hardware and application software and is accessed by system administrators only) and application software (which is operated by end-users). From the standpoint of manufacturing companies and modern service providers, the software houses are changing from product vendors into providers of comprehensive solutions. This trend favours the big US software houses in particular and is to the detriment of their small European competitors that typically specialise in individual solutions. Software houses need to react quickly to the rapidly changing requirements of manufacturing industry and modern service providers in order to remain viable. Innovative business models focus on significantly improving the contact between suppliers and customers.

Layers of IT architecture



Source: DB Research, 2005

US software houses dominate the global market

Scrutinise web publishing for added value

Depending on the form of interaction within the value chain the innovative business models can be placed in three categories: web publishing, web applications and web services.

The internet-aided business model of the first category, web publishing, which has become more and more widespread since the second half of the 1990s, uses the web as a marketing instrument for external communications. In its original form web publishing saw websites whose content largely comprised company brochures and reports, which meant no additional information was made available online compared with that contained in the conventional printed products. From the customer's point of view this model is hardly satisfactory. Internet entrepreneur Greg Gianforte has thus provocatively asserted that: "Thus, an exclusively first-generation approach to web site content will actually drive customers away from the site and force them to regularly use slower, less cost-efficient communication channels. Frustrated web site visitors are easily lured by competitors offering better, fresher information online."⁴ The software houses thus need to go beyond this initial internet-aided marketing approach, which is based on static information.

First-generation, internet-aided business models generate only very limited added value

Value chain more streamlined due to the internet

Web application – the internet-aided, second-category business model – adopts an inward-facing approach. The web application model seeks to optimise business processes throughout the value chain and thus complements the outward-facing web publishing model. The web applications offered by software houses fall into three product

⁴ Gianforte, Greg (2002). The Insider's Guide to Next-Generation Customer Service on the Web, Bozeman.

categories: customer relationship management (CRM), enterprise resource planning (ERP) and supply chain management (SCM).⁵

CRM, ERP and SCM applications are confronted by the problem that IT structures in companies have expanded over time in most cases as stand-alone solutions and have seldom been rigorously integrated via software layers and interfaces to form a comprehensive solution. In many companies the different IT applications can at best be described as a loosely stitched patchwork quilt. The use of proprietary program codes, the incompatibility of diverse software applications, Byzantine licence conditions and overloaded functionalities thus lead to inefficiencies and the limited adoption of these software solutions in the value chain.

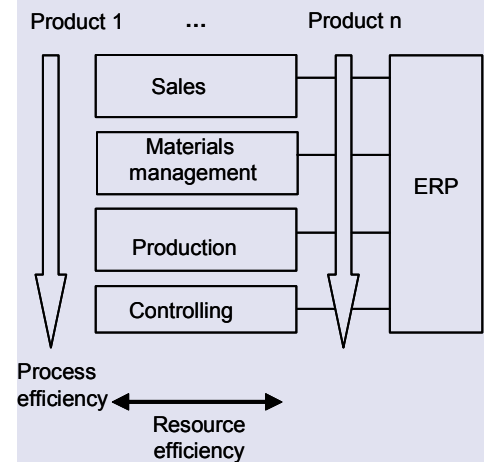
Complex mission for CRM, ERP and SCM

Customer relationship management (CRM) systems systematically analyse client contacts. This analysis enables companies to tailor their product range better to their own clientele. CRM systems simplify the contact between the seller and the buyer, opening the way for improved market penetration.

Enterprise resource planning (ERP) systems offer solutions for process planning, management and controlling. The systems address the process and resource efficiency of the value chain (see "Stylised EAI business model" chart, p. 5). ERP systems originally focused on sales, materials management, production and accounting in big companies from the manufacturing industry and the services sector. The consequences of these historic roots are that today's ERP systems are typically very comprehensive and therefore unnecessarily complex. This complexity in particular dissuades many small and medium-sized companies from using ERP systems.

Supply Chain Management (SCM) optimises the flows of goods along the value chain from the raw material supplier via the manufacturer to the retailer. Ideally goods are thus available at the right time in the required quality and quantity at the various stages of the value chain.

Stylised ERP business model

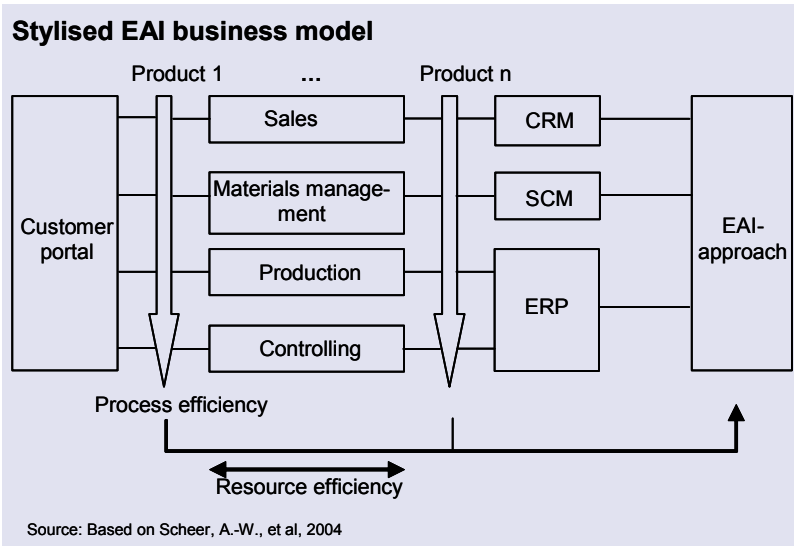


System integration is gaining increasing importance for software houses given the inefficiencies generated by operating web applications side by side. In this regard the Enterprise Application Integration (EAI) approach is the first area receiving special attention. Conventional EAI boosts process and resource efficiency by thoroughly reorganising corporate structures. Sales, materials management, production and accounting, and the CRM, SCM and ERP applications on which they are based, have to be geared towards the specifications of the EAI application.

Software is no longer merely the means for executing predefined processes; it assists in the structuring of these processes. On the one hand, this fundamental approach enables EAI to achieve the direct, seamless integration of business processes into the value chain. But, on the other hand, this approach is based on a capex budget that is higher than many companies can afford.

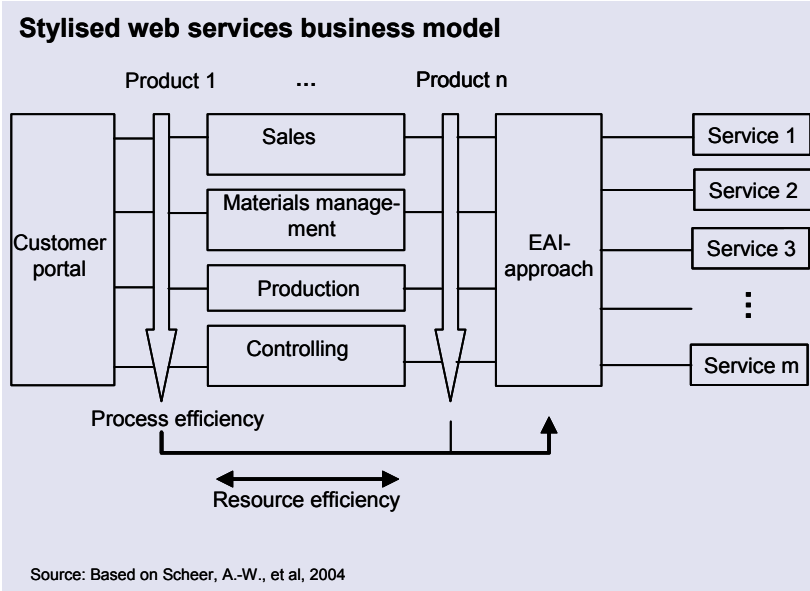
IT is the heart of the process

⁵ See Heng, Stefan (2001). Software houses and IT services – growth sectors in the IT business, in: Deutsche Bank Research, E-economics No. 15, Frankfurt am Main.



Designing IT architecture efficiently on a shoestring

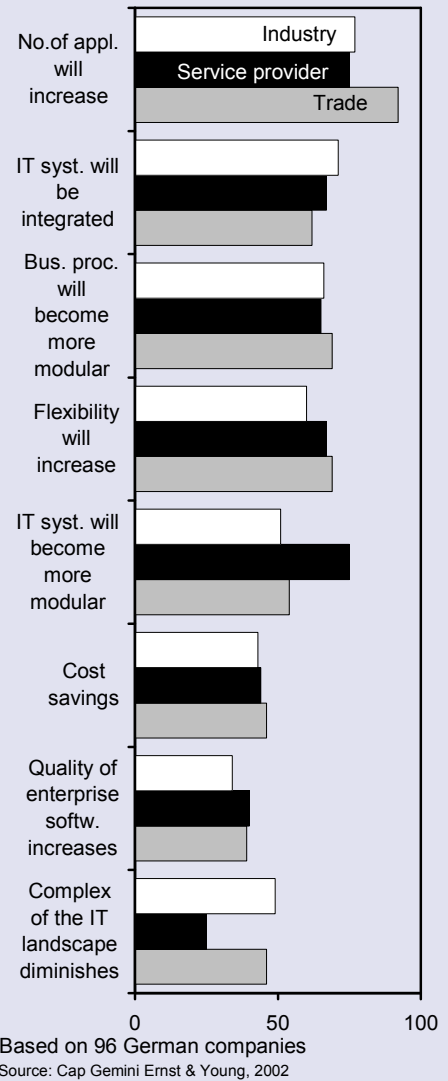
The low-cost integration of hitherto discrete web publishing and web applications is increasingly becoming the dominant software trend. The latest internet-based business model for the third category, web services, expands on the integrative EAI concept. This now emerging web services model, however, reacts more directly than EAI to the tight budgets of companies. Web services are based on already installed IT systems and therefore do not displace web publishing or web application solutions. Instead, web services form an open-system platform, which enables the diverse inward and outward-facing software applications to be melded into a comprehensive concept.



The modular structure allows companies to gradually implement the software modules that they really need. Since web services are based on the IT systems companies already have installed and are structured as complementary software modules, they can be implemented sequentially and are thus considerably cheaper than conventional EAI systems.

But over and above the cost argument the new application options also underline the case for web services. Besides enabling the interaction between man and machine (integration), web services also allow particularly promising interaction between machines (interoperability).

What do you associate with web services as regards your business process?



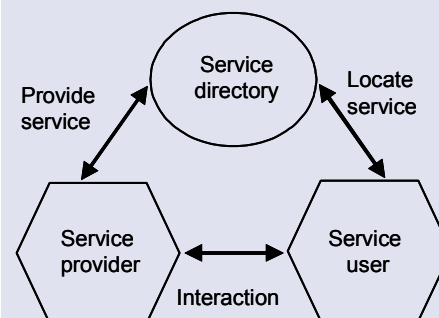
With the ongoing digitisation of the economy and the continued automation of processes there is ever increasing demand for interoperable commercial applications.

Web services have not yet become sufficiently established in the commercial market. All the same the model's cost-effective integrative approach is a convincing argument in its favour. The market for web services should thus expand considerably within the next three years.

Web services defined via specification, publishing and interaction

Web services are defined via three parameters: specification (description of a new service), publishing (publication of a new service) and interaction (interface between service and user). The specification of Internet-based services is executed via Extensible Markup Language (XML). XML contains, forms, names, structures and protects information via symbols embedded in text (markups). XML thus describes a structure on which languages can be based for exchanging information on the web. An internet-based service is published using the universal description, discovery and integration (UDDI) protocol. UDDI is a register of companies and is thus structured like the Yellow Pages for traditional businesses. But apart from this information UDDI provides more detailed information about business and technological aspects (see chart). The interaction between service and user takes place via Web-Services Description Language (WSDL). Communication itself is via Simple Object Access Protocol (SOAP).

Web services interaction



Source: DB Research, 2005

Fragmented software market is typically European

While European software houses have typically contended with country-specific legal and cultural peculiarities, their US competitors have been direct beneficiaries of the size and homogeneity of their domestic market. The market relevance of this is expressed via three aspects: standardisation, network effect and transfer of ideas in geographically concentrated sectors.

On the one hand, the size of the market helped IT firms in the US to develop into the world's most important agglomeration. The geographical concentration of the sector favours direct, reciprocal exchanges between business and researchers in academic institutions. Furthermore, such agglomerations shorten innovation cycles considerably, thus allowing geographical concentration that results in new research findings being commercially exploited a great deal faster.⁶

And on the other hand, the software houses operating in their homogeneous home market have the opportunity to influence global IT standards simply on account of their size. This advantage in the standardisation process results in US software houses quickly gaining global market share. Furthermore, this effect is self-promoting, as the network good – software – becomes more desirable for users as demand increases.

By contrast, the typically small European software houses enjoy only very limited growth potential owing to the structure of their respective home markets. Given this market environment the logical course of action was to concentrate on customised solutions for specific sub-segments or even for individual clients.

Network effect: Desirability rises as demand increases

The network effect ensures that the value of certain categories of goods rises exponentially with the number of already purchased goods with the same functionality. Network goods are linked with each other and therefore make up a network (in most cases either an information or communications network). Each network good uses on the one hand the existing network of identical goods as a resource, but at the same time expands this network as well. With network goods a virtuous circle of new opportunities and ever-increasing added value is thus set in motion. The network effect results in the successful solutions from established suppliers squeezing the new solutions of small suppliers out of the market.

The telephone is a good where the network effect is very clearly demonstrated. The more people who have a telephone line installed, the more attractive it becomes for other consumers to also purchase a telephone. The number of potential connections (M) grows faster than the number of telephone lines (N). The applicable formula is:

$$M = \sum_n^N (n-1)$$
 The appeal of the telephone for a potential subscriber therefore increases as the popularity of the telephone rises among other users.

⁶ See Heng, Stefan and Jürgen Schaaf (2002). Business locations in a networked world – no death of distance, in: Deutsche Bank Research, E-economics No. 30. Frankfurt am Main.

Germany losing ground internationally

An international comparison reveals very stark differences between the market situation. Germany claims some 8% of the global software products market. This makes the German market one-fifth the size of the US market – by far the biggest software market. However, if we ignore global size considerations and instead make a comparison at the European level we certainly discover Germany's significance in software products. In 2004 the German software market was nearly eight times bigger than the entire Eastern European market and around 14% bigger than the UK market – the second biggest in the EU-15.

However, the development of national software markets has been highly mixed. Since 2003 the German market for application software has conceded nearly 7% p.a. to Eastern Europe, but gained almost 2% p.a. compared to the UK. On the system software front, Germany has lost over 3% p.a. to the UK and nearly 8% p.a. to Eastern Europe during the same period. Germany looks likely to remain one of Europe's biggest software markets for the foreseeable future, but from a European perspective there will nevertheless be some shifting in the importance of certain countries. Eastern European markets in particular will continue to expand and grow in importance.

Companies want the direct and seamless integration of business processes into the value chain. Major business opportunities thus open up for software houses offering innovative solutions. Nevertheless there are very divergent prospects for software houses due to the differing sizes and level of homogeneity of their home markets. Software product sales in the US are expected to rise from EUR 96.6 bn (at 2003 prices) at present to EUR 125 bn in 2008. During the same period software sales in Germany are forecast to climb from EUR 15.4 bn to EUR 21 bn and in Eastern Europe from EUR 2 bn to EUR 4 bn. Worldwide, software product sales are set to rise from EUR 190.1 bn today to EUR 270 bn in 2008.

Prospects for Germany: Cloudy with some bright spots

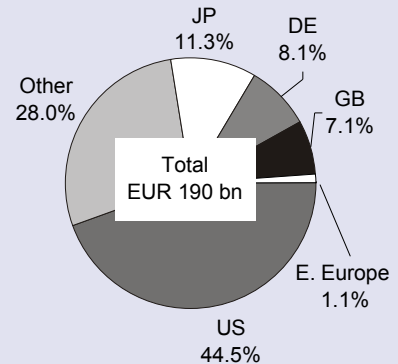
Following the stagnation in early 2004, optimism is starting to spread among German software houses again. For example, the ifo index of business expectations rose in H2 2004 after a long period in the doldrums. In addition, the ifo employment survey also suggests that the extended series of redundancies is now over.

However, the glimmer of hope for the sector as a whole is not equally bright in each sub-segment. There are evident differences between the current situation and the outlook depending on the size and product category. For while the big software houses are currently doing much better business, the smaller houses are still in the doldrums. Order intake and sales at the small software houses are even lower than their pre-year levels.

Conclusion: Software houses remain bogged down

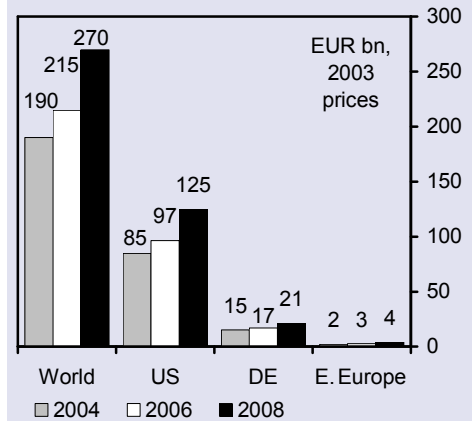
Software houses are shifting their focus onto products and services that enable companies to integrate their processes directly and seamlessly into the value chain. The first applications with this focus are CRM, ERP and SCM products. They are however for the most part confronted by one major problem: IT structures in companies have expanded over time in most cases as stand-alone solutions and have too seldom been rigorously integrated beyond software layers and interfaces to form a comprehensive solution. The frictional losses resulting from the complex IT architecture that has developed over time reduces the efficiency of the processes. This ultimately also hampers the adoption

Global software market, 2004



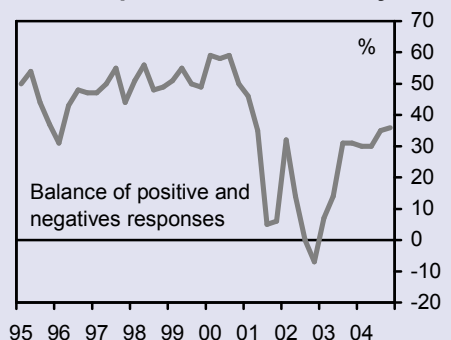
Source: EITO, 2005

Software product sales by region



Source: DB Research, 2005

Business expectations of IT service providers in Germany



Source: ifo Institut, 2005

of software products in this category by clients from manufacturing industry and the modern services sector.

New strategies are needed given these inefficiencies associated with web applications. The big, international software houses are currently expanding their product ranges well beyond their original core activities. Comprehensive modular software applications are particularly attractive. The logical consequence is that the inexpensive system integration provided by web services will become a more important element of the offerings of software houses. The integration of IT systems that companies have hitherto operated side by side will become the dominant software trend. In particular the growing interaction between machines will substantially expand the scope of applications. Even though web services have not yet managed to establish themselves in the commercial market, they are highly promising applications. For manufacturing companies and modern service providers, software houses are changing from product vendors into providers of comprehensive solutions.

The market environment for software houses remains extremely dynamic. Following the dotcom crash software houses now also see brighter days ahead. There are, however, variations in developments from region to region. European software houses are definitely seeing opportunities open up for them to dock onto web service architecture with customer-specific solutions. However, the potential market open to the typical small European software house remains very limited. In the web services age, too, the big US houses that specialise in standard software will exploit their advantages in developing and marketing new products. The economies of scale and the network effect associated with the growing base of standard software users will ensure that US software houses consolidate their dominant market position even further in the near future.

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System integration becoming dominant trend

Market potential differs appreciably according to product group and region

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