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The European e-Business Report 2008

6th Synthesis Report of the Sectoral e-Business Watch

Executive Summary



EXECUTIVE SUMMARY

The Sectoral e-Business Watch

The "Sectoral e-Business Watch" (SeBW) studies the adoption, implications and impact of electronic business practices in different sectors of the economy. It continues activities of the preceding "e-Business W@tch" which was launched by the European Commission, DG Enterprise and Industry, in late 2001, to support industrial policy, notably in the fields of competitiveness and innovation. The SeBW is based on a Framework Contract between DG Enterprise and Industry and empirica GmbH, running until the end of 2010.

In ICT-related fields, DG Enterprise and Industry has a twofold mission: to enhance the competitiveness of the ICT sector, and to facilitate the efficient uptake of ICT for European enterprises in general. The services of the SeBW contribute to achieving these goals, by supporting informed policy decision-making in these fields.

In 2007/08, ten studies on sectors and specific ICT issues have been conducted. This report summarises the main results. The full study reports, and further resources such as brochures, case studies and table reports with more detailed survey data, can be downloaded from the programme's website (www.ebusiness-watch.org).

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Imprint

This is a summary of the European e-Business Report 2008, which has been prepared by empirica Gesellschaft für Kommunikations- und Technologieforschung mbH on behalf of the European Commission, Enterprise and Industry Directorate General, in cooperation with Altran Group, Databank spa, DIW Berlin, IDC EMEA, Ipsos, GOPA-Cartermill and Rambøll Management.

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The document is available in electronic format and can be downloaded from the e-Business Watch website (www.ebusiness-watch.org).

A great deal of additional information on the European Union is available on the internet. It can be accessed through the Europa server (<http://ec.europa.eu>).

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On a fast track towards “e-Business 3.0” – the digital integration of value networks

Basic ICT infrastructure, such as simple computer networks and access to the internet, has become a commodity for a majority of enterprises in all sectors. These technologies have become so widely used that they are now essential in daily business (see Exhibit Ex-1). Besides the basic role of ICT, its strategic potential for enabling new business models, influencing value chains and increasing process efficiency are presented in the Sectoral e-Business Watch studies. This extensive report shows the critical role in tomorrow's economy for the advanced information infrastructures, services and the value creating activities which are made possible by computer networks and access to the internet. However, e-business¹ is not primarily about systems and technology. It is about optimally **managing relationships** with customers, suppliers and business partners in a complex and often global competitive environment. Furthermore, e-business is not just about accomplishing electronic transactions such as procurement and sales. It is about accessing, providing and sharing **information** in business networks. Ultimately, it is about doing business in the advancing **digital economy**. The way business is done is changing rapidly, mainly due to globalisation. Large companies are moving rapidly to exploit the advantages offered by ICT for their business strategies (see Exhibit Ex-2). Smaller companies will have to follow suit, or risk being excluded from digital supply chains.

The trend towards digitally integrated value systems connected through ICT can be seen as a new life-cycle of e-business. We refer to the period between 1995 and 2000, over which internet based trade emerged, as “e-Business 1.0”. During this time, companies connected to the internet and were quickly lured into buying all sorts of immature technology. After the shake-out of several failed business models, e-business between 2001 and 2005 focused on cutting costs. We refer to this more conservative attitude towards ICT as “e-Business 2.0”. However, companies are growing more “e-friendly” again. The underlying information infrastructures have matured and today no one doubts their importance for modern business. A new era appears to have emerged, “e-Business 3.0”.

Exhibit Ex-1: Basic ICT infrastructure has become a commodity

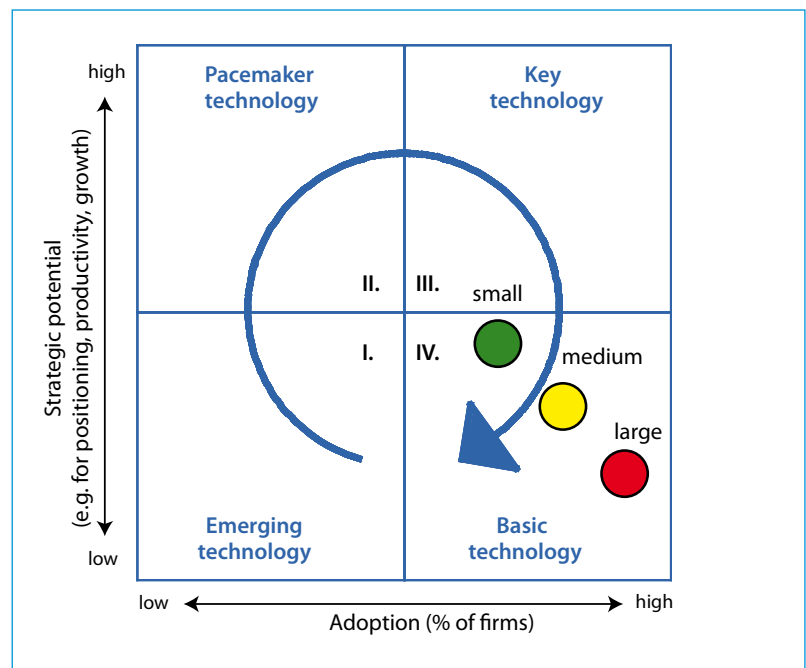
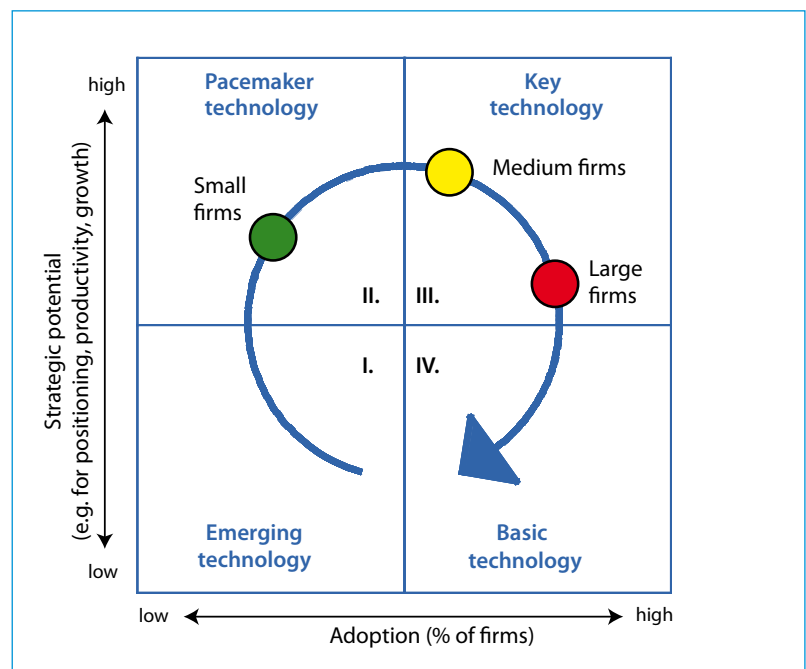


Exhibit Ex-2: Advanced e-business activity still holds strategic potential for companies



1. The Sectoral e-Business Watch defines e-business as «automated business processes (both intra-and inter-firm) over computer mediated networks», following a definition proposed by the OECD. Automation means that formerly manual, paper-based processes or exchanges are partly or fully replaced by digitally processing or exchanging the same data.



ICT as a tool for innovation and growth

This development implies a change of focus. Although firms continue to use ICT to improve process efficiency (mainly conceived as ICT for cost-cutting), ICT are increasingly recognised as an important tool for **innovation and increasing revenues** by enabling new services and new ways of working within value networks. Globalisation and the evolution of value networks are forcing firms to cooperate and compete in new ways. New challenges include the emergence of specialised intermediaries, and

the greater importance of **knowledge-intensive activities** within both the manufacturing and services sector. Companies are increasingly focusing on their core competences. ICT enhances this process by improving the transparency of information flows. It facilitates the outsourcing of non-core business processes, and offers new forms of cooperation within networks. ICT is no longer merely the key to internal process innovation - it is also vital for external process innovation.

ICT & e-business trends observed in 2007/8

- **Improved e-maturity.** The quality of companies' ICT infrastructure has significantly improved in the past 3-4 years, in particular among SMEs. This can be seen in the studies on the chemicals and retail sectors by comparing the Sectoral e-Business Watch data on ICT adoption from 2003 and 2007. Companies are better prepared for more advanced forms of e-business.
- **From transactions to service provision.** Companies, including those in manufacturing sectors, are increasingly devoting attention to using e-business for better service to their customers, with the goal of creating sustained relationships with them. This trend has already been observed in the previous report (2006 edition) but it has since gained considerable momentum. It highlights the fact that e-business goes far beyond concluding transactions.
- **ICT for information management and transparency of processes.** Notwithstanding the trend towards focusing on customer services, increasing the efficiency of internal processes remains an important objective for ICT. Many case studies show that a major potential of ICT in this context is to improve the transparency of processes and information management, which facilitates planning and decision-making processes.
- **Outsourcing and e-intermediaries.** ICT and e-business open up new opportunities for outsourcing specific business processes. Outsourcing promises to boost company productivity. Specialised "e-intermediaries" support data exchanges between companies, for instance by ensuring the compatibility of document formats. Electronic invoicing is a good example of a B2B service that can be outsourced.

W@tch out: emerging trends

- **ICT for sustainable industrial development.** ICT's potential to help companies reduce the amount of energy they use, or at least improve their energy efficiency, is not yet well understood. The issue ranks high on the agenda of businesses and policy due to rising energy costs and environmental challenges. A great effort will be made to promote further innovation in this area, for instance by implementing new energy management systems. The Sectoral e-Business Watch has started to explore links between ICT adoption and energy consumption (see Section 3.3).
- **e-Business implications for business models.** If "e-Business 3.0" matches its promise, it is likely that many companies will revise or change their business models in line with their e-strategy. This includes decisions on which parts of the value chain to cover, on product portfolios, distribution channels and cooperation strategies. Business models, in turn, are driven by market developments and competitive demands.
- **ICT and innovation are becoming inseparable.** The new series of sector studies confirms once again the critical role of ICT for introducing new business processes, such as organisational and process innovation in companies. The borderlines between implementing new ICT-based systems and introducing process innovation are getting blurred. Even the difference between a "product" and "process" innovation may become obsolete as products and services are combined in new ways.



The economic impact of ICT and e-business it is more than a “productivity story”

The interest of policy in the economic impact of ICT was mainly triggered by the productivity growth resurgence in the USA and a simultaneous diffusion of ICT products in the 1990s. It was assumed that a significant part of this increased productivity growth was attributable to increased ICT investments. In response, a lot of research has been conducted to better understand the importance of ICT for competitiveness, productivity and growth. Unsurprisingly for such a complex topic, the research results cannot easily be summarised into simple conclusions. Studies revealed that only some countries and specific sectors (notably services and the ICT industry itself) have seen a clear surge in productivity resulting from ICT investment.

The Sectoral e-Business Watch aims to contribute to this debate mainly in two ways. Taking a **holistic view**, it will offer a combination of **micro-data** with **macro-data** based evidence in an integrated way. At the same time, it will focus on **sectoral specificities** in ICT adoption, usage and impact. Unfortunately, even this broad approach affords no simple, straight forward conclusion in the end. The Sectoral e-Business Watch studies of 2007/08 find a range of evidence in their assessment of ICT impacts. While micro-data evidence clearly underlines the strategic importance of e-business for individual companies, macro-economic analysis at industry level finds only moderate direct effects of ICT capital on productivity and industry growth (see summary of main results in Exhibit Ex-3).

These diverse results imply that the “**productivity paradox**”² is still valid. Despite ICT being pervasively used in all sectors and business functions, it is difficult to track the direct impact on productivity and growth. A differentiated analysis can bridge the (apparent) gap between the micro and macro perspectives. This may have implications for future research approaches. Issues to be considered include:

- **Physical infrastructure vs. business processes:** The case studies demonstrate that e-business is mainly about optimally organising information flows, work and production processes, by exchanging and processing data electronically. This requires

ICT, but investments in the technology part can be insignificant compared to the “investments” in implementing the organisational changes.

- **“Embedded ICT”:** The important role of embedded ICT, for example technical components in plants or in other technical equipment used in production, may not be fully accounted for in data on “ICT capital”, which typically covers investments in computer hardware, software and telecommunication services.
- **Effects of outsourcing:** Not all the ICT-based activities of a company are necessarily accounted for in figures on ICT capital / ICT investments, as many companies (notably SMEs) outsource ICT activities to external service providers. The study on ICT, innovation and firm performance (see Section 1.3) concludes that outsourcing is probably a key factor for growth in labour productivity. ICT has a double role to play in this context. A good ICT infrastructure facilitates the outsourcing of business processes, while parts of the ICT infrastructure and maintenance itself can be outsourced.
- **More than a productivity story:** The arguments for ICT-related policies have focused on closing the productivity gap. However, this is only one aspect of company performance that ICT can contribute to. A good e-business strategy can be crucially important for companies’ presence in global markets, without necessarily increasing their productivity. Furthermore, the use of ICT may identify problems by increasing transparency or result in a better quality of products and services, rather than in productivity gains.

From a methodological point of view, these observations illustrate why company growth can be a poor indicator of the impact of ICT and ultimately of e-business. Without questioning the merits of this method, a strong point can be made that a combination of different analytical approaches delivers a more balanced evidence base from which informed policy decisions can be taken.

2. «Computers are everywhere but in the productivity numbers.» (Robert Solow, 1987). The «productivity paradox» (or «Solow computer paradox») refers to the discrepancy between measures of IT investment and measures of output, in studies using growth accounting methods to explain the contribution of different inputs. The paradox was common in studies of the late 1980s and early 1990s, while later studies found more evidence of ICT-induced productivity effects.



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Exhibit Ex-3: The impact of ICT and e-business – micro and macro evidence from Sectoral e-Business Watch studies of 2007/08

Micro-data evidence: increasing strategic importance of e-business	Sector-level analysis: only modest impact of ICT capital on productivity and industry growth
<p>Micro-data evidence from the firm surveys (see Section 1.1) and the case studies (see Section 1.2) conducted in 2007/08 point towards a dynamic development of e-business in all of the sectors studied.</p> <ul style="list-style-type: none"> ■ Case studies: Microanalysis data show that ICT have become a general purpose technology – they are widely used in all business functions. For many companies, e-business has become an important instrument with which to implement strategy. The specific e-business objectives and applications, however, differ widely depending on the business model of a company, its size, and the market in which it operates. ■ The companies' view: 55-70% of companies in all sectors expect that ICT will have a high or medium impact on their business. This is true across practically all areas, including primary functions (such as production, marketing and logistics) and support functions (such as controlling, human resources and accounting). ■ Data analysis: A regression analysis based on data from the e-Business Survey 2007 finds that ICT use is positively linked with an increase in turnover in all sectors studied. For firms from the chemical, retailing and transport & logistics sectors, there is evidence of a positive impact of ICT use on market shares. This points towards positive effects on firm performance. 	<p>At the sector level, the direct contribution of ICT capital to productivity growth and industry growth is less pronounced. An econometric analysis for the sectors studied shows ICT having only moderate effects (see Section 1.3).</p> <ul style="list-style-type: none"> ■ ICT & value added growth: Growth accounting (using data from the EU KLEMS Productivity and Growth Accounts³) does not deliver convincing evidence for growth effects of ICT capital in most of the sectors analysed. The sector in which ICT plays the greatest role is banking. The most significant contributor to value added growth throughout the analysed periods was non-ICT capital. ■ ICT & labour productivity growth: An analysis based on EU KLEMS panel data from 1995 until 2004 finds only a modest impact of ICT capital on labour productivity. Instead, the key driver for labour productivity growth (measured as gross production value per working hours) was intermediate inputs intensity. This indicates that outsourcing has been key to increasing labour productivity. The strongest evidence in this respect was found for the retailing, chemical and steel sectors, and to a lesser extent for transport and banking. ■ ICT & energy: An econometric pilot study by the Sectoral e-Business Watch on the impact of ICT on energy consumption (for three sectors) finds that electricity intensity is reduced by the use of communications devices, but is increased by IT (computers and software).

3. The EU KLEMS Growth and Productivity Accounts are the result of a research project financed by the European Commission to analyse productivity in the European Union at the industry level. See www.euklems.org



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Sectoral differences in ICT adoption and e-business focus

Companies from all sectors use ICT and e-business. The sector studies of 2008 provide evidence for a dynamic process of adoption. But e-business can cover a wide range of activities. The objectives and the focus of ICT use differ widely between sectors. Variations depend in particular on the types of products and services which companies offer, the scale of the markets in which they operate and on their marketing strategy, including the choice of distribution channels. In manufacturing sectors, the e-business strategies of companies focus on supporting procurement, optimising supply chain management, integrating with retail and distribution, and increasingly on providing the best possible service to customers. In retail, supply chain management is also a key aspect of e-business. Whether and how retailers use e-commerce to sell their goods depends on their business model. In the logistics industry, internal operations are largely based on highly complex ICT systems. In banking, the internet has transformed the whole sector and become a critical element in the business strategy of banks (see Exhibit Ex-4).

ICT and e-business in manufacturing sectors

The large companies of the **chemical, rubber and plastics products industry** are advanced users of ICT and e-business in all business areas. They are increasingly replacing paper-based, manual processes by electronic exchanges (see Section 2.1). In 2007, three in four companies with at least 10 employees said that at least some of their processes

were conducted electronically. The industry has developed the "Chem eStandards", its own technical standard for data exchange related to buying, selling and delivering chemical products. These are based on XML and were developed as a cooperative effort of more than 20 chemical companies in late 2000. Since 2001, CIDX (a non-profit organization) coordinates the development of Chem eStandards. However, smaller companies in the sector are less advanced. Bridging the "e-gap" between the large and small firms will be important in the years to come to exploit the full synergies of e-business at an industry-wide level.

In the **steel industry**, the main impact of ICT is on process efficiency along the value chain. However, the prospects for using e-business in direct e-commerce transactions, such as procurement and sales, are limited. Iron and steel companies prefer to procure raw materials in long-term offline relationships, due to an oligopolistic market structure (see Section 2.2). Nevertheless, e-business solutions are used to enhance communication with customers, including for example product specification, scheduling, and invoicing. Moreover, the use of ICT for internal operations can significantly enhance workflows and business processes and thus increase productivity and reduce costs in steel enterprises. The main driving forces for further e-business developments are the continued cost pressure and ongoing industry consolidation. As long as the price of raw materials remains high and competition between steel companies remains fierce, the pressure to reduce process costs will continue.

Exhibit Ex-4: The relevance of ICT and e-business for various business functions (overall assessment based on survey results, case studies and desk research)

Application Sector	Sourcing & procurement	Design & production	Logistics / distribution	Marketing & sales	Customer service
Chemical, rubber & pl.	●●●	●●○	●●●	●●●	●●○
Steel	●●●	●●●●	●●●	●●	●●●
Furniture	●●●	●●●○	●●	●●	●●
Retail	●●	n.a.	●●○○	●●○○	●○○
Transport & logistics	●○	n.a.	●●●○	●●○	●●○
Banking	●	n.a.	n.a.	●●●●	●●●●

● = low; ●● = average; ●●● = high; ●●●● = very high; ○ = applies only to some sub-sectors / types of firms



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The European **furniture industry** is confronted with a quickly changing and highly competitive market environment. Product innovation and reduced lead times are essential for businesses to remain competitive. In this context, ICT can play an important role. It can for example support product design (see Section 2.3). CAD (Computer Aided Design) software and 3D tools are used by companies of all sizes not only to facilitate the product's design process, but also to enhance the customer's experience at the point of sale. 3D tools enable a virtual presentation of products. Ultimately, this triggers customer-driven production and innovation processes. For e-business, a decisive characteristic of this sector is the large number and diversity of business players in the value chain, including handcraft companies and professionals. The resulting diversity of ICT systems and e-skills levels is a major hurdle to integration through e-business. In particular, e-business integration is still underdeveloped between manufacturers and independent distributors. This is due to the characteristics of furniture distribution networks and the complexity of industrial categorisation and coding. e-Marketing and e-sales activities towards final customers are still limited in this sector. Those that exist are aimed at providing technical and commercial information rather than actual e-commerce functions.

ICT and e-business in retail and service sectors

In **retail**, e-business can be used to facilitate upstream supply chain management (SCM) processes as well as for marketing and sales purposes (see Section 2.4). The purpose of SCM is to design and manage the processes, information and material flows between retailers and their suppliers. Case studies demonstrate that ICT have significant potential in this context, not only to cut costs, but also to improve service levels for customers. However, companies have to balance availability with inventory levels and associated costs. Advanced SCM software systems are still not widely used, but adoption has been dynamic among large retail companies (from 7% of companies in 2003 to 35% in 2007). Downstream, retailers representing 38% of the industry's employment stated that they use e-commerce: that is, they sell at least some of their goods online. Pure e-retailers are still the exception. In many cases, online sales are

marginal compared to shop sales. Case studies in the report include examples where companies make about 1% of their total sales through e-commerce. US retailers were found to make more use of e-marketing and e-commerce than European retailers.

The **transport and logistics services industry** is characterised by a pronounced digital divide between small and large companies. Large transport and logistics companies use highly sophisticated ICT systems, such as fleet control systems, to manage their logistics. In contrast, small companies, particularly in freight transport, often run their operations in much more traditional ways (see Section 2.5). "e-Business" can mean different things in this sector. In passenger transport, it can mean "e-ticketing", enabling customers to order and receive their ticket online. In freight transport and logistics, e-business mainly means a system that initiates, tracks, and acknowledges shipments online. In both cases, paperless trade eliminates the operational costs related to manual paper processing and increases the transparency of the supply chain and information exchange between trading partners. Case studies in the report demonstrate the potential of ICT for companies in these fields. They include examples of e-ticketing systems as well as track and trace solutions for cargo handling.

The introduction of ICT in the European **banking industry** has had a significant impact on banks operating with physical branches. Most importantly, the internet has made it possible for banks to cut costs by offering online banking. The study shows that ICT use is positively correlated with firm restructuring activities (see Section 2.6). ICT enables companies to redefine the boundaries of their organisations and possibly gain a competitive advantage. e-Banking is nowadays supported by advanced ICT solutions which enable most everyday banking services to be conducted online. This has led to a prevalent change in the strategy of banks and in branch structure: dual combination banking. In this model, most of the traditional manual banking services are performed by customers online, while more sophisticated services are still performed in the branch bank. The customer takes advantage of the low-cost nature of e-banking and the face-to-face advisory services of the branch bank.



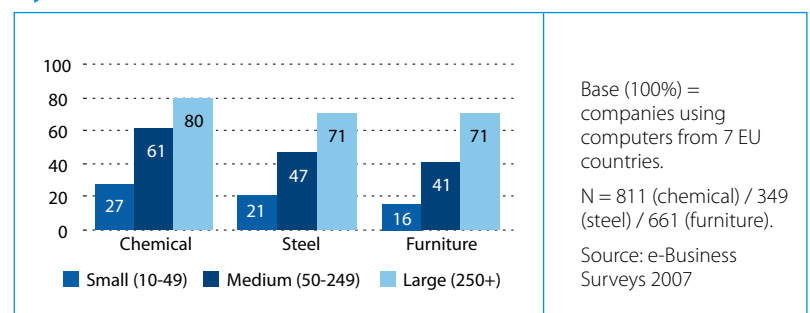
e-Business for SMEs – opportunities and challenges

ICT implications are ambivalent for small and medium-sized businesses. On the one hand, large enterprises can gain a disproportionate advantage from e-business by exploiting **economies of scale**. Their operations have critical mass to make use of advanced ICT systems. The 2007 survey confirms a linear increase according to firm size for the diffusion of ICT systems for internal and external process integration such as ERP systems (see Exhibit Ex-5). Many smaller companies, by contrast, still struggle with the requirements of **getting digitally connected** with their suppliers and customers. If they cannot cope with the requirements of the digital economy, however, they risk being eliminated from the value systems that tend to be orchestrated by large firms.

On the other hand, smaller companies do not necessarily need the same powerful solutions as large

firms in order to achieve the same benefits, because their organisational structure is less complex. Many case studies demonstrate that SMEs successfully use ICT and e-business, whether in response to customer requirements or proactively to stay competitive and to support growth strategies.

Exhibit Ex-5: % of companies with an ERP system (by sector and size, 2007)



e-Business opportunities for small firms	e-Business challenges for small firms
<ul style="list-style-type: none"> ■ Access to international markets. e-Commerce is an opportunity (if not the only way) for many smaller companies to do expand their market area. ■ ICT usage facilitates cooperation. SMEs need to cooperate, for example by building networks. ICT usage facilitates cooperation in many ways (e.g. through project management tools, or online collaboration tools for design). ■ Affordable ICT solutions. ICT vendors have developed more and better solutions which are targeted to the needs of SMEs in recent years, for example smaller-sized ERP and CRM software packages. Costs are no longer the main barrier. ■ Support from large firms. The economic impact of any communication technology depends critically on the number of users connected. Large companies therefore have a strong incentive to connect with their smaller trading partners in order to reap the full benefits of e-business. 	<ul style="list-style-type: none"> ■ Lack of ICT and e-business skills. Smaller firms often lack a coherent ICT investment strategy or the related skills - partly because most SMEs cannot afford to employ ICT practitioners. ICT strategy and implementation critically depends on the respective skills of the management. The speed of developments in this field adds to the challenge. ■ Complying with different ICT requirements. Although large companies tend to be supportive (see "opportunities" in the column on the left), they can use their power to impose ICT standards and systems upon small supply companies. In B2B exchanges, small firms may therefore be forced to comply with different systems in parallel. ■ Rising customer expectations. In the internet era, customers increasingly expect to be offered a wide range of information and services online. It can be a challenge for smaller companies to meet these service levels.



e-Business adoption in Europe and the US

In 2007, the e-Business Survey included for the first time companies from outside the EU - companies from the US. The objective was to open up the analysis of ICT and e-business use to a wider international context. Information about differences between EU and US companies in e-business use may be insightful for companies and policy makers in the EU because the US is a benchmark for ICT and e-business use. However, while the US is a serious competitor on global markets, the principal competitors for industries included in the 2007/8 study period may also come from other countries, notably from Asia.

The e-Business Survey 2007 revealed that EU-7 companies in the five industries included in the survey generally use ICT and e-business less than their US counterparts. In order to compare ICT and e-business performance of EU and US companies on an aggregate level, average values were calculated for 16 indicators in the area of infrastructure, e-procurement, internal e-operations and e-sales.⁴

EU companies were found to lag 11 to 15 percentage points behind in terms of infrastructure, e-procurement and e-sales – see Exhibit Ex-6. The overall use of internal e-operations was found to be very similar in EU and US companies. This is mainly due to the larger level of ERP use in the EU-7.

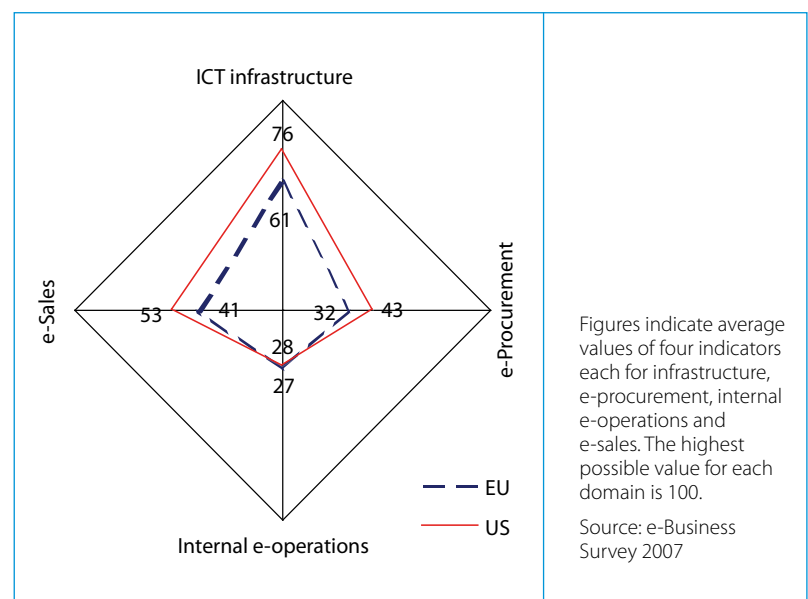
This general trend of less ICT use in Europe, with similar internal e-operations, applies with small differences to all five industries studied. The European chemicals, rubber and plastics industry was found to have a considerably lower level of e-sales (42% versus 60%) but to perform much better than US firms in internal e-operations (38% versus 28%). The furniture industry was found to have a similar level of e-business use except a lower level in infrastructure (61% in the EU versus 78% in the US).

The lags may indicate higher potential for competitiveness, productivity and growth among US

companies – to the extent that ICT actually determines these parameters in an industry or market segment. However, it is worth looking more closely at the competitive situation in the industries. For example, the European steel industry was found to lag the furthest behind. The average e-procurement indicator in the EU-7 steel industry was 27%. This is roughly half the US value of 52%. Nevertheless, according to the SeBW Advisory Board, European steel enterprises are more competitive than US ones. US steel firms are bound to tight shareholder value requirements which restrict their ability to invest in ICT. In particular, EU steel firms are better equipped with ICT in production facilities. Although this contributes to the companies' competitiveness, it is not monitored in detail in the e-Business Survey.

All in all, the sector studies indicate no clear competitive disadvantage caused by lower ICT and e-business use in EU companies in comparison with the US.

Exhibit Ex-6: EU versus US firms in e-business use



4. The following indicators were used: (1) ICT infrastructure: internet access, broadband internet access, W-LAN, remote access to company's computer network. (2) e-procurement: ordering electronically, ordering more than 50% of goods electronically, SCM, receiving e-invoices. (3) internal e-operations: ERP, CRM, RFID, CAM (retail and transport: warehouse management system). (4) e-sales: having a website, selling electronically, offering with e-catalogue (retail and transport: online advertising), sending e-invoices.



Standards and interoperability are key to promoting e-business

According to the e-Business Survey 2007, EDI-based standards are still the most commonly used family of standards for electronic data exchange. Many large manufacturing and retail companies maintain EDI connections with business partners. Proprietary standards are also popular (CRP 31%, steel 22%, furniture 34%). Fewer than a quarter of the companies in each industry reported using standards based on extended mark-up language (XML) (CRP 16%, steel 22%, furniture 16%) and fewer still on other standards. In all industries, the use of standards was found to be much more prevalent in large companies than in SMEs. However, the actual deployment of standards may be higher than these figures indicate, as standards are often embedded in software.

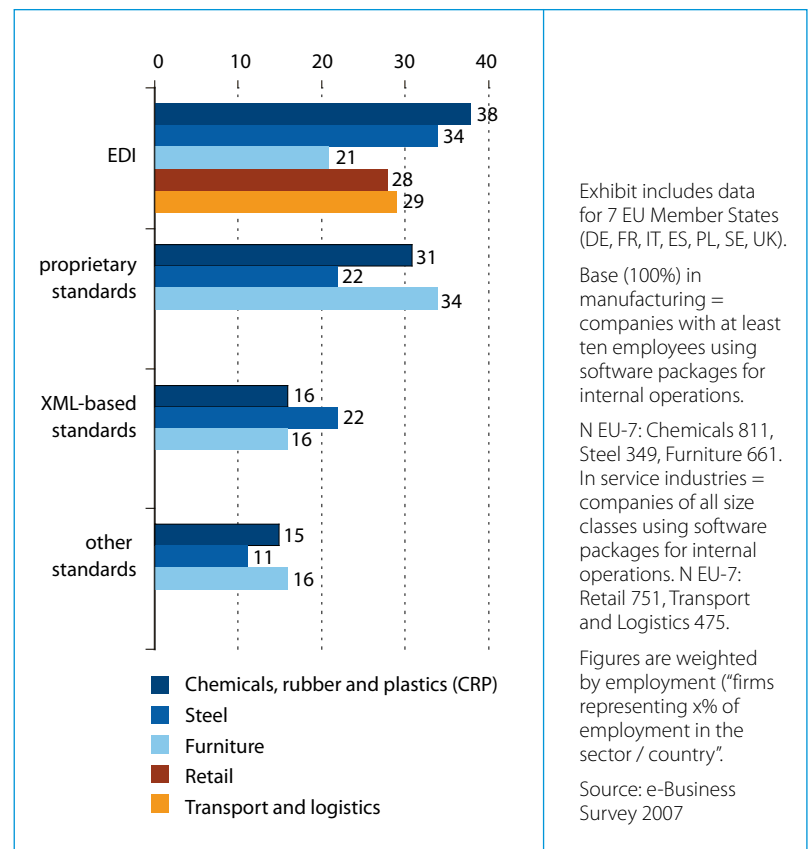
ICT standards in the health sector: lack of widely used standards

A special study carried out in 2008 by the Sectoral e-Business Watch on e-standards in the health sector found that there was a lack of widely used standards and problems of interoperability. Many of the conflicting standards are proprietary. There is also a lack of the "right" e-health standards. The health sector is in need of effective standards developed specifically for particular applications and concrete cases. For health service providers, this may imply that computerised systems remain stand-alone and unable to exchange data with each other in-house or externally. In particular, solutions for electronic health records are often isolated without data exchange and interoperability.

In November 2007, empirica conducted an online survey of e-health experts from the ICT industry, user organisations, public authorities, universities and research institutions, standards development organisations (SDOs), and consultants. 94 experts responded and the majority agreed that all seven e-health SDOs mentioned (ISO, CEN, IHTSDO, HL7, IHE, DICOM, openEHR) should be important in the future. Nearly all interviewees agreed that there is a lack of widely used e-health standards. They also believed that e-health standards are not sufficiently developed, that, they would benefit from

more harmonisation, and that there are too many conflicting standards. Nearly three quarters of the respondents felt that within a single health service provider, the standards currently used are supportive. The majority found however that the situation was unresponsive for cross-border care provision. The respondents favoured a stronger involvement in e-health standardisation processes from many different organisations, including above all ICT user organisations and national governments, but also national competence centres, the EC and ICT industry. One of the barriers to adopting international e-health standards in hospitals is that hospital IT managers place internal process functionality as a higher priority than commonly used standards. The respondents also agreed that the managers have no financial incentive to exchange information electronically.

Exhibit Ex-7: ICT standards adoption in industries covered by the e-Business Survey 2007





e-Business case studies

In 2007/8, the Sectoral e-Business Watch conducted a total of 89 case studies in 38 countries, of which 23 countries were in the European Union. 55 case studies relate to large companies and 34 to SMEs. The objective is to complement the quantitative picture of e-business adoption from the e-Business Survey 2007 and the econometric analyses. Case studies provide a very valuable source of evidence on a wide variety of e-business practices, benefits, challenges and impacts.

The majority of case studies clearly illustrate the benefits of e-business for companies. They demonstrate enhanced workflows, increases in productivity, cost reductions, service improvements, and increased numbers of customers. These benefits are closely related to the many reasons for implementing or enhancing a particular e-business solution. The overarching theme of the case studies is to sustain or expand business in a competitive environment. Many case studies also highlight barriers to implement or expand e-business solutions. Some focus on resistance from associate companies in a group, and others on the reluctance of employees to take on more responsibilities.

The case studies illustrate the benefits of e-business along the whole value chain. They cover procurement, in-house operations and co-operation with business partners, marketing, sales and distribution. Benefits include for example reduced costs, improved workflows, increased productivity and enhanced customer service. Regarding procurement, case studies demonstrate tangible cost saving opportunities. Internal systems such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) have the potential to improve the transparency of processes throughout the company's value chain. Case studies focus on interactions with customers, including transactions, but also support sales, marketing and distribution.

Some of the emerging themes that these studies highlighted include the increasing importance of intermediaries that carry out standardised and outsourced tasks, the importance of business models for e-business use, the provision of comprehensive e-solutions going beyond e-transactions, and the use of ICT to reduce energy consumption. Prevailing themes include the need to invest not only in ICT hard- and software but also in training and management changes, and examples of how to integrate SMEs into value systems.

Exemplary case studies

Company	Profile	Key issues and lessons learned
BASF (Chemicals, Germany)	One of the world's leading chemicals companies, 95,000 employees worldwide. Product portfolio includes chemicals and chemical products, plastics, performance products and agricultural products.	<ul style="list-style-type: none"> ■ Demonstrates the pervasive importance of e-business for global operations of large players. ■ Focus is no longer on accomplishing transactions, but on providing business solutions ("e-solutions"): online information and service ("24/7"). ■ Importance of leading companies as leverage to accelerate e-business adoption within their network of customers and suppliers.
ArcelorMittal Gent (Steel, Belgium)	Subsidiary of the world's leading steel company. 5,680 employees. Production of flat carbon steel for automotive, construction and household appliances industries.	<ul style="list-style-type: none"> ■ Example of a web-based solution for electronically managing goods in warehouses dispersed across Europe ■ A simple e-solution can facilitate processes in case (small) business partners are not ready to invest heavily in ICT (e.g. Electronic Data Interchange).
Webmobili, (Furniture, Italy)	Spin-off from Federmobili, the Italian Association of Furniture Retailers, catering for the Italian market. 12 employees.	<ul style="list-style-type: none"> ■ Marketing and communication service for independent retailers and manufacturers: search engine for consumers about national furniture offers. ■ Huge effort in standardising product coding. ■ Important role of industry associations in supporting SMEs' visibility and market reach.



Policy implications of e-business

Rationale for political activity in the field of ICT and e-business

The e-Business Watch derives its suggestions for policy actions from study findings and related analyses. A caveat should be made about the balance between industry policies and ICT policies. In some industries, the key competitive battles are not around ICT. Nevertheless, without improving productivity and customer service through e-business, companies in these industries may have serious problems beating or even keeping up with the competition. They therefore still need to foster effective use of ICT. All in all, there are solid arguments for policy makers to promote ICT and e-business adoption, but their policies should carefully consider the industry context and the specific role of ICT for competitiveness in different industries.

Three policy areas were identified as playing a particularly important role: ICT standardisation policy, ICT skills policy, and promoting industry value chains and SMEs. Policy makers should also pay special attention to the potential for ICT to reduce energy consumption and to the prospects offered by the EU's common markets. These issues are not new to the policy agenda and they are likely to remain important because they constitute essential and evolving issues.

Promoting the adoption of ICT standards

The e-Business Survey 2007 found that the adoption of ICT standards is slow, leading to interoperability problems. However, the survey may underestimate the use of standards because the interviewees are not aware that certain standards are implemented in purchased software.

With regard to the steel industry, the EC could support projects to develop and implement the European Steel Industry Data Exchange Language (ESIDEL). ESIDEL is currently used by only a tiny share of European steel firms, but there is evidence about the standard's benefits. In the chemicals industry, the Chem eStandards developed by CIDX, the Chemical Industry Data Exchange, are widely used so that no particular efforts appear to be necessary to promote their use. In the furniture industry the majority of large firms rely on

proprietary standards. Policy measures should now aim at fostering faster and wider implementation of standards both at sector and at cross-sector level.

In transport and logistics, public bodies might support the standardisation process by fostering co-operation between private companies involved in standards definition, seeking to ensure that the interests of SMEs are adequately considered. The banking industry can do more to implement SEPA, which implies important standardisation issues, as it requires substantial ICT investments. The EC could support cooperation between banks in ICT development projects to implement SEPA work processes. Interoperability is still a key barrier to Radio Frequency Identification (RFID) adoption. Policy makers should define a regulatory roadmap that goes beyond ten years, thus effectively supporting enterprises in safeguarding RFID investments.

As regards e-health standards, the EC and the Member States may be well advised to develop a common strategy and roadmap for e-health standards development. The collaboration initiative of ISO, CEN and HL7 which started in August 2007 should be strengthened. The large-scale pilots for patient summaries and e-prescribing that are starting in Member States should be extended to other key applications.

Promoting ICT skills

The importance of ICT skills – i.e. professional skills, user skills and e-business skills – for the competitiveness and growth of the European economy has been confirmed in several high-level documents and initiatives of the European Commission. However, in the EC there are persistent concerns about the availability of ICT skills. The e-Business Watch studies of 2007/8 show consistently that successfully implementing ICT needs to go hand-in-hand with adapting related skills. The e-Business Survey 2007 found that large companies in particular are facing difficulties in filling vacancies for skilled ICT personnel. The e-Business Survey also found that e-business has an impact on skills requirements.

Developing e-skills has three principal facets: educating ICT professionals, educating ICT users, and providing adequate information about ICT and e-business to



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managers. e-Skills shortages are a horizontal issue which concerns practically all sectors. However, there may nevertheless be a need for industry-specific approaches. As regards ICT user skills, it may be helpful if university curricula of departments that do not primarily teach ICT subjects also include training elements about ICT. As regards management skills, information supply to SME managers may take place most effectively through industry-specific, tailor-made and personalised information channels such as industry associations.

Fostering ICT value chains

The principal items of a company's value chain are procurement, production, marketing, sales, and distribution. Effective management of value chains is essential for competitive advantage. Findings from the SeBW 2007/8 show that a high proportion of companies use ICT and e-business to enhance their value chains, but the findings also show much scope for improvement. Barriers to adopting e-business are often related to hampered network effects: in all sectors of the e-Business Survey 2007, "suppliers and customers not being ready for e-business" was mentioned as the most important reason for not applying e-business more intensely.

The EC and Member States may launch or strengthen initiatives to facilitate e-business in industry supply chains. A sectoral focus facilitates the involvement of experts and associations with sectoral background

and reputation. However, the most innovative policies will also recognise cross-sectoral aspects since smaller firms typically deal with customers from different industries. Activities to foster supply chains could pay particular attention to those supplier or customer industries which are important customers but which have a low level of e-business applications.

Policy implications from special studies

Findings from the study of ICT and energy consumption suggest that it is worth promoting the diffusion of communication technologies regarding electricity intensity of production and productivity. The promotion of Energy Monitoring and Management Systems and energy consumer education would lead to a decrease in energy intensity of production.

Despite the fact that climate change and increasing energy prices are leading to a mentality change, policy-makers can still provide the right incentives by adapting the regulatory framework to reward and coordinate energy efficiency measures at EU level. An improved data basis for energy intensity is needed to be able to undertake further empirical econometric studies, both in terms of countries covered and disaggregation by capital input factors. EU-KLEMS and Eurostat data can be improved and disaggregated to study the relationship between ICT and energy consumption at industry level.

Summary of suggested policy action lines

	ICT standards adoption	ICT skills	ICT value systems
Rationale	Low level of ICT standards adoption, frequent use of proprietary standards → interoperability problems	Difficulties in filling vacancies for ICT professionals, lack of development of ICT user skills and e-business skills	Lack of readiness of suppliers and customers the most important reason for not applying e-business more intensely; Large firms in particular report difficulties in convincing SMEs about e-business benefits
Objectives	Promoting industry-specific standards if they are not widely used but offer proven benefits	Develop, promote and implement a European e-competence framework and national e-skills strategies; support multi-stakeholder initiatives Enhance distribution of e-business knowledge for managers	Support industry-specific e-business networks, particularly including SMEs
Links with DG ENTR policy	General standardisation policy Europe INNOVA standardisation networks	European e-Skills Forum Industry-specific e-skills projects	eBSN activities to promote SME best practices



Methodological notes - the e-Business Survey 2007

Since 2002, the Sectoral e-Business Watch collects data on the use of ICT and e-business in European enterprises by means of representative surveys. In 2007, four surveys were conducted, with a total coverage of about 5,500 interviews with decision-makers in enterprises from 9 European countries and the USA (see table). The survey field work was coordinated by Ipsos GmbH (German branch office) and conducted locally by its partner institutes.

Interviews were carried out mainly in August and September 2007, using computer-aided telephone interview (CATI) technology. The decision-maker in the enterprise targeted by the survey was normally the person responsible for ICT within the company, typically the IT manager. Alternatively, particularly in small enterprises without a separate IT unit, the managing director or owner was interviewed. The survey included only companies that used computers. The average interview length was about 15-20 minutes in surveys 1 and 2, and about 8-12 minutes in surveys 3 and 4.

Weighting

For data presentation, two weighting schemes have been applied: weighting by employment and weighting by the number of enterprises. Employment-weighted data should be read as "enterprises comprising x% of employees" in a sector or country.

Statistical accuracy – confidence intervals

For industry totals in surveys 1 and 2, an accuracy of about +/- 3 percentage points on average can be expected for most values that are expressed as "% of firms", and of about +/- 5 percentage points for values that are weighted by employment. In survey 3 (RFID), confidence intervals (at $\alpha=0.90$) are about 5 percentage points for total figures, but can be higher for sector break-downs. In survey 4 (IPR), the expected accuracy is about 3-5 percentage points for the total ICT industry (depending on the weighting scheme and values), and 3-8 percentage points for sub-sectors.

Non response

In a voluntary telephone survey, in order to achieve the targeted interview totals, it is always necessary to contact more companies than just the number equal to the target. In addition to refusals, or eligible respondents being unavailable, any sample contains a proportion of "wrong" businesses (e.g., from another sector), and wrong and/or unobtainable telephone numbers. The completion rate (= the number of completed interviews divided by the net sample of contacts established with eligible enterprises) varied considerably between countries and surveys. In the larger surveys 1 and 2, it varied between 5% in the USA and 23% in Italy, while it was about 12-15% in the other countries.

More information

More detailed information about the e-Business Surveys 2007 is available at the Sectoral e-Business Watch website (www.ebusiness-watch.org) in the "About" section (see: "methodology").

Coverage of the four e-Business Surveys 2007

Survey	Sectors covered	Countries covered	No. of interviews
Survey I: e-Business in manufacturing	Chemical, rubber & plastics; steel; furniture	France, Germany, Italy, Poland, Spain, Sweden, UK, USA	2,121
Survey II: e-Business in retail & logistics	Retail; transport services, logistics		2,248
Survey III: RFID adoption	Manufacturing; retail; transport services; hospitals	France, Germany, Ireland, Italy, Poland, Spain, UK;	434
Survey IV: IP protection	ICT industry (manufacturing, software, ICT services)	Austria, France, Germany, Ireland, Italy, Poland, Spain, UK;	683

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