



# *The European e-Business Report*

*2005 edition*

*A portrait of e-business  
in 10 sectors of the EU economy*

*4th Synthesis Report of the e-Business W@tch*

*e-business  
w@tch*



European  
Commission  
Enterprise & Industry Directorate General

**The European e-Business W@tch 2004/05**



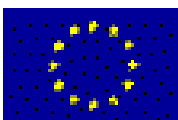
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November 2005



**European Commission**  
Enterprise & Industry Directorate General

## The e-Business W@tch

The European Commission, Enterprise Directorate General, launched the *e-Business W@tch* to monitor the growing maturity of electronic business across different sectors of the economy in the enlarged European Union and in EEA countries. Since late 2001 the *e-Business W@tch* has analysed e-business developments and impacts in 20 manufacturing, financial and service sectors. All publications of the *e-Business W@tch* – including this report – are available in electronic format on the internet either via the Europa server ([www.europa.eu.int/comm/enterprise/ict/policy/watch/index.htm](http://www.europa.eu.int/comm/enterprise/ict/policy/watch/index.htm)) or directly at the *e-Business W@tch* website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)).

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Copies can be requested, free of charge, from [info@ebusiness-watch.org](mailto:info@ebusiness-watch.org). The report is also available in electronic format and can be downloaded from the "resources" section of the *e-Business W@tch* website ([www.ebusiness-watch.org](http://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://europa.eu.int>).

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## Foreword



In today's global networked economy, European enterprises are confronted with far-reaching changes in their markets. They have to cope with increasing competitive pressure, structural upheavals in their industries, and an acceleration of innovation and product life-cycles. At the macro-level, Europe's economy has yet to make significant progress towards the Lisbon targets. Productivity growth is regarded as a key priority in this process, and the impact of information and communication technologies (ICT) for productivity growth is commonly recognised.

Against this background, the Enterprise and Industry Directorate General of the European Commission 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.

To accomplish this goal, it is necessary to collect data on the development of e-business, and to analyse the impact for European enterprises and industries. Since its launch in late 2001, the Commission's *e-Business W@tch* has matured into an internationally recognised resource for sound, unbiased information on related issues. Its studies help policy-makers better understand the different dynamics and implications of ICT usage in various sectors of the European economy, and thus take more informed decisions.

Figures by themselves, however, rarely answer questions. They need to be put into perspective. In 2005, *e-Business W@tch* has made a special effort to link empirical evidence from representative surveys with case studies of e-business activity in individual enterprises. Cases reflect the full diversity of e-business across Europe: they feature examples of small companies and large firms, best practices, new trends and state-of-the-art activity.

For DG Enterprise and Industry, *e-Business W@tch* is a key policy instrument alongside the e-Business Support Network, the European eSkills Forum, the eMarket Services portal, the eEurope 2005 Standardisation Action Plan, and various initiatives addressing the legal aspects of doing business electronically. Together these activities make a significant contribution to creating a favourable environment for European companies' investments in ICT and, consequently, to enhancing their competitiveness.



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## Introduction to the e-Business W@tch

### **e-Business W@tch – a market observatory and intermediary since late 2001**

The European Commission's *e-Business W@tch* monitors the adoption, development and impact of electronic business practices in different sectors of the economy in the enlarged European Union. The background for launching this initiative (in late 2001) was the eEurope 2002 Action Plan, which provided the basis for targeted actions to stimulate the use of the internet for accelerating e-commerce, acknowledging that "*electronic commerce is already developing dynamically in inter-business trading*" and that "*it is important for SMEs not to be left behind in this process.*" The eEurope 2005 Action Plan confirmed and built further upon these objectives with Action 3.1.2 "A dynamic e-business environment", which defined the goal "*to promote take-up of e-business with the aim of increasing the competitiveness of European enterprises and raising productivity and growth through investment in information and communication technologies, human resources (notably e-skills) and new business models*".

The main objective of *e-Business W@tch* is to provide sectoral analysis based on empirical research, including representative enterprise surveys in countries of the European Union, the EEA and Accession States, with special emphasis on the implications for small and medium-sized enterprises (SMEs).

Since its launch, *e-Business W@tch* has published e-Business Sector Studies on about 20 sectors of the European economy, three statistical pocketbooks and various other resources, including brochures and special issue reports. This document is the fourth comprehensive synthesis reports about the status of electronic business in the European Union. All publications are available in electronic format on the web at [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources').

The quantitative analysis about the diffusion of ICT and e-business is based to a large extent on regular representative surveys among decision-makers in European enterprises. The 2005 survey covered about 5200 enterprises from 10 different sectors across 7 EU Member States. In addition, more than 70 case studies on e-business activity in enterprises from EU, EEA and Accession countries were carried out, to complement the statistical picture by a more detailed analysis of current e-business practices.

Survey results of 2005 have confirmed the initial assumption and rationale of the *e-Business W@tch* that the sector in which a firm operates and the size of a company, more than its location, are the main determinants of its e-business activity. Results are an acknowledged and relevant resource in international e-business research. Facilitated by positive responses and the growing interest in its analysis, the *e-Business W@tch* is increasingly developing from an observatory into a think-tank and intermediary, stimulating the debate about the economic and policy implications of e-business among stakeholders at an international level.

### **The wide-angle perspective: e-Business W@tch provides the "big picture" as a basis for further research**

The mission of *e-Business W@tch* is to present a 'wide-angle' perspective on e-business developments and practices in the sectors covered. This has important implications regarding the level of detail in which various issues can be explored, both in terms of the quantitative picture (survey) and in terms of the qualitative assessment and background research.

Over the past 10 years, electronic business has increased from a very specific to a very broad topic to be studied. The OECD proposes a definition of e-business as "*automated business processes (both intra-and inter-firm) over computer mediated networks*". This definition makes clear that e-business is more than e-commerce (which focuses on commercial transactions between companies and their

customers, be it consumers or other companies) and that e-business includes internal processes within the company as well as processes between companies. Furthermore, the OECD definition implicitly indicates that the focus and main objective of electronic business is to be found in business process automation and integration, and the impacts thereof.

This implies that the potential scope for e-business analyses has also broadened. The measurement of e-commerce transactions (the volume of goods and services traded online) can and should be complemented by studies analysing the degree to which business processes, including intra-firm processes, are electronically linked to each other and have become digitally integrated. Hence, it becomes practically impossible to cover in depth all areas and facets of e-business in one study. Thus, study scope needs to be carefully defined.

*e-Business W@tch* Sector Studies, and this synthesis report, apply a wide-angle perspective and zoom into selected aspects of electronic business only. In general, studies with a wide-angle approach allow for a wider range of issues to be covered and investigated at the same time. This, however, necessarily limits the level of detail in which each single issue is explored. This must be considered when using studies prepared by *e-Business W@tch*.

In addition to the analysis of e-business developments, *e-Business W@tch* Sector Studies also provide some background information on respective sector. However, this is neither intended to be, nor could it be a substitute for more detailed and specific industrial analysis.

The **mission** of *e-Business W@tch* is to monitor, analyse and compare the development of e-business in different sectors of the European economy – not the sectors themselves.

Its **objective** is to provide reliable results, based on commonly accepted methodologies, which are not readily available from other sources and would trigger the interest of policy-makers, researchers, and other e-business stakeholders for more in depth analyses (or statistical surveys).

*e-Business W@tch* has adopted a 'wide-angle' perspective in its **approach** and the necessary trade-offs are transparently depicted in all its deliverables.

### **The definition of sectors and the adequate level of aggregation**

Economic sectors constitute the main level of analysis for *e-Business W@tch*. In 2005, the sample consisted of ten sectors. Their configuration and definition are based on the NACE Rev. 1.1<sup>1</sup> classification of business activities. The rather broad aggregation of different business activities into sectors in 2002-2004 made it possible to cover a broad spectrum of the economy, but also caused some challenges for the analysis of e-business developments. For instance, it was hardly possible to focus on individual sub-sectors in much detail within a single sector report.

The selection and definition of sectors proposed for 2005 reflect these concerns. Six out of the ten sectors covered are sub-sectors that were part of (aggregated) sectors analysed in 2002-2004. The rationale for 'zooming in' on former sub-sectors is that the broad picture for the whole sector is now available from previous sector studies, and that this seems to be the right time within the prospective life-cycle of *e-Business W@tch* to focus the analysis on more specific business activities.

<sup>1</sup> NACE Rev. 1 is a 4-digit activity classification which was drawn up in 1990. It is a revision of the 'General Industrial Classification of Economic Activities within the European Communities', known by the acronym NACE and originally published by Eurostat in 1970.



The 10 sectors covered in 2005 were selected on the basis of the following considerations:

- The current dynamics of electronic business in the sector and the impact of ICT and electronic business, as derived from earlier *e-Business W@tch* sector studies.
- Interest articulated by the industry in previous years on studies of this type.
- Policy relevance of the sector from the perspective of the European Commission, DG Enterprise & Industry.
- 'Roll-out strategy': New sectors (not covered in 2002-2004) were added, as well as specific industries which had only been covered as part of a larger sector in the past.

In 2005, *e-Business W@tch* also published four cross-sector studies. These Special Reports focus on a particular e-business topic of interest across different sectors rather than on a single sector.

**Exhibit: Sector reports and special studies by e-Business W@tch in 2005**

No.	Sector Studies	NACE Rev. 1.1	Publication date(s)	
1	Food and beverages	DA 15	July 2005	Sep. 2005
2	Textile industry	DB 17, 18	July 2005	---
3	Publishing and printing	DE 22	July 2005	Sep. 2005
4	Pharmaceutical industry	DG 24.4	July 2005	Sep. 2005
5	Machinery and equipment	DK 29.1-5	July 2005	Sep. 2005
6	Automotive industry	DM 34	July 2005	---
7	Aerospace	DM 35.3	---	Sep. 2005
8	Construction	F 45	July 2005	Sep. 2005
9	Tourism	H 55, I 63.3	---	Sep. 2005
10	IT services	K 72	July 2005	Sep. 2005
<b>Special Reports (cross-sector)</b>				
A	A User's Guide to ICT Indicators: Definitions, sources, data collection		July 2005	---
B	Overview of International E-Business Developments		July 2005	---
C	E-Business Standards and Interoperability		---	Sep. 2005
D	ICT Security and Electronic Payments		---	Sep. 2005

## Executive Summary

E-business continues to develop dynamically in the EU and in other advanced economies of the world. Rapid technological progress, for example in wireless technology, and the increasing competitive pressure on companies in the global economy have been important drivers for e-business adoption in the past 2 years. However, the pace and the direction of related developments differ considerably between industries. Within sectors, opportunities and challenges are different for small firms and for medium-sized and large ones. Moreover, regional disparities in enterprises' ICT use and in their readiness for innovation can still be found within the EU, mainly among smaller companies.

### The statistics – trends in 2005

- ▶ **ICT infrastructure:** further migration towards broadband internet connections: about a third of firms\* had adopted broadband in 2005.
- ▶ **ICT solutions for e-commerce:** About 19% of firms\* use ICT solutions for e-procurement, about 17%\* to support marketing or sales processes.
- ▶ **Digital divide** between small and medium-sized enterprises: for many e-business applications, medium firms (50-249) appear to have the 'critical size' for adoption. For instance, e-standards adoption by micro and small firms generally trails behind.
- ▶ **Alignment in international development:** EU companies are, on average, on a similar stage in e-business adoption as their international counterparts. Differences are more pronounced between individual countries within the EU.

\*in % of employment

### W@tch out: new developments ahead

- ▶ **Breakthrough of RFID?** RFID solutions promise substantial improvements in tracking and tracing products along the supply chain, for example in the food industry. Opportunities for combating counterfeiting activities could be a key driver for RFID adoption in the pharmaceutical and the textile industries.
- ▶ **e-Invoicing:** Triggered by policy initiatives, e-invoicing could drive the digital integration and e-standards development in B2B transactions.
- ▶ **Focus on marketing and sales:** As it has been the case in procurement, increasing cost pressure could now become a driver for e-business in marketing and sales. Specific solutions, such as CRM systems and new mobile applications, promise a high potential to increase the efficiency of related processes.

### The relevance of ICT and e-business in 10 sectors in 2005

(overall assessment based on survey results, desk research and case studies)

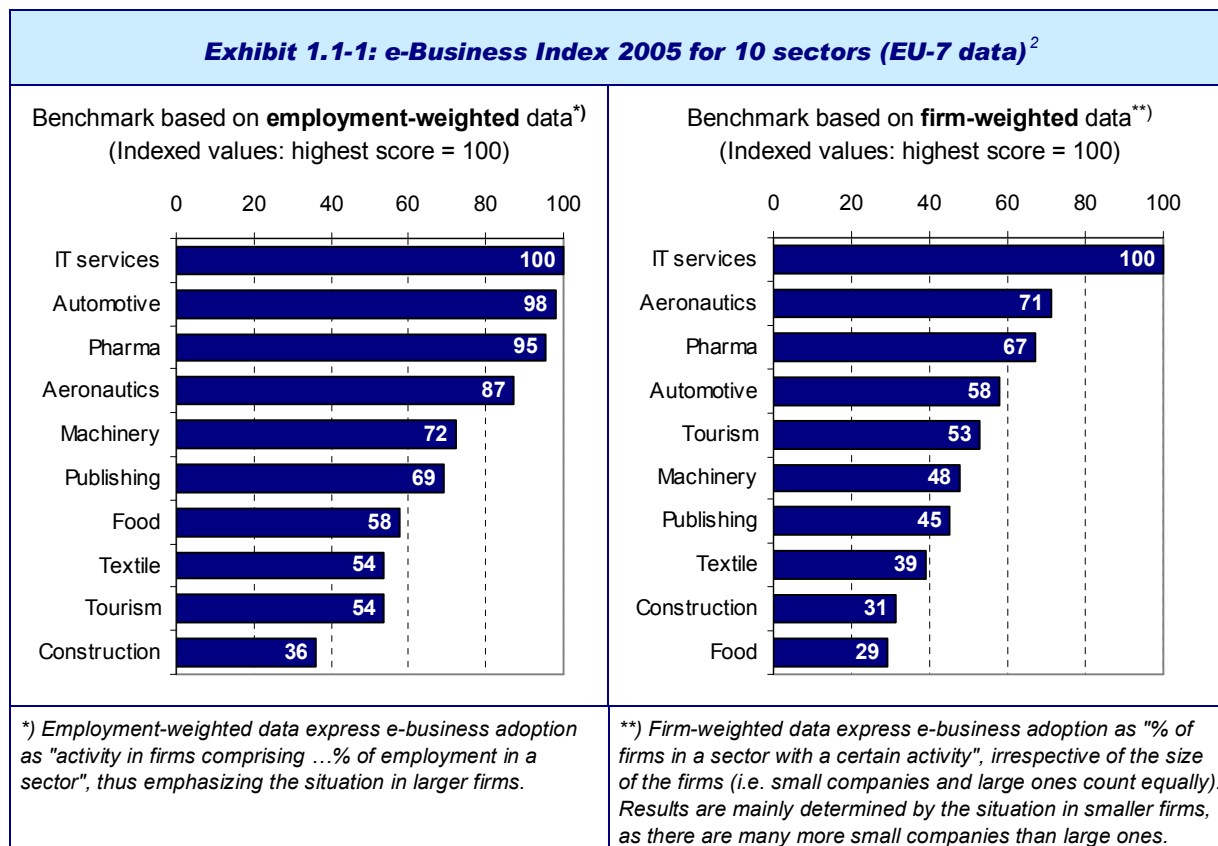
Application Sector	Broadband adoption	ICT for innovation	ERP / SCM	Sourcing & procurement	Marketing and sales	Overall significance
Food & beverage	I	I	II i	II	I	I i
Textile	I	I i	II	I	I	I
Publishing	III	IIII	I	II	III	II i
Pharmaceutical	III	II	IIII	III	II	III
Machinery	II	II	III	II	I i	II
Automotive	III	II	IIII	III	I i	III
Aerospace	III	II	III	IIII	I	III
Construction	I	I	I	I	I	I
Tourism	II	II	I	II	III i	II i
IT services	IIII	IIII	III	III i	III i	IIII

I = low relevance / diffusion; II = average relevance / diffusion; III = above average relevance / diffusion  
 IIII = high relevance / diffusion; i = applies only for some sub-sectors / applications

Source: e-Business W@tch (2005) – based on analysis from the respective Sector Studies

## Sectoral e-business differences – manufacturing, construction, services

Results of the e-Business Survey 2005 and sector studies confirm that the nature, intensity and impact of electronic business activity still differs between sectors, particularly between manufacturing and service sectors. The e-Business Index (see Exhibit 1.1-1) is a compound indicator for the intensity of ICT use in the 10 industries studied in 2005, enabling relative comparisons of sectors to each other.



Source: e-Business W@tch (2005)

### Manufacturing

- ▶ Among the 7 manufacturing sectors surveyed in 2005, electronic business activity has reached the highest level of intensity in the **automotive**, **pharmaceutical** and **aeronautics** industries. The rapid development in these sectors is mostly driven by the large international companies.
- ▶ Supply-chain integration and the streamlining of procurement processes are common objectives in these industries for which e-business solutions are attractive. Online procurement has become a part of everyday business and belongs to the most frequently adopted e-business applications.
- ▶ In the **pharmaceutical industry**, the use of ICT and e-business plays an important role for the process of discovery and development of new drugs and pharmaceutical treatments. Thus, ICT have an impact on R&D efficiency and, thereby, on lowering the competitive pressure.
- ▶ In the **machinery and equipment** industry, electronic business activity has not yet reached the same level of intensity. At first sight, this confirms the findings of the Survey 2003. However, developments in this sector have been quite dynamic since then. For example, e-business is increasingly recognized as a useful means of providing customer service.

<sup>2</sup> For background information about the construction of the index, see Annex III (Methodology Report)

- ▶ The **publishing and printing** industry has a different e-business profile, as major segments of this sector operate in B2C markets. ICT has a considerable impact on production and internal work processes. Furthermore, customer-facing activities (online publishing, marketing, advertising) are critical. On the other hand, processes with a high e-business potential such as inventory and supply-chain-management are less critical in this sector.
- ▶ The food and beverages sector, and the textile and clothing industry, are late adopters of ICT compared to the other manufacturing sectors studied.
- ▶ However, in the **food and beverages** industry, there are signs of increasing e-business activity, mainly in response to structural changes and new regulatory requirements. Important issues that promote e-business are food safety and the digital integration of the value chain. RFID (Radio Frequency Identification) based technologies could play an important role in these areas.
- ▶ In the **textile and clothing** industry, and this is new evidence compared to the previous sector studies of 2004, there are signs that the use of advanced ICT systems in large companies is quite in line with adoption rates among large firms from the most advanced manufacturing sectors. Examples are Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) systems. It appears that a significant share of large textile firms have taken the lead towards supply chain integration and online trading with business partners.

### Construction

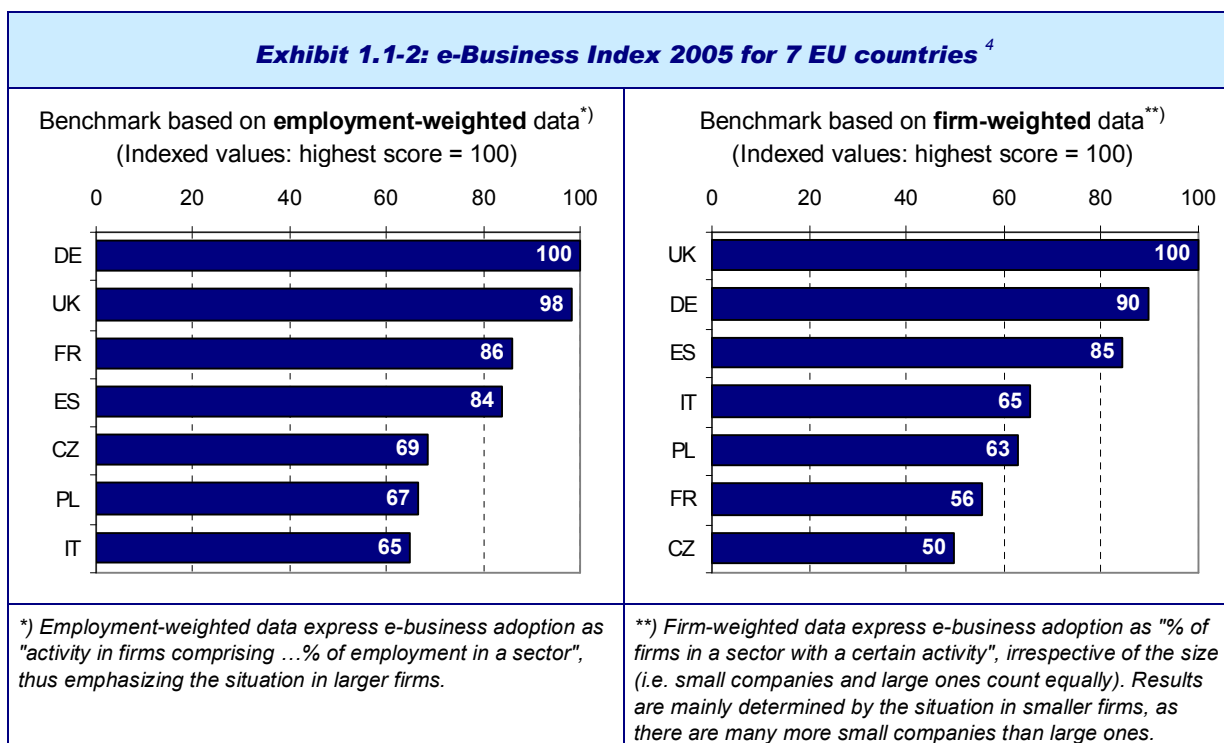
- ▶ ICT adoption and e-business activity in **construction** companies appears to be very limited compared to all other sectors studied by the *e-Business W@tch*. The structure of the industry, which includes many small craft companies, cannot fully explain this gap.
- ▶ Construction is an industry with a multitude of standards, technical specifications, labels, and certification marks. This is not an optimal environment for drawing benefits from electronic business. However, e-business tools have the potential to benefit complex construction projects where there is a need to coordinate a large number of sub-contractors.

### Service sectors

- ▶ The **IT services** sector is a special case with regard to e-business. Although companies in this sector have Information Technology and e-business as their end product, ICT also plays a significant role in the way that this product is produced, promoted and provided. This specific way of using ICT distinguishes the IT services industry from the other sectors analysed by *e-Business W@tch*. Here, the use of ICT and the production of related services are difficult to separate from each other.
- ▶ The IT services sector shares a common feature with tourism: in both industries, online channels have become key tools for marketing, communication and interaction with customers.
- ▶ In **tourism**, online booking and reservation services have been widely accepted among consumers and business travellers, and "e-tourism" has truly taken off. However, the great importance of ICT in this sector is not properly reflected in the e-Business Index. The main reason is that e-business normally does not have the same significance in supply-side activities and internal work processes (for example in hotels), as in manufacturing sectors.

## Geographic disparities in ICT use for business

In international comparisons, EU enterprises are (on average) head-to-head with their counterparts in other advanced economies in terms of electronic business activity.<sup>3</sup> However, gaps are more pronounced within the European Union (i.e. between Member States) than on the aggregate level in international benchmarks. The same observation could be made for other large economies, notably for the USA, where digital divides between states or regions also exist. The e-Business Index 2005 shows differences in the ICT adoption and use between firms from 7 EU countries.



Source: e-Business W@tch (2005)

- ▶ Country comparisons, however, should be taken with a pinch of salt, as they partly **reflect industry structure**. In **Italy**, for example, sectors dominated by small firms are much more prevalent than in other countries. Since large firms are more advanced in electronic business, aggregate employment-weighted data consequently point at a comparatively lower level of e-business activity in Italy. This reflects, at least to some extent, the structure of the economy rather than the overall e-maturity of firms.
- ▶ In general, firms from the **UK and Germany** tend to be most advanced in e-business among the 7 countries. Among larger companies, companies from **France and Spain** are close behind.
- ▶ Firms from the **Nordic countries**, which were not covered by the e-Business Survey 2005, are likely still to be leaders within the EU. Eurostat data mostly confirm this assessment.
- ▶ The survey confirms that **Spain** is the country where firms have demonstrated the most dynamic e-business development<sup>5</sup>, among the seven countries included in the survey of 2005.
- ▶ For **Polish** companies, data indicate that the digital divide may have narrowed compared to the situation in 2003. The level of e-business activity appears to be comparable to the one in the **Czech Republic**.

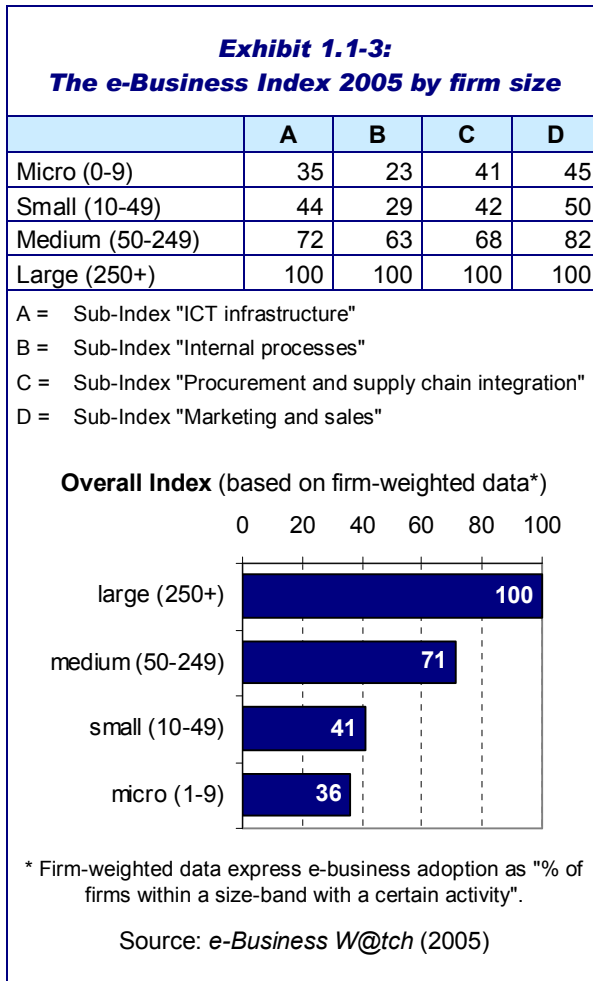
<sup>3</sup> See e-Business W@tch Special Report "Overview of International e-Business Developments", July 2005.

<sup>4</sup> For information about the construction of the index, see Annex III (Methodology Report)

<sup>5</sup> See also contribution by Jesús Galván on "e-Business in Spain" in Part 3 of the report.

## Opportunities and challenges for smaller firms

The e-Business Report 2004 concluded in the executive summary that "large firms continue to drive the development – but SMEs catch up" (p. 12). While this holds true as a general trend, results of the e-Business Survey 2005 point at a peculiar gap in e-business adoption between the small firms (with up to 49 employees) and the medium-sized ones (50-249 employees), as Exhibit 1.1-3 shows. This would reconfirm earlier observations by *e-Business W@tch* from the 2002/03 period.<sup>6</sup>



In general, ICT systems of large companies obviously tend to be more powerful and sophisticated than those of small firms. This translates into more intensive and advanced electronic business practices, and a greater potential for exploiting cost-saving opportunities.

However, research by *e-Business W@tch* conducted in 2005 on the automotive industry indicates that the relationship between innovative activities and firm performance is independent of company size.<sup>7</sup> Consequently, ICT-based innovations are attractive for both large and small enterprises. This should hold true for other sectors as well, and lead to further ICT adoption among smaller firms in the medium and long run.

As regards customer-facing e-commerce activities, comparatively many small firms have specialised in doing business online, particularly in service sectors. The tourism industry can serve as an example: the share of firms reporting that online sales account for more than 25% of their total sales (reference period: 2004) is the same across all company size-bands (about 10%). The use of specific ICT solutions for e-marketing and sales, on the other hand, increases with company size.

### e-Business Opportunities for Small Firms

- ▶ **Flexibility:** SMEs can be more flexible in decision making and implementing organisational changes than larger firms.
- ▶ **Internal communication** processes are often 'smoother' in smaller organisations.
- ▶ **Used to cooperation:** Out of necessity, SMEs tend to be used to cooperating with other companies, for example in tendering. E-cooperation can further enhance this attitude.

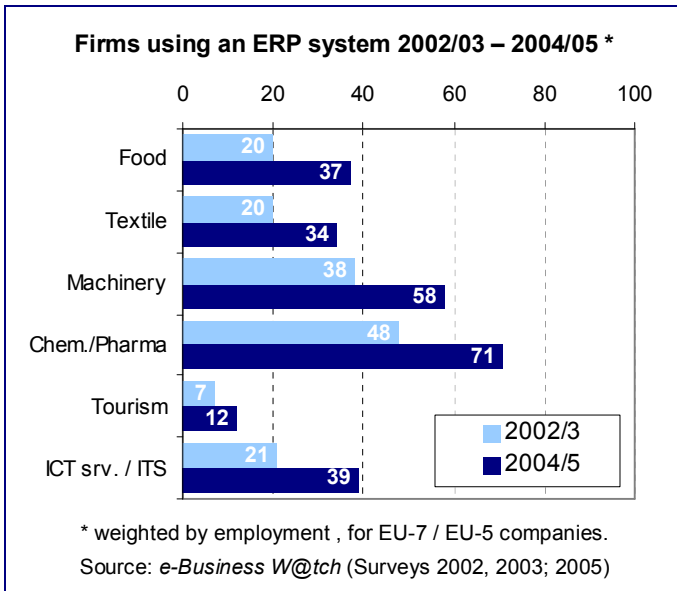
### e-Business Challenges for Small Firms

- ▶ **Lack of ICT strategy and skills:** Smaller firms often lack a coherent ICT investment strategy or the related skills.
- ▶ **Standards:** The lack of e-standards and interoperability increases risk in technology decisions and investments.
- ▶ **Pressure on prices and margins:** Sophisticated e-procurement schemes of large buyers increase the pressure on supply companies, many of which are SMEs.

<sup>6</sup> A presentation of *e-Business W@tch* findings at the IST Conference 2003 in Milan (4<sup>th</sup> Oct. 2003), for example, was titled "SMEs or MLEs?", indicating that e-business activity in medium-sized and large enterprises ('MLEs') could have more in common than activities of small and medium ones ('SMEs').

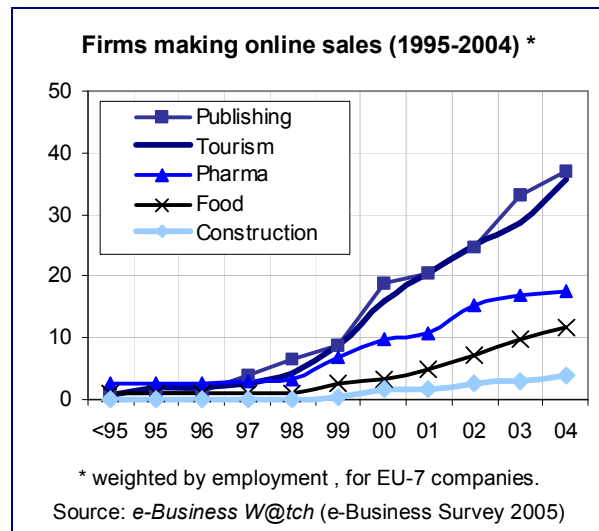
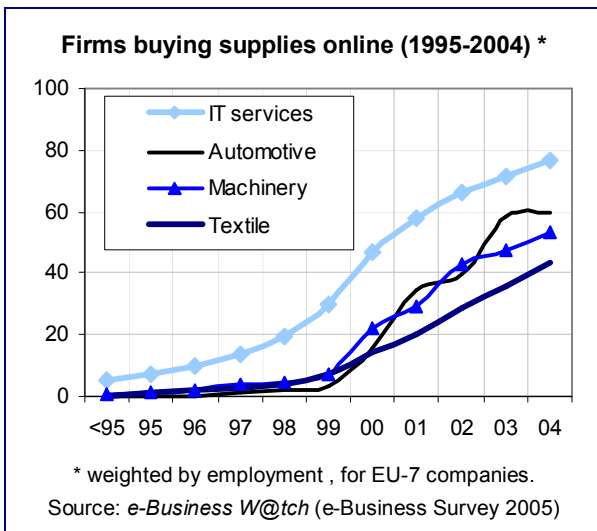
<sup>7</sup> See *e-Business Sector Study on the Automotive Industry* (July 2005), p. 75.

**Trends from 2003-2005: the base for 'next-level' e-business has matured**



The deployment of Enterprise Resource Planning (ERP) systems is a good indicator for the overall e-business maturity in many sectors. ERP is the technical backbone for various e-business applications, including systems for product planning, purchasing, inventory management, order tracking and finance. A comparison of results to earlier surveys by e-Business W@tch shows that ERP adoption has significantly increased in the EU since 2002/03. Thus, companies can now implement new and more advanced e-business solutions than 2-3 years ago. This should also facilitate productivity growth.

**Further growth in e-commerce, in particular in B2B online trading**



B2B online trade has reached a significant level in all industries. Companies are eagerly exploiting cost saving opportunities of e-procurement and e-sourcing. In any of the 10 sectors studied, 40-60% of firms (by their employment share) are purchasing at least some of their supplies online, for example from their suppliers' websites, on internet trading platforms or via dedicated firm-to-firm connections. Among IT services companies, e-procurement is even more common. It is used by close to 80% of firms and accounted for about 15-18% of their total purchasing volume in 2004 (estimate by e-Business W@tch for the EU-7). In most other sectors, the share is estimated at 3-8%.

Sector profiles differ widely in terms of customer facing e-commerce activities. In publishing and in tourism, for example, the internet has a profound impact on how companies communicate with their customers. Close to 40% of companies in these sectors (by employment) enable customers to buy products online (e.g. by downloading articles, or making online reservations). In most manufacturing sectors, online marketing and sales show only moderate growth. However, Sector Studies of 2005 demonstrate that activity in this area is not fully grasped by the concept of 'online selling'. For example, online channels are of growing importance for the delivery of after sales services.

## Policy implications of e-business

E-business developments can have implications for several policy areas. Relevant considerations made in this context can be grouped around two overall objectives which are paradoxically, to some extent, antagonistic:

- ▶ **Promote ICT adoption:** Policy may have an interest in accelerating the adoption of ICT and e-business activity among companies, particularly among SMEs. This is based on the assumption that ICT are a driver of productivity and competitiveness.
- ▶ **Counteract ICT induced market failure:** At the same time, policy will have to consider intervention if e-business activity causes undesirable effects on the aggregate level, i.e. market failure.

The following table summarises the most frequently stated policy objectives, and suggested actions, from the *e-Business W@tch* Sector Studies of 2005. These objectives should be regarded as relevant for most sectors. Two objectives were seen as particularly important in 2005: the improvement of e-skills among smaller companies, and the advancement of interoperability and standards.

### **Exhibit: Policy implications arising from e-business**

Policy objective	Suggested actions	Possible initiators
<b>Improve e-skills in SMEs</b>	<ul style="list-style-type: none"> <li>• Counteract e-business skill-shortages in the market, e.g. by offering opportunities for vocational training and for ICT product demonstrations to companies.</li> <li>• Facilitate knowledge transfer between research centres and enterprises</li> <li>• Provide information on how to assess cost-benefits of e-business</li> <li>• Provide incentives for conducting ICT training</li> <li>• Help SMEs to better understand organisational aspects of e-business, not just focused on technology</li> <li>• Identify good practices and communicate their benefits to SMEs</li> <li>• Stimulate the use of e-learning</li> <li>• Create opportunities for dialogue between SMEs and ICT service providers</li> </ul>	Business support agencies Competence centres Chambers of commerce Other intermediaries Member States (via their e-business programmes)
<b>Promote interoperability and standardisation</b>	<ul style="list-style-type: none"> <li>• Grant support for research projects, e.g. targeting standardised internet-based systems</li> <li>• Support for related industry initiatives</li> <li>• Promote adequate representation of SMEs in standardisation processes</li> <li>• Policy can act as a neutral coordinator and promoter of standardisation initiatives</li> </ul>	International / national standardisation bodies EU Member States Industry associations
<b>Encourage cooperation among SMEs</b>	<ul style="list-style-type: none"> <li>• Encourage initiatives for networking and cooperation, e.g. through competence centres</li> <li>• Stimulate the participation of SMEs in business networks</li> </ul>	Sector associations Business intermediaries Competence centres
<b>Promote a positive climate for innovation</b>	<ul style="list-style-type: none"> <li>• Create incentives for innovation activity in SMEs</li> <li>• Emphasise the innovative potential of e-business</li> <li>• Promote cooperation between companies and fair benefit sharing practices</li> </ul>	Member States Regional governments Associations
<b>Ensure fair competition, address barriers in the legal environment</b>	<ul style="list-style-type: none"> <li>• Address intellectual property rights issues</li> <li>• Protect relationship-specific investments</li> <li>• Monitor implications of e-business on concentration of ownership</li> <li>• Consider harmonization of taxation (e.g. VAT)</li> </ul>	EU Member States





## Chart Report: Electronic Business in 10 Sectors of the European Union



### Contents

Section 1: The e-Business Index 2005	2
Section 2: 20 Indicators in ICT and e-Business	4
Section 3: Sector Profiles: the e-Business Scoreboard	14
Section 4: Diffusion of e-Commerce Activity since 1995	20



## Section I: The e-Business Index 2005

Chart 1-1:

### e-Business Index 2005 by sector

Based on 16 ICT indicators (weighted by employment), aggregated into two sub-indices.

Population: firms using computers from 7 EU countries (CZ, DE, ES, FR, IT, PL, UK)

Size of the bubble: persons employed in a sector (in relation to other sectors)

Green: manufacturing  
Blue: services  
Red: construction

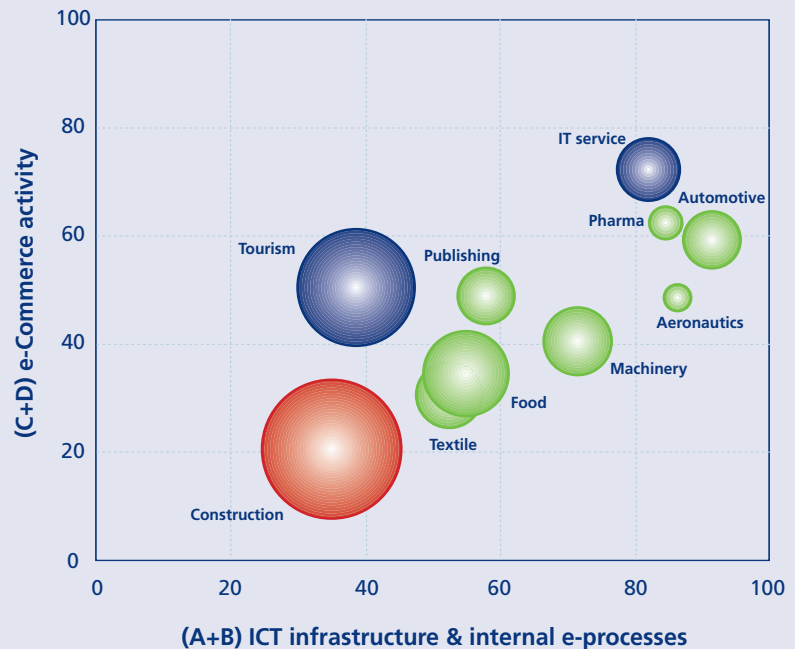


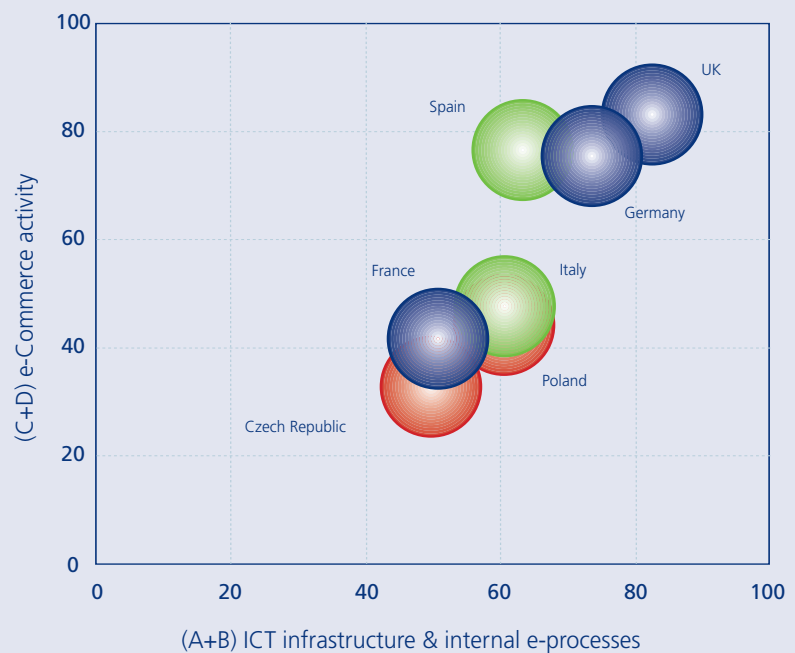
Chart 1-2:

### e-Business Index 2005 by country

Based on 16 ICT indicators (in % of firms from a country), aggregated into two sub-indices.

Population: firms using computers from 10 sectors (see Chart 1-1)

Blue: Western Europe  
Green: Southern Europe  
Red: New EU Member States



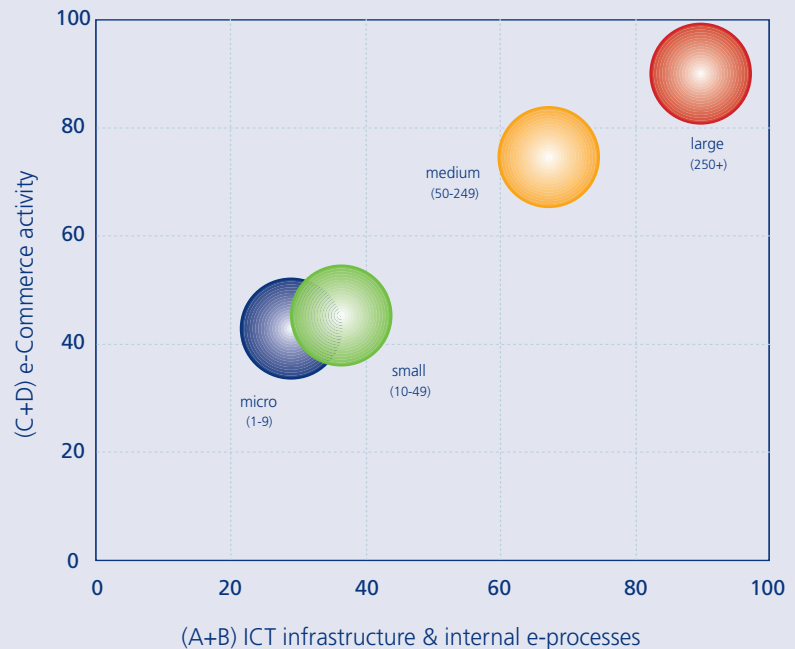
## Section I: The e-Business Index 2005

Chart 1-3:

### e-Business Index 2005 by size-band

Based on 16 ICT indicators  
(in % of firms from a  
country), aggregated into two  
sub-indices.

Population: firms using  
computers from 10 sectors  
(see Chart 1-1)



The intensity of electronic business differs widely between sectors, particularly between manufacturing and service sectors. The e-Business Index 2005 shows that (among the 10 sectors surveyed) e-business activity is most advanced in IT services, the automotive, aeronautics and pharmaceutical industries. The rapid development of e-business in the leading manufacturing sectors is mostly driven by their large international companies. Supply-chain integration and the streamlining of procurement processes are common objectives in these industries. E-business offers attractive solutions for related tasks.

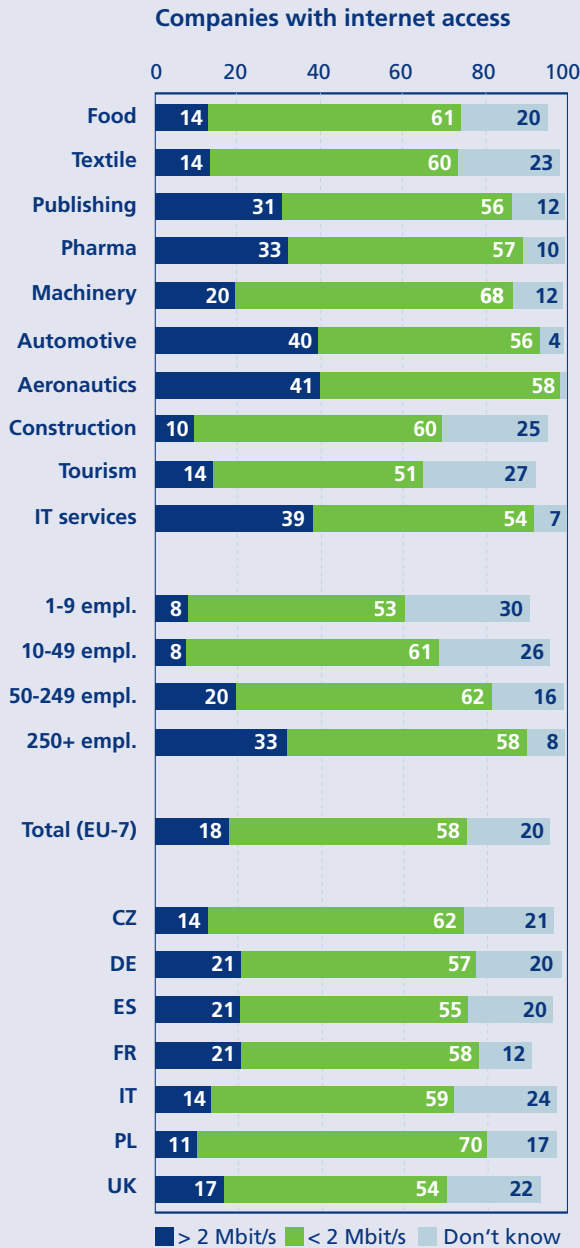
From a country-perspective, firms from the UK and Germany appear to be most advanced in their use of ICT and e-business among the sample of seven EU countries compared. However, results should be taken with a pinch of salt, as they partly reflect industry structure. In countries where industries with a large number of micro and small firms dominate, data are likely to point at a comparatively lower level of e-business activity.

Notwithstanding these caveats, there are some interesting results. For Polish companies, data indicate that the digital divide may have narrowed compared to the situation in 2003. In essence, adoption levels for firms from Italy, Spain, Poland and the Czech Republic are similar. Companies from Spain appear to be dynamic adopters of ICT and e-business, in particular when it comes to e-commerce activity and more sophisticated applications, for instance in the areas of supply chain integration and e-procurement.

As can be expected, large firms are most advanced in e-business adoption. Survey results of 2005 indicate that the state-of-play among micro and small firms is very similar. For many e-business applications, medium-sized enterprises appear to constitute 'critical mass' in order to benefit.

## Section II: Indicators in ICT and e-Business

Chart 2-1



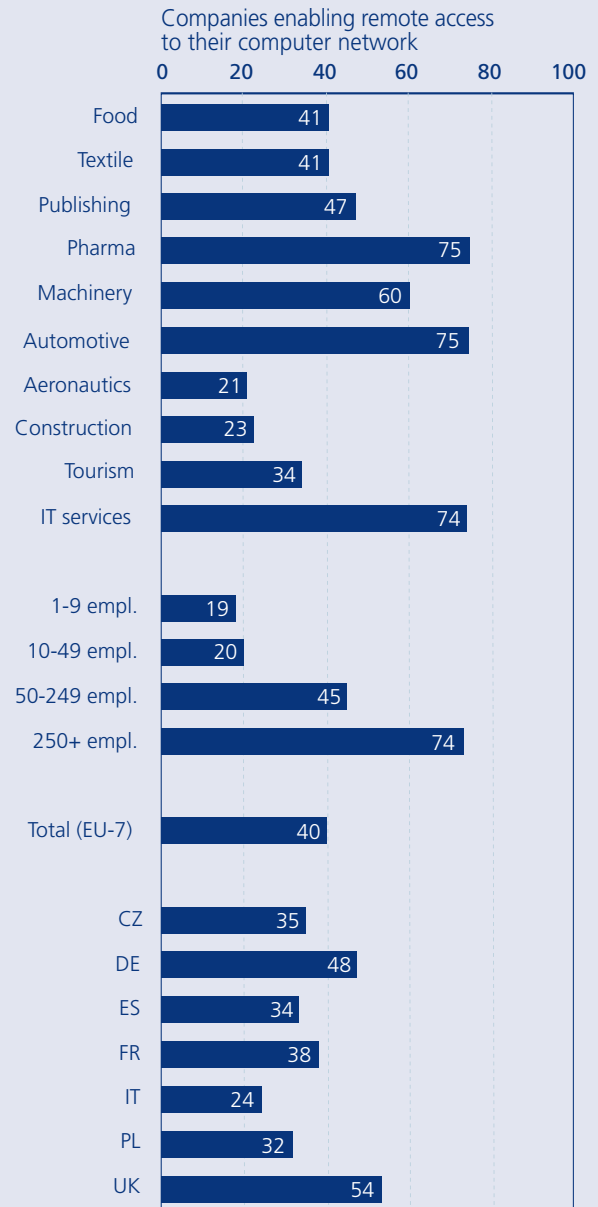
Based on survey questions C2: "Does your company have access to the internet?" and C5: "What is the maximum bandwidth of your company's connection to the internet?"

Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-2



Based on survey question C8: "Can employees of your company access your computer system remotely from outside the company, for instance from home, from a hotel or while travelling?"

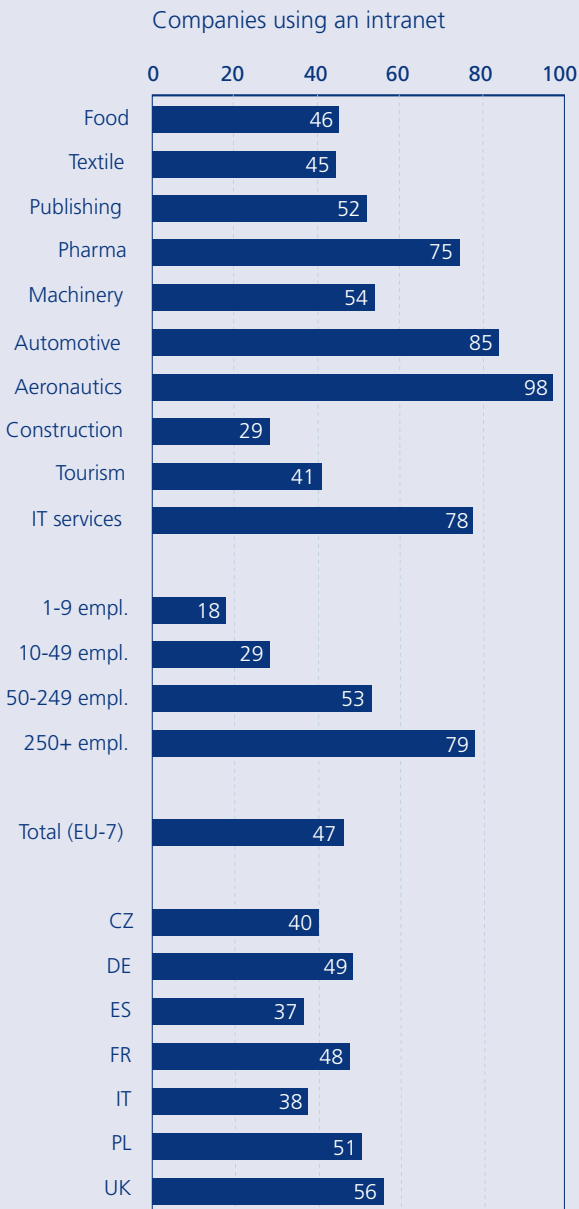
Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

## Section II: Indicators in ICT and e-Business

Chart 2-3



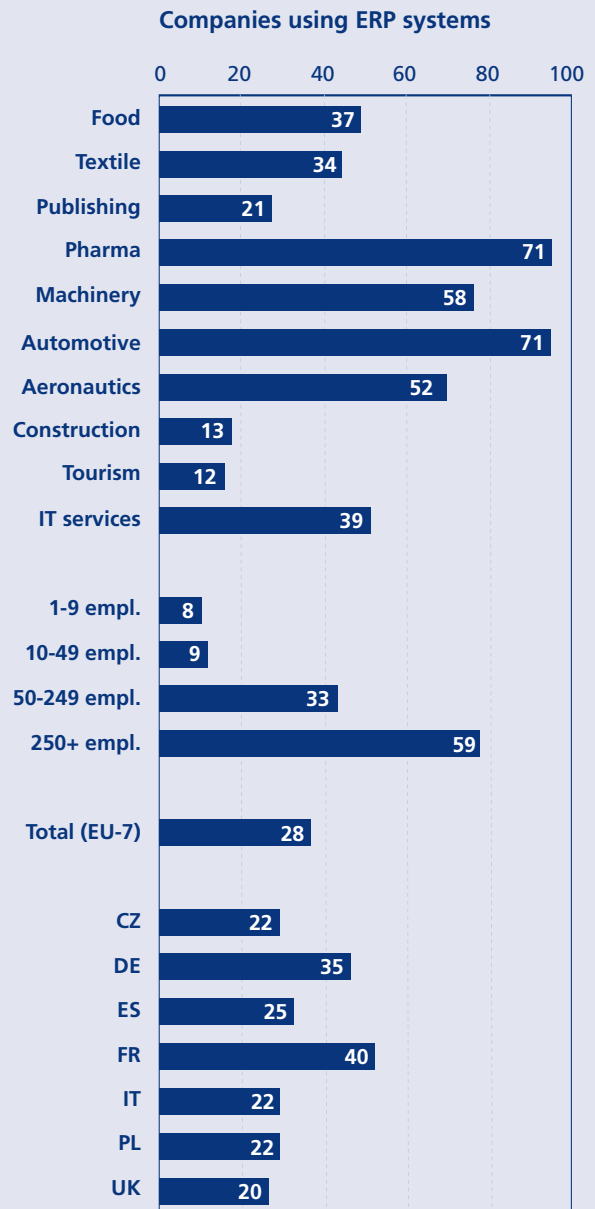
Based on survey question E1a:  
"Do you use an Intranet?"

Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-4



Based on survey question E1d:  
"Do you use an ERP system?"

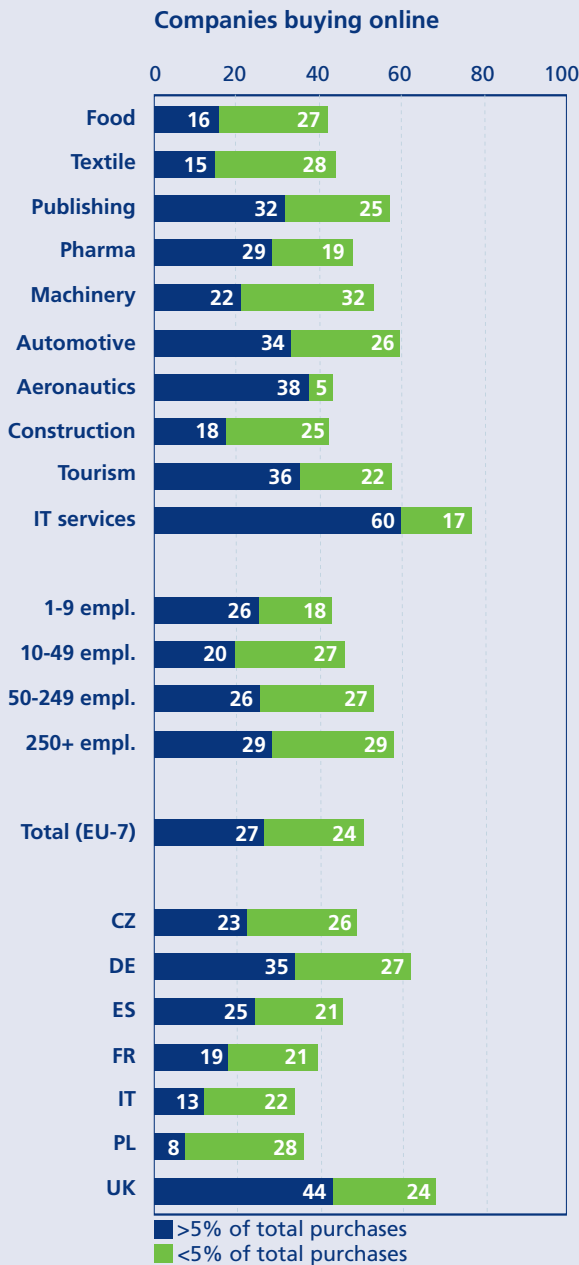
Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

## Section II: Indicators in ICT and e-Business

Chart 2-5



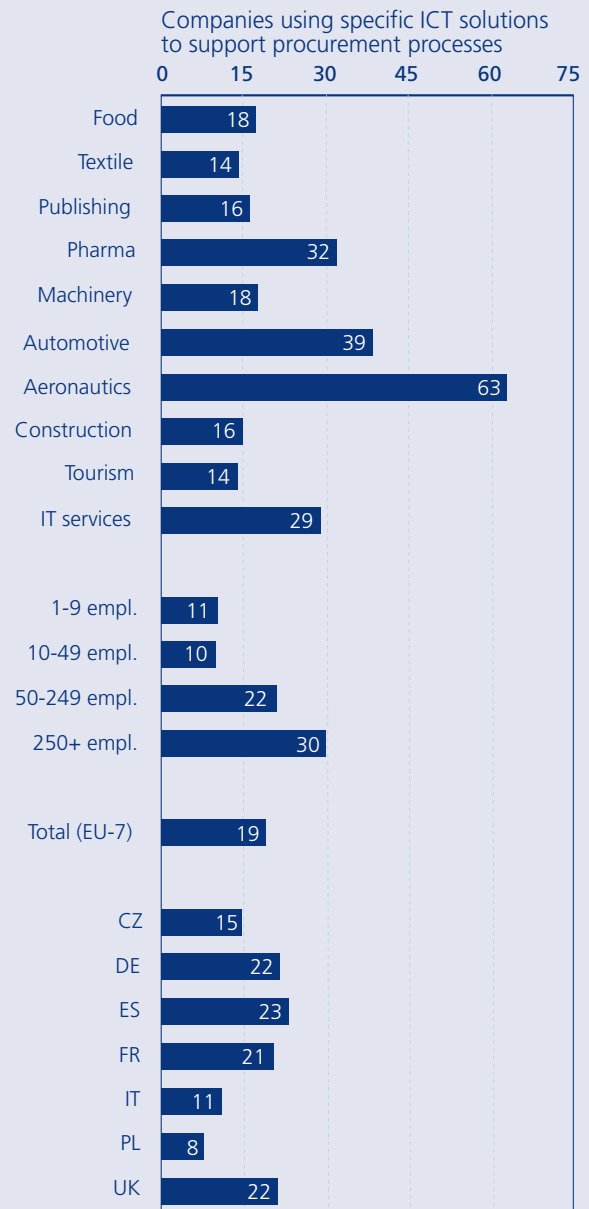
Based on survey questions F1: "Does your company use the Internet or other computer-mediated networks to purchase goods or services online?" and F4: "Please estimate how large a share of your total purchases is conducted online."

Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-6



Based on survey question F6: "Does your company currently support the selection of suppliers or procurement processes by specific IT solutions?"

Base (100%): enterprises using computers

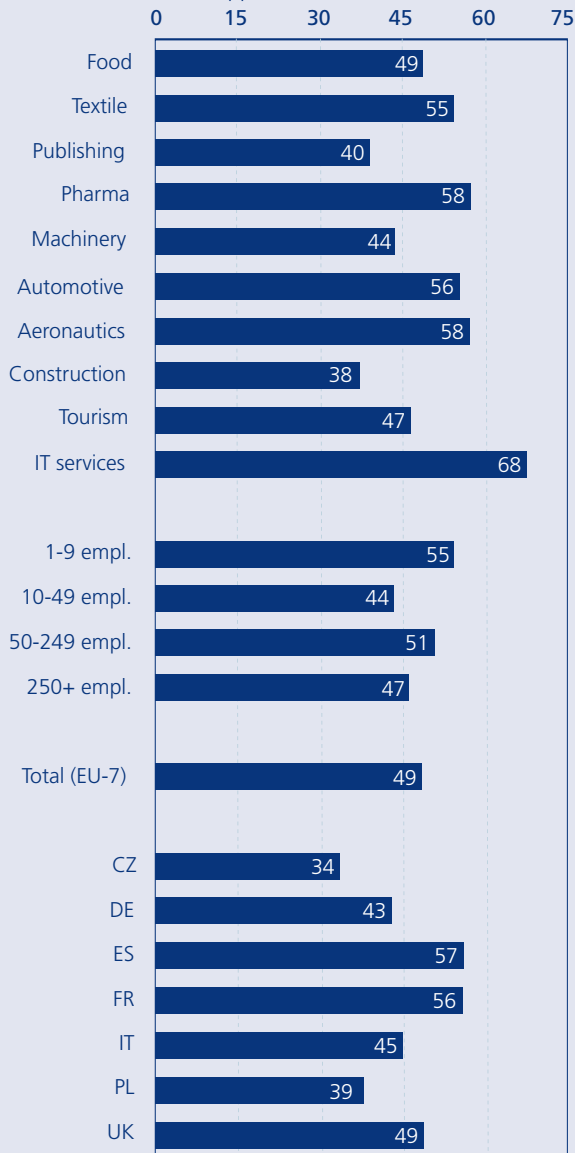
Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

## Section II: Indicators in ICT and e-Business

Chart 2-7

Companies using ICT for billing invoices from suppliers



Based on survey question F7e: "Do you use IT solutions for billing invoices from suppliers?"

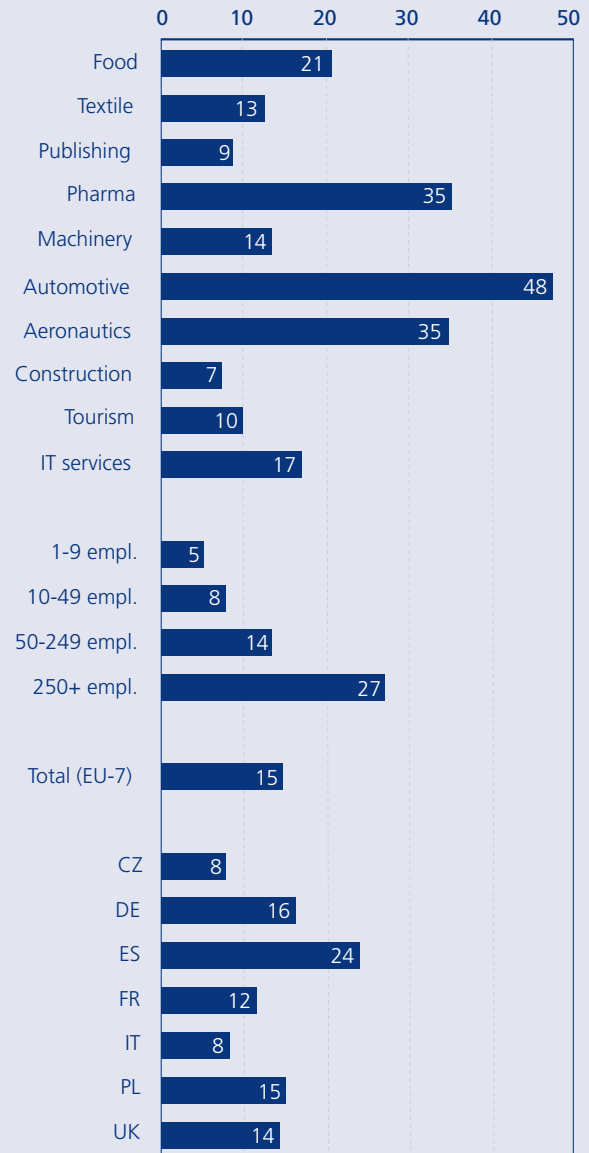
Base (100%): enterprises purchasing goods or services online

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-8

Companies using an SCM system



Based on survey question E1e: "Do you use an SCM system?"

Base (100%): enterprises using computers

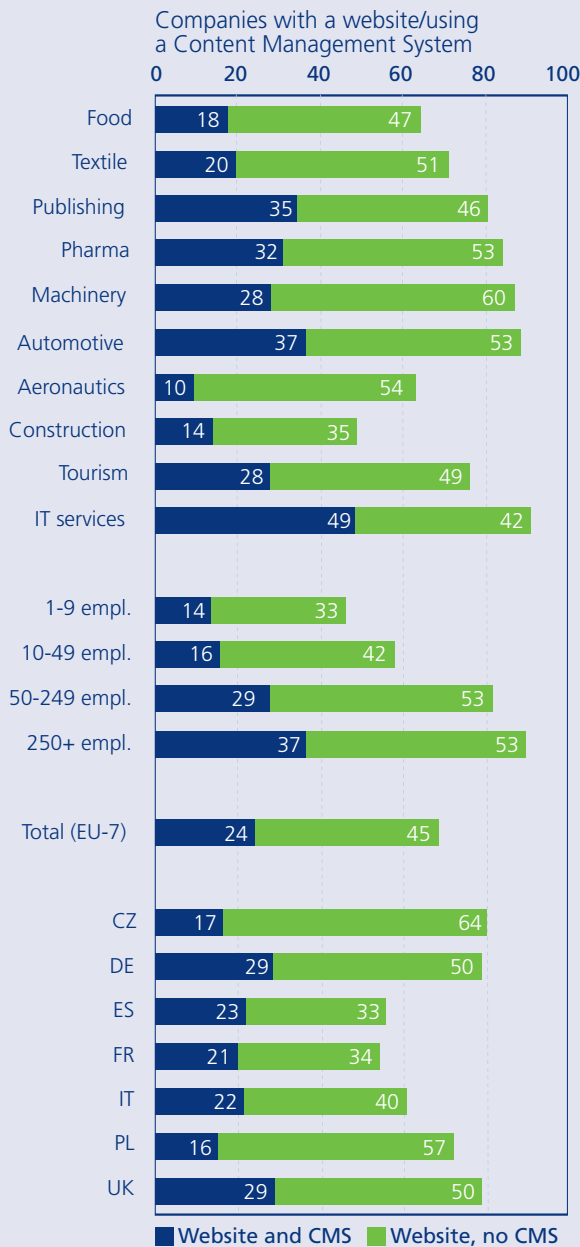
Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)



## Section II: Indicators in ICT and e-Business

Chart 2-9



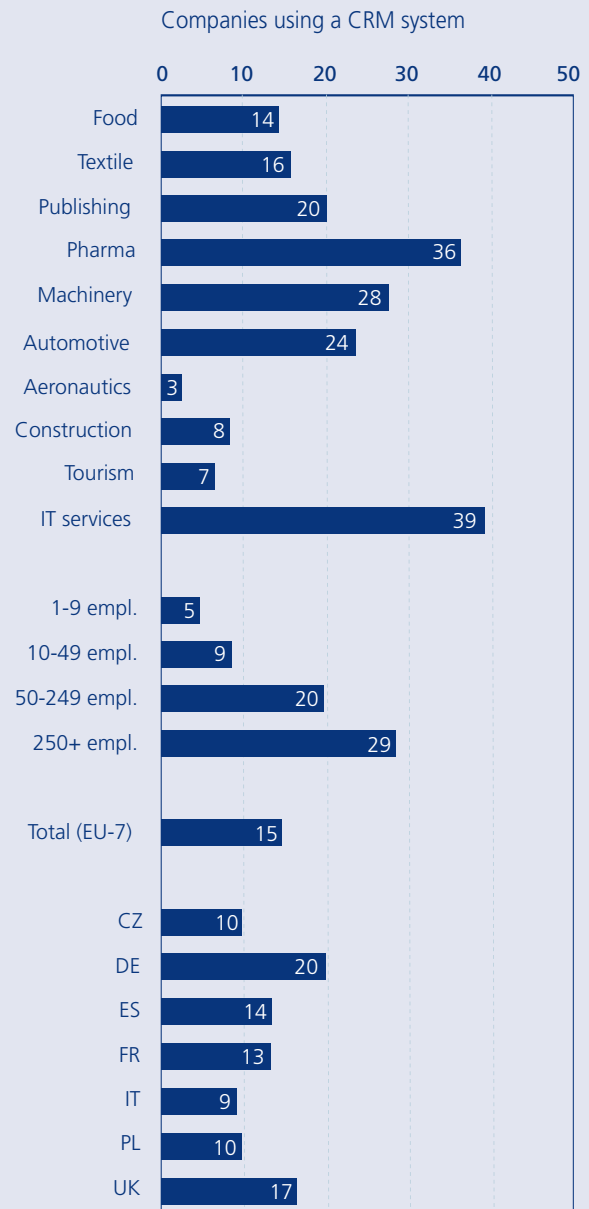
Based on survey questions G1: "Does your company have its own website on the Internet?" and G2: "Does your company make use of a content management system, i.e. special software for maintaining and updating the website?"

Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-10



Based on survey question G11: "Does your company use a CRM system, i.e. a software for customer relationship management?"

Base (100%): enterprises using computers

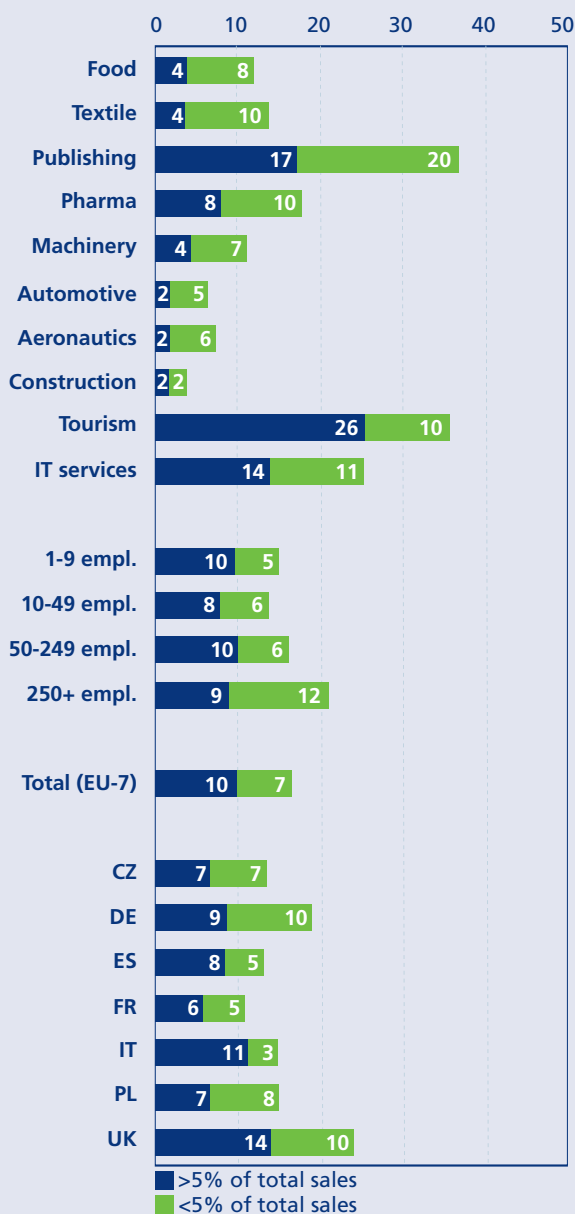
Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

## Section II: Indicators in ICT and e-Business

Chart 2-11

Companies selling goods/services online



Based on survey questions G3: "Does your company sell goods or services online on the Internet or through other computer-mediated networks?" and G5: "Please estimate how large a share of your total sales is conducted online."

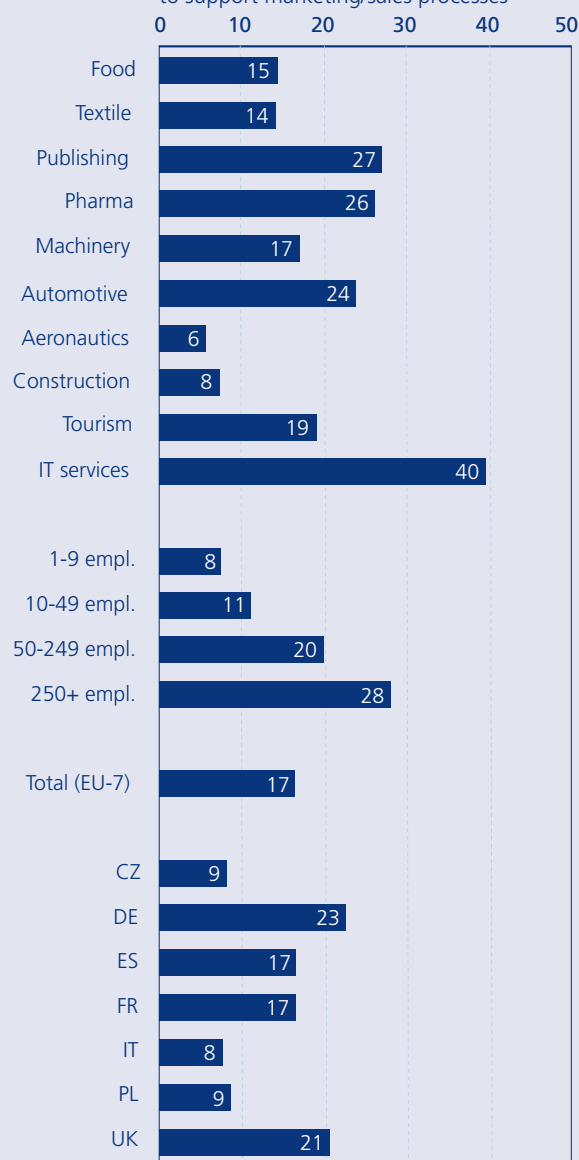
Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-12

Companies using specific ICT solutions to support marketing/sales processes



Based on survey question G7: "Does your company support marketing or sales processes by specific IT solutions?"

Base (100%): enterprises using computers

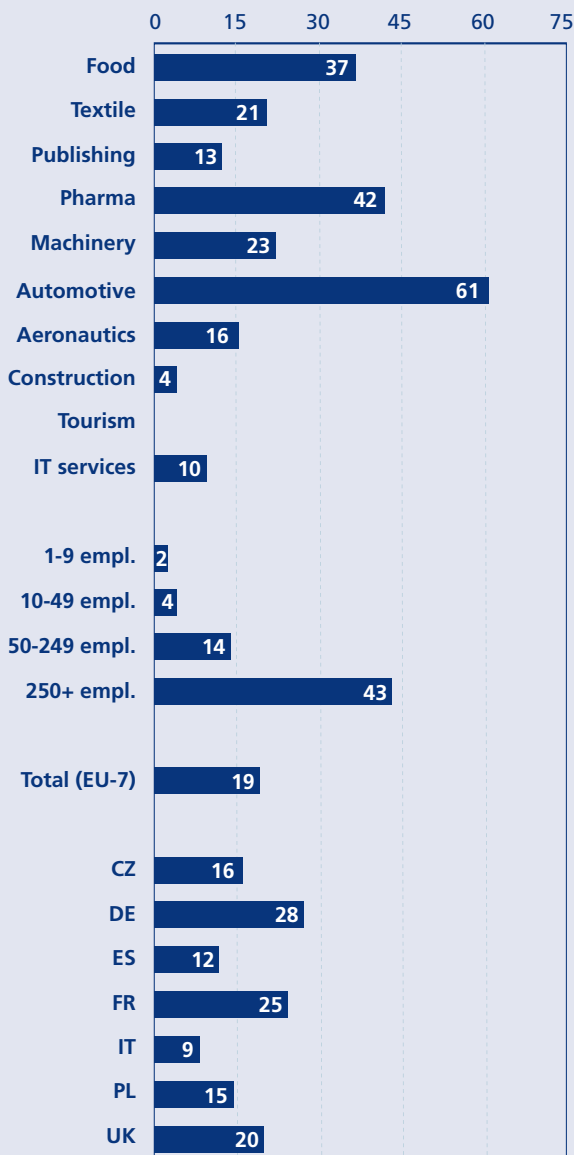
Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

## Section II: Indicators in ICT and e-Business

Chart 2-13

Companies using EDI based standards



Based on survey questions H1a: "Do you use EDI-based standards, for example EDIFACT, EANCOM, ANSI X12 or TRADACOM?"

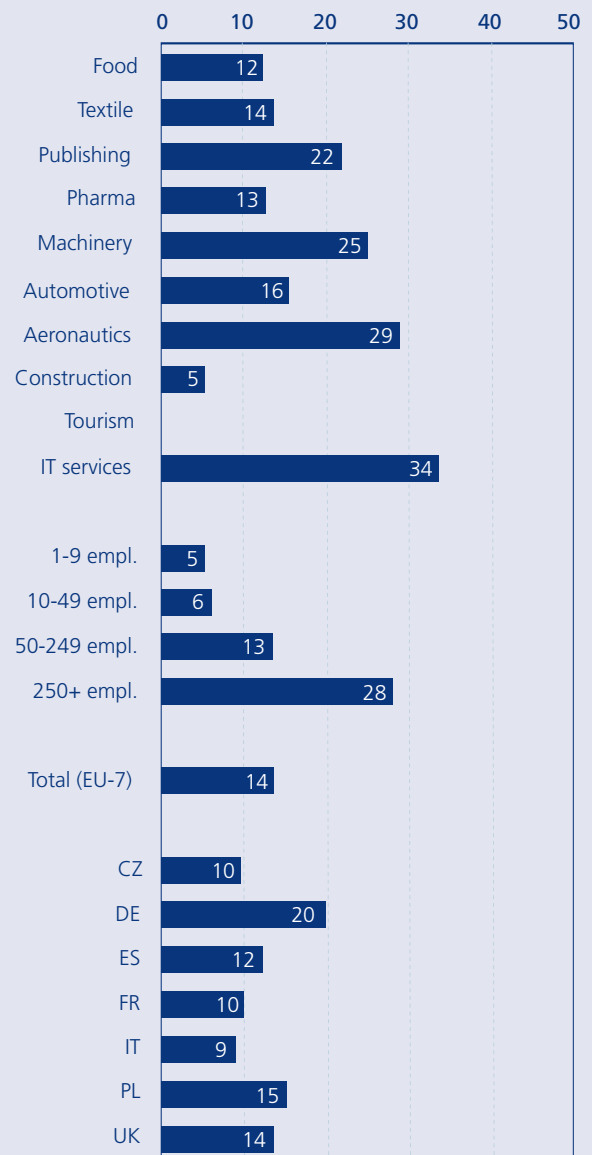
Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-14

Companies using XML based standards



Based on survey question H1b: "Do you use XML-based standards such as cXML, UBL, RosettaNet, xCBL?"

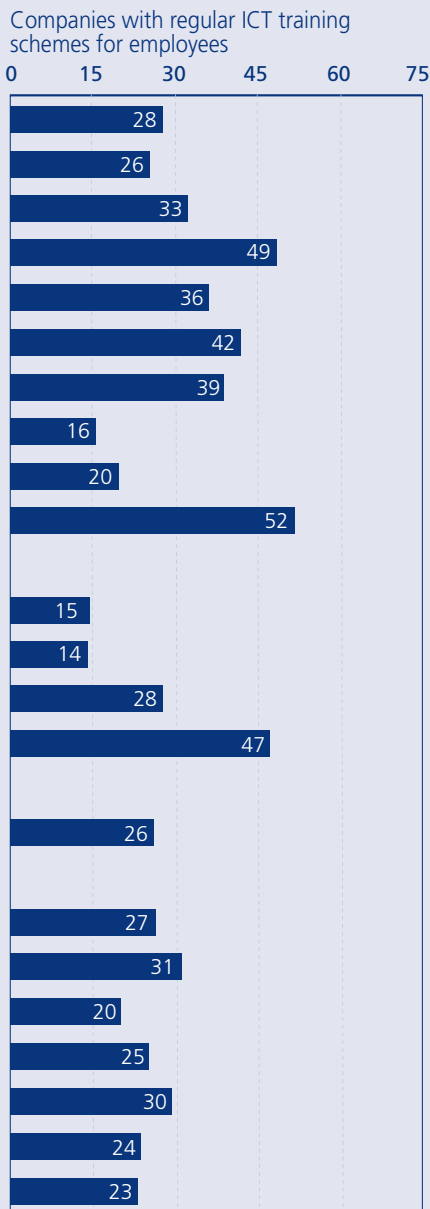
Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

## Section II: Indicators in ICT and e-Business

Chart 2-15



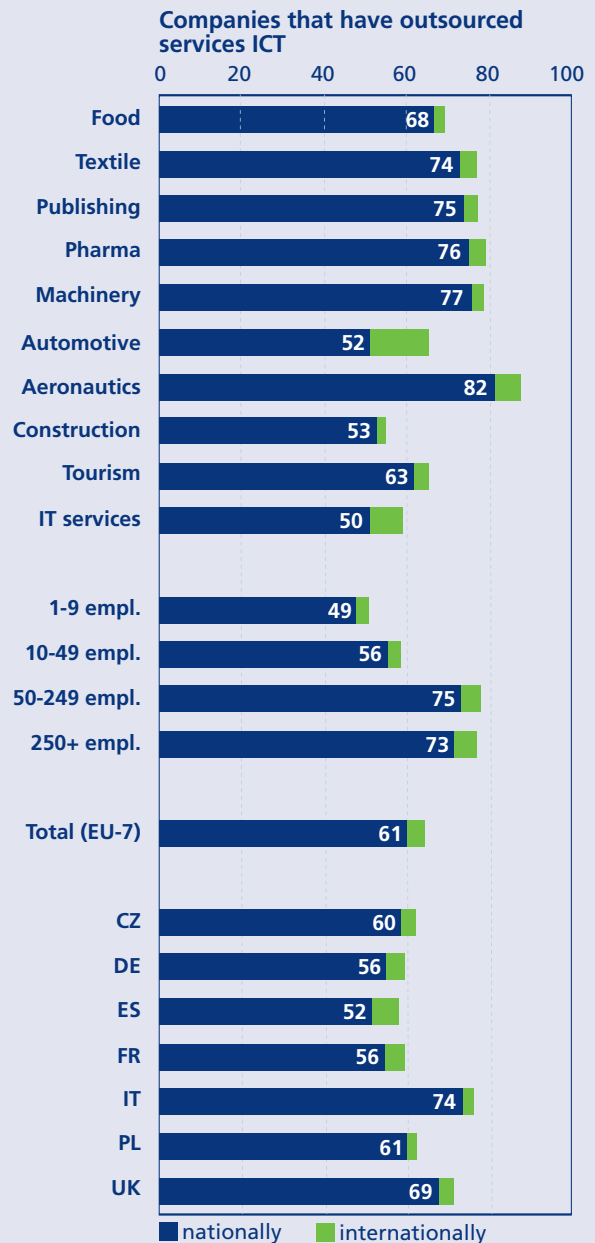
Based on survey question D4: "Does your company regularly send employees on ICT training programmes?"

Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-16



Based on survey questions D5: "Has your company outsourced ICT services to an external service provider?" and D6: "Where are the ICT service providers, to whom your company has outsourced ICT services, located?"

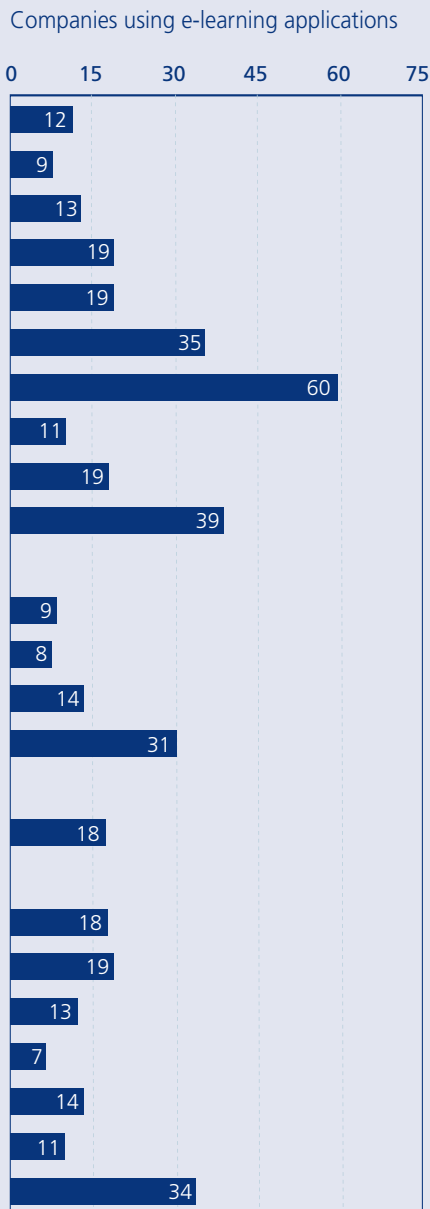
Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

## Section II: Indicators in ICT and e-Business

Chart 2-17



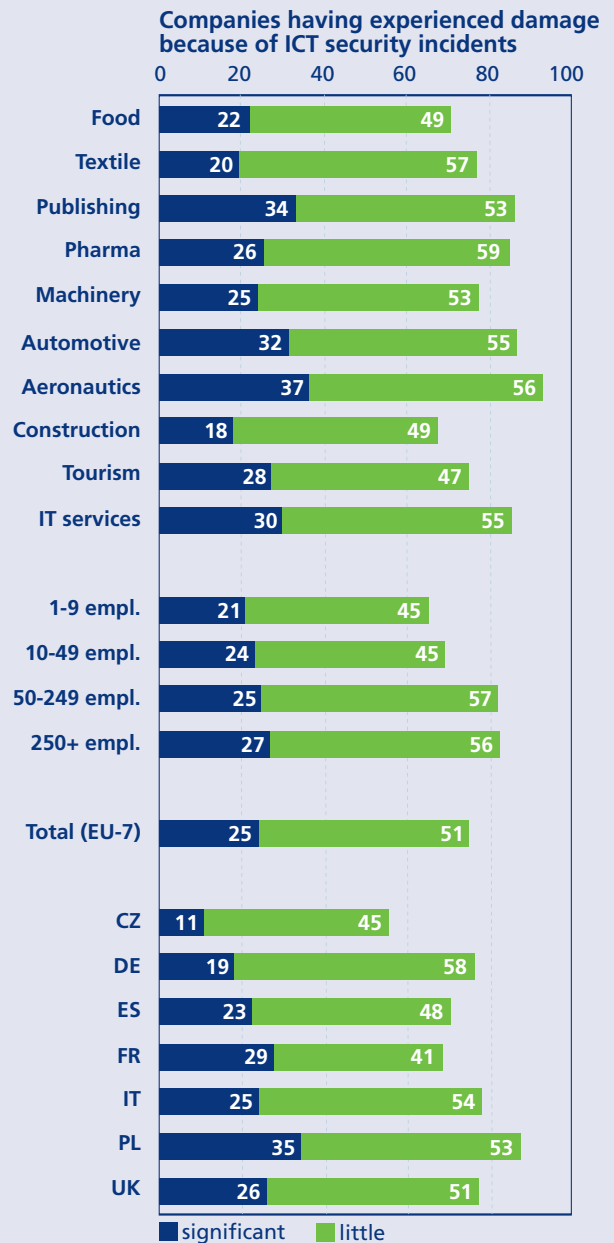
Based on survey question E3: "Does your company use e-learning applications, that is for instance learning material for employees available on the Intranet or on the Internet?"

Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-18



Based on survey question D11: "During the past 12 months, which of the following incidents have had an impact on your business, for example by causing economic damage or endangering customer relationships? Has [incident] had a significant impact, little impact or was there no incident in this period?" The chart shows how many companies have experienced at least one incident causing significant or little damage.

Base (100%): enterprises using computers

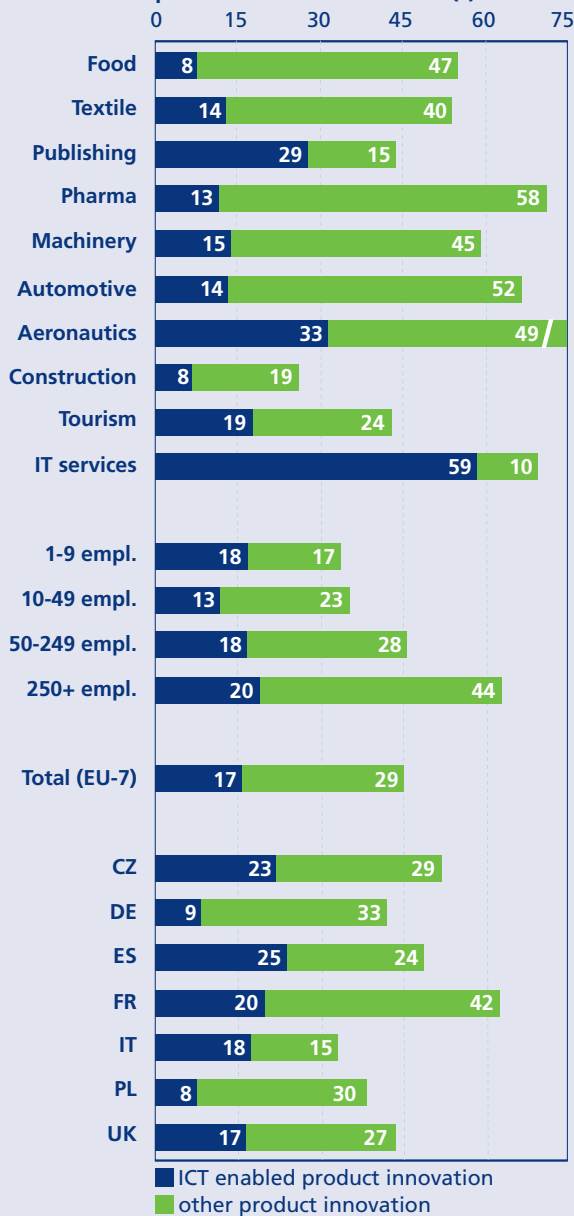
Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

## Section II: Indicators in ICT and e-Business

Chart 2-19

Companies having introduced product/service innovation(s) in 2004



Based on survey questions B1: "During the past 12 months, has your company launched any new or substantially improved products or services?" and B2: "Have any of these product innovations been directly related to or enabled by information or communication technology?"

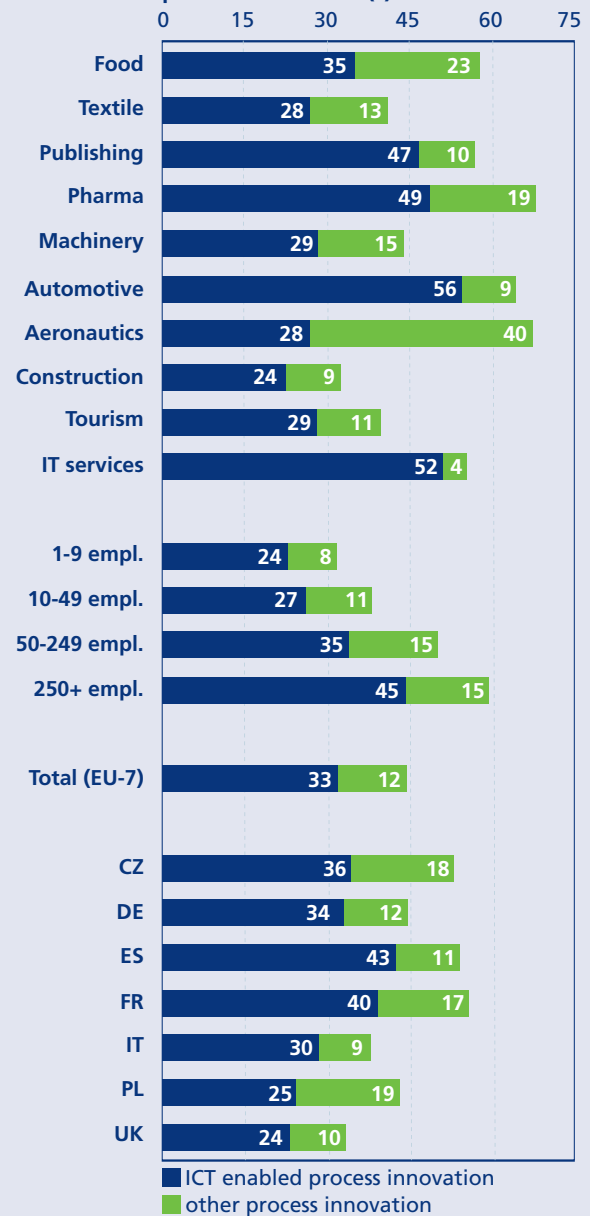
Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

Chart 2-20

Companies having introduced process innovation(s) in 2004



Based on survey questions B3: "During the past 12 months, has your company introduced any new or significantly improved internal processes, for example for producing or supplying goods and services?" and B4: "Have any of these process innovations been directly related to or enabled by information or communication technology?"

Base (100%): enterprises using computers

Weighting: figures for sectors, countries and the EU-7 total are weighted by employment; figures for size-bands in % of firms from the size-band.

Source: e-Business W@tch (e-Business Survey 2005)

## Section III: The European e-Business Scoreboard 2005

### Introduction

The spider and diamond diagrams of the e-Business Scoreboard visualise the importance of ICT and e-business applications for 10 sectors of the European economy. The Scoreboard aggregates 16 component indicators. For reasons of consistency and comparability, all data are derived from the e-Business Survey 2005 of the *e-Business W@tch*. Normally, benchmarking activities of this type imply that a higher score stands for a better performance. In this context, however, the main objective of the Scoreboard is not to make a statement about the e-business performance of sectors. Rather, the Scoreboard is intended to show the different importance which information and communication technologies can have for various sectors of the economy.

### The component indicators

The Scoreboard is composed of 16 component indicators for ICT and e-business which are grouped into four categories (according to business functions). Spider diagrams show the results for each component indicator. Diamond diagrams show the compound sub-indices for the four categories. The categories and component indicators are:

#### Category

#### Component indicators

#### A Basic ICT infrastructure of the enterprise

- A.1) Enterprises connecting computers with a LAN
- A.2) Internet connectivity index
- A.3) Remote access to the company network
- A.4) VPN access to the company network

#### B Applications for internal business process automation

- B.1) Use of an intranet
- B.2) Use of online technology to track working hours / production time
- B.3) Use of Electronic Document Management (EDM) systems
- B.4) Use of Enterprise Resource Planning (ERP) systems

#### C Electronic procurement and supply chain integration

- C.1) Enterprises purchasing at least 5% of their supplies online
- C.2) Use of specific ICT systems for e-procurement processes
- C.3) Use of Supply Chain Management (SCM) systems
- C.4) Use of online technology for inventory management

#### D Electronic marketing and sales

- D.1) Enterprises maintaining a website with a content management system
- D.2) Use of Customer Relationship Management (CRM) systems
- D.3) Enterprises selling at least 5% of their goods and services online
- D.4) Use of specific ICT systems to support marketing and sales

### The scale – normalisation

For the e-Business Scoreboard, values of component indicators were normalised, based on mean values (for the 10 sectors) and standard deviations. The scale shows the multiple

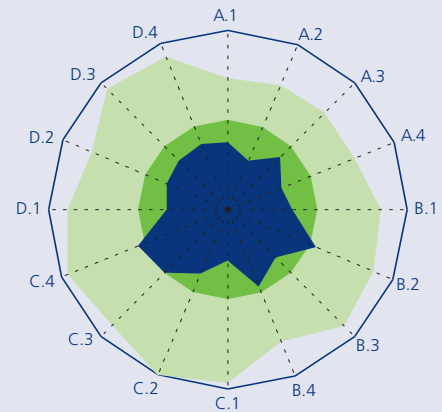
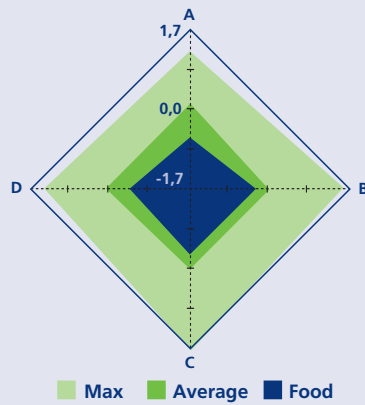
of a standard deviation for a specific sector. 0 equals the mean value for all 10 sectors. The size of the green square indicates the (relative) e-business intensity of a sector.

## Section III: The European e-Business Scoreboard 2005

Chart 3-1:

### The food and beverage industry

NACE Rev. 1.1:  
DA 15

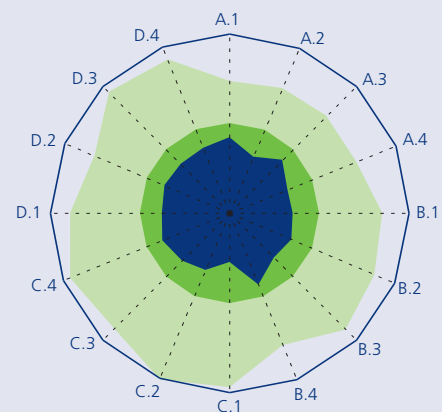
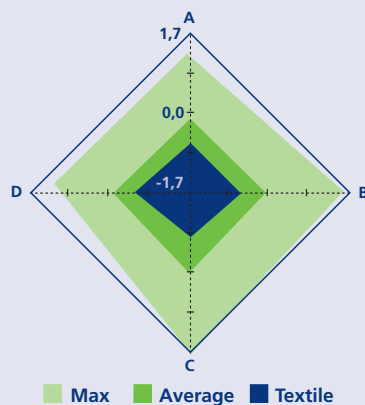


Production in the F&B industry is characterized by small batch processes that are hard to consolidate and integrate. Despite high investments in plant automation, many operations are still labour intensive or only partially automated. This situation is reflected in a comparatively low diffusion of ICT among firms from the sector. However, ICT could play a more important role in the future, for example in supporting control over raw material supply and quality assurance.

Chart 3-2:

### The textile and clothing industry

NACE Rev. 1.1:  
DB 17, 18



Among larger companies from the textile and clothing industry, e-business activity has increased. However, the economic crisis in the sector hampers innovation among small firms. Adding to the difficult economic conditions, the limited degree of computerisation and the diversity of technological equipment in place are constraints for the adoption of e-business among smaller companies.

Scoreboard categories: (A.1 – A.4) ICT infrastructure, (B.1 – B.4) Internal business process automation, (C.1 – C.4) Electronic procurement and supply chain integration, (D.1 – D.4) Electronic marketing and sales activities.

Charts are based on data from the e-Business Survey 2005 (EU-7), weighted by employment.

Max = maximum value for one of the 10 sectors benchmarked.

Average = mean value for all 10 sectors. Scale: 1 = standard deviation from the average (+/-)

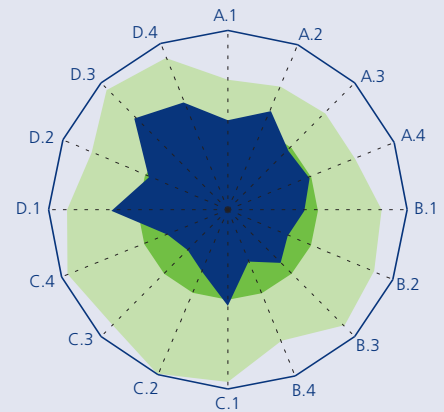
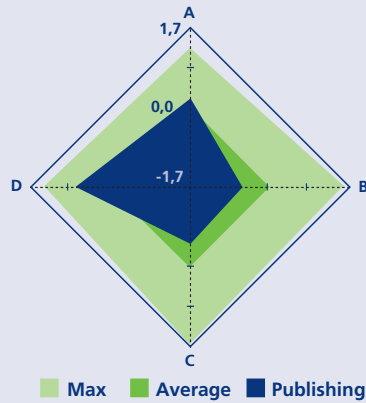


## Section III: The European e-Business Scoreboard 2005

Chart 3-3:

### Publishing and printing

NACE Rev. 1.1:  
DE 22.1, 22.2

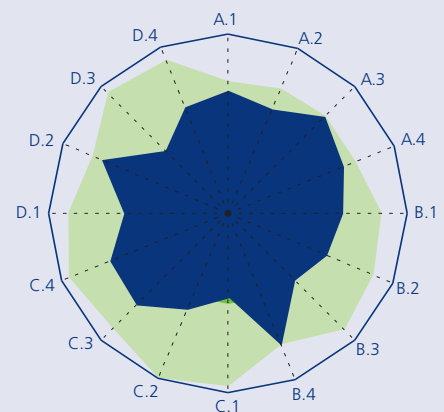
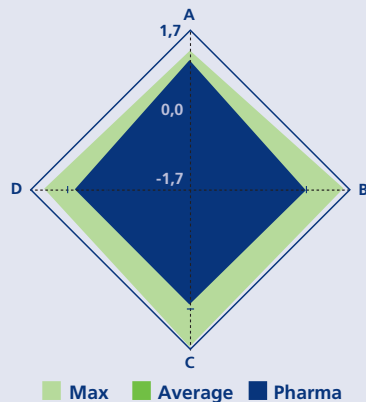


The European publishing and printing industry is in a state of flux. ICT, and in particular the internet, have had a profound impact on business activities of firms from all sub-sectors of this industry. This has had an effect on practically all areas of business activity, most importantly internal work and production processes, the products themselves, the distribution of products, marketing strategies and interfaces between companies and their customers in general.

Chart 3-4:

### The pharmaceutical industry

NACE Rev. 1.1:  
DG 24.4



The pharmaceutical industry is an intensive user of electronic business: ICT and internet-based solutions play a key role in supporting marketing and sales processes in the pharmaceutical industry. CRM (Customer Relation Management) systems and mobile solutions have a high potential for facilitating the management and work of the pharmaceutical sales force. Combating counterfeiting activities currently appears to be a main driver for the deployment of RFID/Auto-ID solutions in this sector.

Scoreboard categories: (A.1 – A.4) ICT infrastructure, (B.1 – B.4) Internal business process automation, (C.1 – C.4) Electronic procurement and supply chain integration, (D.1 – D.4) Electronic marketing and sales activities.

Charts are based on data from the e-Business Survey 2005 (EU-7), weighted by employment.

Max = maximum value for one of the 10 sectors benchmarked.

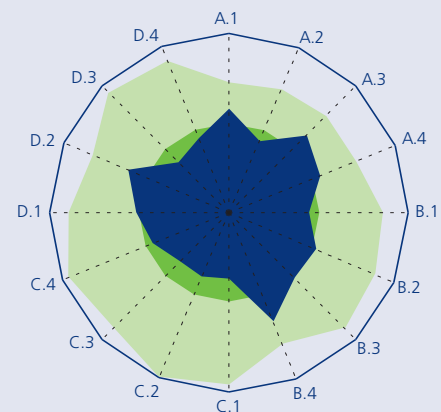
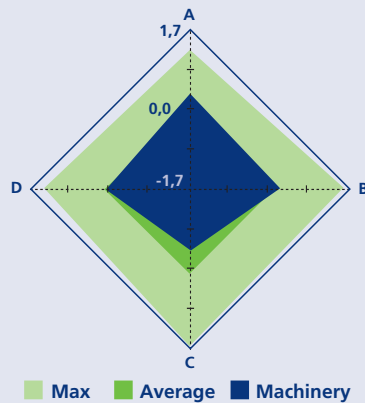
Average = mean value for all 10 sectors. Scale: 1 = standard deviation from the average (+/-)

## Section III: The European e-Business Scoreboard 2005

Chart 3-5:

### The machinery and equipment industry

NACE Rev. 1.1:  
DK 29 (exc. 29.6,  
29.7)

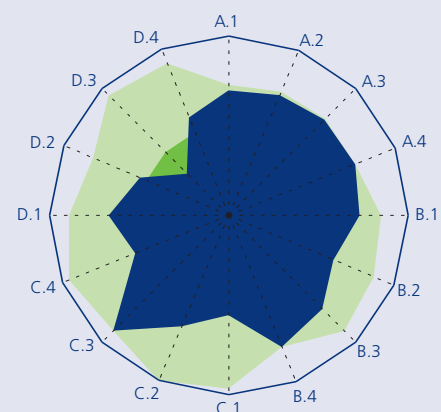
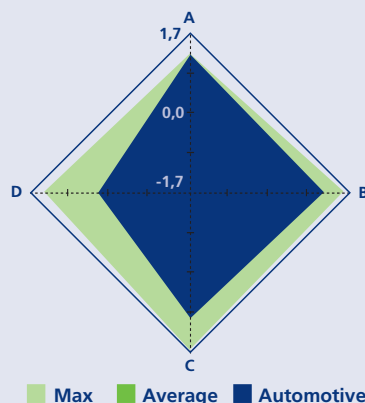


Companies in the machinery and equipment (M&E) sector are moving from the endowment with basic ICT equipment to embedding e-business in their business strategies. An important application area for e-business in the M&E industry is after sales service. Machines are increasingly being sold in combination with services covering implementation, maintenance, repairs, or the operation of the machine. These services offer many opportunities for the use of electronic service delivery tools.

Chart 3-6:

### The automotive industry

NACE Rev. 1.1:  
DM 34



Large enterprises in the automotive industry are advanced users of e-business technologies, mainly for automating B2B processes. Frequently used systems include ERP, SCM, and collaborative design systems. ICT-enabled innovations still remain a source of competitive advantage. The process of inter-firm integration proceeds rapidly in the automotive industry. Online procurement has become a part of everyday business and belongs to the most frequently adopted e-business applications.

Scoreboard categories: (A.1 – A.4) ICT infrastructure, (B.1 – B.4) Internal business process automation, (C.1 – C.4) Electronic procurement and supply chain integration, (D.1 – D.4) Electronic marketing and sales activities.

Charts are based on data from the e-Business Survey 2005 (EU-7), weighted by employment.

Max = maximum value for one of the 10 sectors benchmarked.

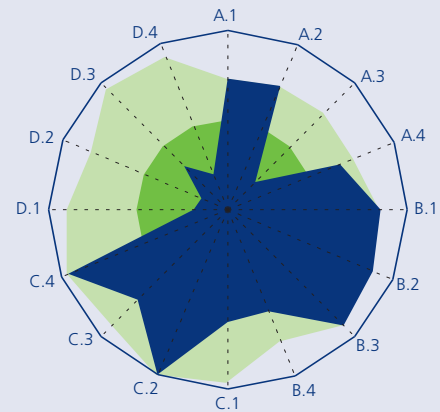
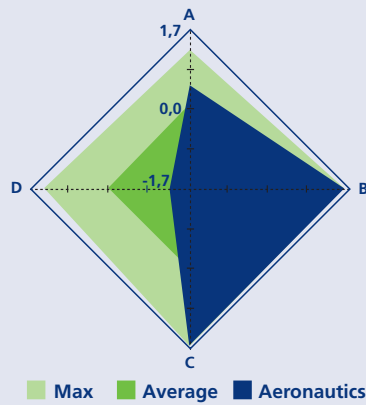
Average = mean value for all 10 sectors. Scale: 1 = standard deviation from the average (+/-)

## Section III: The European e-Business Scoreboard 2005

Chart 3-7:

### The aeronautics industry

NACE Rev. 1.1:  
DM 35.3

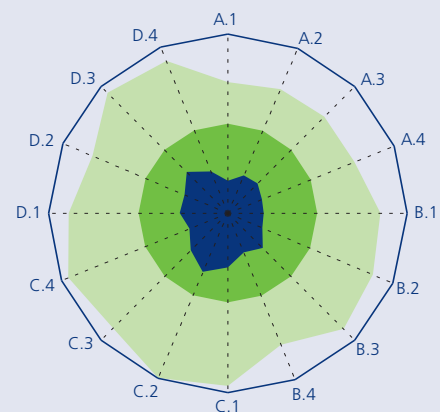
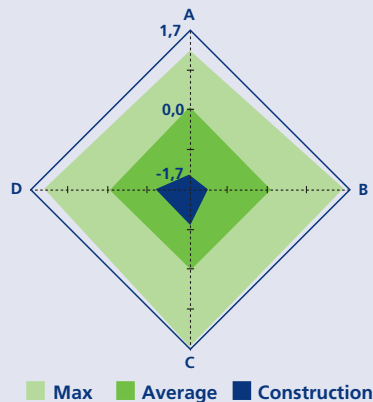


Electronic procurement is a key application in the aeronautics industry. Although the high complexity and specialisation of end products in this sector puts some restrictions on online trading, 65% of companies procure inputs (e.g. raw materials) online, and one in four companies even more than 10% of all supplies. ICT are also important in this industry to support inter-firm collaboration. As a result, ICT can still be regarded as a potential source of competitive advantage.

Chart 3-8:

### Construction

NACE Rev. 1.1:  
F 45



The construction industry has yet to show the same level of productivity improvements as other industries (including production). This has also to do with a comparatively slow ICT uptake. Reluctance to invest in ICT is still strong, and most companies are reactive rather than proactive in adopting e-business as a tool to increase competitiveness. Internal integration could be an important driver for ICT development in the future.

Scoreboard categories: (A.1 – A.4) ICT infrastructure, (B.1 – B.4) Internal business process automation, (C.1 – C.4) Electronic procurement and supply chain integration, (D.1 – D.4) Electronic marketing and sales activities.

Charts are based on data from the e-Business Survey 2005 (EU-7), weighted by employment.

Max = maximum value for one of the 10 sectors benchmarked.

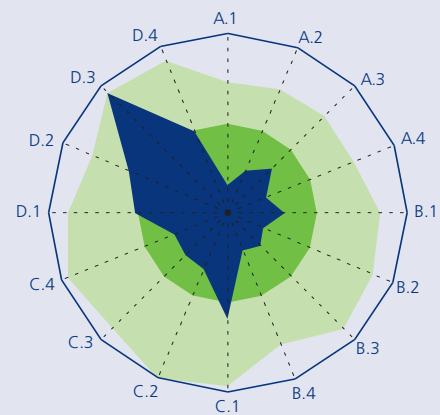
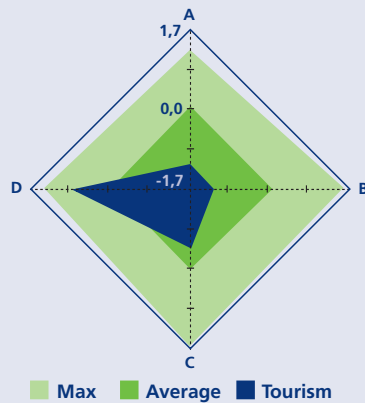
Average = mean value for all 10 sectors. Scale: 1 = standard deviation from the average (+/-)

## Section III: The European e-Business Scoreboard 2005

Chart 3-9:

### Tourism

NACE Rev. 1.1:  
H 55, I 63.3

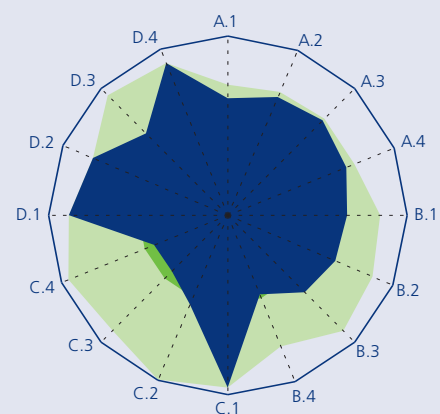
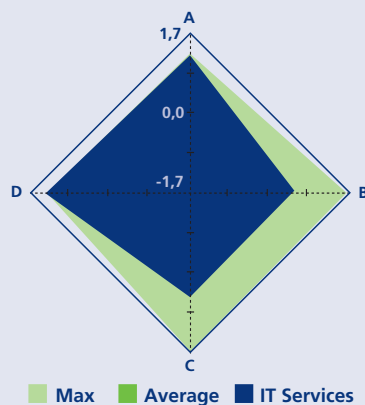


The focus of e-business in tourism is on customer-facing activities, encompassing all areas of marketing and sales. Online booking and reservation services have become widely accepted among consumers and business travellers. The adoption rate of selling online in tourism is approximately twice as high as on average among the 10 sectors surveyed by *e-Business W@tch* in 2005. CRM is emerging as a promising application, although not yet widely diffused.

Chart 3-10:

### IT services

NACE Rev. 1.1:  
K 72



Information and communication technology and e-business services are not only the output of the IT services sector. They influence crucially the way in which this output is produced, promoted and provided. This specific way of using ICT distinguishes IT services from the other industries analysed in the *e-Business W@tch*. As a consequence, adoption and use of nearly all major e-business applications are above the average of the 10 sectors studied, and exert a strong impact on the competitive situation in the IT services sector.

Scoreboard categories: (A.1 – A.4) ICT infrastructure, (B.1 – B.4) Internal business process automation, (C.1 – C.4) Electronic procurement and supply chain integration, (D.1 – D.4) Electronic marketing and sales activities.

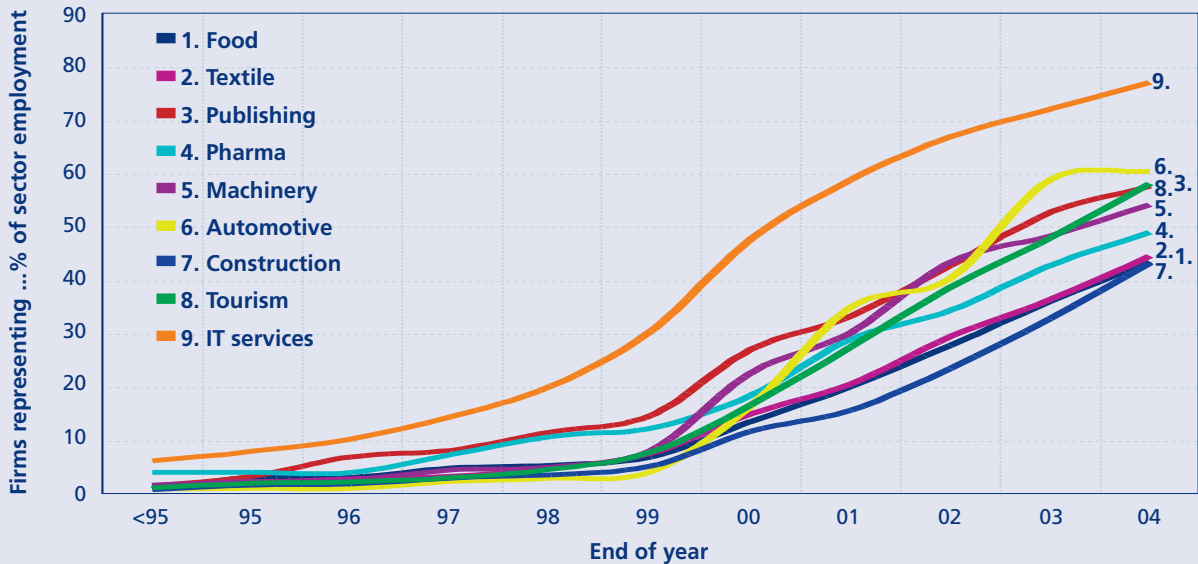
Charts are based on data from the e-Business Survey 2005 (EU-7), weighted by employment.

Max = maximum value for one of the 10 sectors benchmarked.

Average = mean value for all 10 sectors. Scale: 1 = standard deviation from the average (+/-)

## Section IV: Diffusion of e-Commerce Activity since 1995

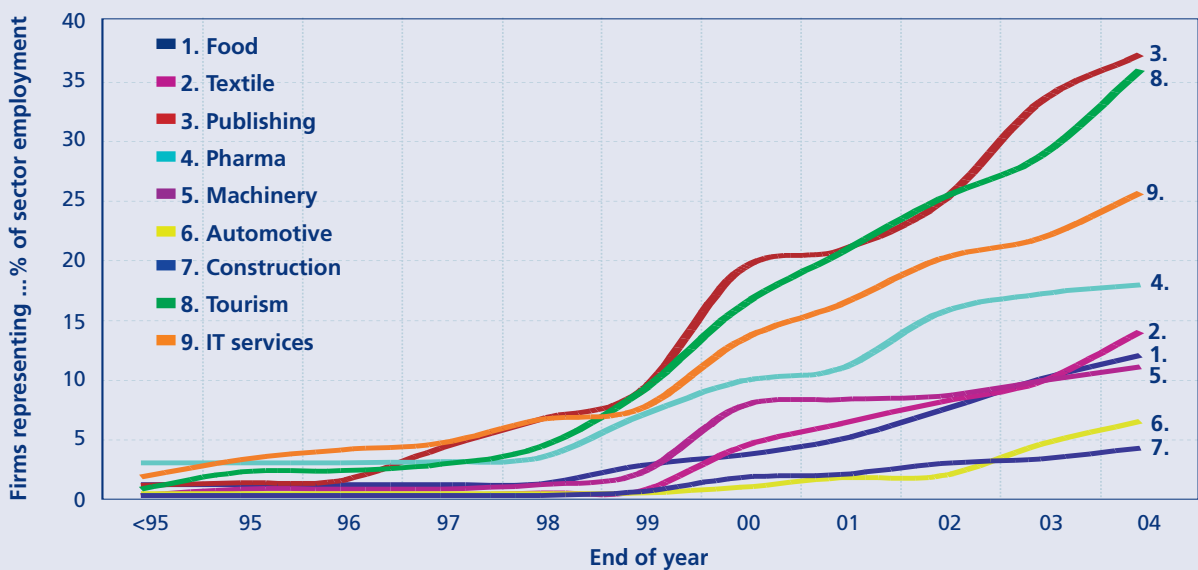
Chart 4-1: Adoption of buying supplies online by sector (1995 – 2004)



Based on survey questions F1: "Does your company use the internet or other computer-mediated networks to purchase goods or services online?" and F2: "When did your company purchase goods or services online for the first time? Please tell me the year." Base (100%): enterprises using computers. Weighting: by employment (enterprises representing x% of employment).

Source: e-Business W@tch (e-Business Survey 2005)

Chart 4-2: Adoption of making online sales by sector (1995 – 2004)



Based on survey questions G4: "Does your company sell goods or services online on the internet or through other computer-mediated networks?" and G4: "When did your company offer goods or services for sale online for the first time? Please tell me the year." Base (100%): enterprises using computers. Weighting: by employment (enterprises representing x% of employment).

Source: e-Business W@tch (e-Business Survey 2005)

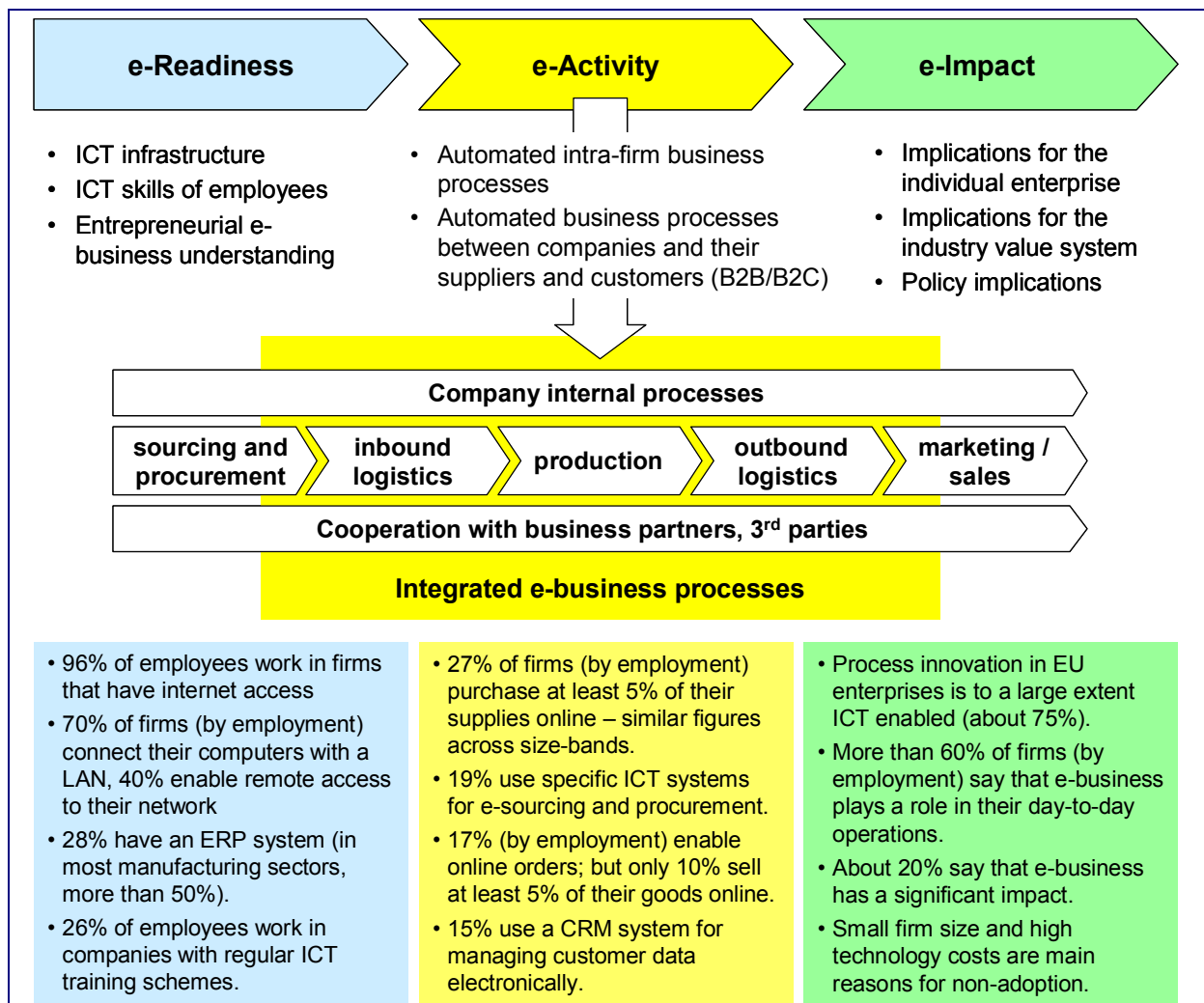
## Part 1: Synopsis of Main Findings

### Overview

This chapter provides an overview of the state of adoption of electronic business in enterprises from 10 sectors of the EU economy. It is largely based on the e-Business Survey 2005 by *e-Business W@tch*.<sup>8</sup> Depending on the question asked in the survey, the reference year is either 2004 (in case of period-related items) or early 2005 (e.g. for yes/no questions on ICT adoption). "Electronic business" is hereby defined – in accordance with the definition proposed by the OECD – as "automated business processes (both intra-firm and inter-firm) over computer mediated networks".

The results update and elaborate on the analysis presented in previous editions of the European E-Business Report. The 2005 Survey data are, however, based on a different configuration of sectors as compared to the earlier surveys. For this reason, and due to some changes in the survey set-up, direct comparisons of totals to those published in the 2003 and 2004 editions should be made with caution.

**Exhibit: Framework of the e-Business Survey 2005 and key results at a glance**



Source: *e-Business W@tch* (2005)

<sup>8</sup> See Annex III (Methodology Report) for more details.

## The e-Business Survey 2005

- ▶ Most of the data and evidence presented in this part of the report are based on results of the e-Business Survey 2005.
- ▶ *e-Business W@tch* collects data on the use of ICT and e-business in European enterprises by means of representative surveys. The e-Business Survey 2005, which was the third survey after those of 2002 and 2003, had a scope of 5,218 telephone interviews with decision-makers in enterprises from seven EU countries (the **EU-7**, i.e. Czech Republic, France, Germany, Italy, Poland, Spain and the UK), which account for roughly 75% of the EU-25 population and GDP.
- ▶ The survey was carried out as an enterprise survey: data collection and reporting focus on the enterprise, defined as a business organisation (legal unit) with one or more establishments. Interviews were carried out in January and February 2005. Except for the aeronautics industry, where only 163 company interviews could be realised due to the small universe of firms in this sector in the EU-7, about **560 interviews per sector** were conducted.<sup>9</sup>
- ▶ In contrast to the e-Business Surveys 2002 and 2003, the survey of 2005 considered only **companies that used computers**. Thus, the highest level of the population ("base") was the set of all computer-using enterprises that were active within the national territory of one of the respective countries, and that had their primary business activity in one of the sectors specified by NACE Rev. 1.1 categories. Therefore it makes a difference if a figure represents a percentage of "*all companies*" (as in 2003) or a percentage of "*companies using computers*" (as in 2005). Differences are much less pronounced, though, when figures have been weighted by employment.<sup>10</sup>
- ▶ The second important difference between the 2003 and 2005 surveys concerns the **configuration of sectors**. Three very large sectors (retail, health, business services) that had a major impact on aggregate results in 2003 were not continued in 2005. Instead, another huge sector (construction) was introduced. For these reasons, direct comparisons of aggregate results should be cautiously made and only with explicit reference to these differences.
- ▶ More detailed information about the survey methodology, including information about sampling and the business directories used, the number of interviews conducted in each country and sector, and data on non-response rates, are available in **Annex III** (Methodology Report) and on the website of the *e-Business W@tch*.<sup>11</sup>

<sup>9</sup> The survey was conducted using computer-aided telephone interview (CATI) technology.

<sup>10</sup> Employment-weighted figures should be read as "*enterprises comprising x% of employees*" in the respective sector (or country). Employment weighting is useful because, due to the significantly greater number of micro- than non-micro-enterprises, un-weighted figures would effectively represent mainly the smallest sizes of firms.

<sup>11</sup> See [www.ebusiness-watch.org/about/methodology.htm](http://www.ebusiness-watch.org/about/methodology.htm) where the questionnaire is also available.

## 1.1 Adoption of ICT Infrastructure and ICT Investments

### 1.1.1 Deployment of ICT network infrastructure

#### Advancement in internet connectivity

The basic ICT infrastructure prerequisites for using e-business are quite good in all sectors and countries that were surveyed in 2005. 96% of employees from the 10 sectors studied worked in companies that are connected to the internet.

**Exhibit 1.1-1: Basic ICT infrastructure: Internet access in 2003/04**

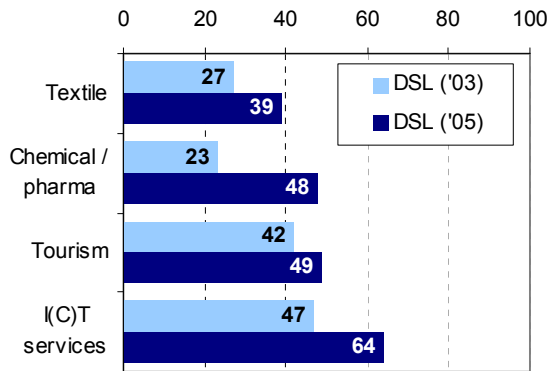
Weighting	Internet access		... of those									
			Analogue modem		ISDN		DSL		Other broadband		> 2 Mbit/s bandwidth	
	empl.	firms	empl.	firms	empl.	firms	empl.	firms	empl.	firms	empl.	firms
<b>Total (EU-7)</b>	<b>96</b>	<b>91</b>	<b>11</b>	<b>18</b>	<b>21</b>	<b>25</b>	<b>43</b>	<b>45</b>	<b>26</b>	<b>11</b>	<b>19</b>	<b>9</b>
<b>By sector (EU-7)</b>												
Food & beverages	95	83	10	26	24	24	40	46	24	4	14	5
Textile & clothing	98	93	11	26	21	24	51	39	19	8	14	4
Publishing & printing	99	98	8	17	13	15	43	53	38	14	32	13
Pharmaceutical	100	96	7	16	8	22	42	48	41	14	33	11
Machinery & equipment	99	95	4	18	21	34	46	42	36	9	20	7
Automotive	100	92	4	18	12	24	34	47	57	12	40	11
Aeronautics	100	99	2	13	1	22	41	49	51	18	41	13
Construction	95	91	14	20	27	31	45	38	14	9	10	7
Tourism	92	90	14	19	23	23	43	49	19	9	15	9
IT services	100	100	5	7	9	9	44	64	47	27	39	20
<b>By firm size (EU-7)</b>												
Micro (0-9 empl.)		91		19		25		45		10		9
Small (10-49 empl.)		96		15		29		46		13		8
Medium (50-249 empl.)		99		6		17		53		25		21
Large (250+ empl.)		99		4		14		37		47		33
<b>By country (10 sectors)</b>												
Czech Republic	97	93	9	11	24	30	15	22	37	28	14	11
France	91	76	20	32	6	5	51	58	26	4	23	17
Germany	99	97	3	7	32	54	43	40	28	3	22	6
Italy	97	95	12	19	26	32	46	46	17	2	14	6
Poland	98	93	16	19	19	27	27	19	33	19	11	5
Spain	96	95	10	13	9	11	71	71	13	8	22	13
United Kingdom	94	92	12	27	23	15	25	27	36	37	18	8
Base (100%)	All		Firms with internet access									
Base: "All" = Firms using computers. N = 5218 (Total, EU-7).												
Weighting: "firms" = % of firms; "empl." = firms representing ...% of employment (in the sector / country)												

Source: e-Business W@tch (e-Business Survey 2005)

However, a closer look at these figures reveals that there are still areas where connectivity should be further improved. In the food and beverages industry, for instance, 17% of companies – although using computers – said that they are not yet online. Although internet access is not a necessity for each and every firm, it can be assumed that it could be useful for at least some of these firms. For example, even small food companies may gain advantage simply from having access to web-based information resources.



**Exhibit 1.1-2: Migration towards DSL-based internet connections (% of firms with internet access) from 2003 - 2005**



EU-5 (2003); EU-7 (2005).

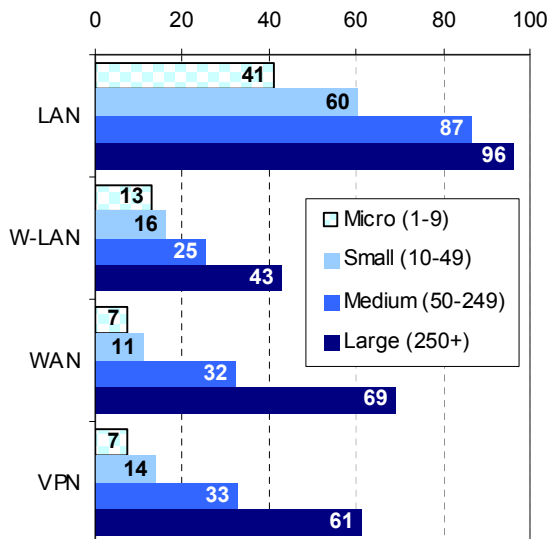
Source: e-Business W@tch (Surveys 2003 / 2005)

Broadband adoption is further progressing. In particular, the share of firms using **DSL** connections (out of those that have internet access) has significantly increased in all sectors that were covered by the surveys of e-Business W@tch in both 2003 and 2005.

At the same time, the percentage of companies still using **analogue dial up** modems to go online has decreased (not shown in figure). In the textile industry, for example, 41% of companies with internet access still connected in this very basic way in 2003; in 2005, 'only' 26% of firms used dial-up modems. Thus, the average bandwidth available has clearly increased from 2003 to 2005.

### Connecting computers within and between establishments

**Exhibit 1.1-3: ICT network adoption by size-band (2005)**



In % of firms, EU-7.

Source: e-Business W@tch (Survey 2005)

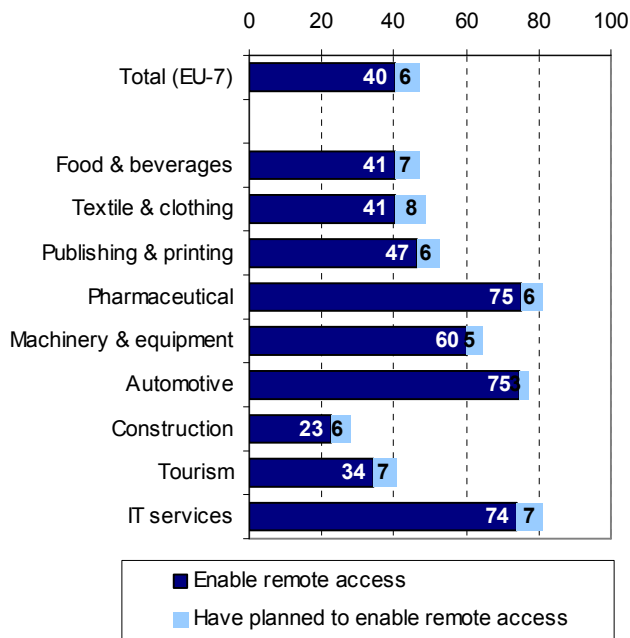
Requirements for connectivity within and between enterprises obviously increase by firm size. **Local Area Networks (LAN)** are a basic form of connecting computers within a company size. LANs are widely deployed even among very small firms. **Wireless LANs** are used, for instance, to enable mobile access to the company network from different places within the site. Employees can take their notebooks to meetings and still have access to company data.

**Virtual Private Networks (VPNs)**, a technology used to connect securely between branches of the same organisation and to other organisations, have rapidly gained in importance over the past few years, particularly among medium-sized firms (33%) and large enterprises (61%).

**Wide Area Networks (WAN)** are relevant mainly for firms with several establishments. Consequently, WANs are mostly used by large firms (close to 70%).

## Remote access: integrating field workers with the firm's network

**Exhibit 1.1-4: Firms enabling remote access to their computer network (2005)**



Weighted by employment (firms accounting for ..% of employment in a sector), EU-7.

Source: e-Business W@tch (Survey 2005)

Remote access solutions are more prevalent in manufacturing sectors than in services, with the exception of the IT services sector.

This aspect of firm connectivity is important to facilitate tasks that require flexible and mobile forms of work:

- ▶ Support the **sales force** in the field: Connecting the (often large) sales force to the backend ICT systems of a company facilitates information flows and streamlines processes.
- ▶ **Tele-work**: Remote access is a precondition for enabling home-based telework, which is increasingly popular among employees and offered by many companies. Tele-work can be a 'win-win' situation for both sides.
- ▶ **Mobile work**: Another group that needs access to company data from abroad are frequent travellers, such as managers.

In spite of the slow deployment of the UMTS<sup>12</sup> standard and services based on it, **mobile solutions** are expected to become important applications in many sectors. In the pharmaceutical industry, for example, many companies have a large sales force that spends most of the time with the customers. Connecting them to the companies' ICT systems promises efficiency gains and better informed sales representatives. Strangely, firms from construction rated low in this area also, although the nature of the industry would call for a more active use of such solutions.<sup>13</sup>

There are several scenarios for the further development of mobile solutions. Some of the paths that are currently explored are:

- **Mobile e-mail**: the opportunity to send and receive e-mails remotely on a mobile device
- **Mobile PIM** (Personal Information Management) and **Sales Force Management**: mobile updating of contact and calendar information by synchronising data remotely with the company network
- **Mobile CRM** (Customer Relationship Management): remote mobile access to the CRM system for recording and retrieving customer data on-site
- **Mobile stock recording**: the recording of product stocks at a retailer's site through mobile devices

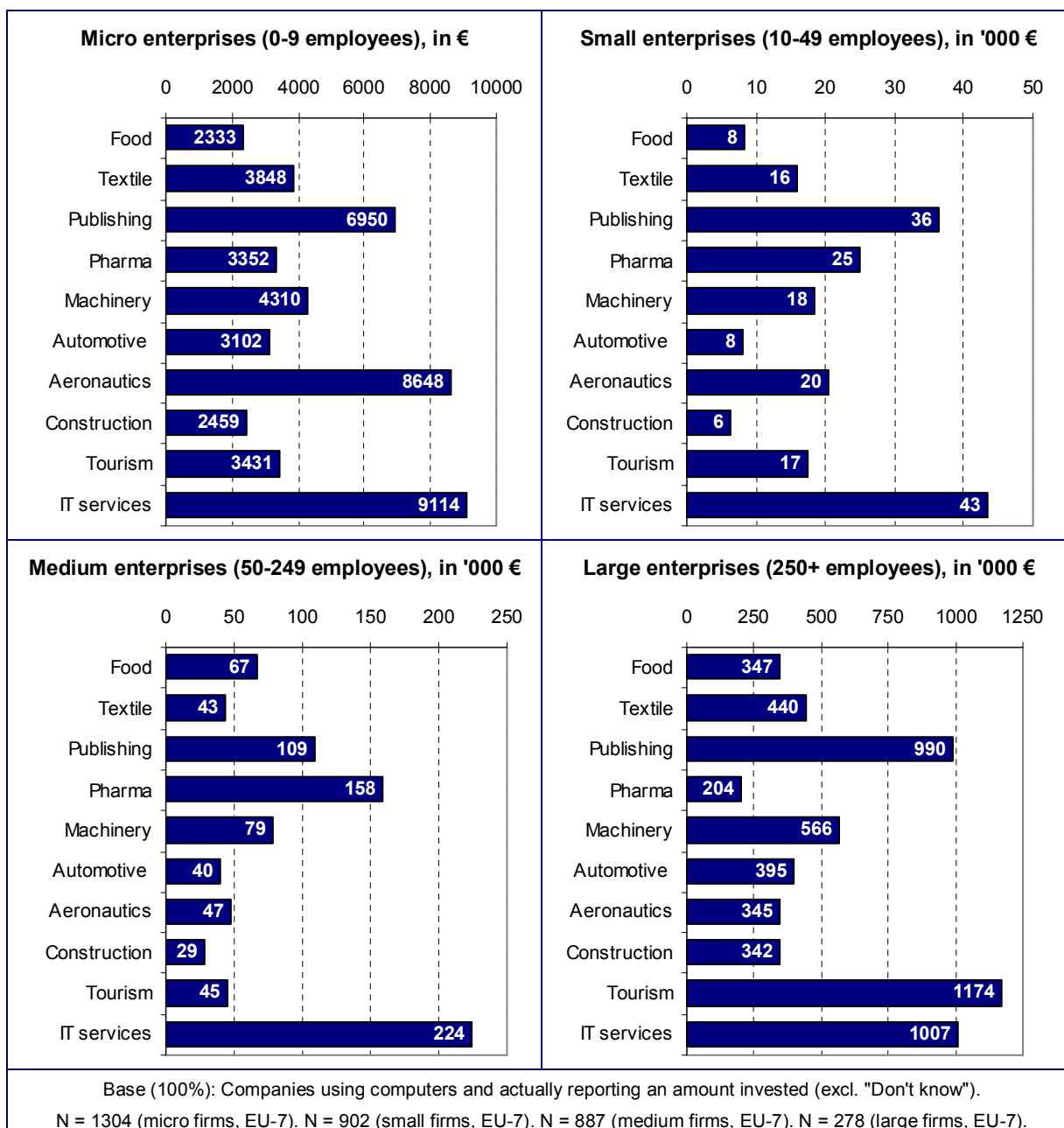
<sup>12</sup> Universal Mobile Telecommunications System, a standard for mobile communications.

<sup>13</sup> For more details and case studies on this topic, see e-Business W@tch Sector Reports on the Pharmaceutical Industry and on the Construction Industry, July 2005. [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources')

### 1.1.2 Investments in ICT

On average, companies from the 10 sectors covered reported an annual expenditure of about 6,600 euros for investments in ICT infrastructure and software in 2004. Obviously, investment differs substantially depending on firm size (see Exhibit 1.1-5). Since industries differ considerably in terms of the average company size<sup>14</sup>, comparisons should rather be made within the same size-band.

**Exhibit 1.1-5: Average investment in ICT infrastructure and software in 2004 (in euros)**<sup>15</sup>



Source: e-Business W@tch (e-Business Survey 2005)

<sup>14</sup> According to calculations based on Eurostat New Cronos data, the average firm size in the 10 sectors ranges from less than 10 employees in construction, tourism and IT services, to more than 100 employees in the pharmaceutical, automotive and aeronautics industries, with other sectors in between. This evidence is, for most sectors, confirmed by the average firm size of the sample from the e-Business Survey 2005.

<sup>15</sup> Based on the survey question D7 "What was your company's gross capital investment in ICT hardware and software in the past financial year?"

- ▶ Among **micro and small firms**, ICT investments were found to be highest (on average) in IT services and in the publishing and printing industry.<sup>16</sup> This observation is in line with evidence presented in the sector reports regarding the dynamic development of ICT adoption and e-business in these sectors.
- ▶ For **publishing and printing** companies, for example, investments in technologies for digital work-flow management and systems for online publishing are directly linked with the core business activity. For **IT services** companies, the vast majority of ICT investments is by definition tightly connected to their main business. In contrast, ICT investments made by small firms from sectors such as textile or machinery and equipment manufacturing concern mainly business support functions, but not the core business itself.
- ▶ Among the **large enterprises**, average ICT investments were found to be particularly high in the **tourism** industry. This is in contrast to findings for the specific industry's SMEs which are not among the 'intensive' investors. However, this can be explained by the fact that many e-business activities of many smaller firms from this industry are outsourced, typically to platform operators. For example, many smaller hotels which enable online reservations do not run the systems themselves, but offer their rooms on various e-tourism platforms.
- ▶ A good example to illustrate the distorting effect of industry structure on "average" ICT investments is the **automotive industry**. Comparing average spending irrespective of size bands, firms from the sector appear to be among the leading investors (32,000 euros compared to 6,600 euros on average in the 10 sectors). However, the differences in ICT investments between company sizes are extreme. On average, a large company in the automotive industry spends 130 times more on hardware and software than a micro-enterprise. If comparisons to other sectors are made within comparable size-bands, as shown in Exhibit 1.1-5, results show that ICT investments made by automotive companies are, in fact, lower than those of firms in many other industries.
- ▶ Findings for firms from the **food & beverages** and the **textile** industries could raise new questions about the reasons for the comparatively low adoption of e-business activity in these sectors. Interestingly, the investment in ICT appears to be at a similar level as in other manufacturing sectors, which are supposed to be more advanced in e-business.

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<sup>16</sup> The apparently high figure for micro-enterprises in the aeronautics industry should be taken with care due to the small sample size in this industry.

## 1.2 Integrating Internal Business Processes

### 1.2.1 ICT for sharing information and managing knowledge

In many companies, an **intranet** is the central platform for the exchange and management of company information, and possibly, for the implementation of internal training programmes. They are internal websites that can be accessed by staff only. If intranets are actively used as an internal information hub, they also reflect to some extent the entire company culture. Company policies and procedures ("how things are done here"), company news and project plans, for example, can be provided on the intranet.

Intranets are widely used in all sectors surveyed (see Exhibit 1.2-1). In total, more than 50% of medium-sized enterprises and about 80% of large firms have an intranet. In some sectors, adoption has further increased since 2003 according to the surveys by *e-Business W@tch*. In the textile industry, for example, diffusion increased from 35% (2003) to 45% (2005)<sup>17</sup>, in tourism from 36% to 41%.

**Exhibit 1.2-1: Applications for internal information sharing, planning and controlling in 2005**

Weighting	Information sharing								Planning / controlling			
	Intranet		KM system		E-learning		Share documents		Track work hours		ERP	
	empl.	firms	empl.	firms	empl.	firms	empl.	firms	empl.	firms	empl.	firms
<b>Total (EU-7)</b>	<b>47</b>	<b>19</b>	<b>13</b>	<b>5</b>	<b>18</b>	<b>9</b>	<b>30</b>	<b>18</b>	<b>19</b>	<b>8</b>	<b>28</b>	<b>9</b>
<b>By sector (EU-7)</b>												
Food & beverages	46	12	11	4	12	6	28	11	28	6	37	6
Textile & clothing	45	17	13	8	9	4	27	13	20	5	34	8
Publishing & printing	52	23	11	8	13	9	29	19	19	5	21	8
Pharmaceutical	75	35	25	8	19	10	43	20	32	9	71	19
Machinery & equipment	54	22	11	6	19	9	37	21	28	11	58	17
Automotive	85	30	25	7	35	9	60	19	34	13	71	18
Aeronautics	98	42	39	14	60	22	26	29	47	17	52	25
Construction	29	14	10	4	11	6	21	11	11	7	13	7
Tourism	41	18	7	3	19	9	23	21	11	5	12	8
IT services	78	50	37	17	39	27	56	50	35	19	39	18
<b>By firm size (EU-7)</b>												
Micro (0-9 empl.)		18		5		9		18		7		8
Small (10-49 empl.)		29		10		8		19		11		9
Medium (50-249 empl.)		53		13		14		33		22		33
Large (250+ empl.)		79		25		31		48		35		59
<b>By country (10 sectors)</b>												
Czech Republic	40	5	9	1	18	14	26	9	18	4	22	7
France	48	10	14	1	7	4	34	11	25	3	40	14
Germany	49	11	10	4	19	12	31	15	24	17	35	7
Italy	38	15	7	3	14	7	27	19	13	8	22	10
Poland	51	9	13	10	11	8	19	14	18	7	22	3
Spain	37	24	21	10	13	9	32	25	14	3	25	8
United Kingdom	56	19	17	11	34	16	30	26	17	11	20	4
Base (100%)	All		All		All		All		All		All	

Base: "All" = Firms using computers. N = 5218 (Total, EU-7).  
Weighting: "firms" = % of firms; "empl." = firms representing ...% of employment (in the sector / country)

Source: *e-Business W@tch* (e-Business Survey 2005)

<sup>17</sup> Both figures in % of companies using computers, weighted by employment.

Special **Knowledge Management (KM)** applications go beyond the functionality of an intranet. They are designed to support organisations in generating value from their intellectual and knowledge-based assets. While knowledge is often shared through informal networks, the intention of formal knowledge management systems is the *systematic* gathering and compilation of information. While the efficient management of knowledge is important for companies of all sizes, special tools to support this function are most valuable for large enterprises. The latter have a complex and often dispersed knowledge base, where files have to be accessed by many different parties in the workflow. Consequently, it is no surprise that large firms are more than twice as likely to use KM software as SMEs (25% versus 10-13%).

It should be considered, however, that "knowledge management" can have different meanings depending on the industry. For publishing companies, for example, the most important application in terms of KM is certainly the systematic archiving of digital assets (e.g. stories, pictures, graphics). Digital news archives have greatly facilitated the work of journalists, as they can run fast key word searches for previous coverage of a topic in the newspaper or magazine they work for. Most publishing companies therefore run powerful databases that have been developed specifically for archiving media contents. In a way, these databases can be regarded as the key KM system for publishing companies, although they are not KM in the usual sense.

**E-learning** applications are predominantly used in sectors which have a high affinity to technology, in particular information technology. In the survey of 2003, manufacturers of electronics, telecommunication companies and computer services firms were found to be prime adopters of these applications. This also holds true for 2005, where e-learning tools are mostly used in the IT services sector (27% of firms) and in the aeronautics industry (22%). Digital learning environments are particularly suited for contents of a technical nature, where opportunities of 3D visualisation and hyperlinked cross-references make them superior to paper-based documentation.

Online applications for **sharing documents** among employees appear to be more widespread than KM or e-learning. 18% of firms from the 10 sectors, comprising 30% of employment, report the use of such systems.

## 1.2.2 Support for planning, controlling and management

### Use of Enterprise Resource Planning (ERP) systems

A major function of internal ICT systems is to support **planning and controlling** processes. Related applications facilitate an integrated and holistic view on the company and are thus an indispensable management tool.

The most important software application in this context are **ERP systems**. In a way, ERP constitutes the **backbone** of all production and product-related ICT systems, including systems for product planning, purchasing, inventory management, order tracking and finance. A number of case studies from different sector reports in 2005 emphasise the importance of ERP systems as a platform for many e-business projects in companies.<sup>18</sup> They were originally developed mainly for large manufacturing, wholesale or retail companies. However, adoption is also widespread in midsize firms and is now gaining momentum among smaller businesses as well. Moreover, an increasing number of standardised software packages for specific industries, such as engineering, are currently reaching the market.

Against this background, the deployment of ERP systems is a good indicator for the overall e-business maturity in many sectors. In fact, ERP adoption has **significantly increased** in the EU since 2002/03 in most sectors (see Executive Summary, "Trends from 2003-2005"). Thus, companies seem to be in a better position to implement new and more advanced e-business solutions than 2-3 years ago.

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<sup>18</sup> See chapter 1.7 for relevant examples ("e-Business Activity Views: Conclusions and Lessons Learned")

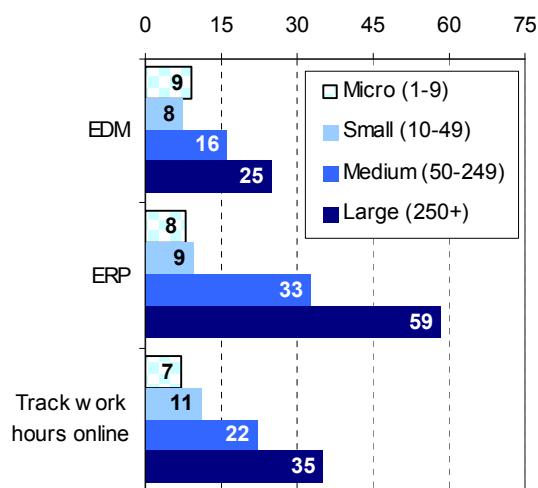
As observed in the e-Business Report 2004, which focused on the situation in the 10 **new EU Member States**, companies from these countries were "*lagging behind in ERP use*" (see box, p. 25). In the electronics industry, for example, adoption rates were found to be much lower in all new Member States surveyed (Estonia: 15%, Hungary: 13%, Poland: 8%, Slovenia: 22%, Slovakia: 21%) than in the former EU-15 (45%). Similarly, adoption among transport equipment manufacturing companies in these countries was significantly lower. This finding cannot be confirmed by results of the e-Business Survey 2005. By and large, ERP adoption rates reported by Czech and Polish companies compare well to those from Italy, Spain and UK. Diffusion is slightly higher among French and German companies, at least if employment-weighted statistics are used (see Exhibit 2.1-1). This holds true in particular for certain sectors, such as the automotive industry. It seems likely that companies in Poland and the Czech Republic, in particular mid-sized and larger ones, have invested in ERP systems as part of their innovation activities over the past 2 years. However, it was also observed that "*in sectors where ERP systems are less important, the gap is much less pronounced*". This could partly explain the different findings of 2005.

### ICT systems for document and work-flow management

In addition to ERP systems, there are other, specialised ICT solutions to optimise specific firm-internal and management tasks. Often, these specialised solutions can be integrated or connected to ERP systems. Only two examples are briefly referenced here:

- ▶ **EDM** (Electronic Document Management) is the management of different kinds and formats of documents in an enterprise, usually enabling a single view of (otherwise) multiple databases. It can help firms to comply with regulatory documentation requirements.
- ▶ ICT systems that allow to **track working hours and production times** online support project and production managers to monitor whether they are "on target" (in terms of schedule and resources used). Such project management tools are particularly useful in collaborative projects involving partners from different sites and places.

**Exhibit 1.2-2: Use of ICT systems for planning and controlling (2005)**



In % of firms, EU-7.

EDM = Electronic Document Management

ERP = Enterprise Resource Planning

Source: e-Business W@tch (Survey 2005)

The use of ICT systems for **planning and controlling production processes** increases by firm size. Large scale projects often involve many players and complicated logistics and work-flows. The complexity of such projects calls for the use of ICT applications to support their management and coordination of this work.

Medium-sized companies appear to have the critical size so that **ERP** systems pay off. The latter however, are used by few firms with less than 50 employees.

**EDM** systems are not yet widespread. Only about 9% of firms from the 10 sectors surveyed (accounting for 15% of employment) use them.

Firms accounting for 35% of employment use tools to **track working hours** and production times online. They are mostly used in the machinery, automotive and pharmaceutical industry, as well as in IT services.

## 1.3 The Supply Side: Electronic Procurement

### 1.3.1 Adoption of online purchasing

#### The drivers: saving direct procurement costs, increasing process efficiency

The drivers for procuring supplies electronically remain the same as in previous years: companies aim at **decreasing direct costs** for supplies and, at the same time, **increasing the efficiency** of the underlying processes within the firm and in communicating with suppliers. In theory, electronic procurement offers the greatest potential to companies from manufacturing industries: as many firms in these sectors have to manage a large number of transactions with their suppliers on a day-to-day basis, even fractional improvements in these processes can aggregate to quite substantial savings. However, empirical findings indicate that not only manufacturing sectors benefit from e-procurement; some of the service sectors are also making intensive use of online buying.

**Standardisation and interoperability** are important requirements to increase the efficiency in B2B procurement processes. Ultimately, the benefit of e-procurement systems relies on the degree to which documents can be exchanged in a standardised format, for example product catalogues, orders, invoices and payments. If the ICT systems of two companies can easily 'communicate' with each other, i.e. if the system of one company 'recognises' the data transmitted (for example as an order with its various specifications, such as type of product, volumes ordered, delivery address), then e-procurement can lead to substantial cost savings. Reduced processing time per item ordered and reduced error rates are common metrics to measure such improvements.

#### Electronic purchasing activity in 2004/05

- ▶ 44% of all companies from the 10 sectors studied in 2005, accounting for more than 50% of respective employment, said in early 2005 that they ordered at least some of their supply goods online (see Exhibit 1.3-1), for example from their suppliers' websites, on internet trading platforms or via dedicated firm-to-firm connections.
- ▶ B2B online trade has reached a **significant level across all industries**. In most of the 10 sectors studied, 40-60% of firms (by their employment share) make online purchases. Among IT services companies, e-procurement is even more common (80%). However, leaving aside companies which say that online purchases account for **less than 5%** of their total purchases, figures fall to almost half that level. This is a consistent finding over the past few years.
- ▶ In fact, **differences by sector** are more pronounced if occasional online purchasers (with a total volume of less than 5%) are not considered. Interestingly, it was not companies from typical manufacturing sectors with large dominant players and deep supply chains which reported the most intensive use of online purchasing. The IT services sector is outstanding in this regard (with more than 40% of firms saying that they buy at least 25% of supplies electronically). In tourism, publishing & printing, and in aeronautics, the share of firms that buy at least 5% of their supplies online is also significant (about 30%). Service sectors and sectors where a lot of digital goods and components are traded (e.g. publishing) may have surpassed typical manufacturing sectors on the more intensive levels of e-purchasing.
- ▶ There is not much difference between companies of different **size-bands**. The adoption rate for micro and small enterprises is about 45%, and for medium-sized and large firms about 55%. The difference diminishes even further if only companies that buy at least 5% of their supplies online are considered.
- ▶ In contrast to other applications whose adoption rates depend largely on firm size, online purchasing activities differs more by sector as well as **by country**. For example, firms from the UK and from Germany tend to make more use of online purchasing than those from the other five EU Member States covered by the survey of 2005.



**Exhibit 1.3-1: Online sourcing and procurement in 2004/05**

Weighting	Make online purchases		... of those:								Use specific ICT systems for e-sourcing	
	firms	empl.	Online purchases <5%		Online purchases 5-25%		Online purchases 26-50%		Online purchases >50%		firms	empl.
			firms	empl.	firms	empl.	firms	empl.	firms	empl.	firms	empl.
<b>Total (EU-7)</b>	<b>44</b>	<b>51</b>	<b>42</b>	<b>47</b>	<b>34</b>	<b>34</b>	<b>11</b>	<b>11</b>	<b>13</b>	<b>8</b>	<b>11</b>	<b>19</b>
<b>By sector (EU-7)</b>												
Food & beverages	22	43	67	62	28	29	4	5	1	4	5	18
Textile & clothing	30	44	62	65	31	29	4	3	3	4	8	14
Publishing & printing	48	57	41	44	41	39	11	6	7	12	8	16
Pharmaceutical	38	48	50	40	32	44	8	8	11	8	14	32
Machinery & equipment	36	53	50	59	39	32	7	7	4	2	10	18
Automotive	41	60	58	44	30	52	7	<1	5	3	13	39
Aeronautics	65	43	44	12	39	83	7	<1	10	4	16	63
Construction	36	43	53	59	40	32	3	5	4	3	9	16
Tourism	49	57	40	38	32	32	16	20	12	11	14	14
IT services	81	76	21	22	26	30	18	25	36	24	19	29
<b>By firm size (EU-7)</b>												
Micro (0-9 empl.)	43		40		35		11		13		11	
Small (10-49 empl.)	46		58		29		8		5		10	
Medium (50-249 empl.)	54		51		35		9		6		22	
Large (250+ empl.)	58		50		32		11		7		30	
<b>By country (10 sectors)</b>												
Czech Republic	42	49	51	53	33	33	9	7	7	7	8	15
France	26	40	44	53	36	28	11	9	10	9	7	21
Germany	56	62	36	44	35	40	11	8	17	7	11	22
Italy	37	35	50	63	37	26	7	7	6	4	7	11
Poland	39	37	62	77	23	11	5	7	11	5	3	8
Spain	50	46	37	45	37	39	13	7	13	9	23	23
United Kingdom	63	68	35	35	31	35	15	20	18	10	11	22
Base (100%)	All		Companies purchasing online								All	
Base: N = 5218 (Total, all companies). "All" = firms using computers.												
Weighting: "firms" = % of firms; "empl." = enterprises comprising ...% of employees (in the respective sector / country).												

Source: e-Business W@tch (e-Business Survey 2005)

### The share of online purchases as % of total purchasing – an assessment

e-Business W@tch does not collect data on absolute (online) purchasing volumes, but asked companies to estimate the percentage of their total purchasing volume that is actually conducted online.<sup>19</sup> A simple computation of the answers suggests that EU companies from the 10 sectors purchased about 5-7% of their total supplies online in 2004.<sup>20</sup> For IT services firms, online orders accounted for about 15-18% of their total purchasing volume in 2004. In most of the other sectors, the share is estimated at 3-8%. However, as outlined above, this is just an assessment and cannot be thoroughly validated on the basis of the figures available.

<sup>19</sup> i.e. including orders from websites, internet trading portals, via extranet connections and through EDI. Companies were given five options for their answer: "less than 5% of total sales", "5-10%", "11-25%", "26-50%" and "more than 50% of total sales".

<sup>20</sup> It was assumed that the average share tends to be towards the lower end in each of the ranges offered as options for their answer. To adjust for the larger purchasing volumes of large companies, employment-weighted figures were used. This is, of course, a crude approximation only.

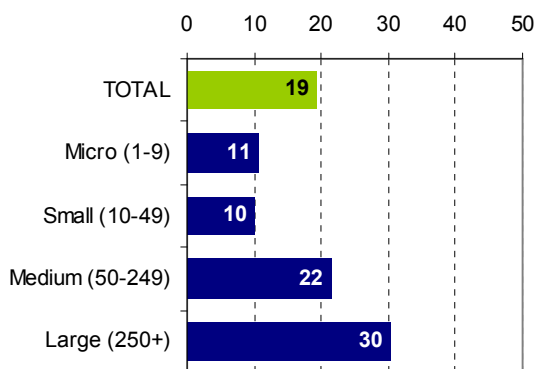
**Spotlight on sectors: specific contexts for online purchasing**

- ▶ A peculiarity of the **food and beverages** industry is the perishable nature of the merchandise. Improved supply-chain integration offers a great potential for quality assurance.
- ▶ Online procurement in the **aeronautics industry** developed in two ways: first, industry-wide online marketplaces were established; second, some large firms decided to introduce their own internet platforms for their suppliers.
- ▶ Online purchasing is widespread in the **tourism** industry. Survey results indicate a notable use of e-marketplaces and trading networks.
- ▶ The **IT services sector** has excellent preconditions for buying online, since many inputs necessary for providing IT services can easily be bought on the internet. This applies, for example, to software, hosting services, internet and telecommunication services, office supplies, books and database content.
- ▶ In the **printing industry**, paper is the main raw material and direct supply which can be easily procured online. In fact, there has been quite a dynamic development in this market, although the forest and paper industry is a very traditional industry which could be expected to migrate rather cautiously into the e-business era.

**1.3.2 Supporting sourcing and procurement processes with ICT**

In the e-Business Survey 2005, *e-Business W@tch* introduced a new question to test and substantiate whether e-procurement is a systematic and digitally integrated process in a firm, or rather an occasional business activity without much significance for the overall business. Companies were asked whether they "support the selection of suppliers or procurement processes by specific ICT solutions".<sup>21</sup> The analysis of the respective results provides a much better picture about online procurement activity than previously available.

**Exhibit 1.3-2: Companies using specific ICT solutions for e-procurement (2005)**



Size-bands: In % of firms; EU-7, 10 sectors.  
 Total: Weighted by employment; EU-7, 10 sectors.  
 Source: *e-Business W@tch* (Survey 2005)

About 11% of firms (accounting for 19% of employment) reported the use of specific software solutions or internet-based services for electronic procurement. Thus there is a substantial gap between the percentage of companies making some online purchases (44%) and those that use special software for doing so. It can be assumed that companies without such software make some purchases from websites of suppliers, which does not require any special e-procurement system.

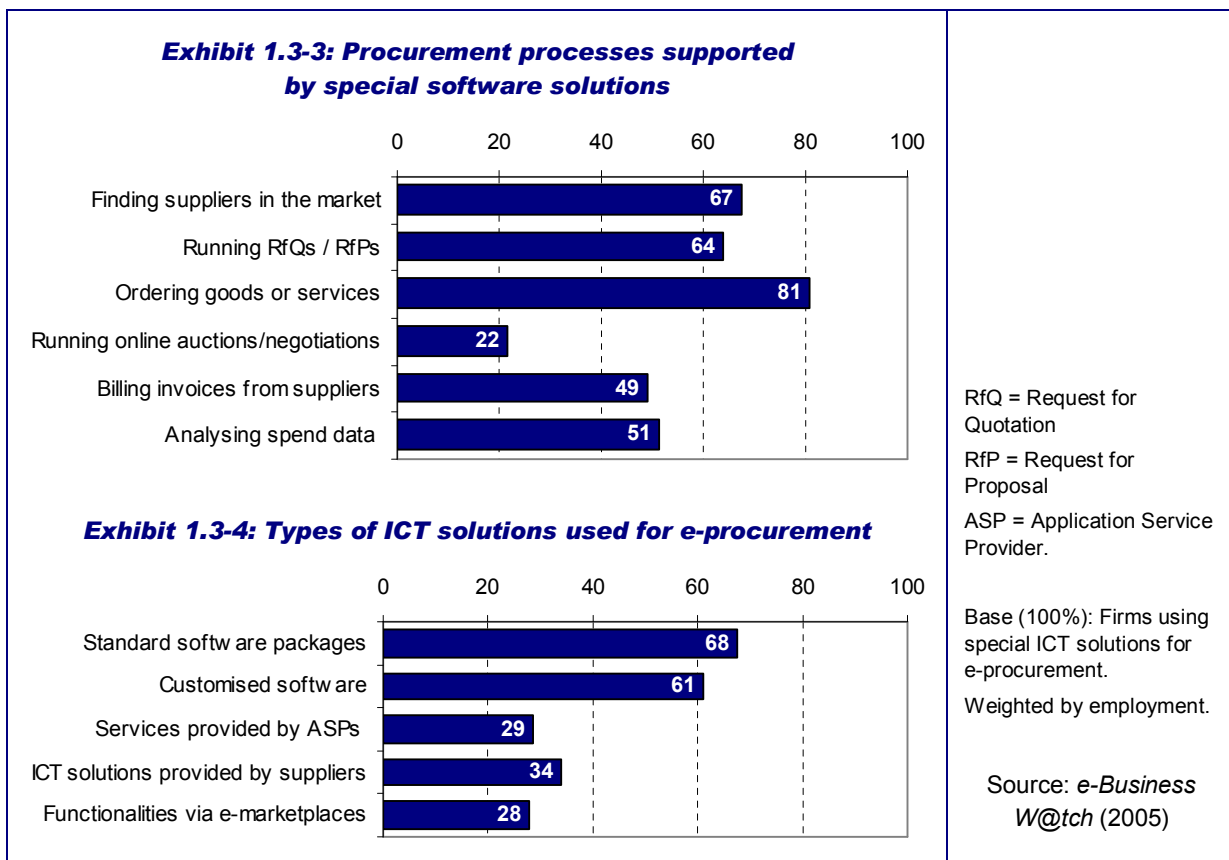
In contrast to 'simple' online purchasing, the use of specific ICT systems for e-procurement increases by company size. While only about one in ten micro and small firms reported the use of such systems, about 20% of medium-sized and 30% of large companies did.

<sup>21</sup> Interviewees were given an additional explanation: "With ICT solutions we do not mean Word, Excel or plain-text e-mail, but rather specific software solutions or internet-based services."

### Types of ICT solutions used and procurement processes supported

As a follow-up question to the one on the use of special ICT solutions for e-procurement, firms were asked which business processes they supported with these systems (see Exhibit 1.3-3). It can be concluded that those companies that use special ICT solutions make use of them for a broad range of procurement-related processes rather than only for specific ones.

As can be expected, the vast majority of those firms that have such systems in place use them for directly ordering goods online from suppliers (about 80%), but also for finding suppliers in the market (67%). Running requests-for-quotations or proposals (RfQ / RfP) is also a standard practice if e-procurement systems are used (64%). Furthermore, about 50% of those firms bill invoices from suppliers electronically, which indicates that the e-procurement system is digitally integrated with accounting, for example through the company's ERP system. All these findings are to a high degree consistent across the 10 sectors surveyed.



A second follow-up question was which type of specific ICT software solutions or internet-based services companies used for supporting sourcing and procurement processes (see Exhibit 1.3-4). Multiple answers were possible and replies show that companies seem to be using different systems and functionalities. About two thirds of those firms that have special software reported using standard software packages. About 60% said that they used customised, company-specific ICT solutions. Other systems, such as software services provided by ASPs (Application-Services-Providers), or functionalities offered by the suppliers themselves, are used by about 30-35% of companies with specific ICT solutions for purchasing online.

## 1.4 Improving Customer Service: Electronic Marketing and Sales

### 1.4.1 Adoption of online selling

#### The continued e-commerce paradox – a boom that is hard to track in statistics

The E-Business Report 2004 pointed at the "e-commerce paradox" (cf. p. 26f.): while a vast majority of observers agree that e-commerce is booming in special markets such as tourism, retail and IT services, a paradox appears when it comes to tracking this boom statistically. The percentage of companies that allow customers to order products and services online appeared to be stagnating. This observation holds still true for 2005, at least on the aggregate level. There is hardly an increase in the percentage of firms reporting online sales.

These observations lead to a frequently cited phenomenon. If e-procurement activities have gained momentum, as an increasing number of enterprises report buying supply goods online, who is the seller on the other side of the line? In fact, there is no straight forward simple answer, although two possible explanations are plausible:

- Firstly, it appears that there is only a limited number of companies in many sectors which have specialised in selling their products online (either through their own website, on B2B marketplaces or via dedicated proprietary networks), while there are many more companies in the respective value chains that make use of this offer without selling their own products online. In other words, online selling could be – to some extent – a one-to-many activity.
- Secondly, some companies make only rudimentary use of e-procurement, for instance for rather insignificant purchases of office material or other MRO goods<sup>22</sup>, without necessarily selling anything online themselves. The e-Business Survey 2005 provides new evidence for this assumption (see chapter 1.3.2, use of ICT systems for e-procurement).

On the other hand, it is uncontested that the internet has had a profound impact on customer service and sales in several industries. A recent special report and cover story of The Economist about the impact of the internet on consumer power concluded that the digital marketplace has made the claim that "the customer is king" come true.<sup>23</sup> While this perspective mainly applies to B2C oriented sectors, *e-Business W@tch* sector reports of 2005 indicate that applications supporting customer service are clearly gaining momentum in B2B oriented sectors as well, for example in the machinery and equipment and the pharmaceutical industries.

#### Electronic marketing and sales: key figures in 2004/05

A majority of firms from the 10 sectors studied in 2005 had a **website** on the internet. Figures are largely comparable to those presented in 2003. About 60% of small firms, 80% of medium-sized and 90% of large companies are represented on the internet. However, these statistics do not provide a good picture about the use which a company makes of its website. Figures include on the one hand the most simple, basic websites which may consist of only one or two pages with company information, and, on the other, highly developed sites with sophisticated interactive features, including high level e-commerce functionalities such as secure ordering and online payment systems.

A useful indicator as to whether websites consist of more than just a few pages and whether they are regularly updated is the use of **Content Management Systems** (CMS). Currently, about 30% of firms that have a website say that they use a CMS. Among large firms, the share is about 40%.

<sup>22</sup> Maintenance, repair and operating goods. Supplies which companies need to maintain their operations, for example office supplies, in contrast to direct production inputs.

<sup>23</sup> "Crowned at last. A survey of consumer power", in: The Economist, April 2-8 2005. 14-page special report.

In 2005, about 15% of firms from the 10 sectors said that they made **online sales** (see Exhibit 1.4-1). Thus, figures are surprisingly similar to those from the previous surveys (2002, 2003), in spite of the different configuration of sectors in 2005 and the dynamic demand for internet-based services in specific sectors such as tourism. Even the relative share of online sales (as % of total sales) has not significantly changed. In brief, it appears that there is no clear statistical evidence of the online boom.

It must be considered, however, that transaction oriented statistics fail to acknowledge the rapidly increasing importance of the internet for making purchasing decisions. Thus, in a way, these figures only show the tip of the iceberg. To understand the real impact of the internet, **'net-influenced' sales** must not be neglected. This approach considers the important role of the internet during the pre-purchase stages, for instance for browsing offers and comparing prices. This observation, which was already presented in the 2003 edition of the European E-Business Report (cf. p. 30), still holds true and may even have increased in importance since.

**Exhibit 1.4-1: Online sales activity in 2004/05**

Weighting	Make online sales		... of those:								Use specific ICT systems for online sales	
	firms	empl.	Online sales <5%		Online sales 5-25%		Online sales 26-50%		Online sales >50%		firms	empl.
<b>Total (EU-7)</b>	<b>15</b>	<b>17</b>	<b>36</b>	<b>43</b>	<b>36</b>	<b>37</b>	<b>16</b>	<b>11</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>17</b>
<b>By sector (EU-7)</b>												
Food & beverages	8	12	74	67	24	21	0	9	2	2	6	15
Textile & clothing	10	14	44	73	42	23	3	2	11	3	7	14
Publishing & printing	18	37	43	53	38	38	6	5	13	4	9	27
Pharmaceutical	13	18	54	54	30	26	4	16	12	3	12	26
Machinery & equipment	5	11	66	61	18	36	0	3	16	1	8	17
Automotive	11	6	49	73	32	15	12	4	8	8	9	24
Aeronautics	12	8	13	72	59	28	26	0	2	0	14	6
Construction	3	4	64	61	36	39	0	0	0	0	3	8
Tourism	31	36	30	28	38	44	20	15	11	13	12	19
IT services	25	25	26	45	28	27	20	12	26	16	23	40
<b>By firm size (EU-7)</b>												
Micro (0-9 empl.)	15		35		35		16		13		8	
Small (10-49 empl.)	14		41		37		16		5		11	
Medium (50-249 empl.)	16		36		49		10		5		20	
Large (250+ empl.)	21		57		30		5		7		28	
<b>By country (10 sectors)</b>												
Czech Republic	12	14	44	51	27	29	20	10	10	9	4	9
France	8	11	37	46	29	23	29	24	6	7	6	17
Germany	25	19	41	53	41	36	7	6	11	4	13	23
Italy	13	15	14	22	57	51	27	18	2	9	3	8
Poland	16	15	37	55	30	30	22	10	10	5	10	9
Spain	15	13	52	36	26	44	2	6	20	13	12	17
United Kingdom	16	24	32	41	21	36	21	9	26	15	13	21
Base (100%)	All		Companies selling online								All	

Base: N = 5218 (Total, all companies). "All" = firms using computers.  
Weighting: "firms" = % of firms; "empl." = enterprises comprising ...% of employees (in the respective sector / country).

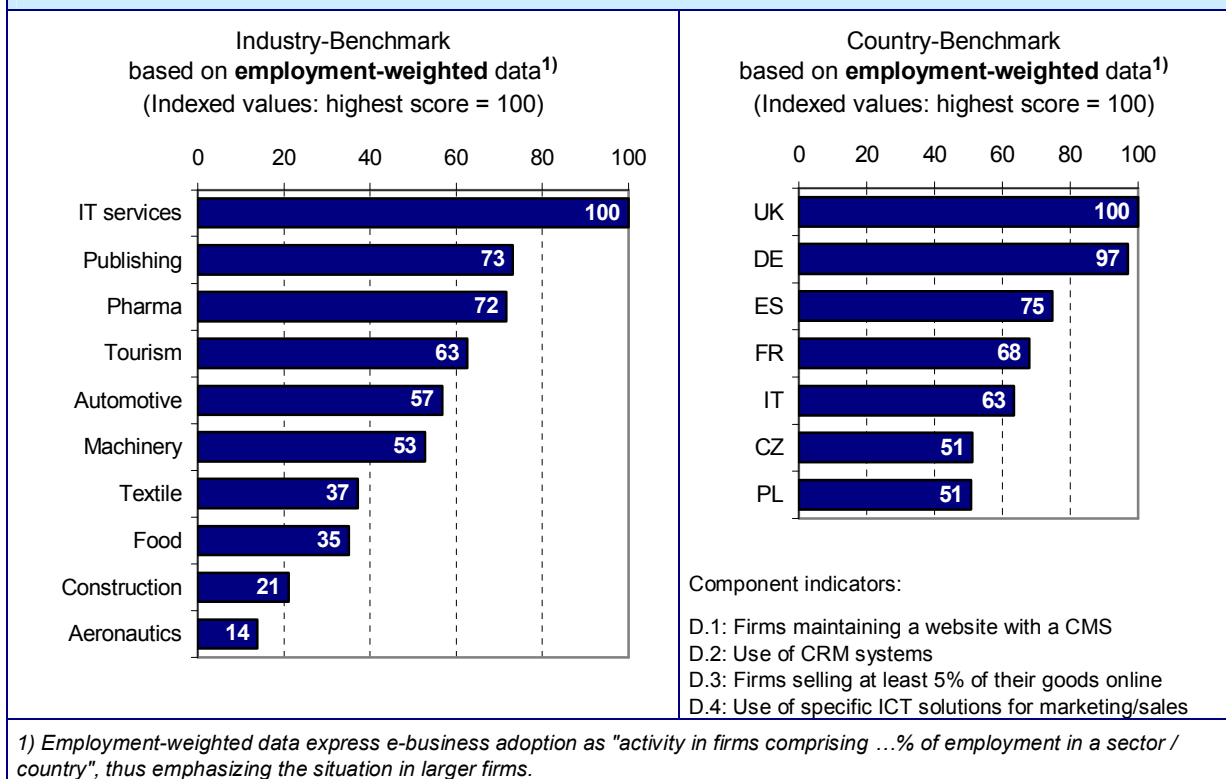
Source: e-Business W@tch (e-Business Survey 2005)

From a broader perspective, an interesting finding is that the same sectors in which companies buy the highest shares of supply goods online are also the ones where the highest shares of online sales were reported. Only in IT services, tourism and publishing more than 10% of firms said that they make more than 5% of their revenues from online sales.

**Spotlight on sectors: specific contexts for online marketing and sales**

- ▶ The **tourism** industry is a prime adopter of e-commerce. The main users are hotels (online reservations) and airlines (e-ticketing). Some companies focus nearly entirely on the internet as their key sales channel (e.g. certain airlines).
- ▶ In the **machinery and equipment** industry, after-sales service is an increasingly important application area for e-business. Electronic service delivery offers opportunities for improving customer service, for instance for maintenance and repair of machines.
- ▶ The use of ICT for the support of sales and marketing activities is a key issue in the **pharmaceutical** industry. CRM systems and mobile solutions are increasingly used to support the sales force attending customers in the field (e.g. pharmacies, doctors).
- ▶ In the **textile** industry, online sales have not yet gained momentum. However, for a large share of businesses, the main customers are not consumers (buying finished products), but other businesses for which the former perform part of the production activity. Transactions among these players are still mainly carried out in a traditional way.
- ▶ Online sales are not a common practice in the **automotive** industry. Carmakers use their internet presence mainly for marketing purposes and are rather reluctant to replace the traditional exclusive dealer networks with other forms of car sales.
- ▶ For **publishing** companies 'online selling' often means granting access to their online newspapers or magazines. In many cases, publishers offer a part of their contents for free on their website, but charge users a fee for accessing other parts.

**Exhibit 1.4-2: e-Business Scoreboard 2005 – Sub-Index on Marketing & Sales<sup>24</sup>**



Source: e-Business W@tch (2005)

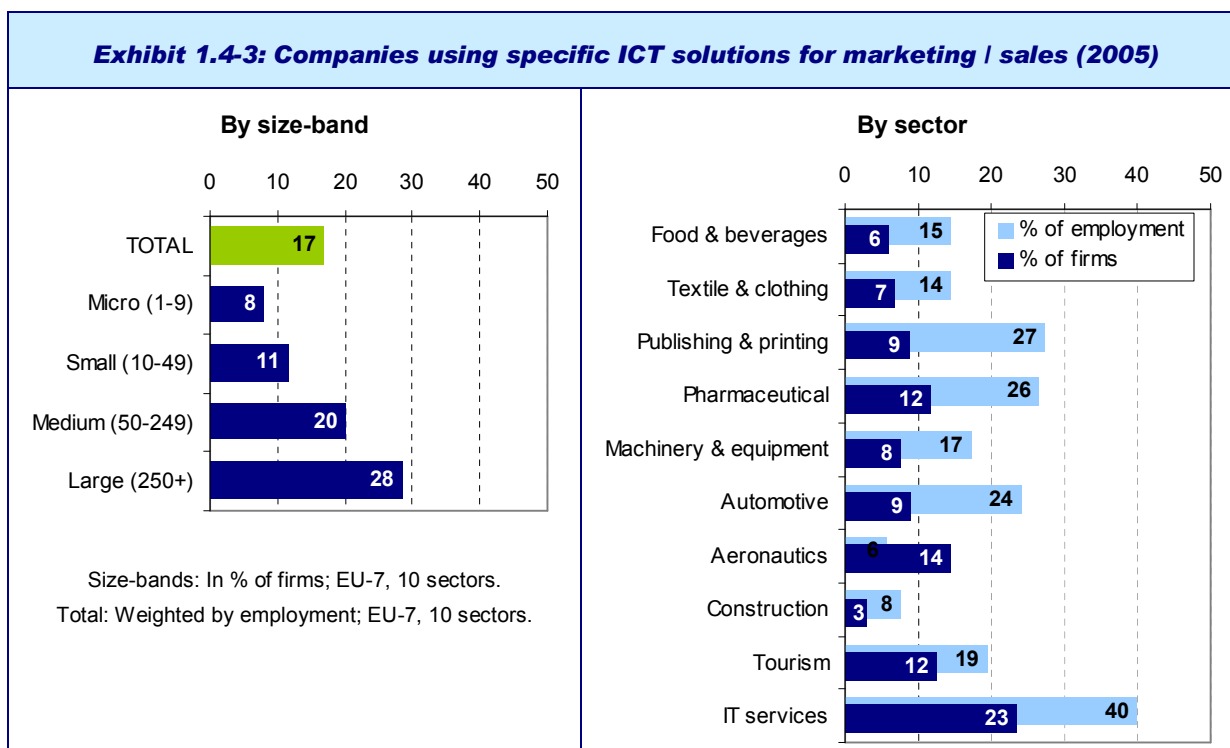
<sup>24</sup> For information about the construction of the index, see Annex III (Methodology Report)

### 1.4.2 Supporting marketing and sales processes with ICT

The e-commerce systems used for making online sales can have different sophistication levels and can be linked (or not) to invoicing, accounting or stock management systems. The development of making online sales, from simply receiving orders by e-mail toward integrating the system with the back-end IT system, can be described as a path of increasing sophistication.

To gain better evidence on this issue, *e-Business W@tch* introduced a new question in the 2005 survey. Similarly as in the case of e-procurement, companies were asked whether they "support marketing or sales processes by specific ICT solutions."<sup>25</sup> About 10% of firms (accounting for 17% of employment) reported the use of specific software solutions or internet-based services for supporting marketing and sales activities (see Exhibit 1.4-2). In contrast to e-procurement (see previous chapter), this figure corresponds closely to the share of companies that make online sales (15% of firms), with the exception of micro-enterprises.

Thus, while online purchases are frequently made from suppliers' websites without using specific ICT solutions, companies that sell their goods or services online typically have some underlying e-commerce system (such as an online shop system). Exceptions are possible, however; in the tourism industry, for example, many hotels (notably smaller ones) have outsourced the operation of an online reservation system to third party service providers (online travel and hotel reservation platforms). Thus, they make 'online sales' (which means they enable customers to make an online reservation) without having a respective ICT system for e-commerce.



Source: *e-Business W@tch* (e-Business Survey 2005)

<sup>25</sup> Interviewees were given an additional explanation: "With ICT solutions we do not mean Word, Excel or plain-text e-mail, but rather specific software solutions or internet-based services."

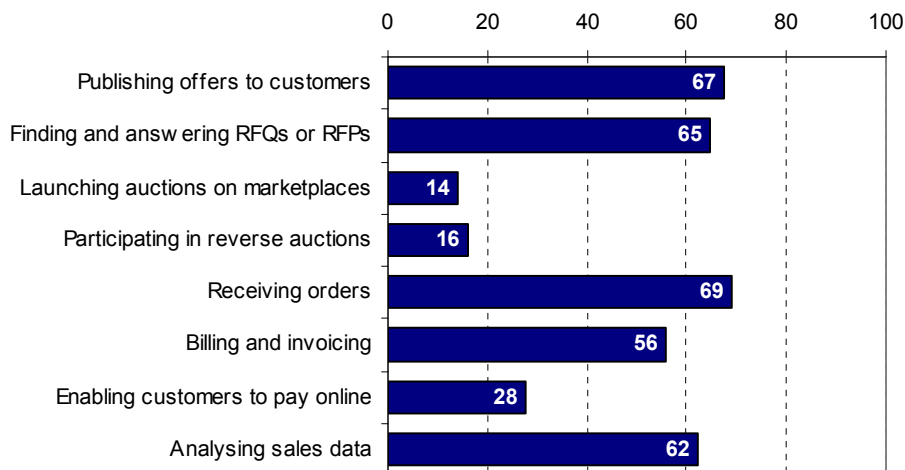
Similarly as in the case of e-procurement, companies that use specific ICT solutions were then asked two follow-up questions: which business processes they actually support with the systems in place, and what type of solutions they use.

As can be expected, companies that have special ICT solutions in place tend to use them for a broad range of sales-related processes. The main purpose is obviously to publish offers and then to receive and process orders from customers electronically (about 65-70%, see Exhibit 1.4-4). In contrast, less than 30% of all firms with such ICT solutions also enable customers to pay online. This indicates that ICT systems are also used for a broad range of marketing related processes, possibly including a facility to place orders, but not necessarily online payment.

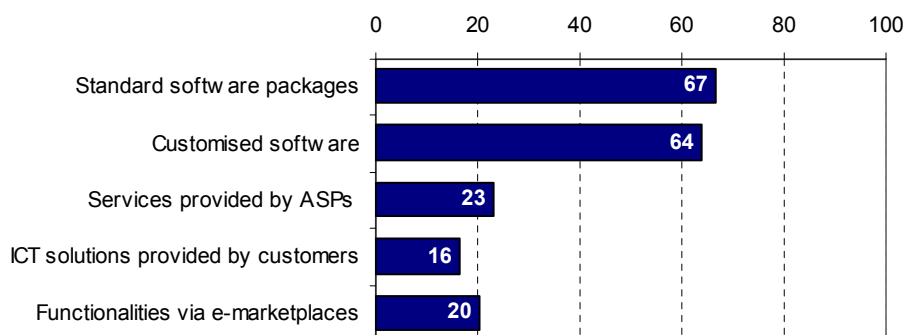
Integration with billing and invoicing processes is more common (56% of companies with specific ICT systems). This means that, in most sectors, about 5% of firms (accounting for about 10% of employment) used ICT to invoice customers electronically, and also about 5% to bill invoices from suppliers electronically in early 2005. In both cases, activity clearly increases by firm size.

About two thirds of those firms that have such solutions in place use standard ('off-the-shelf') software packages, for instance ready-made e-shop systems (see Exhibit 1.4-5). Also, about two in three companies have implemented customised, company specific ICT solutions, either in addition to or instead of standard software (multiple answers possible). Other solutions, such as systems provided by Application Services Providers (ASPs), have a lower diffusion, but are still used by about 20% of companies (out of those using specific systems).

**Exhibit 1.4-4: Marketing or sales processes supported by special software solutions**



**Exhibit 1.4-5: Types of ICT solutions used for marketing or sales**



RfQ = Request for Quotation

RfP = Request for Proposal

ASP = Application Service Provider.

Base (100%): Firms using special ICT solutions for e-procurement.

Weighted by employment.

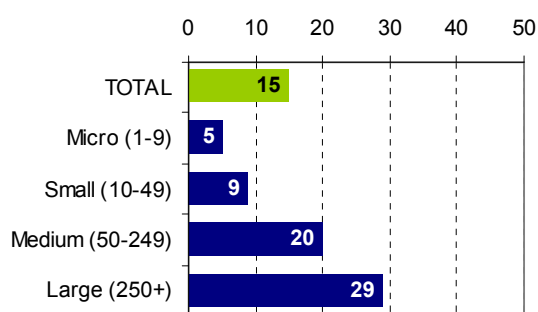
Source: e-Business W@tch (2005)



### 1.4.3 Customer Relationship Management

Customer Relationship Management (CRM) systems are integrated software applications that help companies to collect and process information about customers. CRM systems can be used in a strategic, as well as in an operative way to target the right customer in the right way. Basically, CRM is an instrument to track all forms of contacts with clients and to store this information so that it can be used on demand; for example to evaluate future demand and business opportunities, or to assess the success of special marketing activities in a systematic manner.

**Exhibit 1.4-6: Companies using a CRM system (2005)**

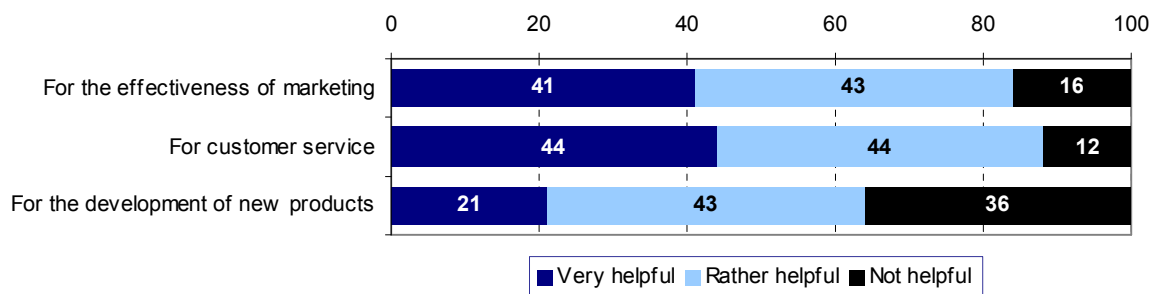


Size-bands: In % of firms; EU-7, 10 sectors.  
Total: Weighted by employment; EU-7, 10 sectors.

As most advanced software architectures, CRM systems are predominantly used among larger enterprises. 20% of medium-sized and 29% of large firms among the 10 sectors surveyed in 2005 have implemented a CRM software. IT services and pharmaceutical companies are prime adopters among the 10 sectors studied.

About 40% of all firms that use CRM report that the system is "very helpful" for the effectiveness of their marketing activities, and about 45% say that it is very helpful for customer service. About 45% (for both application areas) say that CRM has been "rather helpful".

**Exhibit 1.4-7: Perceived value of CRM systems for various business purposes (2005)**



Base (100%): Firms using a CRM system, excl. "don't know" answers (N ~ 645 per item). In % of firms.

Source: e-Business W@tch (Survey 2005)

- ▶ Although survey results do not point at a high adoption rate of CRM systems in **tourism**, CRM is highly relevant for specific players within this industry. Airline frequent flyer programmes and hotel frequent guest programmes, for example, are heavily dependant on powerful CRM applications.
- ▶ In the **pharmaceutical industry**, a key objective of marketing is to establish and maintain excellent contacts to the intermediaries between pharmaceutical companies and end users, for example pharmacies and doctors. CRM is a very important instrument supporting this objective.
- ▶ In the **IT services sector**, CRM solutions are popular even among micro-firms (more than 20% use CRM). This indicates the great importance of this software application in the sector, in particular for customer service.

## 1.5 Making e-Business Work: Standards and Interoperability

### Introduction

This chapter summarises results of the special report on "e-Business Interoperability and Standards", published by *e-Business W@tch* in September 2005.<sup>26</sup> Interoperability refers to the ability of ICT systems and applications to work seamlessly together, and for diverse information resources to be systematically and consistently accessible to applications, when required. Without standards there would be no interoperability.

The *e-Business W@tch* special report provides a cross-sector perspective by enterprise size-band, on the concepts, requirements, application and adoption of e-business interoperability and standards in the context of relevant public business policy issues. It is a sourcebook of reliable current background information, source data and indicative findings, in particular, for SME business managers and public policy makers. The synthesis as seen from the viewpoint of SMEs, especially those operating in the manufacturing sectors, is based on the e-Business Survey 2005, specific business case examples and desk research.

### 1.5.1 e-Business Interoperability

In general, the approach to achieving interoperability depends on the context and the individual perspectives concerned. In the e-business context, there are two main facets:

- **Technical Interoperability (TI)**, which determines how different software programs in different companies can interact; and
- **Business Interoperability (BI)**. Also known as 'Collaboration', BI is about the semantics and the agreements between companies acting in trading communities. It determines how different companies can align their respective business processes in order to do business electronically.

Neither is sufficient on their own; both are essential and must be simultaneously addressed, preferably within at least a common sector driven approach.

*Business Interoperability is a far more complex issue than Technical Interoperability, since it not only involves semantics, but also culture, language, business practices, legislation and corporate politics (Dick Raman, CEN/ISSS WS/EBES<sup>27</sup> Chairman, 23 March 2004)*

Trading globally, over electronic networks, depends on the trust networks established between suppliers and purchasers and also on the enabling physical and logical infrastructures. *All of this must be as easy as making a telephone call, even with trading partners who are complete strangers. After all, with one telephone call we nowadays already can place an order. Computerisation should make life easier, not harder.*<sup>28</sup>

<sup>26</sup> Available at [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources')

<sup>27</sup> The CEN/ISSS eBES (e-Business Board for European Standardisation) Workshop is a focal point within Europe for the standardisation of technologies to exchange electronic business data. WS/eBES is the "European entry point" for the UN-ECE/CEFACT electronic business standardisation process. (<http://www.cenorm.be/cenorm/businessdomains/businessdomains/iss/iss/activity/wsebes.asp>, August 23, 2005)

<sup>28</sup> van Blommestein F.B.E. and P.G.L. Potgieser (2005). ebXML for managers: a co-production of ECP.NL and Interpay. p22. ([http://www.ecp.nl/publications/ebXML\\_for\\_managers.pdf](http://www.ecp.nl/publications/ebXML_for_managers.pdf), August 23, 2005)

## Interoperability Framework

In order to have a practical business meaning and interpretation, interoperability must be understood and expressed in the context of a business standards interoperability framework. The European Interoperability Framework (EIF)<sup>29</sup> for pan-European eGovernment Services, published in November 2004 by the IDAbc<sup>30</sup> defines an interoperability framework as follows:

*An interoperability framework can be defined as a set of standards and guidelines that describes the way in which organisations have agreed, or should agree, to interact with each other. An interoperability framework is, therefore, not a static document and may have to be adapted over time as technologies, standards and administrative requirements change.*

Business interoperability between different companies is gradually being enabled by more sophisticated, and yet easier to manage, internet based systems. Systems such as ebXML<sup>31</sup> have reached a point where they are now ready for full scale deployment. The lure of instant “plug and play” web and grid services is allegedly not far away. Behind these powerful new tools is a myriad of standards and standards development organisations, some proprietary and others more open. All are seeking their rightful place in the emerging business interoperability frameworks. To make sense of all this, work is constantly underway to rationalise the standards maze, by selecting the best technologies, proving them in pilots and introducing mechanisms to eliminate duplication and manage conflicts among standards developers.

### 1.5.2 Open and internationally accepted standards

Open standards of whatever flavour and source are favoured for sustainable e-business interoperability. The definition of standard in Directive 98/34/EC is also essential, because it underlies the New Approach and European standards policy. Despite the rhetoric that pervades the concept, there is no commonly accepted, universal definition of an ‘open’ standard. Legislators have offered many definitions, and generally received strong reactions in return. For example, the Initiative for Software report cites examples from France, Belgium, European Union, and the US. These examples and the recent comprehensive definition in Resolution GSC-10/04<sup>32</sup> of the 10th Global Standards Collaboration meeting (Sophia-Antipolis, September 2005) have in common the following principles:

*availability, non-discrimination, publication, low costs and protection of intellectual property rights (although in many cases there are no royalties due).*

<sup>29</sup> European Interoperability Framework for pan-European eGovernment Services (2004) (<http://europa.eu.int/idabc/servlets/Doc?id=19528>, August 23, 2005); see also the complete EIF specification (<http://europa.eu.int/idabc/en/document/3473/5585>, August 23, 2005)

<sup>30</sup> Interchange of Data between Administrations (IDA), is a Community Programme managed by the European Commission's Enterprise and Industry Directorate General. IDA supports the implementation of EU legislation, from internal market regulations to consumer and health policies, by facilitating the exchange of information between public administrations across Europe through the use of information technology

<sup>31</sup> ebXML (electronic business using eXtensible Markup Language) is a proven framework and unified set of internationally agreed upon technical specifications and common XML semantics designed to facilitate global trade. The ebXML framework for e-business is a joint initiative of UN/CEFACT and OASIS ([www.ebxml.org](http://www.ebxml.org)). UN/CEFACT is the United Nations Centre for Trade Facilitation and Electronic Business, the international body whose mandate covers worldwide policy and technical development in those areas. Headquartered in Geneva, it has developed and promoted many tools for the facilitation of global business processes including UN/EDIFACT, the United Nations Directories for Electronic Data Interchange for Administration, Commerce and Transport. Since 1999, it has collaborated with OASIS in the development of ebXML ([www.uncefact.org](http://www.uncefact.org)). OASIS (Organization for the Advancement of Structured Information Standards) is a not-for-profit, global consortium that drives the development, convergence and adoption of e-business standards. ([www.oasis-open.org](http://www.oasis-open.org))

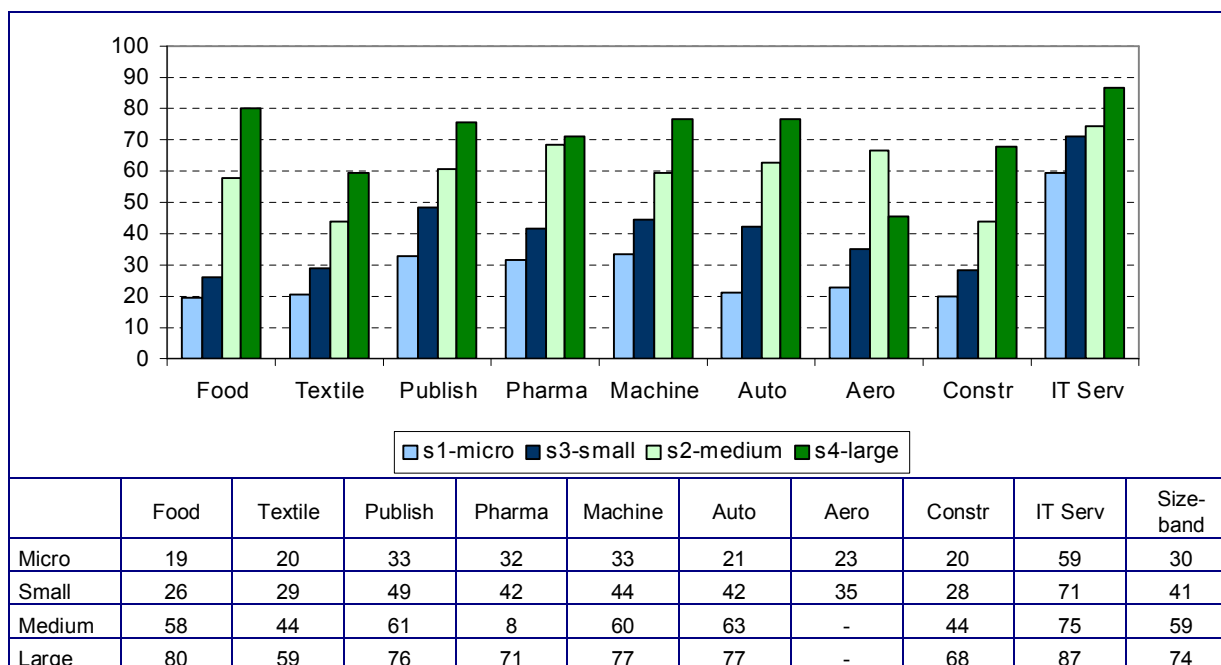
<sup>32</sup> Global Standards Collaboration, 10th meeting Sophia Antipolis, September 2005. Resolution GSC-10/04: (Joint) Open Standards ([http://portal.etsi.org/docbox/workshop/sos\\_interoperability/SOS2/SOS2\\_13\\_ANSI\\_VIEWS\\_on\\_open\\_standards.ppt](http://portal.etsi.org/docbox/workshop/sos_interoperability/SOS2/SOS2_13_ANSI_VIEWS_on_open_standards.ppt), 29 September 2005)

Open standards allow the implementation of open source software or proprietary software. However, to guarantee flexibility in assessing the best technological solution to enhance interoperability, the choice as to which standard and, especially, which software is to be used must not be imposed by government.

### 1.5.3 Survey results on interoperability and standards

SMEs are not a homogenous set. The analysis of the survey data on the take up of standards and technology clearly shows that the adoption rates and future plans are highly dependent both on the sectors and the size of the companies involved. One of the basic premises underlying the research is that a sector led approach to implementation, that meets national business and cultural requirements, is required to achieve the maximum benefits. This must include mechanisms to help SMEs set challenging and realistic targets for their B2B implementations, for accelerated development and harmonisation of sectoral standard roadmaps, and for the adoption of all relevant business and technology agreements.

**Exhibit 1.5-1: Standards are taken into account in new products, services and processes (% of Firms)**



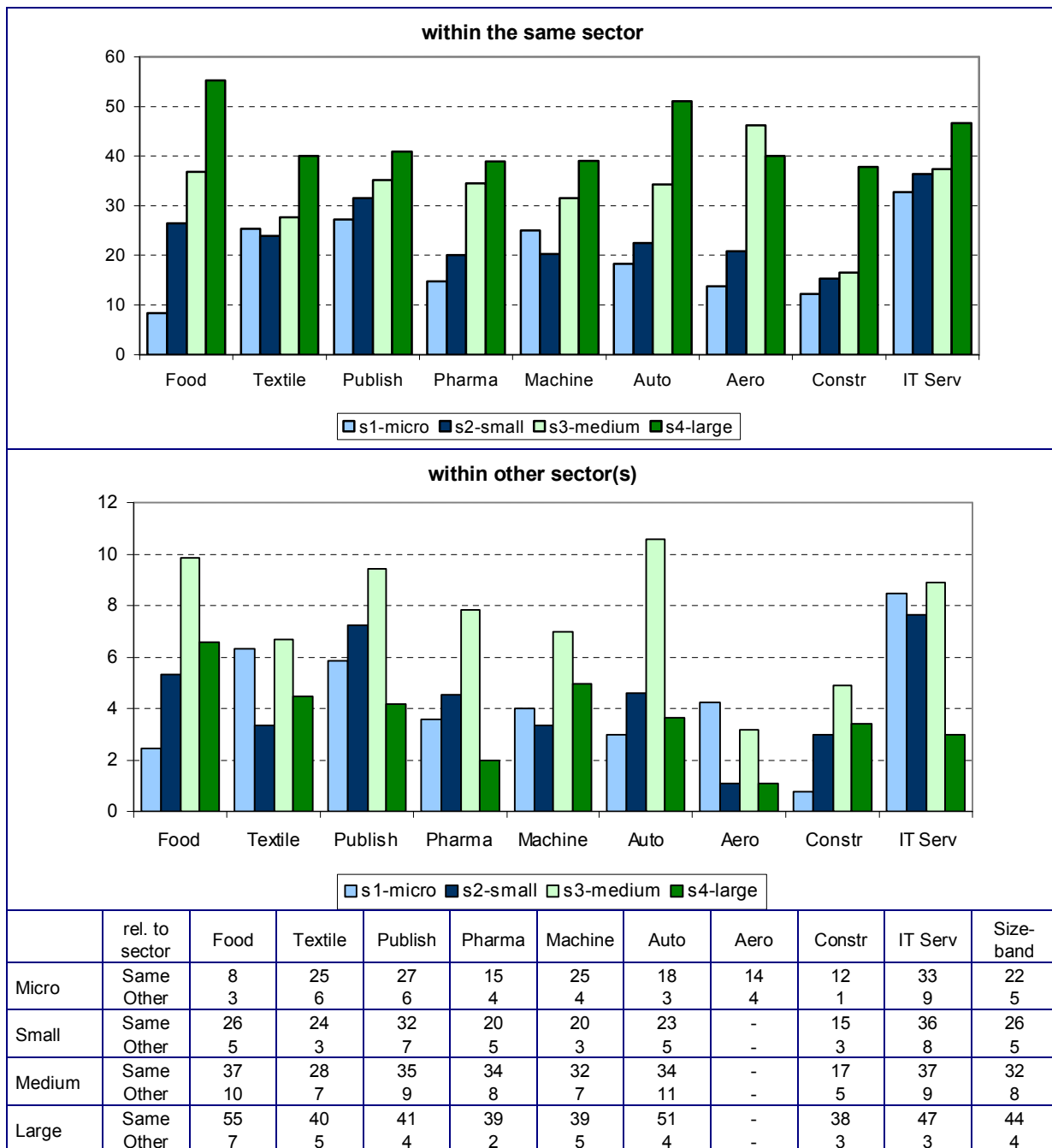
Percentage (rounded) of firms by size-band within sector that take technology or data standards into account in new product, service or process development. Base: All firms, excluding tourism sector and "Don't Know". Cells with insufficient observations to indicate accurate % within size-band are left blank (-). Caution advised when interpreting the corresponding data in graphic.

Source: e-Business W@tch (e-Business Survey 2005)

As shown in Exhibit 1.5-1, the importance of standards in innovation increases by enterprise size-band. About 60-85% of all large firms, depending on the sector, said that they take industry standards and specifications into account when deciding which technology and data standards to use for new products, services or business processes. However, excluding the IT Services sector, only about 20-45% of micro and small enterprises gave the same response. Sectoral differences for medium sized companies are less pronounced, with the exception of IT Services industry on the one hand (higher importance) and the construction industry on the other hand (low significance, see chart).

Despite the variation, there is solid evidence of a high level of commitment and practice across all of the enterprise size-bands that standards play a critical role, and are taken into account, when making decisions on what technology to use in the introduction of new products, services and processes.

**Exhibit 1.5-2: "Interoperability within/external to my sector is critical for e-business" (% of firms)**



Percentage (rounded) of firms by size-band within sector that consider interoperability is critical for e business between their enterprise and other companies or organisations in SAME or in OTHER sector(s). Base: All firms that use the internet for purchasing, or selling or marketing or selection of suppliers for, goods or services. Excluding tourism sector and "Don't Know".

Source: e-Business W@tch (e-Business Survey 2005)

Exhibit 1.5-2 shows that, of those enterprises that use the internet for purchasing, selling, marketing or selection of suppliers (about 60% of enterprises interviewed), over 40% of large enterprises across all sectors report that interoperability is critical for doing business electronically with companies within their own sector, whereas only 4% consider interoperability with companies outside their sector to be critical for their business. Among SMEs, the perspective on interoperability requirements is more varied. Between 8% and 33% of micro-enterprises regard interoperability as critical for business within their own sector. When studied by enterprise size-band, interoperability with companies outside their own sector is most important for medium sized enterprises, irrespective of their sector.

## 1.5.4 Implementation issues

To achieve interoperability, an organisation must be actively engaged in the ongoing process of ensuring that its systems, procedures and organisational culture are managed in a way that maximises opportunities for internal and external exchange and re-use of information – whether using ICT or not. This general picture helps to convey the important considerations:

- interoperability is not an end, in itself;
- standards are necessary but not sufficient for interoperability; and,
- any study of inter-enterprise interoperability and the standards enabling it must be based on an understanding of the business, social, cultural and political circumstances in which the enterprises operate.

### National Initiatives

National interoperability initiatives in Luxembourg and Australia, which focus on methods to encourage and enable implementation of e-business standards by and for SMEs, are proposed for consideration as models for similar initiatives in other sectors and regions.

- The case study from Luxembourg (**BUILD-IT**) outlines the experiences, results and conclusions drawn from the way in which the construction industry stakeholders, including SMEs, have been brought together to implement a common standardised approach based on shared knowledge of existing e-construction standards. The approach is used to outline a successful sector-independent, pre-competitive, cross-business implementation process ([www.tudor.lu/](http://www.tudor.lu/)).
- The story of **Bizdex**, the Australian national standards policy initiative on B2B, its practical realisation and possible future are also outlined in the special report. This is an example of a successful PPP (public private partnership) model where the standards body takes on a much greater role and responsibility for the costs, standards and integration tools developed. In effect it becomes part of a wider business partnership and assumes risks in taking this approach. ([www.bizdex.com.au](http://www.bizdex.com.au))

### Key observations

The comparative cross-sectoral data and conclusions from the e-Business Survey 2005 indicate that the pace and direction of e-business development differs considerably between sectors and between type of enterprise. In some sectors, internet based e-business is already significantly changing the way companies interact with their customers and business partners. Nonetheless, despite the apparent differences in take up, there are commonalities when viewed in the context of an e-Business Interoperability Framework: all sectors utilise similar core business processes and share the need for agreed cross-partner trading profiles.

The following observations, applicable to all sectors, have been deduced from the survey analysis and the national initiatives:

- Subject to the absolute recognition of open voluntary participation, the **role of a national or regional standards body** can usefully include application of industrial project initiation criteria, coordination and management processes to assist SMEs moving to and benefiting from online trading operations.
- The longer term requirements for sustainable agile manufacturing and flexible service delivery in B2B networks can be best met by using **open, flexible and efficient business trading frameworks**, such as ebXML. Interoperability, enabled by appropriate standards development, testing environments and sector-wide implementation, is essential.

Looking at the e-Business Survey 2005 data for each sector, and the average values per sector and per enterprise size class for the entire sample the following fundamental questions can be addressed:

- What is the **appropriate target**, and rationale, for the measured value per enterprise size-band?
- What **circumstances** will yield a basically identical percentage across all enterprise size-bands in a given sector (as shown most nearly for instance in the IT services sector)?

The answer to both questions is likely to be strongly sector structure dependent. In that case, it is useful to understand the underlying driving forces and so help SMEs to set their own goals with a clear sector specific understanding of what standards must be taken into account in their work. Such detailed sector answers would produce a set of powerful **sector-specific standards roadmaps**. Depending on how these roadmaps are prepared and maintained, they could become a valuable resource for all enterprises in the sector. Such roadmaps could also explore the relative values of the average responses across sectors per standard area. The roadmaps could also provide the basis for a cross-sectoral review of common standards and potential for increased harmonisation between sectors.

Taken in conjunction with other data, the roadmaps would acquire several dimensions which can be drilled down to get an overview on common interoperability practices and targets for all layers and levels of interoperability.

### Policy conclusions

The study conclusions and proposed policy actions are addressed to the following organisations:

- ICT Vendors
- ICT Innovation Centres
- Sector Industry Associations
- National Standards Bodies
- Member state business development agencies
- High Level ebXML Implementation Group (proposed)
- SME Associations
- DG Enterprise & Industry
- CEN/ISSS eBIF and EBES member organisations

The suggestions focus on proposed medium term actions which could directly contribute to implementation of common standards based solutions in all sectors. For long term value, transparent fairness and maximum impact (relative also to the additional goal of movement towards standards convergence) the proposed actions are suggested to be focused primarily at the sectoral, cross-sectoral, and standards policy levels. The actions are fully consistent with, and actively complement, the focus on increased implementation and use of technology proposed in the i2010 Action Plan.<sup>33</sup>

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<sup>33</sup> See <http://europe.eu.int/i2010>

## 1.6 ICT Security: Incidents Experienced and Measures Introduced in EU Enterprises

### Introduction

This chapter summarises results of the special report "ICT Security, e-Invoicing and e-Payment Activities in European Enterprises", published by *e-Business W@tch* in September 2005.<sup>34</sup> It focuses on findings from the first part of the special study (ICT security), as data on e-payment and e-invoicing are reported in chapters 1.3 and 1.4. The special study investigates the incidence and pattern of damage from ICT security breaches and the extent of controls and other measures introduced by European enterprise to counter these threats.

The use of ICT systems has grown enormously in recent years across all sectors of business activity and public services but also in leisure and family activities. The economic well-being of enterprises in Europe has come to depend increasingly on instant access by all enterprises and their customers to an unlimited flow of information, based on interoperable public networks and information technology systems. Considering the growing dependency of enterprises and society in general on ICT systems, weaknesses and vulnerabilities in networks and systems are posing an increasingly serious threat to the proper functioning of key value chains in Europe. The magnitude of this threat continues to grow along with the number of networks users and the value of the transactions they carry out.

European enterprises increasingly must deploy security measures ('controls') not just to avoid damage to their own operations but to meet new legislative and regulatory requirements, such as data protection, designed in the main to protect the interests of others, their customers, suppliers, staff or partners.

Against this background, the e-Business Survey 2005 included for the first time<sup>35</sup> a module on ICT security. The main results and conclusions to be drawn from these questions are summarised in this chapter.

### 1.6.1 Security incidents experienced by EU enterprises

*e-Business W@tch* asked companies the following question as part of the 2005 survey: "During the past 12 months, which of the following incidents have had an impact on your business, for example by causing economic damage or endangering customer relationships? Has ... [item] had a significant impact, little impact or was there no incident in this period?". A list of 10 items (see Exhibit 1.6-1) was offered.

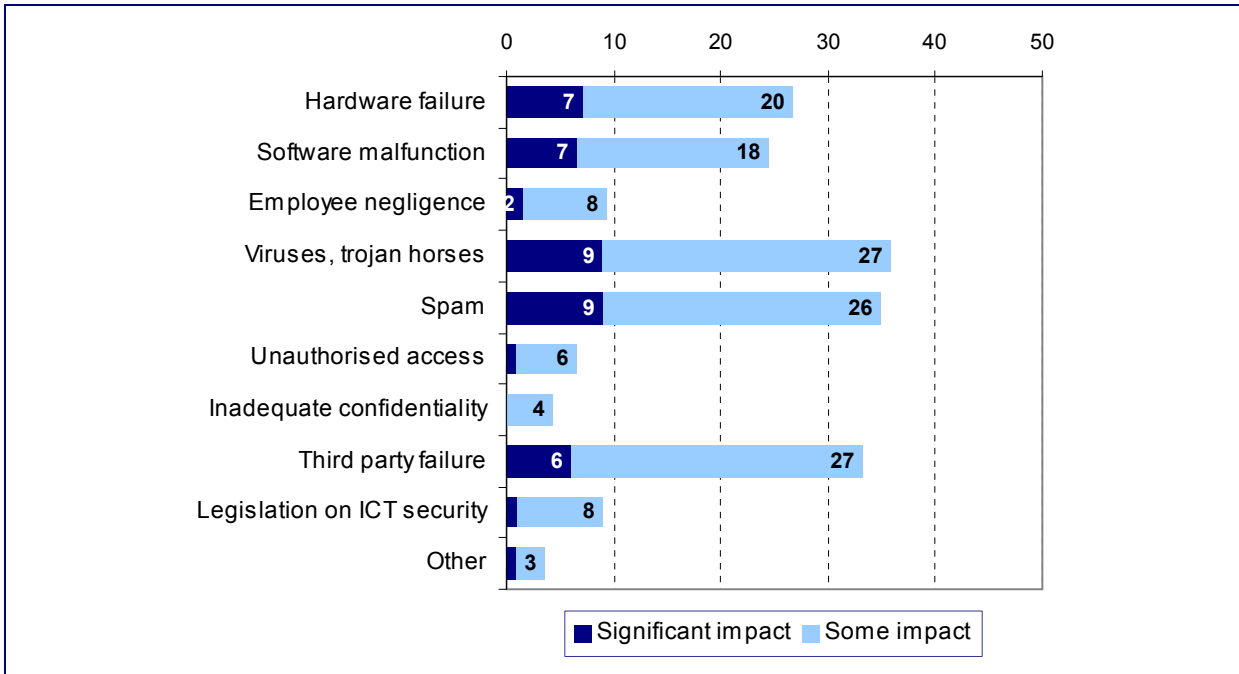
In general, security breaches appear not to be common: levels of reported incidents with a significant impact rarely exceed 10% of a category in any of the 10 sectors covered in the survey. Exhibit 1.6-1 provides an overview of gross frequency of incidents per category including both those with 'some impact' as well as those with 'significant impact', bringing the level of incidence up to near 40% in some categories, but diluting the relevance of the statistic to some degree. The figure shows that the most frequently reported damage and significant damage result from security breaches related to e-mail, both unsolicited – 'spam' – and malicious – e-mail containing viruses or trojan horses. Over a quarter of enterprises reported damage within the past year for each of these two types of incident, and in nearly 10% of cases the damage reported is rated 'significant'. Failure of systems and networks is the next most important area of security breach.

<sup>34</sup> Available at [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources')

<sup>35</sup> These questions were not included in the surveys of 2002 and 2003. The survey questionnaire is available at the website.



**Exhibit 1.6-1: ICT security incidents that had an impact on the business  
(% of firms having experienced such an incident)**



Source: e-Business W@tch (e-Business Survey 2005)

**Variations by firm size**

Incidence of damage from breaches of security and other security-related costs vary with size of enterprise, but the trends of incidence with size are mixed in direction. It is clear that in many cases the level of threat increases with size, e.g. with the number of staff employed or premises operated. At the same time, small enterprises are much less likely than large corporations to implement controls and other measures to reduce the impact of security threats.

The opposing trends of threats and controls lead to the mixed picture in European enterprises overall, a picture which can hide real disadvantages faced by small organisations. For example, although the likelihood of employee negligence causing significant damage in any year is reported to be considerably lower in micro enterprises compared to larger organisations, the level of threat to micro organisations is very much smaller. It is estimated that damage could be reduced up to twenty-fold in cases such as these if means could be found to enable small organisations to counter the associated threats as effectively as larger organisations.

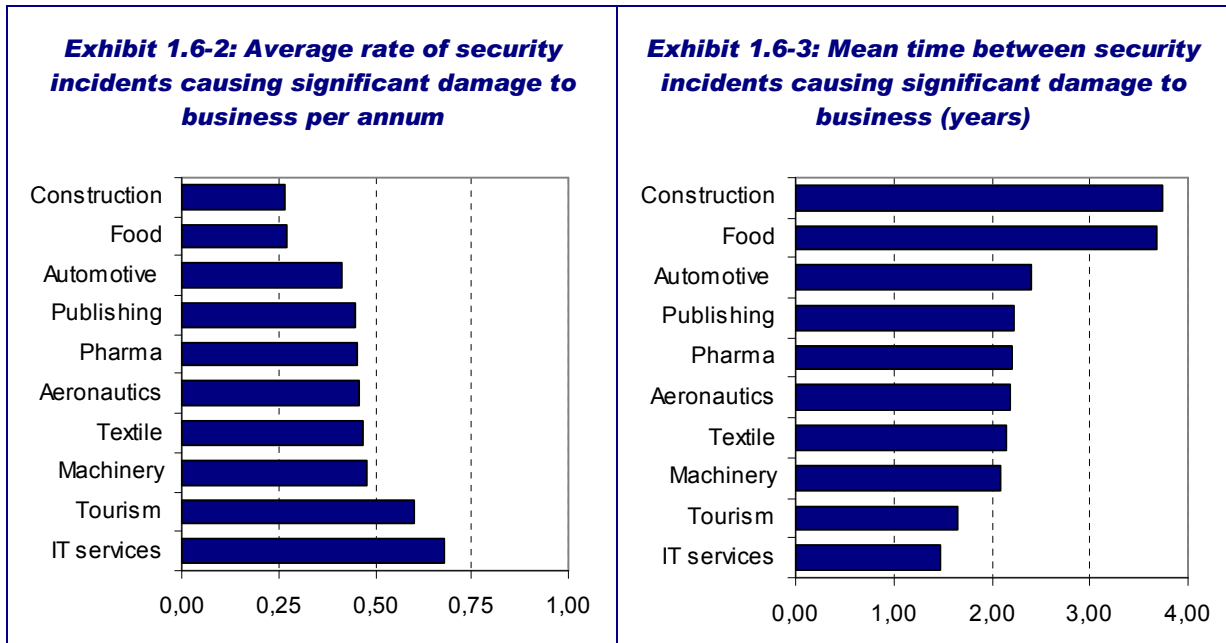
**Variations by sector**

Across the 10 sectors, incidence of damage through security incidents also varies strongly. However, the picture is rather complex. Overall, enterprises in the IT services sector report the greatest number of incidents causing significant damage, nearly three times as many as in the construction or food & beverages sectors (see Exhibit 1.6-2). Whereas the rate of incidence in tourism is nearly as high as in IT services, other sectors are in mid field.

The fact that there is no consistent relationship between overall levels of incidence and average size of enterprise in a sector means that sector-specific communication and ICT deployment structures are likely to be a more important covariant of the frequency of security failures and security-related costs than size of enterprise.

Tourism and IT services appear particularly prone to damaging incidents. In the former case, a high volume of communication with a wide audience in a B2C environment might be a contributory factor. In the other, underlying causes are more likely to be the vulnerability of strongly ICT-based production processes to breaches of ICT security.

The opposite factors may contribute to the relatively low level of incidence in the construction and food and beverages sectors: a low level of ICT use and physical rather than virtual outputs offer less opportunity for ICT-based threat. In addition, in both cases there are a relatively small number of clients involved in any time period.



Based on unweighted figures.

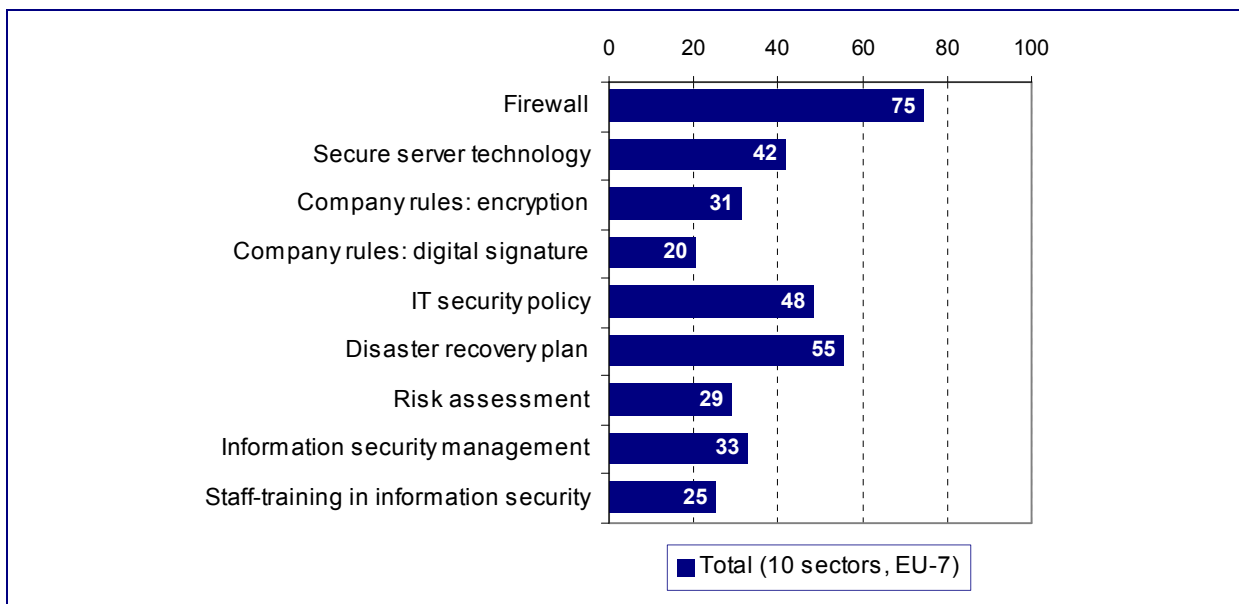
Source: e-Business W@tch (e-Business Survey 2005)

However, this overall picture masks considerable and interesting divergence across the specific security domains. For instance, the automotive sector is an interesting case, exhibiting very low levels of incidence of both hardware and software malfunction. It is probable that large manufacturers in the sector are being particularly effective at setting standards for hardware and software and ensuring that quality hardware/software solutions are introduced into and used throughout their supply chain. This would have the effect of improving the resilience of smaller enterprises in the sector to this kind of security threat, and it may well be that other sectors could learn lessons from the automotive industry. At the same time the sector was found to have a particularly high incidence of damage from spamming, and it appears that no sector can lay claim to universal best practice in avoiding damage from security-related threats.

### 1.6.2 Deployment of ICT security controls

e-Business W@tch asked companies in the 2005 survey which security controls and measures they applied to counter ICT security threats.<sup>36</sup> The analysis shows that basic components such as firewalls and secure servers – for those enterprises requiring these – already exhibit high levels of penetration. Major deficits in security controls in European enterprise are evident in the low levels of reported application of data encryption, which is generally regarded as essential in distributed and mobile computing environments. The yet lower levels of deployment of public key infrastructure could represent an obstacle in the evolution of interoperable solutions for many e-business processes, particularly those with strong contractual content such as the transfer and agreement of large liabilities.

**Exhibit 1.6-4: Prevalence of ICT security measures by size-band**



Base: All enterprises using computers. N = 5218.  
In "% of employment", i.e. firms representing ...% of employment.

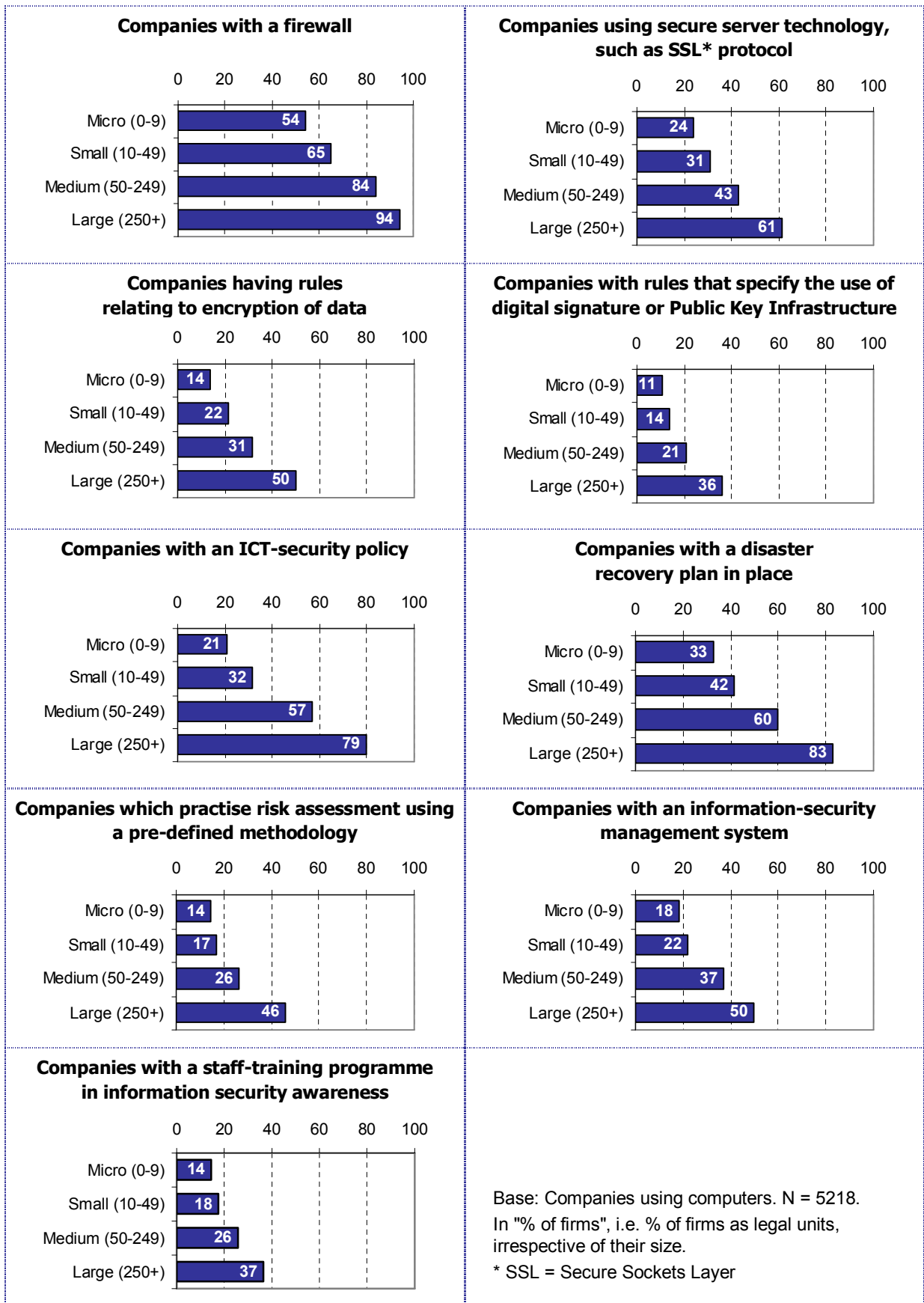
Source: e-Business W@tch (e-Business Survey 2005)

Given the importance of the human factor in breaches of security, the low proportion of enterprises reporting that they train their staff in security awareness, carry out risk assessment or, in particular, have put a security management system in place, should be a cause for concern among policy makers. Though the proportion of larger enterprises which have drafted disaster recovery plans and developed a security policy is over 70% (in each case), the picture is much bleaker among smaller businesses. Only 21% or 32% respectively of micro- and small enterprises report having an ICT security policy in place (see Exhibit 1.6-5), despite strong consensus among security consultants and standards-setting bodies that such planning is essential in building a proper response to security threats.

The lower levels of control deployment found in smaller enterprises have a clear economic foundation. The ability to profitably deploy resources in combating security threats tends to be a function of the size of a business, particularly where in larger enterprises key ICT functions are centralised. These economies of scale can be clearly seen in the behaviour of enterprises in respect of the security controls included in the survey.

<sup>36</sup> The question was: "Does your company have any of the following IT security measures in place? Do you have / use ... [item]?" A list of 9 items (see Exhibit 1.6-4) was offered.

**Exhibit 1.6-5: Prevalence of ICT security measures by size-band**



Source: e-Business W@tch (e-Business Survey 2005)

## Variations by sector

To simplify sectoral analysis, the underlying covariance structure was investigated by means of a principal component analysis (PCA).<sup>37</sup> Security controls and measures were grouped along three principal factors: 'management and policy', 'secure components', and 'PKI (Public Key Infrastructure) and encryption'. The resulting picture by sector shows the clear dominance of enterprises in the IT services sector in the introduction of security controls in the areas of 'secure components' and 'management and policy'. Yet despite this leading position the incidence of damage is high for these enterprises, showing that the sector clearly faces some of the highest levels of threat. Fortunately, perhaps, enterprises in this sector can draw the know-how to select, implement and maintain secure systems from core business units, in contrast to other sectors.

The strongest contrast with the behaviour of enterprises in the IT services sector is given by companies in food and beverages, textile industries, tourism and construction. These latter sectors score lowest on all three factors. At the same time, these sectors are among those with the smallest average size, from which follows that they have a particularly large proportion of small and micro enterprises, whose behaviour dominates the statistics.

### 1.6.3 Summary of key findings

Incidence of security breaches	Deployment of ICT security controls
<ul style="list-style-type: none"> <li>• The <b>mean time between security-related incidents</b> with significant impact on an enterprise is <b>well under 2 years</b> in the most vulnerable sectors in Europe, such as tourism and IT services.</li> <li>• <b>Malicious software</b> and <b>unsolicited e-mail</b> currently have the greatest impact, followed by failures of hardware or software.</li> <li>• Incidence of damage from breaches of security and other security-related costs <b>vary with size of enterprise</b>, but the trends of incidence with size are <b>mixed in direction</b>.</li> <li>• From a sector perspective, firms in the <b>IT services</b> sector report the greatest number of incidents.</li> <li>• The <b>automotive industry</b> is an interesting case, exhibiting very low levels of incidence of both hardware and software malfunction.</li> <li>• However, the <b>pattern is not consistent</b> for all items. Low levels of incidence in some sectors are rather the result of less prevalent use of ICT hardware and lower dependence on ICT in respective sectors.</li> </ul>	<ul style="list-style-type: none"> <li>• Basic components such as <b>firewalls</b> and <b>secure servers</b> already exhibit high levels of penetration.</li> <li>• Low application levels are reported for <b>data encryption</b> and deployment of <b>public key infrastructure</b>. This could hamper the development of distributed and mobile computing environments, and the evolution of interoperable solutions for many e-business processes.</li> <li>• A low proportion of enterprises reporting that they <b>train their staff in security</b> awareness, carry out risk assessment or, in particular, have put a security management system in place.</li> <li>• Clear dominance of enterprises in the <b>IT services</b> sector in the introduction of security controls in the areas of 'secure components' and 'management and policy'.</li> <li>• In contrast, low endowment with security controls in <b>food and beverages, textile industries, tourism</b> and <b>construction</b>. However, this is partly explained by the dominance of small firms in these sectors.</li> </ul>

<sup>37</sup> Principal component analysis (PCA) involves a mathematical procedure that transforms a number of (possibly) correlated variables into a (smaller) number of uncorrelated variables called principal components. The first principal component accounts for as much of the variability in the data as possible, and each succeeding component accounts for as much of the remaining variability as possible.

## 1.7 e-Business Activity Views: Conclusions and Lessons Learned

### 1.7.1 Introduction

In 2004/05, *e-Business W@tch* collected more than 90 e-Business Activity Views, including examples from all sectors covered, and from nearly all EU Member States, the USA, Bulgaria, Romania, Turkey and Switzerland. Activity Views are snapshots of real-life e-business activity in companies from the sectors studied. These short case studies<sup>38</sup> have the objective to complement the quantitative picture of e-business adoption from the e-Business Survey 2005, and to indicate concrete impacts of e-business activity in enterprises.

Activity Views are based on personal interviews with company representatives and desk research. Most of the Activity Views were presented in the Sector Studies of 2005, either in full detail (as 'case studies') or in summary (as 'business examples'); some further Activity Views that could not be included in Sector Studies will be published on the website. This section presents a brief synopsis of the main results and offers conclusions.

#### Selection and types of Activity Views

Activity Views were mainly selected on the basis of their relevance for the e-business issues analysed in the various Sector Studies, with the intention to validate, illustrate and contextualise the assessment and findings presented in the studies. *e-Business W@tch* cooperated with local correspondents in various EU Member States and the USA in collecting Activity Views. Examples include different types of Activity Views:

- **Best practices:** Activity Views that represent good e-business practice within the respective industry. Assessment could be based on the citation of the case in media (for example in e-business magazines), or in references from technology providers.
- **Innovative e-business approaches:** Activity Views that represent innovative approaches and methods of e-business, particularly if it can be argued that this practice might reveal some insight about developments to be expected in the sector in the future.
- **Lessons learned:** Activity Views containing an interesting experience of a company, i.e. lessons to be learned from the described activities. In this context, it is also possible to present a case of "e-business failure".
- **Typical example:** Activity Views that represent typical state-of-the-art e-business activity in the respective sector. Not all case studies need to be about exceptional activities.
- **SME dimension:** An adequate quota of Activity Views from small and medium-sized enterprises was to be achieved, considering the rationale of *e-Business W@tch* to focus on e-business implications for SMEs.

In total, about 45% of the Activity Views conducted in 2005 are about e-business initiatives of SMEs, about 25% about activities of large firms, and the remaining ones (30%) describe projects and initiatives rather than activities of individual companies (see Exhibit 1.7-1). The latter category includes collaborative initiatives, e-business activities of industry associations, and examples of online trading platforms. From a geographic perspective, about 70% of Activity Views focus on firms from the former EU-15 Member States<sup>39</sup>, about 15% on enterprises in the 10 new Member States, about 8% are about

<sup>38</sup> The term "case study" normally implies a more detailed and in-depth analysis of a specific example. e-Business Activity Views presented by *e-Business W@tch* in sector studies have a scope of 2-4 pages on average. However, they have in common with more detailed case studies that results are mostly based on primary research, i.e. personal interviews with company representatives. Interviews were carried out either face-to-face or by telephone.

<sup>39</sup> The distribution of Activity Views mirrors the economic significance of the former EU-15, which account for more than 80% of inhabitants and about 90% of GDP in the EU.

firms from other EEA or accession countries, and about 7% are international examples or such which cannot be attributed to a specific country (e.g. international collaboration projects).

**Exhibit 1.7-1: e-Business Activity Views and Business Examples collected in 2005**

Sector	SME Activity Views	Large company Activity Views	Networks, associations and projects
<b>Food and beverages</b>	Svenska Foder (SE) Terrasolis (IT); Aarstiderne (DK) Castelcarni (IT); Sadpol (PL) Manobi (FR)	Ebro Puleva (ES) Granarolo (IT) Unilever (NL,UK) Beaver Street Fisheries (US) Utz Quality Foods (US)	E-Piim (EE) Paysans.fr (FR) XSAg.com (int.)
<b>Textile</b>	Liola (IT) Yoox (IT)	Rifil Order (RO); Ludvig Svensson (SE)	Greekfashion.gr (GR)
<b>Publishing and printing</b>	Finepress Oy (FI); Cardcorp.co.uk (UK); DerStandard.at (AT) Nielsen BookNet (UK) Grada Publishing (CZ) Satellite Newspapers (US/NL) Guardian Unlimited (UK)	Berliner Verlag (DE) Repubblica.it (IT)	PubEasy (UK)
<b>Pharma</b>	Marmosa (ES); EGIS Poland (PL) Queisser Pharma (DE) Bluepharma (PT) UCB Pharma Poland (PL)	Bayer (DE) AstraZeneca (DE/TR) Aureus Pharma (FR) Pfizer (DE)	Diagdirect (FR) Aegate (UK) grid.org (int.) Pharma-mall (DE) Pharmaplace (DE)
<b>Machinery &amp; equipment</b>	Telschig (DE); Fire Eater (DK) Köhler and Hörter (DE) Rigibore (UK)	Palfinger (AT) Wilo AG (DE) Bonfiglioli Riduttori (IT)	VDMA (DE); SBS (UK) maex-online (DE) ACAMAS (FR) DPT Services (NL)
<b>Automotive</b>	Camelin Décolletage (FR) Lovász Forgácsoló Kft (HU) TecCom / supply firms (DE/HU)	Webasto (DE) Thomas Built Buses (US) Supply firm (anonymous) (DE)	Dutch Ford car dealer association (NL) SupplyOn (DE) GALIA and ALFA (FR)
<b>Aeronautics</b>	Mecahers (FR)	Dassault Aviation (FR) Aerostar (RO) MTU Aero Engines (DE)	Polish Aeronautics Industries (PL) AFNeT (FR)
<b>Construction</b>	Bygg og Industriservice (NO) Termonica (PL) BravoSolution (IT)	Intertime Continental (BG) Skanska (SE)	Digital Construction (DK) IJ Regeltechnik (DE) BUILD-IT (LU) PAIS (NL)
<b>Tourism</b>	Limba.sk (SK) Gulliver Ireland (IE) Lookb4 (UK)	SkiStar (SE)	Mountainbiker.it (IT) Ski amadé (AT) ENGADINcard (CH) London Taxi Point (UK) ANET (AT)
<b>IT services</b>	PGS Software (PL); Softgate (RO) Open Cascade (FR); Onventis (DE) Janus Software (NL); PMS (PL) Wice (DE);GKS (DE); AB Strakt (SE)		VSA Group (DE)

Activity Views focus on different areas of e-business. Exhibit 1.7-2 shows which applications were covered by the examples collected in 2005 (as listed above) in the 10 sectors. This does not mean that applications areas not covered in a sector are irrelevant for this particular industry; the matrix reflects the selected research priorities of the 2004/05 period.

**Exhibit 1.7-2: Main application areas studied in e-Business Activity Views**

Sector	Electronic procurement	Electronic sales	Business process efficiency	Information management	Inventory management
Food and beverages	ü	ü	ü		
Textile		ü	ü		ü
Publishing & printing		ü	ü	ü	ü
Pharma	ü	ü	ü	ü	
Machinery	ü	ü	ü	ü	
Automotive	ü	ü			ü
Aeronautics	ü	ü	ü	ü	
Construction	ü	ü	ü	ü	
Tourism		ü			
IT services	ü				
Sector	e-Collaboration, firm networks	Supply Chain Management and logistics	ERP	CRM / Customer service	Quality assurance
Food and beverages	ü	ü		ü	ü
Textile	ü				
Publishing & printing	ü	ü	ü	ü	
Pharma	ü			ü	
Machinery	ü	ü	ü	ü	ü
Automotive	ü			ü	ü
Aeronautics	ü		ü	ü	
Construction	ü			ü	
Tourism	ü		ü	ü	
IT services	ü			ü	

## 1.7.2 Synopsis of main results and lessons learned

### Saving costs through electronic procurement

The main goals pursued by enterprises through e-procurement include decreasing direct procurement costs, streamlining the selection of suppliers, and increasing the efficiency of business processes between companies. The latter can be achieved, for example, by processing and exchanging orders electronically through e-procurement software systems. This allows companies to substitute paperwork and manual data entry and should normally lead to reduced error rates in B2B exchanges.

Activity Views on e-procurement show how large corporations use their buying-power to achieve better purchasing-conditions. In 2000, *Unilever* (NL,UK) started a project to establish an internet-based buyers' platform. The main objective was to simplify procedures, and to reduce procurement costs by internationalising purchasing activities. Up to that point, local branches used to negotiate local deals, thus Unilever was not leveraging its buying power. By the end of 2004, the project had resulted in structural savings of 2.5% - 4% per annum on all transactions conducted across the platform, and there is still seen huge upward potential.

Other examples present service providers which offer procurement software solutions that promise companies to enhance their purchasing processes (*Pharmaplace*, *BarvoSolution*). Examples also show that the use of e-procurement systems and online ordering can significantly save time, even if a company is only able to purchase a small portion of standard components online (*Köhler and Hörter*).

Despite the diversity of the background in various companies, some common lessons can be learned from the Activity Views conducted in 2005:



- The issue of **standardisation** proves to be critical in e-procurement. A good example is the e-procurement solution of *Köhler and Hörter* (DE), which implemented a new system based on the eCl@ss standard. As a result, suppliers are now required to provide eCl@ss-conform, standardised classification numbers of their products. However, a compilation of potential suppliers indicated that there are very few suppliers fulfilling these needs. In conclusion, the company is only able to purchase a small portion of standard components online.
- Another issue is the **gap between small and large companies**. The Case study of *MTU Aero Engines* (DE) indicates that many of the smallest suppliers (at least in the aeronautics industry) still have little or no ICT knowledge. However, in some cases, even small suppliers can have considerable negotiation power: if supplies needed are very specialised, suppliers may develop into a quasi-monopolist producer. In such a situation, it is difficult for buyers like MTU to convince their suppliers of the benefits of e-business applications.
- E-procurement may facilitate **cross-border trade** in the long run. In order to save money on material costs, the construction company *Skanska* (SE) initiated the “efficient procurement project”, in which e-procurement is an integral part. E-ordering implies asking suppliers to forward electronic catalogues, placing orders through these, and then signing contracts with selected suppliers. In the long-term perspective, this move is expected to open the market and facilitate the entry of new suppliers from other countries. The example of *Unilever* also points in the same direction.

### **New distribution channels: selling products and services online**

In some industries, notably in B2C markets and service sectors, e-business has had major impacts on marketing and sales strategies and customer communication. The e-Business Activity Views of 2005 reflect the importance of ICT for customer facing business processes, even in sectors where this is not yet considered as the main application area.

*Aarstiderne* (DN), for example, is a Danish internet-based company that delivers a wide range of organic products from its own farms and other Danish and international farms directly to the consumer. Organic expenditure in Denmark and internet penetration have allowed *Aarstiderne* to develop from a simple farm to become a virtual supermarket, selling and delivering groceries to approximately 35,000 online customers. The company has grown quickly without compromising profitability. The e-commerce system is integrated with internal business functions and thus supports, for example, accounting and controlling.

In publishing, online distribution channels are of increasing importance. The example of *Grada Publishing* (CZ) shows how a publishing company can benefit from the introduction of an internet-based sales channel that is integrated with an internal editorial system. In 2000, *Grada Publishing* decided to launch the internet-based business portal of its own. The main objectives were to shorten the supply chain and thus to improve customer service by fastening the flow of information. This was achieved by using a catalogue system, supplemented by enhanced functionality such as book browsing, information about authors, or book reviews. The company reports that online-sales have increased annual sales by 45% and the number of new customers by 40% a year. These growth rates are regarded as a clear proof of the trend towards substituting printed catalogues by online presentation of the offer in the book market.

### **Increasing the efficiency of internal business process**

Increasing the efficiency of internal business processes is a key driver for e-business adoption in all sectors. It is also a main aspect in many of the Activity Views, which clearly demonstrate the potential of ICT in that respect.

The example of *Ebro Puleva* (ES), a leading company in the Spanish food market, shows how e-business can enhanced the efficiency of internal processes such as human resources management, analysis of data from sales points, customer service and logistic flows. After a merger, the company decided to integrate the formerly separated IT architectures from each of its business lines (e.g. dairy

products, sugar, rice). This involved several e-business applications and areas. The company reports that its integrated approach has enhanced the efficiency of internal processes such as human resources management, analysis of data from sales points, customer service, and logistics flows related to product repurchasing.

### **Enhancing information and knowledge management**

Information management can be described as the handling of company knowledge acquired from disparate sources in a way that optimises access to and retrieval of this knowledge. ICT can greatly facilitate information management in a company, for example through intranets or dedicated knowledge management systems.

*Telschig GmbH* (DE), a small company from the machinery industry specialised in solutions for bulk handling, started an ambitious project aiming at information management. The company establishes a comprehensive database comprising the company's history of customer orders as well as systems, spare and wear parts delivered. The database is a major prerequisite for Telschig's online shop for spare and wear parts. Up to now, the procedure for ordering spare parts has been telephone based and is thus very time consuming. Once the database has been implemented, customers will be able to log in to the system, see the machines they have already purchased from Telschig, and find a list of the matching spare and wear parts.

Another example is *Aureus Pharma* (FR), a French supplier of knowledge management solutions that support the drug discovery programmes of pharmaceutical companies. Central for the company offer are databases that bring together information about the relationships between protein targets, biological function and ligands. After about 3 years of use, concrete research outputs are reported where the database played a critical role. Several substances have been synthesised, some of which are close to entering clinical trials. Further extensions of this knowledge system for R&D in the pharmaceutical industry are envisaged, for instance enriching the database with proprietary research data.

### **Facilitating inventory management**

ICT based systems offer a huge potential for innovation in tracking and tracing products along the supply chain. Such systems typically involve Auto-ID components, that is a product code that allows for a unique identification of the product. In contrast to product identification standards (e.g. a code identifying a *box* of aspirin) deployed today, the code should be able to identify the product on item level (*this specific box* of aspirin). Identification technology (e.g. RFID – Radio Frequency Identification) allows reading the product code automatically while passing through the supply chain. Central information services then combine the product code with product-related information necessary for carrying out tracking and tracing services. Some of the e-Business Activity Views featured related initiatives in companies.

A good example for an inventory management system is the *UtzFocus* system. *Utz Quality Foods* is number three in salty snacks in the US with more than US\$ 200 million annual sales. The company uses an internet-based sales tracking system ("UtzFocus") that monitors sales of company products at each supermarket and point of sale. It also informs delivery personnel about special product promotions in stores in order to adapt the amount of products to be delivered. The company monitors all its plants with real-time data on the usage of ingredients, chip slices measures, production numbers, inventories of ingredients and plastic bags stocks are provided through the intranet to confirm that production matches sales requirements. Re-engineering the value chain this way resulted in cost-savings and helped increase sales.

*Camelin Décolletage Industries (CDI)*, France, is an international supplier of complex brake parts to the car industry, with about 100 employees. In 2004, the company introduced an Enterprise Resource Planning (ERP) system. One of the key objectives was to decrease inventory costs. One of CDI's daily challenges is to manufacture large volumes of different car parts and to load them within just one hour in the suppliers' trucks. More than 65% of its production is exported to the Czech Republic, Spain and

Germany. The new ERP system (implemented in late 2004) proved to support this objective, as it helps CDI to better anticipate short term and long term deliveries.

### **e-Collaboration and business networks**

For SMEs in particular, collaboration in business networks can be an important strategy to counteract advantages of large firms due to economies of scale. ICT play an important role as a 'glue' for such networks, for instance for shared marketing or procurement activities. Business networks can also enable SMEs to have access to ICT resources which would otherwise not be accessible for them. Associations and business support organisations appear to play an important role as enablers of such networking initiatives.

In 2000, *the Dutch Ford car dealer association (NFDA)* initiated a project to improve the exchange of spare parts between the associated car dealers. This was motivated by the ever rising costs of spare part inventories and the increasing pressure on net margins. The online exchange opens up spare part inventories of all connected dealers to each other. The impact of the project on the management of spare part inventories turned out to be significant; cost savings are realised by improved purchasing policies, and, in particular, by facilitating the dealer-to-dealer reselling of old and often rare spare parts.

However, not only small firms benefit from cooperation. *Pharma-mall* (DE) is an integration hub initiated by a joint venture of the pharmaceutical companies Boehringer Ingelheim, GlaxoSmithKline, Merck, Novartis and Schering. The collaboration of research-based pharmaceutical companies in non-core business areas is not unusual. In order to manage the high risk involved in developing new products, for example, R&D co-operation is common in this sector. In addition, producers of pharmaceuticals are also collaborating in sales logistics. Today, *pharma-mall* provides an integration hub that interconnects the sales systems of associated pharmaceutical companies with the manifold ERP or procurement systems of hospitals and pharmacies. By integrating the various backend systems, *pharma-mall* supports the entire supply process, including ordering, confirmation and accounting.

### **Improving supply chain management and logistics**

Supply chains in almost every industry tend to be complex and fragmented. Production processes normally involve various networks among suppliers, third parties and customers. They consist of a number of discrete activities. ICT can help to organise these relationships as integrated production networks. Integration can be both horizontal and vertical.

A notable example from the printing industry is the integrated workflow system "Prinect", which is used by the Finnish print company *Finepress Oy*. The solution allows *Finepress* to link electronically all the steps within its production chain (including prepress, press and post-press phases), and to connect those with the management information system. Through process integration, the company was able to reduce operator input, which resulted in a marked reduction in the fixed cost of processes.

### **Integrating business processes through ERP**

Enterprise Resource Planning (ERP) systems typically link manufacturing, logistics, distribution, inventory, shipping, invoicing, and accounting processes in a company. Thus, ERPs are cross-functional and enterprise wide. They constitute an important control system and backbone for many business activities, including sales, delivery, billing, production, inventory management, and human resources.

*Palfinger* (AT) is a leading international manufacturer of hydraulic lifting, loading and handling systems. *Palfinger* considers information and communication technologies (ICT) mainly as a means for business process innovation. The company uses e-business for various purposes, including e-procurement and e-sales, and – probably most important – internal processes. In 2003/04, *Palfinger* implemented a new SAP system in the distribution, production, and logistics divisions. The aim was to

better co-ordinate the entire scope of Palfinger's activities from maintenance and services to profitability analyses. The system also supports collaboration across the value network – with area representatives, suppliers, component manufacturers, and even end customers. Despite some initial difficulties, the objectives were successfully realised, with sizeable impacts on the efficiency of internal and external processes.

*SkiStar* is a Swedish company (875 employees) whose core business activity is the operation of lifts for alpine skiing. The main driving force of *SkiStar* to invest in ERP was to consolidate its four skiing destinations into one organisation in terms of IT-systems, booking procedures and marketing. *SkiStar* developed a system for analysis that is connected to the booking system, i.e. once every 24 hours the booking data from the customer database is transferred to the analysis system. This enables *SkiStar* to check the running order intake and compare it to previous years and customer groups. Since skiing is a very seasonal activity, it is important for *SkiStar* to be able to detect when the demand is at peak in order to adjust prices and the number of staff according to demand. The system for data analysis has been in operation for one year and is common for all destinations within *SkiStar*.

In some cases, system changes and innovations can be imposed on companies by their main customers. *Mecahers* is a French tier 1 supplier of sheet metal parts for the aerospace industry. Airbus, its main customer, has recently shifted its supply chain system from an EDI-EDIFACT to a new web portal *Sup@irWorld*. In order to comply with Airbus' new supply chain interfaces and requirements, *Mecahers* decided to implement a new ERP system to automate order management and increase the flexibility of production. *Mecahers* aims at improving the monitoring of production costs and the profitability analysis. This will help the company to take "make-or-buy" decisions, for example which mechanical parts should be internally produced, outsourced or off-shored according to their profit margins. As a result, the company can focus on production segments with the highest added value.

### **Improving customer relationship and customer service**

Customer Relationship Management (CRM) systems promise the ability to synthesize data on customers' behaviour and needs and thus to provide a universal view of the customer. They are mainly used to optimise marketing strategies. Implementing CRM systems can be very costly for firms. The results achieved has been very mixed in the past. While some companies are very satisfied, others are disappointed about their benefits. Activity Views collected by *e-Business W@tch* in 2005 are prevaillingly positive, but also reveal the many challenges involved with CRM.

*EGIS Poland* is one of the leading manufacturers of pharmaceuticals in Eastern Europe today. In the intensive competition with other distributors of pharmaceuticals, maintaining excellent customer relationships is a key priority at *EGIS Poland*. A systematic knowledge about customer demand and preferences is a key success factor in this context. The conventional CRM system that was used by *EGIS Poland* turned out not to be appropriate for fulfilling this task. Functions that enabled the sharing of customer information, or the analysis of sales data, were too limited. Therefore, the company decided to implement a new and more powerful CRM system in 2003. This system better supports sales representatives in their day-to-day work. The company also reports that marketing campaigns and promotional events can be better targeted than before. Further extensions to the system are already planned, e.g. enabling wireless access for representatives by means of mobile solutions.

Considering the fierce competition in the tourism industry among destinations, the Swiss Engadin region was convinced that its organisations need to join forces in developing and exploiting CRM related opportunities. In the winter season of 2002/03, a customer card was introduced. The *ENGADINcard* should facilitate the provision of personalised services for guests in the region, and – as a 'by-product', it should deliver a wealth of customer data to feed a sophisticated CRM application. However, the implementation was not without problems. Until 2005, specific features of the card system were adapted several times in order to overcome these initial difficulties. The concept of the destination card is challenging, risky and promising at the same time.

## Quality assurance

Quality assurance is a very sensitive issue in many industries, for example in the food & beverages industry with its perishable goods. ICT can assist companies in establishing and improving quality assurance mechanisms. Some of the e-Business Activity Views have addressed this issue.

The commercial association *E-Piim* ("E-Milk") is a dairy co-operative owned by Estonian milk producers. In order to provide quality assurance and take full advantage of modern technological solutions, E-Piim launched already in 2002 an SMS-based milk quality feedback system. After the quality of milk has been checked by e-Piim, a milk producer receives immediate feedback via SMS and/or e-mail. Prompt feedback enables the producer to implement immediate changes in the production system. This solution has generated a remarkable increase in the quality of raw milk.

*Fire Eater A/S*, a small Danish manufacturer of fire preventing systems and fire fighting equipment (40 employees), uses ICT based systems for quality management. The company buy a standard quality management software system. Software modules cover document handling, environment and work environment management, calibration and maintenance, management of certificates and standards, failure reports, customer satisfaction surveys, and audit plans. The company reports that the system has improved information flow and storage of data, and to comply with regulatory demands.

### 1.7.3 Conclusions

The systematic collection of e-Business Activity Views, which was substantially extended compared to 2004, proved to be a valuable source of information for the purposes of *e-Business W@tch*. Activity Views help to understand and contextualise the results of the survey, and to assess the implications of e-business for firms and sectors. Some of the lessons learned, moreover, can be considered of general interest for enterprises or other institutions that may carry out similar initiatives. Issues such as the users' acceptance in determining the success of e-business initiatives, the importance of a commonly shared vision whenever initiatives involve various players, or problems related to the standardisation and the establishment of a common vocabulary for interactions, go beyond the specific experience and can be taken as general recommendations.

The examples also show that "off-the-shelf" e-business solutions, for example for ERP, e-procurement, or CRM, are widely used across the sectors covered. This is also confirmed by survey results. On the other hand, many companies and cooperative projects invest in the development of niche-applications or services fulfilling special functions which is not readily available from the shelf.

However, the experience made by correspondents and editors when gathering information about real-life e-business activities also shows that it is not always possible to assess the outcome of ICT investments in terms of exact figures (e.g. "increase in sales", "costs saved in % of total costs"). Many companies cannot (or do not want to) provide such figures. In some cases, when ICT systems have recently been implemented, it may also be too early to make a valid assessment of impacts. In other cases, there is a causality problem, as business changes can possibly be attributed to several factors, including overall changes in the market environment.

Activity Views rather have their strength in providing examples for the motivation of companies to invest in e-business, how they go about this task, and about challenges they have to address. In this regard, the Views collected for Sector Studies provide good evidence on e-business activity in the EU in 2005.

## 1.8 International e-Business Developments

### Introduction

This chapter summarises the main results of the special report "Overview of International e-Business Developments", published by *e-Business W@tch* in July 2005.<sup>40</sup> This report compares the status-quo of e-business monitoring activities in major economies of the world. It identifies the major national monitoring initiatives and their institutional set-up, and features the main results as far as they have been accessible. Five countries outside Europe have been selected for this purpose: Australia, Canada, Japan, Korea and the USA. The findings for these countries are compared to equivalent activities in the European Union. The selection considers the economic importance of these countries in the global economy, access to sources on e-business development, and the objective to include economies from different continents. The study concludes with some policy recommendations for international e-business monitoring in the future.

### 1.8.1 E-business monitoring in Australia

#### Institutional background and main surveys

The **Australian Bureau of Statistics** (ABS – [www.abs.gov.au](http://www.abs.gov.au)) is Australia's official statistical organisation. The ABS collects a range of information technology data as part of its innovation and technology statistics programme of work.

In this context, the ABS also collects e-commerce related data by one dedicated survey measuring the "Business Use of Information Technology" (**BUIT**). The survey uses the narrow OECD definition of an internet commerce transaction and focuses on income (revenues) resulting from internet orders for goods and services. Further information is collected on barriers to internet sales. Measuring units are enterprises of any size covered by the ANZSIC (Australian and New Zealand Standard Industrial Classification). BUIT has been conducted annually since 1999-2000, while before 1999 it was conducted biennially.

#### Main results

Based on the BUIT surveys, the ABS reports that Australian companies continue to embrace information technology. The proportion of businesses which reported placing orders via the internet was 31% for 2003/04, an increase of 3 percentage points from the previous year (see Exhibit 1.8-1). This growth is a continuation of the trend seen over recent cycles for this business practice. Over the same period, the proportion of companies selling via the internet slightly decreased from 13% to 12% of all businesses.

**Exhibit 1.8-1: Orders for goods and services via the internet or web (Australia)**

	2000/01	2001/02	2002/03	2003/04
Businesses which placed orders via the internet or Web (%)	20	25	28	31
Businesses which received orders via the internet or Web (%)	9	6	13	12
Internet income (in AUD (€) billion)	9 (5.2)	11 (6.3)	24 (13.8)	33 (19.6)

Source: ABS-BUIT 2003/4 (doc. 8129.0)

<sup>40</sup> Available at [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources')

Electronic commerce represented approximately 2.0% of total income for all businesses surveyed, and approximately 7.2% of total income reported by those businesses surveyed who received orders via the internet or web during the period. In comparison, for the year 2003, internet income was approximately 1.4% of total income for all businesses surveyed, and approximately 4.9% of total income reported by those businesses surveyed who received orders via the internet or web during the period. Of the 84,000 businesses estimated to be receiving internet income in 2003–04, 44% generated 5% or more of their total income in this manner.

A good deal of e-commerce activity, however, still appears to be conducted by rather simple means. Businesses which received orders via the internet or web were asked to identify ways in which these orders were received. Businesses could identify more than one way of receiving orders. E-mail not linked to a website was the most common method (81% of businesses received orders in this way). Orders received via an e-mail linked to a website was reported by 30% of businesses, 15% of businesses received orders through a website online order form and only 6% received orders through a web site shopping-cart facility.

Of these businesses that accept online orders, 86% indicated that their systems which are used to receive orders did not have automated links to any other business system.

## 1.8.2 E-business monitoring in Canada

### Institutional background and main surveys

**Statistics Canada** ([www.statcan.ca](http://www.statcan.ca)) has been active in monitoring developments in ICT-induced transformations and e-business adoption and usage by Canadian enterprises. Its research in several aspects of ICT-related phenomena include the size, growth and significance of the ICT sector, the penetration and use of ICT by households and individuals, business and government connectivity and engagement in e-commerce. Much of Statistics Canada's work in this area is shared internationally, in a quest for common knowledge and learning.

Additionally, the Canadian e-Business Initiative (**CeBI**), a private sector-led partnership located within the Electronic Commerce Branch of Industry Canada, aims to foster Canada's e-business success by focusing on productivity, leadership and innovation issues ([www.cebi.ca](http://www.cebi.ca)).

The main survey dedicated to the collection of e-commerce related data in Canada is **SECT** (Survey of Electronic Commerce and Technology). SECT is based on the narrow OECD definition of internet commerce transactions and measures the income resulting from internet orders for goods and services, with or without online payment. Included is the value of orders received over the internet. Sales using electronic data interchange over proprietary networks and transactions conducted on automatic teller machines are excluded. Businesses are stratified by type of activity. Statistics Canada has conducted annual surveys to measure ICT use by business since 1999 (and since 2000 under the name of SECT).

### Main results

Online sales by Canadian companies and government departments grew substantially for the fifth consecutive year in 2004, but e-commerce still accounted for less than 1% of total operating revenues for private businesses.<sup>41</sup>

Sales from B2B amounted to CAD 19.8 (€ 12.3) billion, which represented about 75% of total e-commerce by private firms, up from only 68% the year before. The value of business-to-consumer (B2C) sales in 2004 amounted to CAD 6.6 (€ 4.1) billion.

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<sup>41</sup> Data reported are taken from several issues of The Daily, Statistics Canada's official release bulletin. Some additional data are taken from reports of the Canadian Business Initiative's (CEBI) Net Impact Study IV of 2004.

Findings confirm the importance of firm size in conjunction with the sector of activity: Sales from one business to another are still concentrated in large, private sector companies. In 2004, these large firms accounted for 63% of business-to-business sales. Smaller retailers were more likely to sell to households. Sales to households accounted for less than 24% of the value of online sales by large firms. Small firms, those with fewer than 20 employees, reported that 41% of the value of their online sales was to households. Overall, e-business adoption by SMEs was found to grow only slowly.

**Exhibit 1.8-2: Value of internet sales (Canada)**

		2000	2001	2002	2003	2004
Internet sales with or without online payment (in CAD / € million)						
Private Sector	CAD	5,549.8	6,336.6	10,815.3	18,164.4	26,438.0
	€	4,054.9	4,572.6	7,309.7	11,495.3	16,373.6
Public Sector	CAD	111.2	180.3	263.6	756.5	1,881.5
	€	81.2	130.1	178.2	478.8	1,165.3
<b>TOTAL</b>	<b>CAD</b>	<b>5,661.0</b>	<b>6,516.9</b>	<b>11,078.9</b>	<b>18,920.9</b>	<b>28,319.5</b>
	€	4,136.1	4,702.7	7,487.9	11,974.1	17,538.8

Source: The Daily, April 20, 2005 (based on Statistics Canada, SECT 2004).

From a sector perspective, four sectors (wholesale, transportation and warehousing, manufacturing and retail trade) accounted for about two-thirds of online sales by private companies in 2004, virtually unchanged from the year before. For the fourth consecutive year, the wholesale trade sector accounted for the largest value of e-commerce sales. Wholesalers sold over CAD 6 (€3.7) billion worth of goods online in 2004, nearly one-quarter of total private sector e-commerce. Firms in the transportation and warehousing sector were second with about CAD 4.6 (€2.8) billion in sales, or 17% of the total.

### 1.8.3 E-business monitoring in Japan

#### Institutional background and main surveys

In Japan, a decentralised statistical system is adopted. Basic and common statistical surveys, for instance the Population Census are conducted by the Statistical Survey Department of the Statistics Bureau, Ministry of Public Management, Home Affairs, Posts and Tele-communications (MPHPT), while other statistical surveys necessary for the policy making of the ministries and agencies are conducted within their respective jurisdiction.

Within this framework, the **Japanese Statistics Bureau** ([www.stat.go.jp/](http://www.stat.go.jp/)) plays a key role. The Bureau is responsible for coordinating the statistical activities of different ministries. The Bureau is part of the Ministry of Internal Affairs and Communications (MIC). Several surveys are conducted by the Japanese Statistics Bureau that address issues related to electronic business development. Topics include the engagement of companies in e-commerce, the ratio of e-commerce by industry, by networks used, by partners for trade, and by size of enterprise.

One of the main surveys on ICT use by enterprises and organisations is **CUTS** (Communications Usage Trend Survey). CUTS consists of two sub-surveys:

- CUTS Offices-Establishments, which MPHPT carries out annually as a nation wide sample survey to 5,600 establishments with more than 5 regular employees;
- CUTS Enterprises, which MPHPT carries out annually as a nation wide sample survey of 3,000 enterprises with more than 100 regular employees.

An important other data source is **ECOM** (Electronic Commerce Promotion Council of Japan), which conducted a joint e-commerce survey with the Ministry of Economy, Trade and Industry (METI), and NTT Data Institute of Management Consulting in 2002.



## Main results

According to the CUTS 2003, nearly 80% of corporations surveyed had established a website in 2003. Positive responses were comparatively higher in the service industries, including financial and insurance services.

30% of corporations responded that they had implemented B2B (business-to-business) e-commerce, while 11.5% said they practised B2C (business-to-consumer) e-commerce. From a sectoral perspective, manufacturing firms were most likely to use B2B (34%), while financial and insurance firms were leaders in B2C use (26%). While the percentage of companies that used B2B e-commerce increased in most sectors from 2002 to 2003 (with the exception of financial services), the share of firms that engaged in B2C had stagnated or even slightly decreased. In financial services, for example, the percentage had dropped from 31% to 26% (rounded), in 'services and other services' from 17% to 14%.

75% of corporations said they had invested in computers and other ICT equipment over the last year (i.e. in 2002). The most common purpose of IT investment given was "to improve business efficiency and speed" (85%). Out of the companies that had made investments, 71% observed a positive effect on their business.

B2B was projected to account for close to 90% of total e-commerce sales in 2005, down from 99% in 1998, B2C was estimated at roughly 10% (up from a 1% in 1998). In B2B trade, electronic commerce already accounts for about 14% of total revenues. In B2C markets, e-commerce is estimated to account for 4.5% of revenues.

Broadband adoption: At the end of 2004, about 74% of companies (with 100 or more full-time employees) that used the internet had introduced Cable TV lines, DSL lines, optical lines or wireless access. The maximum bandwidth exceeded 1.5 Mbps in 61% of companies.<sup>42</sup>

### 1.8.4 E-business monitoring in Korea

#### Institutional background and main surveys

The Korean National Statistical Office (**KNSO** – <http://www.nso.go.kr/english>) collects, monitors and disseminates data and information on ICT adoption. However, it is not the only relevant source for information on e-commerce and e-business. Various organisations are involved in promoting e-commerce through research and project implementations in co-operation with the Korean government.

KNSO has developed a set of indicators measuring changes of the knowledge and information society and is monitoring and measuring changes in e-business at a national scale. Its definition of e-commerce coincides with that of the broad OECD definition. KNSO monitors the adoption of e-business in Korea mainly by means of two dedicated surveys:

- a monthly B2C survey, called 'Cyber Shopping Mall Survey', and
- the quarterly B2B and B2G survey, which is called the 'e-Commerce Survey'.

Both surveys measure the type of e-commerce, the amount of e-commerce sales/purchases, and the number of business establishments involved. The monthly 'Cyber Shopping Mall Survey' (B2C) was first released in August 2000. The 'E-commerce Survey on Enterprise' (B2B) was first released in June 2001, and the 'E-Commerce Survey on Government' (B2G), being incorporated into the B2B survey, was first released in September 2001. The two surveys were approved as designated statistics in February 2004 by the Korean Statistics law.

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<sup>42</sup> Ministry of Internal Affairs and Communications (2005). Information and Communications in Japan. Stirrings of u-Japan. White Paper 2005.

## Main results

Korea has gained much ground in e-commerce. According to KNSO's "Report on the E-Commerce Survey" (2004), the total e-commerce transaction volume was KRW 235,025 billion (€ 176 billion) in 2003 (including B2B, B2G and B2C transactions). This is a growth of 32% from 2002. Data for the 1<sup>st</sup> quarter of 2004 indicated further growth of about a third compared to 2003.

B2B has emerged as the major type of e-commerce, accounting for close to 90% of the transaction volume in 2003 (see Exhibit 1.8-3). B2B has also shown the highest growth rates over the past few years. In 2003, the e-commerce transaction volume in inter-firm trade increased by more than 30%.

**Exhibit 1.8-3: E-business volume in Korea by type of customer (B2C, B2G, B2B)**

	2002		2003		Change over previous year	
	billion KRW	ratio	billion KRW	ratio	billion KRW	+/- rate
<b>Total e-commerce</b>	<b>177,810</b> <b>(€ 151 b)</b>	<b>100.0</b>	<b>235,025</b> <b>(€ 176 b)</b>	<b>100.0</b>	<b>57,215</b> <b>(€ 25 b)</b>	<b>32.2</b>
Business-to-Business (B2B)	155,707	87.6	206,854 (a)	88.0	51,147	32.8
Business-to-Government (B2G)	16,632	9.4	21,634	9.2	5,002	30.1
Business-to-Consumer (B2C)	5,043	2.8	6,095 (b)	2.6	1,052	20.9
Other	427	0.2	442	0.2	15	3.5

### Notes:

- (a) KRW 206,854 billion for B2B is the sum of KRW 206,336 billion estimated by the E-commerce survey on Enterprise and KRW 518 billion by the Cyber Shopping Mall Survey.
- (b) KRW 6,095 billion for B2C and 21,634 billion KRW for B2G were estimated from the results of the Cyber Shopping Mall Survey & E-commerce Survey and Government respectively.

Source: KNSO, 2004

B2C has also significantly increased by about 20% in 2003, according to KNSO. However, the total transaction volume accounts for only about 3% of total e-commerce. Nevertheless, further growth is expected for the years to come, in line with a trend that can be observed for many countries these days. In the case of Korea, the fast catching-up in household internet penetration (compared to the late 1990s, when other advanced economies were still ahead of Korea in that respect), coupled with the general rise of the internet, may well lead to extraordinary growth rates in future B2C e-commerce. Back in 2002, approximately 20% of all internet users in Korea were identified as B2C e-commerce users. It can be speculated that this percentage has significantly increased since.

"Closed transactions" (i.e. transactions between large corporations and their long-term suppliers) accounted for about two thirds of the total e-commerce transaction volume in 2003. "Open transactions" (i.e. transactions via bidding or open markets) accounted for about one third.

## 1.8.5 E-business monitoring in the USA

### Institutional background and main surveys

The most important authority for measuring e-business in the United States of America is the U.S. **Census Bureau** of the Department of Commerce (DoC, [www.census.gov/eos](http://www.census.gov/eos)), pre-eminent collector and disseminator of timely, relevant, and quality data about the people and the economy of the United States. The Census Bureau conducts a population and housing census every 10 years, an economic census every five years, and more than 100 demographic and economic surveys every year, all of them evolving from the first census in 1790.

**E-Stats** ([www.census.gov/estats](http://www.census.gov/estats)) is the U.S. Census Bureau's internet project site devoted exclusively to Measuring the Electronic Economy. It features recent and upcoming releases, information on methods, classification systems, and background papers.

ICT and e-business-related data are collected mainly through the following Census Bureau surveys:

- the Annual Survey of **Manufacturers (ASM)**,
- the Annual **Trade** Survey (**ATS**),
- the **Service** Annual Survey (**SAS**),
- the Annual **Retail** Trade Survey (**ARTS**), and
- the **Economic Census**.<sup>43</sup>

Another relevant source is the U.S. Economics and Statistics Administration (**ESA** – <https://www.esa.doc.gov>) which publishes the "Digital Economy" reports. The latest one was the Digital Economy 2003 report, the Department's fifth annual report on conditions in U.S. information technology industries and the effects of ICT on national economic performance.

### Main results

The latest edition of E-Stats, the official news bulletin of the US Bureau of Census (May 11, 2005) reported the following e-commerce highlights for the USA:

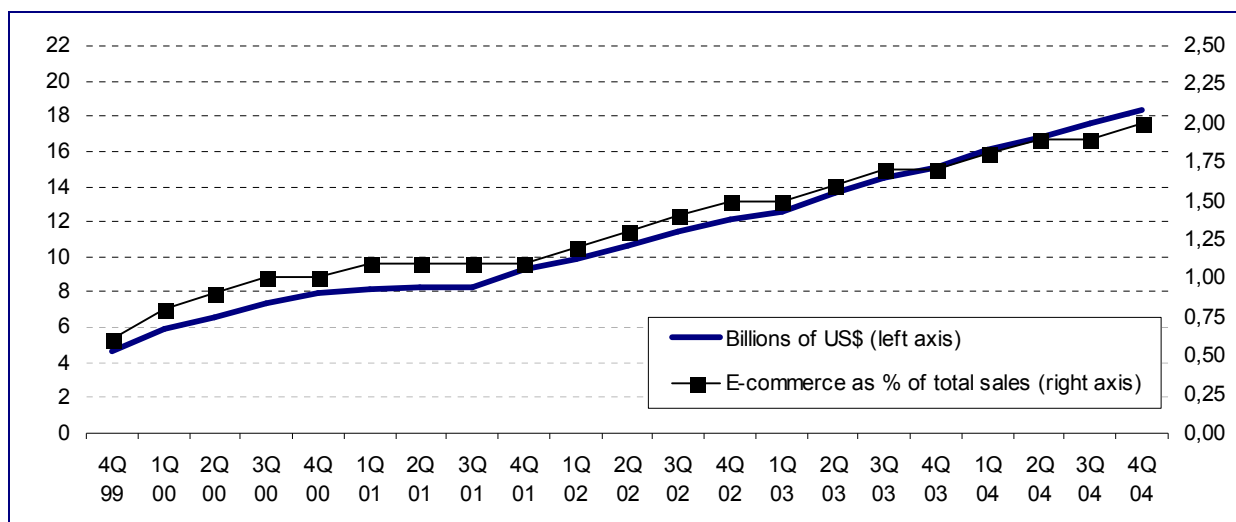
- E-commerce, on a percent change basis, outperformed total economic activity in all four major economic sectors (i.e. manufacturing, merchant wholesale, retail trade, service industries) measured between 2002 and 2003. For example, in manufacturing the percentage change in shipments was 1.5% in total, but 12.1% for e-commerce. E-commerce as percent of total shipment increased from 19% in 2002 to 21% in 2003<sup>44</sup>.
- Business-to-Business (B2B) activity, which depends critically on Electronic Data Interchange (EDI), dominated e-commerce. For example, EDI as percent of total sales in merchant wholesale trade increased from 10.5 to 11.3% from 2002 to 2003.
- Most e-commerce occurred in a handful of industry groups within each sector. Among 21 manufacturing industries, for example, transportation equipment manufacturing accounted for almost 40% of the e-commerce shipment value, followed by chemical manufacturing which accounted for 10%.

While more comprehensive synthesis results for all industries, as reported by E-Stats, are only available for the year 2003, data for US retail e-commerce sales are collected and reported on a quarterly basis. Historically, the US Bureau of Census has begun collecting e-commerce sales from retailers included in the monthly retail survey (sample of about 12,000 retailers) in October 1999. Since then, data has been collected quarterly, which allows precisely tracking the growth of e-commerce.

Exhibit 1.8-4 shows data for US retail e-commerce sales as percent of total quarterly retail sales for the time period of 1999 to 2004. It shows that e-commerce retail sales represent a slowly but steadily increasing share of total retail sales, in terms of both value and volume. The total e-commerce retail sales volume (in millions of dollars) has been estimated at USD 18.4 billion (€ 14.8 billion) for the fourth quarter of 2004, an increase of 4.7% from the third quarter of 2004 (left axis). Total e-commerce retail sales amounted to only 2.0% of total retail sales in the fourth quarter of 2004 (right axis). However, this e-commerce volume is nearly twice as large as that of 2001 (1.1%) and almost four times as large as 1999 (0.6%).

<sup>43</sup> In 1999, the Census Bureau conducted the Computer Network Use Survey (CNUS). Results of CNUS have been frequently used in ICT related research in combination with evidence from the annual industry surveys mentioned.

<sup>44</sup> Source: <http://www.census.gov/eos/www/papers/2003/table1.xls>

**Exhibit 1.8-4: Estimated<sup>a</sup> quarterly US retail e-commerce sales<sup>b</sup>****Notes:**

- (a) Estimates are adjusted for seasonal variation and holiday and trading-day differences, but not for price changes.
- (b) E-commerce sales are sales of goods and services where an order is placed by the buyer or price and terms of sale are negotiated over an internet, extranet, Electronic Data Interchange (EDI) network, electronic mail, or other online system. Payment may or may not be made online.

Source: US Bureau of the Census (2004).






The steady growth of e-commerce is also supported by the fact that the growth rate of total retail e-commerce for the first quarter of 2004 was 28% (compared to 2003), while the rate of growth of total retail in the same period was only 9%. A report by UNCTAD<sup>45</sup> projects this positive trend to continue: "On current trends, retail e-commerce in the United States could amount to USD 100 billion by mid-2006, at which moment it could represent between 2.5 and 3% of total retail sales in that country" (p. 12).

### 1.8.6 Synopsis of findings and comparison to the EU

Exhibit 1.8-5 provides a comparative overview of the main instruments used for collecting e-business data in the five countries, and highlights some of the main results of these monitoring activities. As outlined in the sections above, e-business monitoring activities in Australia, Canada, Japan, Korea and the USA differ in their structure and focus. Therefore, the international comparability of results from different sources is limited and problematic. A truly international benchmarking of e-business developments requires special studies that have the resources to conduct primary research on their own. This also applies to the comparability of data with results for European enterprises. Some general conclusions, however, can be drawn regarding the state-of-play of e-business in Europe.

<sup>45</sup> UNCTAD (United Nations Conference in Trade and Development) (2004). E-Commerce and Development Report 2004, Geneva.

**Exhibit 1.8-5: Overview of international e-business monitoring initiatives and snapshots of key results**

	Australia	Canada	Japan	Korea	USA
					
<b>Main survey(s)</b>	Business Use of Information Technology survey (BUIT)	Survey of Electronic Commerce and Technology (SECT)	At least 41 official statistical surveys with questions related to ICT use. Most relevant for e-business: CUTS (Communications Usage Trend Survey), EEC (Establishment and Enterprise Census), and Surveys by ECOM (Electronic Commerce Promotion Council of Japan)	Cyber Shopping Mall Survey E-commerce Survey on Enterprise (B2B)	Data are collected in five separate Census Bureau surveys, focusing on different segments of the economy: for manufactures (ASM), wholesale trade (ATS), services (SAS), retail trade (ARTS), and the Economic Census.
<b>Sampling frame</b>	ANZSIC	NAICS	JICS	KSIC	NAICS
<b>Snapshots – main findings</b>	85% of firms use a computer, 74% use the internet and 25% have a web presence. 31% of firms place orders on the internet (+3%-points compared to 2002/03). 12% have received orders via internet or web. Out of those, 44% generated 5% or more of their total income in this way.	The volume of e-B2B transactions is CAD 19.8 (€ 12.3) billion, representing 75% of total e-commerce by private firms. The volume of e-B2C transactions is CAD 6.6 (€ 4.1) billion (25% of total e-commerce). 7% of firms, representing 27% of gross business income, engage in e-commerce.	In 2003, 80% of corporations had a website. 30% engaged in B2B e-commerce, 12% in B2C e-commerce. While B2B increased, B2C was stagnating. Projections for 2005 estimate that e-commerce will account for 14% of total B2B and 4.5% of total B2C trade volume.	B2B transactions account for about 88% of total e-commerce. In 2003, the B2B transaction volume increased by more than 30% compared to 2002. B2C transactions account for about 3%, B2G (business-to-government) for about 9% of electronic transactions. B2C increased by 20% in 2003.	E-commerce accounts for 16.3% of total B2B and 2.0% of total retail sales. 92.7% of total e-commerce is B2B, 7.3% B2C. In manufacturing, e-commerce accounts for more than 20% of the total value of shipments. E-commerce outperforms total economic activity in all sectors studied.
<b>Main trends identified</b>	Dynamic overall development, but stagnation in the percentage of firms that sell on the internet	B2B sales drive e-commerce growth; E-commerce has high growth rates, but still accounts for less than 1% of total operating revenues for private companies.	The major e-commerce adopter in the Asia-Pacific region. B2B drives the development, accounting for close to 90% of total e-commerce sales. B2C has recently stagnated.	Enormous growth rates in e-commerce: e-transaction volume grew by 32% from 2002 to 2003, and by 31% from 2003 to 2004 (1 <sup>st</sup> quarter comparison).	B2B is dominating, but B2C retail e-commerce is growing fast, particularly in specific sectors (e.g. books, textiles).
<b>Reference year</b>	2003/4	2004	2005 (projected)	2003	2004

Source: Developed by e-Business W@tch (2005) from various international sources.

## Similar state-of-play in e-business in advanced economies

Most e-business data indicate that the maturity of ICT adoption and e-commerce activity among enterprises is at a similar stage in all major economies. The percentage of enterprises' total turnover from e-commerce, for example, appears to have reached similar levels in Europe (EU-25), the USA and Australia with about 7-10% in each of these economies.<sup>46</sup> This indicates that the significance of e-business activity for sales transactions is comparable, at least on the aggregate level.

However, as argued in the summary box below, gaps are more pronounced when comparing individual EU Member States. Eurostat reports that enterprises from the EU-25 make 8.6% of their total turnover from e-commerce.<sup>47</sup> Figures vary considerably between Member States. For Greece, for example, Eurostat reports a share of 1.6% of turnover, for Poland 2.8%. In contrast, shares are highest for Ireland (20%), the UK (13.7%), Denmark, Finland, Sweden and Germany.

### **Exhibit 1.8-6: Main conclusions on the performance of EU enterprises in e-business**

- **Head-to-head:** On average, EU enterprises are head-to-head with their counterparts in other advanced economies in terms of electronic business activity.
- **Gaps within the EU:** However, gaps in e-business adoption within the European Union (between Member States) are clearly more pronounced than on aggregate level in international benchmarks, that is between firms from the EU-25 and the USA, Australia or Japan (and others). Of course, the same observation could be made for other large economies, notably for the USA, where digital divides between states or regions also exist.
  - **EU countries as international benchmark:** Firms from those EU Member States which are most advanced in their information society development (the Nordic countries in particular) are not only 'e-leaders' within the EU, but constitute international benchmarks of ICT infrastructure adoption and e-business activity.
  - **Major EU economies aligned with international development:** Many EU countries are well aligned with the international state-of-play in e-business. This holds true for some of the major economies in the EU, for example the UK, Germany, the Netherlands and Spain. For France and Italy, results are mixed; some indicators point at a lower adoption of e-business activity.
  - **Digital divide concerns mostly the 'third tier':** ICT and e-business adoption is comparatively low among firms from EU Member States which constitute the least advanced group in information society development. This group includes some of the new EU Member States, Greece and Portugal.
- **Cultural similarities reflected in e-business activity?** International findings on e-business activity are strikingly comparable in particular for Europe (EU-25), the USA, Canada and Australia. Results for Japan and South Korea suggest some differences in specific areas,<sup>48</sup> notwithstanding that the overall dynamic is still similar. The same observation could be made for countries within the EU, where Member States with a similar culture show comparable patterns in e-business adoption.

<sup>46</sup> Sources: Eurostat (EU); ABS-BUIT 2003/4 (AUS); US Census Bureau 2005 (USA).

<sup>47</sup> Eurostat survey on ICT use by enterprises (2004). Data for this indicator are available on the Eurostat website [http://epp.eurostat.ec.eu.int/portal/page?\\_pageid=0,1136195,0\\_45572097&\\_dad=portal&\\_schema=PORTAL](http://epp.eurostat.ec.eu.int/portal/page?_pageid=0,1136195,0_45572097&_dad=portal&_schema=PORTAL) (downloaded in July 2005). Percentages relate to the base of enterprises with at least 10 employees and using computers.

<sup>48</sup> For example, the wider use of customer-facing e-commerce activity in South Korea, compared to e-procurement, is not to be found in any of the other countries.

### 1.8.7 Recommendations for policy

Considering the importance of ICT as a driver and enabler of globalisation processes, further initiatives to facilitate the international comparison of e-business developments and their impacts should be encouraged. There are several possibilities how this goal can be addressed. Three approaches are suggested as feasible options. They are discussed in more detail, in terms of their requirements, strengths and weaknesses, in the full special report.<sup>49</sup> These options are not necessarily substituting or excluding one other. The proposed measures can also be conducted in parallel. In particular, approach 1 should be viewed as a complementary and preparatory activity in relation to either approach 2 or 3.

An improved international cooperation in e-business monitoring would certainly make sense, both in terms of effectiveness and efficiency. International cooperation can be expected to be effective, as it creates an added value when (national) monitoring results can be put into an international perspective. Cooperation will normally also be efficient, as the total cost of the individual efforts involved should not be significantly higher than if carried out without coordination. There are more arguments for an increasingly international orientation in monitoring activities. These include demand for a better understanding of causal links between e-business developments and international (cross-border) trade developments, implications for SMEs, and impacts on growth, productivity and employment in different parts of the world.

<b>Possible policy approaches for improving the availability of internationally comparative e-business data</b>		
<b>Approach</b>	<b>Focus</b>	<b>Potential initiator(s)</b>
<b>1. Coordination of methodology development</b>	<ul style="list-style-type: none"> <li>• Focus on development of common definitions, guidelines and instruments</li> <li>• Encourage adoption of these instruments in as many surveys as possible</li> </ul>	<ul style="list-style-type: none"> <li>• OECD</li> <li>• UN</li> <li>• Statistical working groups</li> </ul>
<b>2. International cooperation of official statistical institutes</b>	<ul style="list-style-type: none"> <li>• The (European) Community Survey on ICT Use in Enterprises as a model for an international survey</li> <li>• Central coordination of methodology development</li> <li>• Local data collection in participating countries</li> </ul>	<ul style="list-style-type: none"> <li>• Official statistical offices in EU, USA, Japan etc.</li> <li>• Government (Ministries or departments responsible for e-business)</li> </ul>
<b>3. The International e-Business W@tch</b>	<ul style="list-style-type: none"> <li>• Implementation of an international observatory</li> <li>• Observatory put in charge of collecting data and preparing reports</li> <li>• Possibly in international cooperation (e.g. EU – USA)</li> </ul>	<ul style="list-style-type: none"> <li>• European Commission</li> <li>• EU Research Programmes (FP 7)</li> <li>• World Bank</li> </ul>

<sup>49</sup> See [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources')

## Part 2: e-Business Sector Profiles: Summaries of Sector Studies

### 2.1 The Food & Beverages Industry

The e-Business W@tch sector study on the textile and clothing industry was contributed by Databank Consulting (contact: [databank@databank.it](mailto:databank@databank.it)).

The full reports (parts 1 and 2) can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



Production in the food and beverages industry is characterized by small batch processes that are hard to consolidate and integrate. Despite high investments in plant automation, many operations are still labour intensive or only partially automated. This situation is reflected in a comparatively low diffusion of ICT among firms from the sector. However, e-business applications could rise in importance. Increasing requirements on food safety, such as clear labelling (origin and contents of food products) can be supported by ICT. This requires the integration of the companies' information systems, for example their ERP (Enterprise Resource Planning) systems, with new track and trace technologies, such as Electronic Product Coding Standards and RFID tagging. In fact, many firms believe that RFID will be important for them.

#### 2.1.1 Sector definition and background

##### Sector definition

The NACE Rev.1.1<sup>50</sup> classification of business activities specifies the "manufacture of food products and beverages" (DA 15). This industry is subdivided into nine groups including meat, fish, fruit and vegetables, fats, dairy products, grain mill and starch products, beverages and, lastly, a group for animal feeds. The food and beverages (F&B) industry, as defined for the e-Business W@tch for its studies, comprises all these activities.

##### **Exhibit 2.1-1: Business activities covered by the F&B industry (NACE Rev. 1.1)**

NACE Rev. 1.1	Business Activity
DA 15	Manufacture of food products and beverages

The food and beverages industry is made up of various and diverse sub-sectors. Production includes a range of specialist products addressing dietary requirements and lifestyle, religious, cultural and personal preferences. This involves a huge variety of production processes and packaging techniques. R&D applications play an important role in this context for improving products and processes, e.g. by extending shelf life, creating products with health benefits, or altering food flavour.

<sup>50</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.



## Industry background

F&B is a very important sector in the European economy, with a production value representing about 13% of total manufacturing. The sector provides jobs for about 4.4 million people in the EU-25.<sup>51</sup> The industry structure is characterised by the dominance of micro and small companies. SMEs (with up to 249 employees) generate almost half of the total EU production.

Over the past years, competition in the food and beverages sector has steadily increased. This development is likely to continue in the next few years, mainly driven by the gradual deregulation of markets and the increasing bargaining power of distribution networks. On the one side, multinational food manufacturers are pushing hard for inputs' price reduction. On the other side, powerful national or multinational retailers are pressing for reduced prices on outputs. In addition, costs of brand development are escalating. In this competitive scenario, it can be expected that the profit margins of agricultural and smaller food producers will be melting down.

### 2.1.2 ICT and e-business adoption in 2005

#### ICT infrastructure

The use of ICT infrastructure increases in line with company size. According to the e-Business Survey 2005, 83% of companies in the F&B industry have **access to the internet**. The percentage increases to 100% if only firms with over 50 employees are considered, whilst it falls to below 80% in micro companies (with less than 10 employees). Most companies report internet connections with less than 2 Mbps bandwidth.

Companies representing 41% of employees from the sector enable **access to their system remotely** from non-company workstations. The gap between small and large enterprises is extremely wide, ranging from 5% in companies with less than 9 employees to 71% in firms with more than 250 employees.

#### Internal business processes and collaboration with business partners

The F&B industry has traditionally been quite advanced in terms of management, control and automation of internal processes, especially those **linked to production**. Specific **ERP** solutions for the food industry capable of managing and automating standard processes have progressively spread in the sector. The diffusion of ERP systems is higher (37%, weighted by employment) than on average in the 10 sectors studied (28%). 70% of large firms from the sector use an ERP system.

12% of firms (involving 34% of employees) of the F&B industry use ICT to manage **production capacity or inventories**, which is also above average (9% of firms). ICT is used to a lesser extent for activities such as tracking working hours or production times and collaboration with commercial partners for the design of new products

Despite a positive trend, the use of ICT for **information sharing** among employees is relatively low in the F&B industry. **Intranets** have a fairly high level of penetration (12% of firms, accounting for 46% of employment), mostly among the large firms in the F&B sector. However, more sophisticated applications such as knowledge management and e-learning are not widely used.

#### Procurement and supply-chain integration

Supply chain integration is one of the most important and all-encompassing aspects of new production methods, procurement making up a substantial part of this. The peculiarity of the F&B industry is the perishable nature of the merchandise. This imposes specific handling times and conditions, as well as the need to monitor the origin of the product and the substances that go into it along the supply chain.

<sup>51</sup> Source: Eurostat New Cronos / DIW Berlin. See *e-Business W@tch* Sector Study on F&B, July 2005 ([www.ebusiness-watch.org](http://www.ebusiness-watch.org))

However, the implementation of **SCM solutions** in the F&B sector appears to be still fairly low among SMEs, although it rises to 36% in firms with more than 250 employees. In total, adoption is higher in terms of employment (21%) than on average in the 10 sectors studied (15%).

Many firms have made considerable investments in **e-procurement systems**. While in larger firms the overriding need is to overcome organisational and cultural resistance, in SMEs there are technological and financial capability limitations to consider. Particularly for the smallest firms, it is possible for e-procurement to take place not through the adoption of their own systems, which are usually costly to acquire and run, but by participating in auctions and other forms of transaction that can be carried out via specialised portals and marketplaces.

22% of firms, involving 43% of employees, in the F&B industry use **online purchasing**. This is lower than on average, but in line with sectors such as the textile industry and construction. 56% of large firms use e-procurement. For the majority of firms that buy online, supplies purchased online account for less than 5% of the total procurement volume. The percentage of firms supporting e-procurement processes with **specific ICT solutions** (dedicated software or internet-based services) is generally quite low at 5% of all firms (28% of large companies).

**Exhibit 2.1-2: Main findings of the e-Business Survey 2005 for the F&B industry**

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>• <b>ICT infrastructure</b> and access in the F&amp;B sector are slightly below the weighted average for the 10 sectors (EU-7).</li> <li>• The usage of <b>network applications</b> such as LANs, W-LANs, Intranet, VPN show a profound dichotomy between larger companies and micro-small ones.</li> <li>• DSL is the most commonly used type of <b>internet connection</b>.</li> <li>• As for <b>ICT skills development</b>, data indicate that in the past 12 months there has been a limited request for ICT specialists in this industry.</li> </ul>
<b>Integration of Internal processes</b>	<ul style="list-style-type: none"> <li>• The F&amp;B industry has traditionally been quite advanced in terms of management, control and automation of <b>internal processes</b>, especially those linked to production.</li> <li>• The penetration of <b>ERP systems</b> is higher than the weighted average for the 10 sectors covered in 2005 (EU-7).</li> <li>• Data indicate a trend towards internal <b>process integration</b>.</li> <li>• For <b>cooperation with business partners</b>, SMEs mainly use Document Sharing Systems, as a first step towards e-business integration.</li> </ul>
<b>Supplier-facing activities</b>	<ul style="list-style-type: none"> <li>• <b>SCM</b> diffusion is low in absolute terms.</li> <li>• The penetration of <b>ERP systems</b> is higher than on average in the 10 sectors.</li> <li>• SCM systems in this sector focus on <b>logistics management</b> rather than on purchasing.</li> <li>• Wherever applied, moreover, <b>online purchasing</b> has not eliminated barriers to international purchasing.</li> </ul>
<b>Customer-facing activities</b>	<ul style="list-style-type: none"> <li>• Making <b>online sales</b> is less common in the sector than e-procurement. About 8% of firms (accounting for 12% of employees) report online sales activity.</li> <li>• <b>CRM systems</b> are predominantly used by large firms (about 25%).</li> <li>• The importance of <b>RFID technology</b> has rapidly increased in the food industry and could have significant implications for sales processes, due to opportunities for reducing waste and returns, and for inventory management.</li> </ul>

## Marketing and sales

33% of firms in the sector have a website. Compared to purchasing online, **online selling** is far less common in the F&B industry. Only 8% of firms (accounting for 12% of sector employment) report online sales. There is no pronounced gap between small and large firms. Accordingly, the use of **specific ICT solutions** for selling online is also fairly low (6% of firms).

**CRM** systems are also used by a limited number of firms (14% in terms of employment share) in the F&B sector. Users report that CRM has been helpful for the effectiveness of their marketing activities and for customer service, but not for the development of new products. This is in contrast to the findings for most other sectors.

New technological developments could enhance e-business in the area of marketing and sales in the future. The use of **RFID**, for example, promises advantages of organising storage and refills of goods in retail stores. 17% of firms (representing more than 40% of sector's employment) already see RFID as a development that will be important for them.

### 2.1.3 Important topics and application areas

#### The need for integration along the value chain

Production in F&B is characterized by small batch processes that are hard to consolidate and integrate. Capital investments focus on production, packaging and process-control equipment. Despite high investments in plant automation, however, many operations are still labour intensive or only partially automated.

Regulators' insistence on traceability and recall systems, as well as on validated electronic information systems, is shaping some plants' spending priorities. Another factor is pressure to achieve supply chain integration with customers, suppliers and co-packers. However, automation without integration limits the gains that can be realized. Integration of production systems with the rest of the enterprise is the real challenge: improving communication between marketing and production, improving integration of the plant floor with sales and forecasting, exploiting customer data in order to meet emerging needs and improve time to market.

Competition and dynamics in this sector push larger companies to concentrate on improving logistics. They upgrade inventory management and storage capacity and try to improve the flows of input and output in order to avoid stock breaches and guarantee more punctual deliveries. Logistics considerations are particularly crucial in the F&B industry, since the short shelf life of most food products is a key factor in moving raw materials to processing plants and in transporting finished goods to market. Demand for faster, more frequent delivery of smaller stock units, coupled with the need for special packaging to fulfil promotional requirements, increases the need for supply chain improvements.

Case studies featured in the first sector report (of July 2005) demonstrate that competition and pressure from distribution are shaping ICT spending in the sector, pushing firms towards investments in business process improvements.

#### Quality and safety assurance: the issue of traceability

As of 1 January 2005, pursuant to the Regulation (178/2002) laying down the general principles for food law, all establishments operating in the F&B sector are obliged to trace the origin of every products or animal feed through the various stages of production, processing and distribution. Traceability and clear labelling are, therefore, important for food safety, allowing producers and consumers to know the origin of the food products.

Although regulation in this field has been welcomed by food industry and consumers' groups, the requirements issued by the EU are putting pressure on food manufacturers, especially private-label processors. Distribution chains are highly sensitive to their brand protection and are increasingly demanding in this respect.

In addition to the legislation, retailers are beginning to roll out RFID (Radio Frequency Identification) mandates to all their suppliers. As far as retailers are concerned, their primary motivation is building customer loyalty and trust. In driving these traceability measures down the supply chain, they are putting into place guarantees that if there is ever a recall, then any problem could be contained quickly.

The "total quality" approach that is required to ensure safety along the entire food supply chain can conflict with short-term commercial interests. However, it may even turn into a way for enhancing productivity, reducing operational costs and creating competitive advantage towards intermediate and final customers. This can be achieved through the integration of the companies' information systems, (e.g. their Enterprise Resource Planning systems – ERPs) with the new track-and-trace technologies, such as the Electronic Product Coding Standards and the RFID tagging.

### **Joint SME initiatives: marketplaces and district portals**

Escalating brand development costs, the increasing number of distribution channels and price competition are major drivers of competition in the F&B sector. These factors involve tight margins for agricultural and smaller food producers.

One of the strategies for SMEs to maintain their competitiveness is to join and participate in virtual markets or in district portals. This way they can exploit the advantages deriving from the use of web-based applications.

Joint SME initiatives using ICT applications are an increasing phenomenon. A small or medium enterprise that wants to go online with its business activity can use electronic marketplaces as a reassuring first approach before using their own e-commerce system for entering the global market. In a way, joint SME initiatives are an alternative strategy to the focus on integration along the supply chain.

There are two main forms of joint SME initiatives:

- A "**marketplace**" is a meeting place for buyers and sellers on the internet. It offers a range of different web-based services, including directory listings, electronic catalogues for purchasing online, providing exchange services for trading opportunities, and in some cases, full ICT integration through supply chains. A marketplace is mainly a virtual market for B2B companies.
- A "**District Portal**" may have the same characteristics as a marketplace, but in most cases products sold are "typical products" for the respective region or country, such as pasta, wine, oil, cheese or chocolate. District Portals may serve both as a showcase and a virtual marketplace where final consumers can buy products. Many of them allow e-commerce transactions.

### **Case studies and business examples**

The sector reports on the F&B industry (July / September 2005) contain short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of both the survey and from desk research, and provide further insight in current e-business trends and developments. Exhibit 2.1-3 summarises the 'activity views' which are featured in more detail in the two reports.

**Exhibit 2.1-3: E-Business Activity Views featured in the sector studies**

E-Business Activity Views	Country	Topics
<i>Case study:</i> E-business integration at <b>Ebro Puleva</b>	Spain	Example of process optimisation focused on improving efficiency and market position in the food sector
<i>Business example:</i> Sales force automation at <b>Granarolo</b>	Italy	Example of an Italian company which moved from traditional sales and distribution to automated management of the sales force
<i>Case study:</i> ICT supporting horticultural business at <b>Sadpol</b>	Poland	Insights into a centralised computer system to monitor and control different phases of production as well as workers' activity.
<i>Business example:</i> Supply chain integration and traceability at <b>Castelcarni</b>	Italy	Information about introducing a quality check label, featuring a statement of the most important checks that have been carried out.
<i>Business example:</i> RFID for Supplier Added Value at <b>Beaver Street Fisheries</b>	USA	Example how RFID solutions can help to meet business challenges in the food & beverages sector.
<i>Case study:</i> <b>E-Pim</b> – SMS-based quality feedback system of a dairy cooperative	Estonia	Example of a simple e-business solution, which effectively contributes to enhancing quality control along the value chain.
<i>Case study:</i> E-logistic and e-marketing for <b>Paysans.fr</b>	France	Information about the organization of a new distribution system, which generates new market opportunities and enhances the business power of small-scale producers.
<i>Business example:</i> <b>Terrasolis</b> - lesson learned about on-line advertising	Italy	Insights into an online-advertising campaign requiring remarkable investments for a micro-company
<i>Case study:</i> <b>Aarstiderne</b> - the organic products challenge	Denmark	Demonstration of how the introduction of a website and a business system has increased sales by allowing more efficient coordination between the company and its customers.
<i>Business example:</i> <b>Terrasolis</b> – lesson learned about on-line advertising	Italy	Insights into an Italian online-advertising campaign, which is linked to remarkable investments for a micro-company
<i>Business example:</i> <b>Manobi</b> – a creative use of technology for local development in the food sector	France	A free-access SMS market information service used by traders and intermediaries on business trips, helping them to select markets on short notice and to sell their goods more efficiently.
<i>Business example:</i> <b>Utz Quality Foods</b> – usage of the internet to improve its value chain	USA	An example of an internet-based sales tracking system that monitors sales of company products at each supermarket and point of sale.
<i>Business example:</i> <b>Svenska Foder</b> : extended ERP usage	Sweden	A Swedish initiative, based on a BizTalk server, enabling the firm to administer its transactions with retailers, customers and subcontractors more efficiently.
<i>Business example:</i> <b>Unilever</b> – e-Ordering of non-production items	Netherlands / UK	The main issue of this example is the establishment of a world class supply chain for production and non-production items.
<i>Business example:</i> <b>Xsag</b> – an e-market for agricultural inputs	World	Insights into an e-marketplace where buyers and sellers trade agricultural inputs such as chemicals, pharmaceutical products and equipment parts.

## 2.1.4 Anticipated implications of e-business for the industry

The second sector report (of September 2005) assessed the implications of ICT and e-business adoption on the structure of the F&B industry. It applied the “five-forces-model” developed by Michael E. Porter (1980) as a framework to do so. This chapter summarises the main findings.

### Threat of new entrants and the F&B industry

ICT has facilitated the entry of new firms into the F&B industry. The development of selling online has supported the foundation of new firms that are specialised in the channel and the growth of existing firms. In recent years, numerous websites, portals and marketplaces have emerged in several market segments including coffee, olive oil, wine, patisserie and typical regional products. In some cases they were doomed to fail, in others they have permitted new firms to enter the market by exploiting low access costs to new distribution channels linked to the internet and online selling.

The increased ease of access to information has also contributed to lowering barriers to market entry, as it has allowed firms to achieve learning and realise savings in all key functional areas (production, marketing, distribution). This has made it possible even for new firms or companies from other sectors to quickly acquire the necessary know-how, whilst enabling them to contain costs.

### Substitution of products/services

The risk of substitute products is growing, fuelled by the development of ICT. ICT adoption has led to a general lowering of costs related to moving from one supplier to another. Companies, particularly the larger ones, are increasingly using specific technologies to find new suppliers (both at home and abroad), to evaluate different products, or to participate in online auctions.

ICT has also contributed to increasing customer trends towards change (of products and suppliers) owing to increased speed and ease of access to product information and ease of purchase of the product itself. Moreover ICT has allowed some competitors to launch substitute products on the market which have a better price / service relationship by comparison to existing products.

One area in which e-business has had a modest impact so far is in product innovation support which is poorly linked to technological aspects.

### Bargaining power of suppliers

The position of suppliers largely depends on the relative difficulty of substituting their products in the purchasing segment. The negotiation power of F&B industry suppliers tends to be rather low due to the high level of fragmentation. However, their position could become stronger if finished products increase in importance, for example to ensure the quality and the efficiency of the manufacturing process.

As regards commodities, supplier negotiation power depends on crops. In years when there has been a bad harvest and crops are in short supply, supplier negotiation power tends to increase, whereas when there is an abundant crop, supplier negotiation power falls.

As with industry-distribution relations, the introduction of ICT can also have a dual impact on relations between raw material suppliers and manufacturers:

- The optimisation of logistic processes, maximisation of the supply chain, rationalisation of procurement procedures, etc. have led to an improvement in relations between raw material suppliers and manufacturers;
- However, where new technology has not been introduced adequately or where its application has not been rational, power relations have remained unchanged.

Generally speaking, the use of e-procurement would help to strengthen buyer negotiation power, which in this case would mean the packing industry, in relation to the raw material producer.

### **Bargaining power of customers**

ICT represents an opportunity to improve relations with distribution chains, but it is also a threat. The negotiation power of modern distribution has been growing for years, particularly as regards SMEs. Amongst the factors that have contributed to this process are:

- the current increase in concentration in the distribution sector,
- the rising levels of volumes purchased,
- the rising service levels demanded of the producers and
- a trend towards an increased average size of sales outlets.

The introduction of ICT may represent an opportunity for the industry to gain ground in its relations with the distribution chains. The problem that characterises the F&B industry in particular is the polarisation between large and small firms and between the different levels of use of technology.

As a consequence, the impact of ICT has again been mixed. On the one hand, the large firms, or at least the more evolved amongst them from an ICT perspective, have seen a partial balancing of power relationships through improved collaboration with trade. On the other hand, SMEs (and less evolved enterprises in general) have witnessed a further fall in their negotiation power in relation to the distribution chains.

### **Rivalry in the market**

ICT has had a mixed impact on the intensity of competition between firms in recent years. Although the introduction of ICT into the industry has increased competition, it has also strengthened market share and the competitive positioning of some companies, bringing about a reduction in competitive intensity.

On the one hand, ICT has increased competition in the F&B sector:

- ICT is an enabling factor in the establishment and development of large groups as it allows interconnection, communication and integration, thus favouring the concentration process. Broadening the gap even more between large and small firms, the introduction of new technology has changed the very foundations on which industry competition was based.
- Price competition has been accelerated by the introduction of ICT. This has led to an erosion of margins, causing some firms to be forced out of business (particularly SMEs).
- The increased level of customer service, made possible by the optimisation of logistics and use of customer management applications, also contributed to increasing competition between firms.

On the other hand, ICT may support firms in facing competitive challenges, as:

- ICT reduces learning and reaction times, in relation to competitor moves, particularly following the launch of new products.
- New, e-business enabled forms of distribution, particularly selling online, are supporting the development of new niche markets. These new forms allow some enterprises to create barriers and defence structures by differentiating from their direct competitors which continue distributing their products via traditional channels.

**Exhibit 2.1-4: Anticipated impact of e-business on the F&B industry**

Forces shaping industry structure	General importance in the sector	Impact of e-business	Examples and arguments
<b>New entrants</b>	<u>Low:</u> <ul style="list-style-type: none"> <li>New competitors have entered the F&amp;B industry in recent years. Generally speaking there is intra-sectoral mobility, i.e. firms already present in the food and/or beverage industry move into other F&amp;B sectors. New entrants rarely come from other industrial sectors.</li> </ul>	II	ICT has lowered barriers to market entry and encouraged new competitors. This has been possible due to: <ul style="list-style-type: none"> <li>E-commerce encouraging the foundation of new firms;</li> <li>Low access costs to new distribution channels;</li> <li>Greater speed and ease of access to information;</li> <li>Ease of finding and purchasing some raw materials.</li> </ul>
<b>Substitution of products / services</b>	<u>Medium:</u> <ul style="list-style-type: none"> <li>The threat deriving from substitute products has a low overall impact within the F&amp;B industry. The threat is strong at intra-sectoral level and has been further accentuated in recent years.</li> </ul>	II	ICT has contributed to increasing the threat of substitute products. Causes of this are linked to: <ul style="list-style-type: none"> <li>Decreasing costs of moving from one supplier to another, due to technology;</li> <li>Increase in customer tendency to change, made possible by the speed and ease of accessing information;</li> <li>Opportunity to launch substitute products with a better price/service relationship</li> </ul>
<b>Bargaining power of suppliers</b>	<u>Low:</u> <ul style="list-style-type: none"> <li>generally low due to the high level of fragmentation at the supplier end of the chain.</li> </ul>	II	The impact of ICT is ambiguous. <ul style="list-style-type: none"> <li>ICT can lead to an optimisation of processes and improve supplier-customer relations.</li> <li>However, if the implementation is not successful, supplier negotiation power remains unchanged.</li> </ul>
<b>Bargaining power of customers</b>	<u>High:</u> <ul style="list-style-type: none"> <li>Negotiation power of customers is high overall. Over the years the contractual power of modern trade has grown progressively, due to high volume purchases and the process of concentration within the value chains.</li> </ul>	III	E-business impact on customer negotiation power is mixed. <ul style="list-style-type: none"> <li>ICT allows the improvement of industry-trade relations and therefore a balance of power relations.</li> <li>However, industry polarisation has also triggered the further loss of contractual power of SMEs and firms that are less developed from an ICT perspective.</li> </ul>
<b>Rivalry in the market</b>	<u>High:</u> <ul style="list-style-type: none"> <li>Current competition is the most important competitive force within the industry.</li> <li>Strong polarisation in F&amp;B between large firms, often multinationals, and a large number of SMEs, which are generally stronger at the local level.</li> </ul>	IIII	Mixed impacts of e-business. Increase in competition due to: <ul style="list-style-type: none"> <li>Better cost competitiveness – price pressure;</li> <li>Increased service levels;</li> <li>Greater difficulty in maintaining competitive advantage.</li> </ul>

Impact of ICT and e-business: I = low; IIII = high



## 2.1.5 Policy implications

The sector study suggests policy initiatives to promote the adoption of ICT among companies from the F&B industry, particularly among SMEs. Regional intermediaries, such as business support agencies or chambers of commerce, play a critical role as initiators of such initiatives.

Policies that can positively affect the adoption and usage of e-business in general include those designed to:

- improve, at a general level, the development of infrastructure and the legal and regulatory environment;
- create a favourable business environment;
- raise awareness about e-business benefits, and improve understanding and managerial skills in e-business.

**Exhibit 2.1-5: Policy implications of e-business in the F&B industry**

Objectives	Concerns and suggestions	Potential initiators
<b>General:</b> Promote innovation and e-business uptake in the industry	<ul style="list-style-type: none"> <li>• Improve infrastructure development</li> <li>• Improve regulatory environment</li> </ul>	<ul style="list-style-type: none"> <li>• EU Member States</li> <li>• Regions</li> </ul>
	<ul style="list-style-type: none"> <li>• Raise awareness and managerial understanding of e-business issues</li> </ul>	<ul style="list-style-type: none"> <li>• Business support agencies</li> <li>• Competence centres</li> <li>• Chambers of commerce</li> </ul>
<b>Specific:</b> Facilitate participation of smaller companies, including farmers and first processing companies, in increasingly integrated supply chains	<ul style="list-style-type: none"> <li>• Provide information on how to assess cost-benefits of e-business</li> <li>• Support firms in providing staff training on ICT</li> <li>• Encourage SMEs to implement ICT tools supporting key business processes, such as supply chain integration, monitoring and control</li> <li>• Measures aiming at the diffusion of easy-to-use mobile-based applications</li> </ul>	<ul style="list-style-type: none"> <li>• Business support agencies</li> <li>• Competence centres</li> <li>• Chambers of commerce</li> <li>• EU Member States (via their e-business programmes)</li> </ul>

## 2.2 The Textile and Clothing Industry

The e-Business W@tch sector study on the textile and clothing industry was contributed by Databank Consulting (contact: [databank@databank.it](mailto:databank@databank.it)).

The full report can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



Among large companies from the textile and clothing industry, e-business activity has increased in the past few years. However, the economic crisis which affects the whole industry in Europe hampers innovation among small firms, which play a very important role in this sector. Small company size is reported as a main reason by many firms saying that e-business does not play a significant role in their operations. Survey results, in fact, show a clear digital divide within the industry between medium and large companies and small enterprises. Adding to the difficult economic conditions, the limited degree of computerisation and the diversity of technological equipment in place are constraints for the adoption of e-business among smaller companies.

### 2.2.1 Sector definition and background

#### Sector definition

The textile and clothing industry (T&C industry) is defined as those business activities covered by NACE Rev.1.1<sup>52</sup> Divisions 17 and 18 (see table). The report of 2005, in contrast to earlier reports presented by *e-Business W@tch* (May, August 2004)<sup>53</sup>, does not cover the footwear sector. NACE 17 comprises mainly the "textile" sector. For the purpose of this study, the term "clothing" was understood to cover the manufacture of wearing apparel; dressing, leather clothes and accessories (NACE 18).

#### **Exhibit 2.2-1: Business activities covered by the textile & clothing industry (NACE Rev. 1.1)**

NACE Rev. 1.1	Business Activity
DB 17	Manufacture of textiles
17.1	Preparation and spinning of textile fibres
17.2	Textile weaving
17.3	Finishing of textiles
17.4	Manufacture of made-up textile articles, except apparel
17.5	Manufacture of other textiles
17.6	Manufacture of knitted and crocheted fabrics
17.7	Manufacture of knitted and crocheted articles
DB 18	Manufacture of wearing apparel; dressing; dyeing of fur
18.1	Manufacture of leather clothes
18.2	Manufacture of other wearing apparel and accessories

<sup>52</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.

<sup>53</sup> *e-Business W@tch* Sector Studies on the Textile Industry: May 2004, August 2004. Available at [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources').

## Industry background

In 2001, the T&C industry in (today's) EU-25 generated a combined production value of about €203 billion. Data that are available for 2002 indicate a negative variation of -4.8% in textile and -12.8% in clothing. More than 224,000 companies are active in these industries. They employed 2.5 million people, representing 7.6% of total manufacturing employment. In 2002, employment went down by 4.9%.<sup>54</sup>

The EU textile and clothing sector is predominantly an SME-based industry. Enterprises with less than 50 employees account for 60% of the workforce in the EU clothing sub-sector and produce almost 50% of value added. Textile companies tend to use high-tech machinery, while clothing manufacture is more labour-intensive and is performed in smaller firms.

## 2.2.2 ICT and e-business adoption in 2005

### ICT infrastructure

The usage of **basic ICT infrastructure** in the T&C sector is fairly in line with the weighted average for 10 sectors covered by the e-Business Survey 2005 (EU-7). Comparisons with specific sectors, however, show that the sector lies in between the manufacturing sectors with more advanced ICT use – which tend to be equipped with more powerful ICT technologies – and service sectors with a lower ICT intensity such as tourism and construction. For example, the availability of **remote access** solutions in the T&C industry (41% by employment) is in line with the weighted average for 10 sectors covered in 2005 (40%), but lower than in the other manufacturing sectors.

The average connectivity of a company tends to increase with company size. In the T&C industry, there is a clear **dichotomy within the sector** itself. While medium and large companies appear to be fairly equipped with ICT infrastructure, small and micro enterprises lag behind.

The picture that emerges of the diffusion of basic ICT infrastructure mirrors the composition of the sector, and in particular the large share of micro and small enterprises, many of which have the characteristics of **handcraft workshops more than companies** playing on the market. Being production oriented, often for very few – if not single – customers, providing them with input sources and determining production timing and flows, these companies have little investment capacity, but possibly also little demand for ICT. A stand alone, basic system can be sufficient to suit their requirements.

As regards **internet connections**, DSL is the most commonly used internet connection: it is used by companies accounting for 51% of employment in the sector (of those with internet access). This type of connection is also common among micro companies: 32% of them use these connections.

On average, companies from the textile and clothing industry reported an annual **expenditure** of about €12,300 for investments in ICT infrastructure and software in 2004. Obviously, investment differs considerably depending on firm size.

### Internal business processes and collaboration with business partners

In the textile and clothing industry, 45% of employees work in enterprises that have implemented an **intranet**, which can be a useful platform for the secure exchange of information within a company and, possibly, the implementation of internal training programmes.

Close to 60% of firms with more than 250 employees and 34% of medium-sized companies have adopted an **ERP system**. Overall, companies representing 34% of employment in this sector can rely on such systems.

<sup>54</sup> Source: Eurostat New Cronos / DIW Berlin 2005. See full sector report (July 2005), chapter 6.2.

## Procurement and supply-chain integration

Efficient management of **procurement** is a fundamental activity along a sector value chain which is very complex and fragmented. Due to the large number of transactions, even slight improvements in this domain can produce significant overall savings. Adoption among companies from the T&C industry (44% by employment) is slightly below the average of the 10 sectors (51%) studied by *e-Business W@tch* in 2005. For the majority of firms, the share of online purchases on total purchases is less than 5%. Only 3% (by employment) reported buying more than 25% of their supplies online. Survey results indicate that companies procure online mainly from suppliers that are located in the same country, but not necessarily in the same region.

The relatively small share of companies using **special ICT systems** for e-procurement follows a path which is quite in line with the weighted average for 10 sectors (EU-7). Most of the companies use standard software packages or rely on ad hoc developed solutions. The rather low use of e-marketplaces reflects the limited number of marketplaces in the T&C industry.

### Exhibit 2.2-2: Main findings of the e-Business Survey 2005 for the T&C industry

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>• Adoption of <b>basic ICT infrastructure</b> in line with average for 10 sectors; however, lower than in most other manufacturing sectors</li> <li>• <b>Dichotomy</b> within the sector itself: medium and large are well equipped with ICT infrastructure, small and micro enterprises lag behind</li> <li>• More than 90% of all firms with a computer (even among micro enterprises) have <b>internet access</b>; DSL connections are the preferred type of access.</li> <li>• Companies representing 41% of employment enable <b>remote access</b> to the company network.</li> </ul>
<b>Integration of Internal processes</b>	<ul style="list-style-type: none"> <li>• 45% of employees work in enterprises that have implemented an <b>intranet</b></li> <li>• Companies representing 34% of employment have an <b>ERP system</b>. Among large firms, about 60% have one.</li> </ul>
<b>Supplier-facing activities: procurement and supply-chain integration</b>	<ul style="list-style-type: none"> <li>• Companies representing 44% of employment make <b>online purchases</b>. This is slightly below average.</li> <li>• However, in many cases the total share of <b>online procurement</b> is less than 5% of the total volume of supplies.</li> <li>• Most of the companies use <b>standard software packages</b> or rely on ad hoc developed solutions for e-procurement.</li> <li>• <b>Supply chain management</b> (SCM) systems are used in about 26% of large firms while being poorly diffused among small firms.</li> </ul>
<b>Customer-facing activities: marketing and sales</b>	<ul style="list-style-type: none"> <li>• Migration towards <b>web-based sales</b> activities has not really taken place. A main barrier for electronic trading is the difficulty in defining electronic standards for codifying the physical characteristics of textile &amp; clothing products.</li> <li>• In total, 10-15% of all companies make some <b>online sales</b>. Among large firms, the share increases to 20%.</li> <li>• Even among large firms, only 20% use special ICT solutions for <b>marketing</b> or sales processes.</li> <li>• The use of <b>CRM systems</b> is limited to medium-sized (17%) and large firms (29%).</li> </ul>

## Marketing and sales

When analysing data about **online sales** it has to be borne in mind that, for a large share of businesses in this sector, customers are not commercial intermediaries and distribution channels buying finished products, but other business for which they perform part of the production activity. The relationships and transactions among these players are still mainly carried out in a traditional way.

Although companies may recognise the potential of networking, the migration towards web-based sales activities has not really taken place. Another important sector-specific reason is the difficulty of codifying the physical characteristics of the products which are, on the other hand, of utmost relevance. This proves to be a relevant barrier to a completely automated management of the transactions.

In summary, at sector level, companies accounting for 17% of employment in the T&C sector stated that e-business played a significant part in the way their company operates and about 40% said it played some part.

### 2.2.3 Important topics and application areas

#### Integration along the value chain

Supply chains in the T&C industry tend to be complex and very fragmented. They consist of a number of discrete activities that are increasingly organised in an integrated production network. Integration is both horizontal and vertical, and companies tend to be specialised in activities (e.g. sewing, finishing) or products. Specialisation and location of these activities are key variables in determining value added and margins of end products.

Deployment of ICT can lead to relevant efficiency gains thanks to the streamlining of a company's functions. The prerequisite for online collaboration with external partners is the digitalisation of information to be exchanged. To allow for automatic processing, information has to be digitalised in structured, consistent and standardised formats. This prerequisite is particularly critical in this sector where production is carried out through numerous exchanges among suppliers, sub-contractors and customers.

So far, the use of ICT solutions in the sector has been limited by the scarce availability and usage of specific description and messaging standards for data exchange, for supplier and product certification, for measuring the various players' performance. The widespread adoption of CAD as well as of code-based labelling systems has not been accompanied by the adequate development of recognised standards in the sector. Nevertheless interesting initiatives in this area have been taking place, e.g. the TEX-SPIN – Textile Supply Chain Integrated Network ([www.atc.gr/texspin](http://www.atc.gr/texspin)) project – which has now been followed by Tex-Weave<sup>55</sup>, a Standardisation Workshop dealing with Standardisation and Interoperability in the Textile Supply Chain Integrated Networks; TEXCOM-Tools, a cooperation project for the development of technical tools for the improvement of industrial communication in textile and clothing industry; and MODA-ML ([www.moda.ml.org](http://www.moda.ml.org)) which aims to facilitate the flow of technical and management information between the firms of the textile and clothing supply chain thanks to the exchange of XML documents via internet.

Supply chain management systems, allowing full integration with business partners, are used in about 26% of large firms while, not surprisingly, being poorly diffused among small firms. These data confirm, once again, that the information flow is still largely carried out in a traditional way despite the complexity of the operations involved.

The case study of *Rifil* describes the experience of raw material producers which implemented a low cost and easy-to-use ordering system addressing its SME customer base, with the goal of integrating sales with production processes.

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<sup>55</sup> [http://www.uninfo.polito.it/WS\\_TEX-WEAVE/](http://www.uninfo.polito.it/WS_TEX-WEAVE/)

## **E-business and the efficiency of development-to-production processes**

The issue of efficiency of development and production processes is closely related to the more general one of integration along the value chain, discussed above. However, it was treated separately in the study because it needs to be addressed from a peculiar sector-specific angle. Sector-specific factors that currently influence the efficiency of development and production processes are: product proliferation, short life cycle, changing customer patterns, the need for systems that can efficiently handle small orders and production batches, reduced lead times and rapidly changing production parameters.

There are diverse strategies which may support companies in dealing with the issue of demand-driven production and lead time shortening. All of them, however, imply that access to sales data should be as detailed and up-to-date as possible. Advances in technologies, such as CRM (customer relationship management) systems, are useful for better capturing, exploiting and managing customer needs and preferences. Distance from the market requires links and agreements with the downstream players of the value chain for such an issue to be effectively dealt with.

Availability and usage of structured information on customers and markets are key factors for gaining efficiency. At a general sector level, the usage of CRM applications is limited, being adopted by firms representing 16% of employment. Usage rises by size of the company, but even among larger firms, this application is presently used by less than one third of players. The fragmentation of the supply chain and the distance of many players from the final customers might account for the low diffusion of such applications.

## **Emerging opportunities for marketing and sales**

Data from the e-Business Survey 2005 show that selling online is not widespread in this industry and that the corresponding volume of sales is quite low. Take-up of B2B e-commerce in the T&C industry has been slower than in other more standardised consumer good sectors (books, music and software). A major reason for this is the problem of product property description.

There have been remarkable technological advances, and many EU funded projects in this field are running. However greater technological development, integration and standardisation are necessary to implement systems for full 3 dimensional visualisation, virtual fitting and system independent colour rendering technologies. These technologies are still complex, expensive and require a degree of equipment and literacy which is not commonly at hand in the sector.

Although the potential benefits of e-business in exploiting data from market and customers are largely recognised, firms from this sector are poorly involved in its use. The percentage of enterprises that use specific ICT solutions for online marketing or sales is fairly low, representing 14% of the sector's employment. Even among large firms, only 20% have implemented ICT systems for this purpose. While the large majority of companies have a website, only a minority of them use it with a proactive marketing purpose.

An interesting, albeit not typical case study in this context is YOOX, illustrating how the web can be used for developing brand and image. The business example of *Greekfashion* demonstrates the role that an industry association can have in providing B2B related services to its members.

## **Case studies and business examples**

The sector report on the T&C industry (July 2005) contains short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of both the survey and from desk research, and provide further insight in current e-business trends and developments. Exhibit 2.2-3 summarises the 'activity views' which are featured in more detail in the report.

**Exhibit 2.2-3: E-Business Activity Views featured in the sector study**

E-Business Activity Views	Country	Topics
<i>Case Study: Rifil Order</i> – the provision of value-added services to SME customers	Romania	Discussion of challenges and success factors for planning, implementing and introducing an order management system for SMEs implemented by a Romanian yarns producer
<i>Case Study: Liolà</i> – business process integration at a medium-sized producer of women’s clothing	Italy	Discussion of challenges and success factors for planning, implementing and introducing automation of distribution process
<i>Case Study: Ludvig Svensson AB</i> – more efficient financial and production management and improved customer service	Sweden	Insight into the use of CRM and ERP systems to improve company’s efficiency along the value chain
<i>Case Study: YOOX</i> – a new approach in the fashion market	Italy	Insight into a web-based company which manages marketing and sales activities in the fashion sector through its website
<i>Business example: Greekfashion.gr</i>	Greece	Example of a B2B portal which promotes the creation of a communication network among its members, and offers IT services to its customers

## 2.2.4 Anticipated implications of e-business for the industry

Based on survey results, case studies and desk research, *e-Business W@tch* has drawn conclusions about opportunities and risks which e-business may bring about for SMEs from this sector.

Opportunities	Risks & barriers
<ul style="list-style-type: none"> <li>• Speed up information flows along the value chain</li> <li>• Increase efficiency of internal processes and adopt standards</li> <li>• Extend market reach and increase visibility</li> <li>• Monitor demand changes and exploit customer-related information</li> <li>• Improve customer service</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of technical skills</li> <li>• Lack of standardisation in business exchanges</li> </ul>

### Opportunities for SMEs stemming from e-business

Small and medium-sized enterprises may profit from ICT and electronic business in the following ways:

- **Speeding up information flows.** This is crucial in a sector where market trends are forcing companies towards small batch production, shorter lead times and proximity to the final customer.
- **Increasing supply chain efficiency.** Using e-business to decrease cost and error rates in commercial transactions could be a driver for e-business. Due to the large number of transactions and exchanges along the value chain, even limited improvements can turn into significant savings.
- **Improving internal processes and adopting leading companies’ standards.** By the introduction of e-business applications companies are able to optimise their internal processes, especially in the areas of production, logistics and administration.

- **Extending market reach.** The internet offers smaller companies the opportunity to make their offer known to a larger target.
- **Improved customer service** may be achieved by faster delivery, decreased inventory in distribution warehouses, introduction of automatic stock replenishment systems, easier communications.

### **Risks for SMEs stemming from e-business and barriers to adoption**

The main barriers to the adoption of e-business in this industry are related to the negative market trends and the increasing competition which affect overall investment capacity at a general sector level. SMEs may also face difficulties with the introduction of new technologies not only for financial reasons, but also due to the shortage of technical skills to manage new ways of operating. Moreover, the limited degree of computerisation and the diversity of technological equipment are constraints for the adoption of e-business.

- **Lack of technical skills:** SMEs in this industry may have difficulty with the introduction of new technologies not only for financial reasons but also due to the shortage of technical skills to manage new ways of operating. Moreover, the limited degree of computerisation and the diversity of technological equipment are constraints for the adoption of e-business.
- **Lack of standardisation:** Electronic business can only be really useful if there is sufficient consensus among companies and industries on electronic standards. This involves issues such as product description or the order/payment process to be described. To date, the use of ICT solutions in the T&C industry has been limited by the scarce availability and usage of specific description and messaging standards.

### **2.2.5 Policy implications**

Policies that can positively affect the adoption and usage of e-business include those designed to improve, at a general level, the development of telecommunications infrastructure and the legal and regulatory environment, to create a favourable business environment, to raise awareness about e-business benefits and to improve understanding and managerial skills in e-business.

Policy measures addressing the textile industry should focus on the key issues of **training** and **standards**. They also should aim at providing information on how to assess cost-benefits of e-business; promoting participation to the value chain at large and moving from the narrow concept of e-commerce to a broader integration of internal and external processes. The e-business potential should be exploited in order to support innovation and competitiveness. Suggestions for policy include:

- Encourage flexible and accessible training
- Encourage improvement of skills linked to the reorganisation of work processes, implementation of new technologies and access to innovation
- Encouraging standardisation
- Encouraging development of sector-specific solutions, especially focusing on SMEs' needs.





## 2.3 The Publishing and Printing Industry

The e-Business W@tch sector study on publishing & printing was contributed by empirica GmbH (contact: [info@empirica.com](mailto:info@empirica.com)).

The full reports (parts 1 and 2) can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



The European publishing and printing industry is in a state of flux. Information and communication technologies (ICT), and in particular the internet, have had a profound impact on business activities of firms in all sub-sectors of this industry. Impacts concern practically all areas of business, most importantly internal work processes (process innovation), the products themselves (product innovation) and their distribution, marketing strategies and interfaces between companies and their customers in general. Newspaper and magazine publishers in particular have already experienced significant substitution effects in advertising markets (e.g. migration of classifieds to the internet). As a consequence, the sector is undergoing structural changes both in terms of organisational processes and with respect to the type of products and services that are produced, delivered, and consumed.

### 2.3.1 Sector definition and background

#### Sector definition

Business activities covered by the publishing and printing (P&P) industry are defined under Groups 22.1 ("publishing") and 22.2 ("printing and service activities related to printing") in the NACE classification of economic activities.<sup>56</sup>

#### **Exhibit 2.3-1: Business activities covered by the P&P industry (NACE Rev. 1.1)**

NACE Rev. 1.1	Business Activity
DE 22	Publishing, printing and reproduction of recorded media
22.1	Publishing
22.2	Printing and service activities related to printing

Business activities subsumed under NACE 22.1 (Publishing) include publishing of books, newspapers, journals and periodicals, of sound recordings, and other publishing. Activities in NACE 22.2 (Printing) refer to all economic activities surrounding the manufacturing and servicing of identical copies of written or graphic material by means of mechanical devices or digital hard- and software technologies and infrastructures. This includes printing of newspapers, bookbinding, and pre-press activities.

The analysis does *not* cover the following business activities which are closely related to P&P:

- The reproduction of recorded media (Group 22.3)
- Printing in the packaging industries (Group 74.82 of above NACE Division 74).
- All downstream distribution channels for content on physical media types (print, video, CD, DVD) such as wholesale or resale of such products (part of NACE 51 and 52, respectively) or video rental (NACE 71.40).

<sup>56</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.

Some statistical problems result from the traditional organisation of the publishing industry. Individual authors, if they contribute as freelancers, are included in NACE 92.31 and are not part of the publishing industry. Another important creator of content, but again not covered in this study, are news agencies (NACE 92.4).

### Industry background

The P&P industry (NACE 22) generated a production value of more than €238 billion in the EU-25 in 2001 and employed about 1.9 million people (excluding Poland, Slovenia).<sup>57</sup> Thus, P&P is not a huge sector compared to others such as construction, retail or business services.

However, the special importance of the media industries is constituted not only by their economic activities, but also by their important information function for supporting democracy and culture. The sector has not been unscathed by the economic industry downturn since 2001. In particular, publishers have experienced a decline in advertising revenues, when many companies (and especially the former stars of the new economy) had to drastically cut down on their advertising budgets.

### 2.3.2 ICT and e-business adoption in 2005

On the whole, results confirm the **general importance of ICT** for this sector. ICT affect almost every business function in this industry, including internal processes, procurement, content production and publishing processes, printing transaction and production processes, and external collaboration. In addition, ICT have a strong influence on the creation and delivery of new products and services in this sector.

Looking at the results in more detail, however, it becomes evident that P&P companies are not per se intensive users of e-business technologies, if compared to average diffusion rates from other industries studied by the *e-Business W@tch*. More importantly, the statistical findings often indicate a significant **gap between large and small companies** in the use of ICT and e-business technologies. This is a common finding in most sectors under study.

The survey data confirm that the general level of **endowment with network infrastructure** and access technologies in the P&P sector is relatively high. There is growing adoption of broadband internet access, mainly among medium-sized and large firms, but not yet among smaller companies.

In contrast to other manufacturing sectors, **marketing and sales** are key application areas for electronic business in the P&P industry, particularly for publishers. However, the rapid proliferation of internet based services over the past 10 years has caused new challenges and increased competition for publishers. Today, the **online strategy** of many publishers can be characterised as a prisoner's dilemma situation: competitors' strategies are determined by collective behaviour. This means that publishers are forced to offer attractive online services because readers increasingly expect it, although the services are not necessarily profitable by themselves. Business examples demonstrate that most online services are still on shaky grounds from an economic perspective.

In spite of these challenges, companies from the P&P industry are intensive users of e-commerce. The share of firms that make **online sales** increases significantly by firm size in the P&P industry. While "only" 16% of micro-enterprises reported online sales, 30-35% of small and medium-sized companies and even 60% of large firms did so. For many publishing companies, 'online sales' means in the first place charging for access to the online edition of their newspaper or magazine. However, other forms of e-commerce are also used to extend existing portfolios, for example by selling books or other products and services that are related to the theme of a magazine or newspaper.

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<sup>57</sup> Source: Eurostat New Cronos / DIW Berlin. See *e-Business W@tch* Sector Study on P&P, July 2005 ([www.ebusiness-watch.org](http://www.ebusiness-watch.org))

**Exhibit 2.3-2: Main findings of the e-Business Survey 2005 for the P&P industry**

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>• Relatively high endowment with <b>basic ICT network infrastructure</b> and access technologies, for example internet access and Local Area Networks</li> <li>• Growing adoption of <b>broadband</b> internet access, but mainly among medium-sized and large firms; not yet among smaller companies.</li> <li>• <b>Virtual Private Networks (VPNs)</b> have rapidly gained in importance</li> <li>• Changes in <b>skills requirement</b> are an important issue in this industry, but only 15% of its firms regularly invest in ICT training of their employees.</li> <li>• More than half of all firms (representing close to 80% of sector employment) have <b>outsourced</b> some of their ICT operations, in particular hardware maintenance and web-hosting. Companies outsource almost entirely to national ICT service providers.</li> </ul>
<b>Integration of Internal processes</b>	<ul style="list-style-type: none"> <li>• For publishing companies, managing their complex <b>internal "content workflow"</b> is a key application area for digital technology. This includes content creation and management, editorial processes, graphics and illustrations, advertising handling, page layout and proofing, output formatting, and archiving of contents.</li> <li>• The use of tools for <b>collaborative design processes</b> in the P&amp;P industry (for example for graphic design) is above average.</li> <li>• Applications designed for <b>managing inventories</b> and supply materials are more relevant for other manufacturing sectors than for P&amp;P.</li> </ul>
<b>Supplier-facing activities</b>	<ul style="list-style-type: none"> <li>• Almost half of all firms in the P&amp;P industry make at least some <b>online purchases</b>. About 30% said that they buy at least 5% of their supplies online, about one in ten companies at least 25%.</li> <li>• About 10% of all companies said they use <b>specific ICT solutions</b> for sourcing and e-procurement. Among medium-sized and large firms, about 20-25% reported using such systems. Systems implemented are mostly standard software packages (64%).</li> <li>• <b>SCM</b> is not a key application in the sector, not even among larger enterprises.</li> </ul>
<b>Customer-facing activities</b>	<ul style="list-style-type: none"> <li>• <b>Marketing and sales</b> are key application areas for electronic business in the P&amp;P industry, particularly for publishers.</li> <li>• In contrast to most other sectors, the share of firms that make <b>online sales</b> increases significantly by firm size in the P&amp;P industry. "Only" 16% of micro-enterprises reported selling online, but 30-35% of small and medium-sized companies and 60% (!) of large firms did so.</li> <li>• <b>CRM</b> systems promise attractive opportunities to publishers, helping them to better understand the requirements, preferences and changing demand patterns of their readers. Not surprisingly, CRM is well diffused among medium-sized (30%) and large companies (37%) in the P&amp;P sector.</li> </ul>

**2.3.3 Important topics and application areas****Digital workflow in printing and print-on-demand**

Automation, digitisation and the introduction of "computer-to-X" technologies<sup>58</sup> have changed the face of the printing industry. In particular, the formerly strict separation between print and non-print techniques has fallen away. ICT now enables different segments of the sector value chain to be combined, or not, and businesses can range in scale from specialised printing to full-scale media house. This must be considered as an important and continuing trend.

<sup>58</sup> Such as, for example, computer-to-print or computer-to-press technology. A term for digital output technologies and systems, i.e. all technologies for outputting of digital information from prepress.

Against this background, workflow and print management systems have become a key issue in printing. These systems integrate and optimise the workflow in print shops all the way from management to production and from prepress to finishing.

The e-Business Activity View on *Finepress Oy* is an example of a successful implementation of an industry-specific integrated workflow system in the digital printing business field, while *Cardcorp.co.uk* is a successful example of a print-on-demand e-business solution for commercial print.

### **Digital workflow management in newspaper publishing**

Workflow management is also playing an increasingly critical role in newspaper publishing. A number of publishers have recently embarked on introducing digital workflow management systems to manage their content workflow. Workflow management is expected to speed up the publishing process and maximise efficiency in creation, processing, storage, and retrieval of all types of digital data. The e-Business Activity View on *Berliner Verlag* features an example of how such a system is being introduced in a publishing company.

### **Business models for online publishing**

Customer facing e-business activities are a key issue in the P&P industry, in contrast to many other manufacturing sectors, where the focus is rather on supply chain integration and e-procurement (for example in the automotive and the chemical industry). Finding the right online strategy has been a key consideration for most publishing companies since the second half of the 1990s. While the internet offers new opportunities for publishers, it also poses substantial challenges and threats, both with regard to audience attention<sup>59</sup> and to advertising markets.

However, there is no single business model for publishers as regards the online strategy. All possible variants exist in reality. There are newspaper publishers who offer more or less the whole content of their daily (printed) newspaper on the internet for free, without having experienced any substitution effect in their sales of subscriptions. Other publishers pursue a mixed model, offering parts of the content for free, while either charging a fee for special stories (mostly micro-payments charged per item), or limiting access to subscribers of the printed edition. Some publishers have special online editions, others simply re-use the content of the printed edition.

The e-Business Activity Views *Guardian Unlimited*, *La Repubblica* and *DerStandard.at* feature examples of different business models and indicate how online newsrooms cooperate with those of the parent newspaper.

Although some of the online ventures have become profitable in the operational business, the online strategy of many publishers can still be characterised as a prisoner's dilemma: competitors' strategies are determined by collective behaviour. Publishers have to offer attractive online services because readers increasingly expect it, although the services do not yet yield substantial profits and normally cannot compensate for the decrease in the core business.

### **Electronic trading in the book industry**

Electronic trading of print-on-paper books is a key area of e-business in a sector where book publishers continue to use the internet mainly as a marketing channel for conventional printed books rather than to deliver digital products.<sup>60</sup> The value chain for printed books is highly complex, and there are pressures both towards rationalization and towards specialization and increased scale of operations. Yet, in spite of considerable consolidation in the last two decades, publishing remains a fairly fragmented sector, as does bookselling.

The consolidation and rationalization pressures are aggravated by the growing availability of digital competitors, especially print on demand and e-books. These technologies and services provide

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<sup>59</sup> Newspaper circulation is either static or falling in most EU member states, and has been for some years. See: Publishing Market Watch Sector Report 1: The European Newspaper Market (2004), p.7; p. 90f.

<sup>60</sup> Cf. European Commission (2004): Publishing Market Watch. Sectoral Report 2: Book Publishing p. 62.

disintermediation in the value chain, meeting new marketing requirements by connecting publishers more directly with end customers, but also generating new competitive substitutes. The e-Business Activity Views of *Nielsen Booknet* and *PubEasy.com* (see table below) are best practice and exemplify key technology trends and business challenges affecting the book industry in a B2B context.

### Case studies and business examples

The sector reports on the P&P industry (July / September 2005) contain short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of both the survey and from desk research, and provide further insight in current e-business trends and developments. Exhibit 2.3-3 summarises the 'activity views' which are featured in more detail in the two reports.

**Exhibit 2.3-3: E-Business Activity Views featured in the sector studies**

E-Business Activity Views	Country	Topics
<i>Case Study: Finepress Oy</i> – Implementing an Integrated Management Information System in a printing company	Finland	Insights into innovative practices regarding an industry-specific integrated workflow system in the digital printing business field.
<i>Case Study: Cardcorp.co.uk</i> – Print your business card on demand	UK	An example on how print companies can profit from e-business print-on-demand opportunities.
<i>Case Study: Nielsen BookNet</i> – E-trading for bookshops, and	UK	Insights into latest technology trends which could affect the book industry as a whole, as well as into the strategies of innovative players in this sector segment.
<i>Case Study: PubEasy.com</i> – Enhancing Supply-chain Efficiency in the Book Marketplace	UK	Analysis of supply chain efficiencies through application of e-business technologies and processes.
<i>Case Study: DerStandard.at</i> – Internet success in news publishing	Austria	Online publishing strategy for a national daily newspaper (from the quality segment), based on advertising. The service is operating with profits.
<i>Business example: Repubblica.it</i> – A business model based on advertising and subscriptions	Italy	Online publishing strategy and business model of a leading online information service.
<i>Business example: Guardian Unlimited</i> – An online newsroom with 75 journalists	UK	Online strategy and business model of one of the major online publishing ventures.
<i>Case Study: Grada Publishing</i> – Widening the Customer Base through online selling	Czech Republic	Successful e-commerce strategy of a major book publisher, with significant implications on customer relationship.
<i>Business example: Satellite distribution of newspapers: The Satellite Newspaper KiOSK system</i>	Netherlands / international	A “glimpse into a possible future”, illustrating how new technology widens customer reach for newspapers by enabling worldwide distribution via satellite.
<i>Business example: Berliner Verlag</i> – Integrating a New Integrated Newspaper Publishing Workflow System	Germany	Example of an innovative publishing workflow system in the newspaper publishing domain, aiming at improved operational efficiency.

### **2.3.4 Anticipated implications of e-business for the industry**

The second sector report (of September 2005) assessed the implications of ICT and e-business adoption on the structure of the P&P industry. It applied the 'five-forces-model' developed by Michael E. Porter (1980) as a framework to do so. This chapter summarises the main findings.

#### **Threat of new entrants and the P&P industry**

By definition, the higher the competition in an industry, the easier it is for new companies to enter into this market. New entrants can therefore affect major features of the market environment (e.g. market shares, prices, customer loyalty) at any time. There is always a latent pressure for reaction and adjustment for existing players in this industry.

The threat of new entries will depend on the extent to which there are barriers to entry. Barriers are, for example, economies of scale (minimum size requirements for profitable operations), high initial investments and fixed costs, scarcity of important resources, e.g. qualified expert staff, and access to raw materials which is controlled by existing players.

When the internet era began, the P&P industry entered a competitive situation where sustainable advantage necessitates learning to move very quickly to defend market positions against attack. Incumbents and would-be new entrants, 'attackers', fight for market share. Initially, dot.com players and new service providers tried to take advantage of what seemed to be low barriers of entry. The size and wealth of the market made this a particularly attractive opportunity. However, attackers learned that there are indeed barriers to entry into P&P, and incumbents acted to strengthen these: joining forces either by merger for market concentration or by alliances linking products / services, suppliers and distributors to increase the scale of operations and make them more efficient, creating and strengthening brand images and customer loyalty, protecting innovation by patent and improving protection of intellectual property.

In many of these defensive – and expansive – moves, e-business solutions have played an enabling role, and it appears today that e-business has helped increase rather than remove barriers to entry into the P&P sector. This view is however partly an artefact of traditional sector classifications, as such competition as there is to P&P incumbents today is less from new entrants into the sector, but more from services delivered to the market from enterprises. These include search engines' operators, enterprises which remain for statistical purposes outside the P&P sector but whose products meet some aspects of market demand served in the past exclusively by the sector's companies.

#### **Substitution of products/services**

A threat from substitutes exists when there are alternative products of lower prices or better quality. They can potentially attract a significant proportion of market volume and, hence, reduce the potential sales volume of existing players. Traditional print products are challenged by substitutes, most prominently by enterprises focusing entirely on online service delivery. Paper sales revenues have come under threat as readers have turned elsewhere and advertising revenues are at risk as advertisers discover alternative channels.

Although e-publishing, for example, has not taken off in the mass market, it has for some time had a significant impact more specialist publishing, particularly on professional and educational publications.<sup>61</sup> Migration of classified advertisement to the internet is cutting into print media's growth. To a great extent incumbent publishers are retaining this revenue by moving the advertising themselves to new (ICT-based) channels. The rising volume of online advertising on newspaper sites can, if prices are to be maintained, cushion these publishers' loss of ad revenue in the print area.

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<sup>61</sup> See, for example, PriceWaterhouseCoopers (2003) Global Entertainment and Media Outlook 2003-2007.

### **Bargaining power of suppliers**

The term 'suppliers' comprises all sources of inputs that are needed in order to provide goods or services. Supplier bargaining power vis-à-vis their customer is likely to be high when the market is dominated by a few large suppliers rather than fragmented, and / or when there are no substitutes for the particular input. High costs of switching from one supplier to another also give power to suppliers.

Where bargaining power of suppliers to the P&P sector is low, there is little incentive to enterprises in the sector to pay attention to improving e-business links to a supplier. This lack of incentive to extend e-business to suppliers is also true for supplies such as paper, where supplier bargaining power is potentially high, but where the intermediate product has a stable specification and supply chain integration is unlikely to bring significant benefits. This situation underlies the pattern found in the survey of supply-side e-business adoption in the P&P sector.

An important exception to this pattern is the supply of production equipment to the P&P sector. The software content of production equipment gains importance and machines are integrated into software-supported production systems. Consequently, dependency on the suppliers of these systems – and their bargaining power – will tend to increase. In this case e-business is tending to increase vulnerability to suppliers. Defences against this source of increasing supplier bargaining power include keeping mission critical software development in-house – which given the cost of development and maintenance requires a large scale of operations and is only open to the largest enterprises – and promoting standards for interoperation of production equipment.

### **Bargaining power of customers**

The bargaining power of customers, like that of suppliers, contributes to pressure on the margins and volumes of an enterprise in the P&P sector. As in other industries, business customer bargaining power is likely to be high when there is a concentration of volume buyers, or when customers can switch suppliers without incurring high cost.

Given these criteria, the bargaining power of customers in the P&P sector can be seen to be quite variable, from low to very low in general printing services to high and near monopolistic in specialist publishing products which are established in their market. The introduction of e-business could have some implications for this situation, as customers of publishing companies (both readers and advertisers) can select from more media offers, including the internet. This gives them a better position to negotiate, for example, advertising prices. Newspaper subscribers could become more price sensitive than in the past.

### **Intensity of competition in the market**

The intensity of competition between existing players (companies) in an industry results in pressure on prices, on margins and, consequently, on profitability for every single company in the industry. Competition between existing players is likely to be high when a market is mature and low growth rates mean that company growth is at the expense of a competitor. The same applies when there are many players of about the same size, with similar strategies and similar product portfolios, as well as when barriers to entry are low and those for exit are high (e.g. expensive and highly specialized equipment).

Competition in the P&P industry today must be considered as high, particularly due to new competitors using ICT to enter core publishing fields to distribute their content (e.g. in publishing through the increasing number of 'free sheets' in major cities) and from other sectors moving into the industry's market. Branding is an effective counter measure to churn, and strengthens customer loyalty.

Additionally, the general economic situation has negatively affected the publishing and printing industry. The weak economic situation has triggered a decrease in advertising spend on print products as well as on direct consumer sales and the level of circulation. In particular the job, housing, and car advertisement markets have moved online where advertising is often offered for free. Overall, there is increased competition and shrinking revenues.



**Exhibit 2.3-4: Anticipated impact of e-business on the P&P industry**

Forces shaping industry structure	General importance in the sector	Impact of e-business	Examples and arguments
<b>New entrants</b>	<u>Low:</u> <ul style="list-style-type: none"> <li>High entry barriers in traditional publishing (news-papers, magazines, books)</li> <li>New delivery channels could change this situation</li> <li>Borderline between 'publishing' and other online activities are blurring</li> </ul>	II	<ul style="list-style-type: none"> <li>Increasing use of sophisticated, advanced ICT systems could increase rather than remove barriers to entry into this sector.</li> <li>Market concentration and incumbent strategies as counter-forces</li> <li>Business migration from non-publishing companies into online publishing (e.g. internet portals such as 'yahoo').</li> </ul>
<b>Substitution of products / services</b>	<u>High:</u> <ul style="list-style-type: none"> <li>Internet as main challenger to traditional outlays</li> <li>Alternative channels for advertisers</li> <li>Cross-media competition with broadcasting for audience attention</li> </ul>	IIII	<ul style="list-style-type: none"> <li>Online services on the internet compete with traditional print products for audience attention.</li> <li>Substantial migration of classified advertising to internet platforms (e.g. used cars, real estate) poses serious economic challenges for publishers, particularly for newspaper publishers.</li> </ul>
<b>Bargaining power of suppliers</b>	<u>Low:</u> <ul style="list-style-type: none"> <li>High competition in most supplier industries, e.g. in the paper industry.</li> </ul>	I	<ul style="list-style-type: none"> <li>E-business applications (for example for e-procurement) tend to further strengthen the buyer's position rather than the supplier's</li> <li>Internet increases price transparency in the supply market.</li> <li>However, no major shift of power is to be expected.</li> </ul>
<b>Bargaining power of customers</b>	<u>Medium:</u> <ul style="list-style-type: none"> <li>Increasing cross-media competition strengthens position of advertising customers</li> <li>Readers have no direct negotiation power for copy or subscription costs</li> <li>But: low switching costs both for readers and advertisers</li> </ul>	III	<ul style="list-style-type: none"> <li>Sophisticated online services have increased expectations of readers in terms of customer service and content availability</li> <li>New opportunities for online advertising strengthens the negotiation power of advertising industry vis-à-vis publishers</li> </ul>
<b>Rivalry in the market</b>	<u>High:</u> <ul style="list-style-type: none"> <li>Competition has intensified, due to stagnating or shrinking markets (e.g. in newspaper circulation)</li> </ul>	III	<ul style="list-style-type: none"> <li>Competition from within the industry and from outside (e.g. internet bookstores)</li> <li>Business migration from companies into publishing markets (see 'new entrants') increases competition among players</li> </ul>
Impact of ICT and e-business: I = low; IIII = high			

### 2.3.5 Policy implications

A number of changes induced by e-business developments in the P&P industry in 2005 have implications for policy in a range of domains, and for revisions in regulations impacting on the industry. A specific circumstance in the publishing sector, however, is that most policy recommendations are inevitably related to 'media policy' in the broad sense. For example, the recommendation to monitor and assess implications of electronic publishing developments on existing media regulation is made with a view to implications on existing subsidies for print media.

**Exhibit 2.3-5: Policy implications of e-business in the P&P industry**

Policy objectives	Concerns and suggestions	Possible initiator(s)
<b>Maintain the viability of micro- and small enterprises</b>	<ul style="list-style-type: none"> <li>• Ensure standardisation of interfaces between all e-business and production-related components</li> <li>• Encourage sectoral and cross-sector cooperation in selecting, acquiring and managing e-business solutions and in negotiating with suppliers</li> <li>• Providing information about e-business and support to decision-making in adoption, to small organisations specifically</li> </ul>	<ul style="list-style-type: none"> <li>• Business intermediaries</li> <li>• Industry associations</li> <li>• ICT services industry</li> </ul>
<b>Facilitate innovation management and skills development in P&amp;P</b>	<ul style="list-style-type: none"> <li>• Monitor demand and supply for ICT skills in the P&amp;P industry</li> <li>• Counteract e-business skill-shortages in the sector by offering facilities for vocational training and product demonstrations</li> <li>• Develop sector specific consulting modules with the aim of investigating e-business opportunities and offer incentives to SMEs for participation</li> <li>• Promote entrepreneurial and managerial understanding of e-business opportunities in general</li> </ul>	<ul style="list-style-type: none"> <li>• 'Knowledge transfer' institutions, e.g. competence centres</li> <li>• Chambers of commerce and associations</li> <li>• Other business intermediaries</li> </ul>
<b>Acknowledge and safeguard the role of media in society</b>	<ul style="list-style-type: none"> <li>• Monitor and assess implications of electronic publishing developments on existing media regulation (e.g. subsidies for print media, legal status of e-books)</li> <li>• Carefully weigh concerns of ensuring free trade versus those about cultural identity</li> </ul>	<ul style="list-style-type: none"> <li>• National governments</li> <li>• EU</li> </ul>
<b>Ensure fair competition, counteract market failure</b>	<ul style="list-style-type: none"> <li>• Monitor concentration of ownership in the publishing industry, including a consideration of online services</li> <li>• Create an adequate framework for digital rights management</li> <li>• Consider impacts of possible changes in VAT regulation on the publishing industry</li> </ul>	<ul style="list-style-type: none"> <li>• EU</li> <li>• National governments</li> </ul>



## 2.4 The Pharmaceutical Industry

The e-Business W@tch sector study on the Pharmaceutical Industry was contributed by Berlecon Research GmbH (contact: [info@berlecon.de](mailto:info@berlecon.de)).

The full reports (parts 1 and 2) can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



The pharmaceutical industry is well suited to the use of ICT and e-business applications. This is true for both internal processes and for the support of B2B relationships. As a result, the industry is an intensive user of e-business. ICT and internet-based solutions also play an increasingly important role in supporting marketing and sales processes. CRM (customer relation management) systems and mobile solutions have a high potential for facilitating the management and work of the pharmaceutical sales force. Combating counterfeiting activities could be a driver for the deployment of RFID/Auto-ID solutions in this sector in the future.

### 2.4.1 Sector definition and background

#### Sector definition

Activities subsumed under NACE<sup>62</sup> 24.4 constitute the core of the pharmaceutical industry. The reports, however, also cover the activities of the cosmetics industry (NACE 24.51) and the manufacture of soaps and detergents, cleaning and polishing preparations (NACE 24.52). The latter two sub-sectors have several things in common with the core pharmaceutical industry, which justifies their joint consideration.

#### **Exhibit 2.4-1: Business activities covered by the pharmaceutical industry (NACE Rev. 1.1)**

NACE Rev. 1.1	Business Activity
DE 24.4	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
DE 24.5	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations.

In contrast to most other parts of the chemical sector, subsumed under NACE 24 (manufacture of chemicals, chemical products and man-made fibres), the outputs of the pharmaceutical industry are mostly produced for end-users and not for other firms of the chemical industry. In addition, most of these products can have an immediate impact on human health. Therefore, the industry has to meet high safety standards and is subject to many regulatory measures in order to ensure the consumers' safety.

Finally, companies active in the sub-sectors analysed by *e-Business W@tch* often use similar distribution channels such as pharmacies and drugstores. For the sector studies, therefore, the term "pharmaceutical industry", is intended to include the whole sector as defined above.

<sup>62</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.

## Industry background

The industry differs in one more respect from the remainder of the chemical industry: it is characterised by an extraordinarily high Research and Development (R&D) intensity. According to EFPIA (European Federation of Pharmaceutical Industries and Associations), pharmaceutical companies in Europe spend about 20% of their sales volume on research and development. This R&D is not only laboratory research to discover new substances or production processes, but a large amount of money and time is also invested in clinical trials and approval processes.

The pharmaceutical industry in Europe shows economic strength. In 2001, in the EU-25 (of today) more than 550,000 people were employed in pharmaceutical companies. The production value in the same year was roughly €148 billion, and the value added almost €55 billion.<sup>63</sup> Due to the high R&D intensity, the sector plays a crucial role in the creation of jobs with high skill-levels.

The manufacture of pharmaceuticals is concentrated in a few countries. In 2001, more than two thirds of the sector's production value was generated by pharmaceutical companies in the large EU countries of France, Germany, Italy, and the UK. In addition, large companies dominate production. Even though about 90% of the enterprises in this sector are SMEs, large companies account for more than 85% of production value and employ nearly 80% of the sector's workforce.

### 2.4.2 ICT and e-business adoption in 2005

The results of the e-Business Survey 2005 confirm a **leading position** of the pharmaceutical industry in the use of ICT and e-business technologies. In fact, for most of the e-business application areas studied, usage shares for the pharma industry are either at or even above the weighted average of the 10 sectors covered in 2005. However, the statistical findings often indicate a significant gap between large and small companies. Therefore, it seems that the pharma industry's position as forerunner in the field of e-business is mainly driven by the activities of large players in this sector.

#### ICT infrastructure

Pharma companies turn out to be **well equipped with basic infrastructure** components (internet accesses, Local and Wide Area Networks). Concerning internet access technologies, data confirm the success of DSL particularly among SMEs. Moreover, ICT outsourcing is of high relevance in the pharma sector, even though offshore outsourcing opportunities do not play an important role. Results on ICT skills development, indicate a gap between large and small companies in the participation of employees in regular ICT training programmes.

#### Internal business processes and collaboration with business partners

Deployment ratios for almost all applications supporting **internal processes are equal to or above the weighted average** of all 10 sectors surveyed. However, the share of pharma companies using knowledge management systems is – in light of the importance of this issue – relatively low. RFID-based solutions are another e-business key issue. However, the statistical findings reveal that the majority of pharma enterprises do not yet regard RFID as important for their company business.

#### Procurement and supply-chain integration

A **significant share of pharma companies** – irrespective of the company size – **purchase online**. In contrast, specific ICT solutions to support procurement activities are mainly used by large companies. Therefore, the share of companies (including the smaller ones) using specific software solutions or internet-based services for running online (reverse) auctions is insignificant.

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<sup>63</sup> Source: Eurostat New Cronos / DIW Berlin. See *e-Business W@tch* Sector Study on the Pharmaceutical Industry, July 2005 ([www.ebusiness-watch.org](http://www.ebusiness-watch.org))

The survey findings also provide some evidence on the use of B2B trading platforms by pharma companies. It turns out that e-marketplaces as providers of procurement functionalities are not widely used. Rather, pharma companies prefer to use internally installed solutions.

### Marketing and sales

Whereas company websites as an important basis for marketing activities are widespread, **online sales are only of minor importance** in this sector. The usage of specific customer-facing IT solutions in this sector shows similar patterns as those observed for supplier-facing IT solutions, particularly with respect to the gap between large and small companies. The importance of online auctions and e-marketplaces is also minor.

The survey results provide some statistical background for the use of CRM systems and mobile solutions, which are key issues in the sector. According to the statistics, **CRM systems are important** in this sector, but used much more by large than by small companies. In addition, pharma companies – particularly large players – are well equipped with remote wireless access as basis for mobile solutions. However, e-mail and calendar dominate among mobile solutions in use today.

#### Exhibit 2.4-2: Main findings of the e-Business Survey 2005 for the pharmaceutical industry

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>• <b>Basic components</b> (internet, LANs, WANs) are widespread in this sector.</li> <li>• Data confirm <b>DSL success</b> – particularly among SMEs.</li> <li>• <b>IT outsourcing</b> is of high relevance in this sector, but offshore opportunities do not play an important role</li> <li>• There is a gap between large and small companies in the participation of employees in regular <b>ICT training programmes</b>.</li> </ul>
<b>Integration of Internal processes</b>	<ul style="list-style-type: none"> <li>• Usage shares for almost <b>all applications</b> discussed in this field are equal to or above the average of all sectors surveyed.</li> <li>• A significant percentage of SMEs use <b>ERP systems</b>.</li> <li>• The share of pharma companies using <b>knowledge management systems</b> is – in light of the importance of this issue – relatively low, but use of intranets as possible alternative for managing company knowledge is widespread.</li> <li>• Online technologies supporting <b>collaborative processes</b> are mainly used for sharing documents as well as for capacity and inventory management.</li> <li>• The majority of pharma enterprises do not consider <b>RFID</b> to be important for their future company business.</li> </ul>
<b>Supplier-facing activities</b>	<ul style="list-style-type: none"> <li>• A significant share of pharma companies <b>purchase online</b>, but online purchases usually account only for a small share of the entire purchasing volume.</li> <li>• <b>Specific IT solutions</b> to support procurement activities are mainly used by large companies.</li> <li>• The share of companies using specific software solutions or internet-based services for running <b>online (reverse) auctions</b> is insignificant.</li> <li>• <b>E-marketplaces</b> as providers of procurement functionalities are not important; pharma companies rather use internally installed solutions.</li> </ul>
<b>Customer-facing activities</b>	<ul style="list-style-type: none"> <li>• <b>Company websites</b> (to support marketing activities) are widespread.</li> <li>• <b>Online sales</b> are of minor importance in this sector.</li> <li>• The usage of specific <b>customer-facing IT solutions</b> shows similar patterns to those observed for supplier-facing IT solutions: a gap between large and small companies, minor importance of online auctions and e-marketplaces.</li> <li>• <b>CRM systems</b> are important in this sector, but used much more by large than by small companies.</li> <li>• Pharma companies – particularly large enterprises – are well equipped with <b>remote wireless accesses</b> as basis for mobile solutions.</li> <li>• E-mail and calendar applications dominate among <b>mobile solutions</b> in use.</li> </ul>

### 2.4.3 Important topics and application areas

#### Important e-business topics: B2B internet platforms, CRM, and RFID

The key e-business issues analysed, as well as the case studies, should be understood as representative examples of current ICT and e-business practices and of related opportunities and challenges. The following topics have been selected for analysis due to their importance for the pharmaceutical industry:

- The use of B2B internet trading platforms
- CRM systems and mobile solutions for the support of sales activities
- RFID-based solutions

This selection does not claim to provide a comprehensive overview. This would be difficult to realize, as ICT and e-business are relevant for nearly all core business areas of the pharmaceutical industry.

#### Existing B2B internet trading platforms meet needs of pharmaceutical companies

B2B internet trading platforms are an issue that is particularly illustrative for developments in the field of e-procurement and supply chain connectivity. The analysis, and particularly the case studies discussed, show that the concept of B2B internet trading platforms is well suited to reflect the current reality of B2B e-business in the pharmaceutical industry. Case studies illustrate the use of different internet trading platforms that do not always have much in common with the original idea of e-markets. Nevertheless, these platforms meet the needs of companies for their B2B e-business activities. This shows that the needs of pharmaceutical companies differ in the field of B2B e-business.

Online directories, for example, do not provide a trading function and have therefore been considered mainly as a side-product of e-marketplaces, if at all. However, as the example of *Marmosa* (see Exhibit 2.4-3) has shown, there is demand for industry directories to help in the establishment of new business contacts and to enhance the companies reach to customers. This holds particularly for SMEs, which do not have a large distribution network or own subsidiaries in different regions. Integration platforms, such as *pharma-mall* (see Exhibit 2.4-3), hardly fit into the original e-marketplace model, as price transparency – often considered to be the main advantage of e-marketplaces – does not play a role in this business model. However, both the associated pharmaceutical companies and their customers obviously profit from this offer.

#### CRM systems: potential for streamlining processes – user acceptance required

The pharmaceutical industry often serves as a prime example of the usefulness of specific customer-facing IT- and e-business solutions, as customer relationships are important and complex and as large sales forces need to be managed. In fact, IT and internet-based solutions play a key role in supporting marketing and sales processes in the pharmaceutical industry. CRM systems and mobile solutions show quite some potential for streamlining company processes on the sell-side and for facilitating the management and work of the pharmaceutical sales force. A key message of the analysis and case studies, however, is that for this potential to materialise, it requires more than just a CRM system or the equipment of the sales force with wireless devices. Their proper use and integration in company processes are key success factors for exploiting the potential of these systems.

The implementation of state-of-the art technologies is less important in comparison. Acceptance of the solution by users turned out to be a key success factor. Companies have many possible ways of increasing user acceptance, including adequate and workflow-compatible design, and integration of stakeholders in the decision-making process.

#### Forerunner in RFID/Auto-ID solutions – accepted standards necessary

The pharmaceutical industry often serves as a prime example of the usefulness of RFID (Radio Frequency Identification) solutions today, particularly where tracking and tracing solutions along the supply chain are concerned. However, RFID in the pharmaceutical industry is still at an early stage,

and has only been introduced in some pilot projects so far. Nevertheless, the early pilots as well as the ongoing preparatory work illustrate very well the challenges and opportunities of such complex IT and e-business systems in the pharmaceutical industry.

Combating counterfeiting activities currently appears to be a main driver for the deployment of RFID/Auto-ID solutions in this sector. The importance of the pharmaceutical industry as a forerunner in this field is accentuated by the large range of suitable applications, the favourable ratio of tag prices to product values and by the enforced pedigree requirements of some regulation authorities.

However, a widespread deployment of this technology within this sector brings many challenges with it. If worldwide cross-industry solutions are to be the goal, the establishment of accepted standards is crucial. In addition, the establishment of RFID/Auto-ID networks requires the solution of business issues – such as who gets access to which information – and the consideration of privacy issues. Therefore, in the short term, the deployment of small specialised projects may be more likely than a full roll-out of a unique RFID/Auto-ID concept along the entire supply chains of several industries.

### Case studies and business examples

The sector reports on the pharmaceutical industry (July / September 2005) contain short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of findings from both the survey and desk research, and provide further insight in current e-business trends and developments. Exhibit 2.4-3 summarises the 'activity views' which are featured in more detail in the two reports.

**Exhibit 2.4-3: E-Business Activity Views featured in the sector studies**

E-Business Activity Views	Country	Topics
<i>Case Study: Marmosa</i> – trying to win new customers via website and B2B portals	Spain	Insights into problems of SMEs when using e-business tools to support marketing and sales activities
<i>Case Study: Pharma-mall</i> – an integration platform initiated by pharmaceutical companies	Germany	Example of integration platforms that are initiated, financed and supervised by producers of pharmaceuticals themselves.
<i>Case Study: Pharmaplace</i> – a collective sourcing platform initiated by medium-sized pharmaceutical companies	Germany	Insights into e-business related problems faced by medium-sized companies in this sector
<i>Business example: Diagdirect</i> : a B2B internet trading network for in-vitro diagnosis	N/A	Example of user-driven trading platforms, aggregating online supplier catalogues to support laboratories' ordering process
<i>Case Study</i> : Deployment of a new CRM system at <b>EGIS</b> Poland	Poland	Discussion of strategies, challenges and success factors for planning, implementing and introducing a CRM system
<i>Business example</i> : E-business activities supporting marketing and sales at <b>UCB Pharma</b> Poland	Poland	E-business strategy and first experiences by a pharmaceutical company trying to improve the performance of sales and marketing activities
<i>Business example</i> : Sales force optimisation by a mobile solution at <b>Queisser Pharma</b>	Germany	Example of pharmaceutical manufacturer deploying mobile solutions to streamline the work of its sales force.
<i>Business example</i> : Authenticating pharmaceuticals at the point of dispensing – an RFID/barcode pilot by <b>Aegate</b>	UK	Example of practicable RFID-based solutions, which increase the safety of the patients, are feasible today and suited to SMEs in the sector



## 2.4.4 Anticipated implications of e-business for the industry

The second sector report (of September 2005) assessed the implications of ICT and e-business adoption on the structure of the pharmaceutical industry. It applied the 'five-forces-model' developed by Michael E. Porter (1980) as a framework to do so. This chapter summarises the main findings.

### New entrants

The pharma industry tends to be more characterized by consolidation than by new entrants. In fact, entry barriers in the core pharmaceutical industry are high. Dealing with the risks of pharmaceutical research, with heterogeneous needs of target groups and with regulatory issues requires large financial resources and significant technological expertise. ICT and e-business are likely to accelerate the consolidation process, often in favour of large enterprises in this sector. Large companies usually have more resources than SMEs to invest in the ICT equipment necessary for increasing the R&D efficiency, automating the production of pharmaceuticals or managing a company sales force.

The barriers to entry are lower in pharma-related sub-sectors like pharma retailing. In these market segments e-business tools may accelerate the establishment of new players. In fact, the internet as distribution channel – jointly with lower legal barriers for distributing pharmaceuticals – has facilitated the establishment of online pharmacies as new players. Also niche players may benefit, as simple e-business tools such as company websites or supplier directories on the internet make it possible to reach a large enough audience to support a niche business.

### Substitution of products

An increasingly important alternative to the conventional production of pharmaceuticals are biotechnological methods. In fact, PricewaterhouseCoopers (PWC) found that “*in 2003, no less than 25 of the FDA’s (US Food and Drug Administration) 32 new product approvals originated from biotech companies*”.<sup>64</sup> As biotechnological methods make the production of treatments for specific patient groups possible, this trend may lead to significant changes in the pharmaceutical market. Whereas suppliers of pharmaceuticals compete on mass markets today, the delivery of patient-specific biopharmaceutical treatments will allow more differentiation in the future.

ICT and e-business technologies are of significant importance in this field. Firstly, a powerful ICT infrastructure as well as e-business applications supporting R&D activities are an essential basis for the development of biopharmaceutical treatments. Secondly, ICT and e-business applications are needed to support the supply of patient specific treatments. The delivery of biopharmaceutical treatments from the manufacturer to specific patients, for example, requires a high degree of transparency in the supply chain and may thus drive the use of RFID-based solutions for tracking and tracing products.

### Negotiation power of suppliers

Basic substances and materials as direct inputs for the production of pharmaceuticals mainly come from chemical companies. Their negotiation power, however, is often limited due to the strong competitive pressure in this sector<sup>65</sup> – at least for commodity ingredients. The same argument holds true for the relationship to suppliers of indirect goods such as packaging material or laboratory equipment.

E-business tools like online auctions may help pharma companies to exploit their relatively strong position. In fact, there are some examples of pharmaceutical manufacturers that could improve their purchasing conditions through the use of online auctions. Merck, for example, claims to have realised savings of up to 25-35% in negotiating framework contracts by using the sourcing service provider's

<sup>64</sup> PWC (2004): “Pharmaceutical Sector - Annual Report 2003”, Corporate Finance Insights – Analysis & Opinions on Merger & Acquisition activity, PricewaterhouseCoopers, 2004 ([www.pwc.com/pharmainsights](http://www.pwc.com/pharmainsights)).

<sup>65</sup> See e.g. *e-Business W@tch* / European Commission (2004). Electronic Business in the Chemical Industry, September 2004. Available at [www.ebusiness-watch.org](http://www.ebusiness-watch.org)

Portum auctioning tools and services.<sup>66</sup> However, survey results indicate that the use of such tools is only of minor importance when all companies in the industry are considered. SMEs in particular often do not have the purchasing volumes that make the use of auctions economical for both sides.

### **Negotiation power of customers**

The negotiation power of customers is relatively high, especially if one includes regulation authorities and health policy institutions as representatives of consumers in this group. In fact, the pharmaceutical market is heavily regulated. Regulatory compliance impacts almost all business segments, including the negotiation of sales conditions. In addition, public health insurance companies and government institutions have a strong influence on the choice of pharmaceuticals as they ultimately decide whether and to what extent expenses for prescribed pharmaceuticals are refunded. Due to the difficult financial situation of public health systems in many European countries, public health authorities are trying to exploit their position as purchasing monopoly in order to contain costs.

ICT and e-business developments are unlikely to change the importance of regulatory activities for this sector. On the contrary, government institutions and regulatory authorities significantly influence the use of e-business technologies by companies in the pharmaceutical industry. Examples of where regulatory issues provide a framework or additional incentives for ICT investments are:

- Recording, filing and retrieving data needed for drug approval procedures;
- Tracking and tracing of pharmaceuticals throughout the supply chain, e.g. for providing pedigrees, tackling recall issues or fighting counterfeiting activities;
- Monitoring the production process to meet requirements for product quality;
- Providing information to customers and raising customer awareness, e.g. by sponsoring or running health portals on the internet.

### **Rivalry in the market**

During the past years the rivalry in the pharma market has increased mainly due to the increasing importance of generics.<sup>67</sup> The consulting company Frost & Sullivan, for instance, expects that the generics and biogenerics market in Europe will double from \$10.9 billion in 2003 to \$21 billion in 2010, where generics show a 20-80% price advantage compared to patent-expired brands.<sup>68</sup> In several European countries – e.g. the UK (20%) or Germany (27%) – the market share of generics is already significant today.<sup>69</sup>

Drivers for this development are more cost-containment measures carried out by government institutions than new ICT or e-business developments. ICT, however, may help pharma companies to deal with the increased rivalry in the market. Research-based pharma companies, for example, may use ICT to increase the R&D efficiency. By having more (patented) drugs in the pipeline, companies become less vulnerable to competition from producers of generics. But the use of ICT to streamline internal processes can also help pharma companies to tackle the increased cost pressure coming from stronger competition.

<sup>66</sup> See case studies presented on the Portum website: [www.portum.com](http://www.portum.com) (February 2005).

<sup>67</sup> "Generics" are typically understood as pharmaceuticals produced by a manufacturer different from the inventor of the original product and are marketed when intellectual property rights are exhausted. See EFPIA (2004): "The pharmaceutical industry in figures 2004 edition", Report, EFPIA 2004 ([www.efpia.org](http://www.efpia.org)).

<sup>68</sup> Frost & Sullivan (2004): "Cost cutting measures and patent expiration to propel the European generics and biogenerics market", Press Release, 19. 10.2004.

<sup>69</sup> See EFPIA (2004): "The pharmaceutical industry in figures 2004 edition", Report, EFPIA 2004 ([www.efpia.org](http://www.efpia.org)).

**Exhibit 2.4-4: Anticipated impact of e-business on the pharmaceutical industry**

Forces shaping industry structure	General importance in the sector	Impact of e-business	Main arguments
<b>New entrants</b>	<u>Low:</u> There are large entry barriers to the core pharma market. Entry barriers are lower in related sub-sectors like cosmetics or pharma retailing.		<ul style="list-style-type: none"> <li>• Use of websites may become the basis for the establishment of niche markets.</li> <li>• Internet as distribution channel enabled the establishment of online pharmacies.</li> </ul>
<b>Substitution of products / services</b>	<u>Medium:</u> Patient-specific treatments, based on developments in biotechnology, might change the pharma market in the future.		<ul style="list-style-type: none"> <li>• Powerful ICT infrastructure and specific e-business applications are the basis for biopharmaceutical developments.</li> <li>• ICT and e-business technologies are needed to manage more sophisticated supply chain processes.</li> </ul>
<b>Negotiation power of suppliers</b>	<u>Low:</u> Competition in supplier industries is high, ICT is strengthening the negotiation power of pharma manufacturers.		<ul style="list-style-type: none"> <li>• Specific e-business tools like online auctions may help to increase negotiation power of pharma companies.</li> <li>• A widespread use of online auctions and negotiation tools, particularly among SMEs, is unlikely.</li> </ul>
<b>Negotiation power of customers</b>	<u>High:</u> Regulation authorities and public health institutions as representatives of consumers have an outstanding position in the pharma market.		<ul style="list-style-type: none"> <li>• E-business issues have less impact on the negotiation power of customers.</li> <li>• Regulation authorities and government institutions can drive or influence the use of ICT and e-business technologies.</li> </ul>
<b>Rivalry in the market</b>	<u>High:</u> Competitive pressure has increased mainly due to the rising importance of generics.		<ul style="list-style-type: none"> <li>• ICT and e-business may be used by research-based pharma to increase the R&amp;D efficiency and, thereby, to lower the competitive pressure.</li> <li>• The use of ICT and e-business technologies to streamline company processes (R&amp;D, production, marketing) helps reducing the cost pressure.</li> </ul>
Impact of ICT and e-business:   = low;      = high			

## 2.4.5 Policy implications

The e-Business Survey 2005 and case studies highlighted two specific issues of policy relevance, namely the need for better IT-related business skills in SMEs and the ongoing development of an RFID infrastructure for the pharmaceutical industry. ICT and the internet have changed the way certain business activities can be conducted, and there is some evidence that SMEs have not yet fully acquired the necessary business skills to make use of these changes. In this regard, there is a potential role for European policy, at least on three levels: the e-Business Policy Support Network, the eMarket Services portal, and the e-Skills Forum.

Furthermore, it would probably be beneficial for the European pharmaceutical industry as a whole to get an independent assessment of the opportunities and challenges of RFID in the pharmaceutical supply chain. Such an assessment could be conducted by establishing an expert group at the appropriate level(s) and/or by commissioning an independent study.

**Exhibit 2.4-5: Policy implications of e-business in the pharmaceutical industry**

Policy objectives	Concerns and suggestions	Possible initiator(s)
<b>Need for better non-technical skills for SMEs</b>	<p><b>Check existing e-business support measures:</b></p> <ul style="list-style-type: none"> <li>• Are technical aspects overemphasised?</li> <li>• Do they help companies to understand organisational aspects of e-business and to acquire the necessary e-business skills?</li> <li>• Are support measures designed to facilitate participation of SMEs?</li> </ul> <p><b>Raise awareness</b> of policy authorities for this issue.</p>	<ul style="list-style-type: none"> <li>• EU Member States and regional policy makers</li> <li>• European Commission via existing projects, e.g. e-BSN, eMarket Services portal, e-Skills Forum</li> </ul>
<b>Ongoing development of an RFID infrastructure for the pharma industry</b>	<p>Provide an <b>independent assessment</b> on opportunities and challenges of <b>RFID</b> in the pharma supply chain by taking into account:</p> <ul style="list-style-type: none"> <li>• alternative technologies</li> <li>• harmonisation of national rules for product labelling</li> <li>• time span for availability of technologies and their suitability for SMEs</li> <li>• role of standards and interoperability</li> </ul> <p>Make sure to <b>understand consequences</b> of policy on standard-setting processes in this field.</p>	<ul style="list-style-type: none"> <li>• European Commission</li> <li>• EU Member States</li> <li>• Public health and regulation authorities</li> </ul>



## 2.5 The Machinery and Equipment Industry

The e-Business W@tch sector study on machinery and equipment was contributed by DIW Berlin (German Institute for Economic Research, contact: [bpreissl@diw.de](mailto:bpreissl@diw.de)).

The full reports (parts 1 and 2) can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



The machinery and equipment industry has not been an early adopter of ICT. However, compared to 2002/03, the sector has advanced in its use of e-business. Companies have started to develop their own strategies. Applications are planned with an understanding of their scope and potential benefits. Companies are thereby moving away from a mere imitation strategy which was common in the early stages of e-business. The transition from e-business as a technical ICT tool to 'e-business as a strategic concept' is a major distinguishing factor in this recent phase. Customer service, and after-sales services in particular, play an important role in this context. The increasing practice of machine sales with accompanying services offers a vast range of opportunities via e-business channels. Quicker procedures in pre-sales and after-sales services, an active role played by customers in shaping and providing the service, 24-hour availability and up-to-date information about new products and services are advantages on the customers' side. In the B2B trading area, a number of e-markets for industrial machinery and equipment were established in 2004.

### 2.5.1 Sector definition and background

#### Sector definition

The machinery and equipment (M&E) sector comprises seven groups as defined by the NACE Rev.1.1 classification of business activities.<sup>70</sup> Reports by *e-Business W@tch* concentrate on groups 29.1 to 29.5. The weapons and ammunitions as well as the domestic appliances industries (29.6 and 29.7) are not included. These industries mainly produce for government agencies (29.6) or end consumers (29.7). Therefore, the characteristics of their markets, their sales strategies and channels differ considerably from those of the other industries in the sector, and their e-business activities cannot be compared with those of the other NACE 29 industries.

#### **Exhibit 2.5-1: Business activities covered by the M&E industry (NACE Rev. 1.1)**

NACE Rev. 1.1	Business Activity
DM 29	Manufacture of machinery and equipment
29.1	Manufacture of machinery for the production and use of mechanical power, except aircraft, vehicle and cycle engines
29.2	Manufacture of other general purpose machinery
29.3	Manufacture of agricultural and forestry machinery
29.4	Manufacture of machine-tools
29.5	Manufacture of other special purpose machinery

<sup>70</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.

## Industry background

In 2002, the five sub-sectors included for analysis had a production value of €418 billion and employed 3.2 million people in the EU-25. With regards to the total sector (29.1-29.7), the new Member States have contributed about 3.6% of the production value and 9.0% of employment. The manufacture of general purpose machinery (29.2) was the largest sub-sector, followed by the manufacture of other special purpose machinery (29.5). 92% of the enterprises in the whole sector (29.1-29.7) have less than 50 employees.<sup>71</sup>

## 2.5.2 ICT and e-business adoption in 2005

### ICT and e-business activity in 2005

Firms in the M&E industry continue to make progress in their usage of ICT and in understanding the strategic scope of e-business initiatives. According to the new survey results, the M&E sector exhibits an average usage of ICT compared to other sectors. Many firms in the M&E sector focus their e-business initiatives on innovative ways to support traditional business functions with simple, user friendly ICT systems. The outsourcing of ICT solutions is currently an important sector-specific trend. Outsourcing is one way for firms in this industry to cope with potential shortages of in-house ICT know-how. A digital divide between SMEs and large companies remains visible. Yet many concrete examples show how SMEs can benefit from implementing e-business solutions.

### ICT infrastructure and internal business processes

Firms in the M&E industry show a high endowment with **basic ICT infrastructure** such as internet access and Local Area Networks, but a slightly below average usage of advanced infrastructure technologies like Wireless LAN (**WLAN**) and Virtual Private Networks **VPNs**. The digital integration of internal information flows and processes is an important issue in the M&E sector. This is reflected in an above average endowment of firms with Enterprise Resource Planning (**ERP**) systems and other specialised ICT solutions that support internal processes.

### Electronic procurement and supply chain integration

The new survey data support previous evidence that **purchasing online** remains one of the most popular applications of ICT and the internet in the M&E sector. Large firms are more prone to e-procurement than small firms, but small firms that actually do purchase online procure higher shares of their total purchasing volume via online channels. Compared to other sectors, however, purchasing online is not as common in the M&E industry as on average among the 10 sectors studied by the *e-Business W@tch* in 2005. Also, firms in this sector primarily use simple technologies to purchase online and to support rather traditional procurement processes.

### Electronic marketing and sales

An above average share of firms in the M&E sector has a website, yet the sector continues to show low usage rates for **online sales** and e-marketplaces. The majority of firms that sell online rely on simple sale-side e-commerce activities. This complies with the insight that there are limits to the usefulness of the internet as a sales channel for the mostly customised, capital-intensive products of this sector that do not easily lend themselves to be sold to an anonymous mass market. There is, however, potential to use customer-facing e-business solutions to improve productivity and **customer service**. Presumably, these business opportunities have not yet been completely realised by a large share of firms in the sector.

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<sup>71</sup> Source: Eurostat New Cronos / DIW Berlin. See *e-Business W@tch* Sector Study on M&E, July 2005 ([www.ebusiness-watch.org](http://www.ebusiness-watch.org))

**Exhibit 2.5-2: Main findings of the e-Business Survey 2005 for the M&E industry**

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>• Almost all firms in the M&amp;E sector are endowed with <b>internet access</b>.</li> <li>• <b>Firm-internal network</b> infrastructures, such as LAN and WLAN, are also widely used, in particular among large companies.</li> <li>• The diffusion of more sophisticated infrastructure and <b>access technologies</b> (WLAN, broadband and VPN) is slightly less advanced in the M&amp;E sector compared to the all-sectors average.</li> <li>• 20% of firms in the industry allow <b>remote access</b> to their computer network, and an additional 5% plan to enable remote access in the near future.</li> <li>• Only 11% of firms in the M&amp;E industry offer regular <b>ICT training</b> to employees.</li> <li>• The average level of gross capital <b>investment in ICT hardware and software</b> in the M&amp;E sector in 2004 was € 70,000; the median was € 5,000. Average investments are thus comparable to those made by firms from other sectors in the sample.</li> </ul>
<b>Integration of Internal processes</b>	<ul style="list-style-type: none"> <li>• The importance of ERP systems and ICT-tools to optimise product-related, <b>internal processes</b> is emphasised in case studies and supported by the survey results.</li> <li>• Adoption level of <b>ERP</b> in particular systems is high in M&amp;E compared to other sectors, but there are still pronounced differences by size-band.</li> <li>• Special ICT solutions to <b>manage capacities and inventories</b> online are used by 13% of enterprises in this sector, compared to 9% on average.</li> <li>• The sector currently shows an average endowment with ICT for <b>sharing information and knowledge</b> among employees, compared to the other 9 sectors surveyed.</li> </ul>
<b>Supplier-facing activities</b>	<ul style="list-style-type: none"> <li>• <b>Purchasing online</b> is confirmed as one of the most popular applications of ICT and the internet in the M&amp;E sector. More than one third of all firms in the sector currently purchase online.</li> <li>• Large firms are again more prone to e-procurement than small companies, but small firms that actually do purchase online reported procuring higher shares of their total purchasing volume via <b>online channels</b>.</li> <li>• Total <b>online purchasing</b> volumes are still rather small, however, if measured as % of total supplies purchased.</li> <li>• Among those companies that reported using <b>special ICT solutions for e-procurement</b> purposes (10% of all firms in the sector), 62% use standard software packages and 51% use customised, company-specific solutions.</li> <li>• 14% of all firms say that they use a <b>Supply Chain Management system</b>. This figure is very close to the average of 15% among the 10 sectors studied.</li> </ul>
<b>Customer-facing activities</b>	<ul style="list-style-type: none"> <li>• The M&amp;E industry continues to show low usage rates for <b>online sales and e-marketplaces</b>. 5% of firms in the sector sell online, compared to 15% on average across all sectors.</li> <li>• The majority of firms that sell online rely on simple <b>sale-side e-commerce activities</b>, rather than complex, sophisticated systems. This is not surprising since M&amp;E products are often highly customized and do not easily lend themselves to be sold via the internet.</li> <li>• Yet, business examples and case studies show that there is potential in this industry to use <b>customer-facing e-business solutions</b> to improve productivity and customer service. Presumably, these business opportunities have not yet been completely realised by a large share of firms in the sector.</li> <li>• 7% of firms (representing 28% of employees) use <b>CRM systems</b>. About one quarter of these firms said that CRM proves to be 'very helpful' in increasing the effectiveness of marketing, while almost 60% considered it 'rather helpful'.</li> </ul>



## 2.5.3 Important topics and application areas

### Slow advances in the usage of e-business

Starting from a low level, the sector is slowly advancing in the usage of e-business. Companies have begun to develop their own strategies; applications are planned with a conscious understanding of the scope and targeted benefits, thus moving away from a mere imitation strategy common in early stages of e-business. The transition from e-business as a technical ICT tool to “e-business as a strategic concept” is a major distinguishing factor in this recent phase. It marks a decisive step in realising sustainable e-business models.

### Importance of standardisation

Standardisation is a major prerequisite for doing e-business. Achieving commonly accepted descriptions and definitions requires coordination among suppliers and initiatives that govern the process from a neutral position. Industry associations and publicly supported programmes cooperate in this task.

### Introduction of new services and quality improvement through e-business

Case studies presented indicate that e-business offers a whole variety of options to introduce new services and to improve the quality of existing ones. In most of these case studies companies claim that e-business has improved their competitiveness – by reducing costs and by enhancing the attractiveness of their products and services.

### E-business implementation delay in SMEs

Some case studies present e-business solutions that have been realised by SMEs. One problem for SMEs is that they cannot benefit from economies of scale in introducing e-business. While larger companies delegate e-business projects to entire task forces, in SMEs the projects have to be conducted by employees who continue to do their normal jobs. This requires strong commitment, but often leads to delays in the realisation of projects.

### Key features for e-business success

Some key features have emerged that are important for the success of e-business projects:

- Linking external e-business applications with internal procedures is not only a problem of integrating ICT systems, but one of reflecting the e-business strategy in other departments of the company.
- Companies should not underestimate the efforts needed to achieve viable solutions beyond the test phase. Organisational re-structuring, training, and learning phases in particular have to be taken into account. Defining a comprehensive e-business strategy is an essential prerequisite for success.
- Stakeholder involvement: customers, employees, suppliers, production, and marketing departments need to be able to influence the shape of the system.
- A strategic decision is needed whether systems should be run in parallel (ICT-based along with traditional procedures). Longer transition periods are a financial burden, while rapid transitions to ‘online only’ systems might drive customers away.
- User-friendliness of systems is important since e-business applications are supposed to involve actors with different backgrounds.
- Service quality: transparency, trust building measures, personal feedback, and back-office support are essential to achieve commitment from all stakeholders.

Starting e-business projects as part of a general re-structuring of business processes can give companies in the new Member States a good position as e-business partners. Furthermore, joint ventures with foreign partners have, in some cases, supported the realisation of advanced e-business projects.

## E-marketplaces offer a variety of services – difficult selection of “right” e-market

Electronic marketplaces that serve the M&E sector offer a variety of services. Functions range from mere contact brokerage to the organisation of auctions and sales procedures. Market variety allows moving beyond the trade of standard parts to more sophisticated products and services. It is essential for market operators to gain a critical mass of trade in order to attract customers and suppliers. For potential market participants selecting the right e-market is not easy. Therefore, information on the functionality, the operators, and their reliability, as well as on the size and scope of electronic markets should be made available to support companies in decision-making.

## Case studies and business examples

The sector reports on the M&E industry (July / September 2005) contain short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of both the survey and from desk research, and provide further insight in current e-business trends and developments. Exhibit 2.5-3 summarises the 'activity views' which are featured in more detail in the two reports.

**Exhibit 2.5-3: E-Business Activity Views featured in the sector studies**

E-Business Activity Views	Country	Topics
<i>Case Study:</i> An Extranet Application for Warranty Handling at <b>Palfinger</b> , manufacturer of hydraulic lifting, loading and handling systems	Austria	Implementation of an electronic system for easy handling of warranty registrations and claims in order to strengthen the quality of customer service.
<i>Case Study:</i> <b>Digital Parts Transfer</b> , broker of machinery blue prints and production capacity	Netherlands	A supply service for physical products, linking partners in the global product ownership, production, and distribution, by digitally storing, distributing and processing electronic product definitions.
<i>Case Study:</i> Establishment of an ERP-System and a Webshop at <b>Telschig</b> , manufacturer of bulk handling machinery	Germany	Implementation of an ERP-system and an online shop for the distribution of spare and wear parts in a small company. The e-business project was financially supported by PROZEUS.
<i>Case Study:</i> Project Management and E-procurement at <b>Köhler and Hörter</b> Compressor Systems, manufacturer of customer-tailored compressors	Germany	Efforts and challenges of a small compressor manufacturer associated with the establishment of a project management system for the production of complex and custom-tailored products.
<i>Case Study:</i> Implementation of Quality Management System in <b>Fire Eater A/S</b> , manufacturer of fire prevention tools and fire fighting equipment	Denmark	A detailed analysis of a Quality Management application. The system allows for the organisation, provision, and distribution of information, for project management, as well as for quick communication.
<i>Case Study:</i> Mosaico Service at <b>Bonfiglioli Riduttori Spa</b> , supplier of speed reducers, gear motors and inverters	Italy	Implementation of a CRM system and the launch of a sales documentation and product configuration portal.
<i>Case Study:</i> The <b>VDMA-e-Market</b> , electronic marketplace for machinery and equipment manufacturers	Germany	Details on the development of the VDMA-e-market as an information platform for the M&E manufacturing industry.

## 2.5.4 Anticipated implications of e-business for the industry

The second sector report (of September 2005) assessed the implications of ICT and e-business adoption on the structure of the M&E industry. It applied the 'five-forces-model' developed by Michael E. Porter (1980) as a framework to do so. This chapter summarises the main findings.

### New entrants

In the M&E sector, e-business tools are primarily used to increase the efficiency of processes in established firms or to improve and introduce new service offers for customers. Compared to other sectors (e.g. retail, banking), the potential for mainly internet-based business models seems limited in M&E manufacturing. Thus, the availability and widespread use of ICT in the sector provides little additional opportunities and incentives for new firms to enter the market. In addition, since the M&E sector is a mature industry, with a majority of established and highly specialised firms, entry and exit rates seem comparatively low compared to other industries. Thus, new entrants are a comparatively low strategic threat for most firms in the sector. Overall, this implies that e-business will only have minor impacts for competition in this sector due to new market entry dynamics.

### Substitution of products / services

The degree to which it is possible to substitute products and services in an industry of competitive dynamics. If products are close substitutes, competition will be mainly based on prices, providing advantages to those producers with the most favourable cost structures. Often, in markets with economies of scale, the winners of competition will be a few big players. However, if products and services are targeted at niche markets or if they can be substantially differentiated from competitors' offers (e.g. via brand names, quality, superior customer service, technological capability or durability), this can limit price competition somewhat, shifting competitive dynamics towards product attributes and service offers. In such markets, specialised small firms can have good business opportunities.

In the M&E sector, the degree to which products and services are standardised and substitutable varies among sub-sectors. In many sub-sectors, machines and equipment are highly customised or built to order and require special engineering know-how and experience that is hard to copy. In such markets, competition focuses more on innovativeness and quality than on prices. Against this backdrop, e-business technologies can have varying impacts on competition. On the one hand, e-business provides numerous opportunities for companies to offer customised products or services, which limits the degree to which offers are substitutable. On the other hand, on-going standardisation initiatives (such as eCl@ss<sup>72</sup>) are expected to make products and components more comparable among different suppliers, thus increasing market transparency, but also increasing the degree to which it is possible to substitute such products among different suppliers. Thus, the net impact of e-business on competition due to the substitution of products or services can vary among different sub-sectors of the M&E industry.

### Negotiation power of suppliers

The negotiation power of suppliers influences the allocation of rents and profits in an industry. The degree to which suppliers can "dictate" the rules of the game varies among different sub-markets in the M&E sector. Some firms in the industry are influenced by their suppliers in their e-business strategies, which implies that suppliers have negotiation power vis-à-vis these firms.

The introduction of e-business solutions can affect the distribution of power between suppliers and customers. On the one hand, if two or more firms commit themselves to common standards and an integrated ICT solution such as SCM), this yields a strategic partnership that can be subject to lock-in effects which can limit competition and increase the dependence of the partners on each other. In particular, firms might get "locked in" to a particular supplier. On the other hand, investments in e-business technologies that are not relationship-specific and accompanied by standardisation initiatives

<sup>72</sup> A German project to develop e-standards for SMEs. See [www.eclass.de](http://www.eclass.de) (April 2005).

to classify products and components may increase market transparency and the negotiation power of firms vis-à-vis the suppliers of such products.

Nevertheless, the empirical analysis and the case studies presented in the full sector reports did not contain specific evidence that these strategic considerations are currently an important issue among firms in the M&E sector. Furthermore the negotiation power of suppliers does not seem to be a major issue for most firms in the sector either. However, to the extent that suppliers have some degree of negotiation power, the dynamics and considerations outlined above could become more important in the future when e-business solutions in this sector reach a higher degree of sophistication.

### **Negotiation power of customers**

Similar arguments to those above apply with respect to the strategic implications of e-business on the distribution of power between firms in the M&E sector and their customers. The degree to which customers have negotiation power also varies greatly among sub-sectors of the industry. For example, firms that primarily and frequently serve a small number of large companies (such as car manufacturers) will be confronted with a substantial amount of negotiation power of their customers, whereas others will not.

The power of customers is a concern for more companies in this sector than the power of suppliers. Large customers with significant negotiation power could force their suppliers to use particular e-business solutions in order to stay in business with them (“take IT or leave it”). The commitment to such relationship-specific investments into ICT can result in lock-in scenarios and hold-up problems, as argued above, although case study evidence and desk research did not indicate that these “battles of power” are currently an important matter of concern for firms in the M&E sector. Nevertheless, the issue could gain importance in the future when firms in this industry begin to adopt more advanced e-business solutions that integrate business processes across company borders.

Another way in which e-business tools could affect the bargaining power of customers has quite an opposite effect: firms in the M&E sector could use customer-oriented e-business solutions as an instrument to tie customers to their business, using e-business to build long-lasting relationships with clients and improve the competitive position of the enterprise. Thus, depending on the specific market in which firms are operating and the type of customers that firms are primarily dealing with, relationship-specific ICT and e-business investments can either improve or weaken the negotiation position of companies.

In summary, for those companies that consider the negotiation power of customers as an important aspect, the further development of e-business could significantly affect the “balance of power” between the producers of machinery and equipment and their customers.

### **Rivalry in the market**

By increasing market transparency and the geographical outreach of companies, the further development and application of e-business could increase the degree of rivalry in some market segments (e.g. those with low barriers to entry) in the M&E sector. In particular, it opens up new opportunities to outsource specific production activities to other countries and to increase the sales area of companies.

The case studies on *Digital Parts Transfers* and *Fire Eater A/S* (see Exhibit 2.5-4) provided real-life examples of how e-business solutions can facilitate the geographic expansion and internationalisation of firms in this industry. However, these developments also need to be put in perspective to the overall nature of the sector: The majority of firms in the M&E sector are mostly small, specialised firms that primarily serve their home markets and rely on long-standing relationships with their clients. Although e-business can affect these traditional structures in some ways, it seems unlikely that it could cause radical changes in the degree of rivalry in the M&E sector.

**Exhibit 2.5-4: Anticipated impact of e-business on the M&E industry**

Five forces shaping industry structure	General importance in the sector	Impact of e-business	Main arguments
<b>New entrants</b>	<u>Low</u> : Mature industry with a majority of established, highly specialised firms that act mainly on national markets	I	<ul style="list-style-type: none"> <li>In this sector, e-business is mainly a tool for already existing firms to increase efficiency and to improve customer service</li> <li>The availability and widespread diffusion of ICT in the sector provides little additional incentives for new firms to enter the market; the potential of internet-based business models in this sector is limited</li> </ul>
<b>Substitution of products / services</b>	<u>Medium</u> : Most firms are highly specialised, which limits the ability to substitute products / services	II	<ul style="list-style-type: none"> <li>E-business offers numerous opportunities for customised products / services, thus making imitation more difficult</li> <li>Standardisation increases transparency and comparability, and could therefore increase the degree of substitution</li> </ul>
<b>Negotiation power of suppliers</b>	<u>Medium</u> : Strongly varies among different market segments	II	<ul style="list-style-type: none"> <li>E-business strategy of some firms is influenced by their suppliers</li> <li>Commitment to common standards and integrative ICT solutions yields strategic partnerships with potential for lock-in scenarios and hold-up problems, which can limit competition and create barriers to invest</li> <li>Higher market transparency can increase negotiation power vis-à-vis suppliers of standard components and products</li> </ul>
<b>Negotiation power of customers</b>	<u>Medium to high</u> : Strongly varies among different market segments	II (I)	<ul style="list-style-type: none"> <li>E-business strategy of many firms is influenced by their customers</li> <li>Commitment to common standards and integrative ICT solutions yields strategic partnerships with potential for lock-in scenarios and hold-up problems, which can limit competition and create barriers to invest</li> <li>Some large customers can force their suppliers to use particular e-business solutions in order to stay in business with them ("take IT or leave it")</li> <li>Higher market transparency on the customers' side can increase their negotiation power vis-à-vis manufacturers of standard components and products</li> </ul>
<b>Rivalry in the market</b>	<u>Medium</u> : Strongly varies among different market segments	II	<ul style="list-style-type: none"> <li>Increased market transparency</li> <li>Potential to internationalise production and sales, new competitors from other countries. Yet, most firms are still active on regional or national markets only.</li> </ul>
Impact of ICT and e-business: I = low; II III = high			

## 2.5.5 Policy implications

Measures to promote e-business applications are starting to take effect in the M&E industries. Awareness programmes have contributed to lower barriers for SMEs and to a higher perception of the potential benefits of e-business.

However, disseminating information does not seem to be enough. Companies need to translate general information into their own business cases; they need to filter relevant material from the inscrutable and sometimes contradictory supply of information. Hence, to overcome fears and to reduce the risk involved in e-business projects, providing **concrete advice** that accompanies individual implementation processes looks like a promising approach. Local and regional e-business competence centres could be the organisational form for the provision of such a service, and some are already operating to this end. A lack of **ICT skills** among SMEs in this sector remains an important issue for public policy.

Public-private-partnerships could be formed to support the compilation of comprehensive product classifications. Extensive engineering knowledge from practitioners is needed to accomplish the task. Industry associations or public bodies could guarantee the neutrality of procedures and outcomes.

**Exhibit 2.5-5: Policy implications of e-business in the M&E industry**

Policy objectives	Concerns and suggestions	Possible initiator(s)
<b>Raising level of awareness</b>	<ul style="list-style-type: none"> <li>• Switch from general information dissemination to individual consulting</li> <li>• Promote accessibility of best practice cases</li> <li>• Emphasise advice on organisational change</li> <li>• Information and dissemination efforts should target the critical mass problem</li> <li>• Prize awards and competitions raise awareness and promote the conceptualisation of projects</li> </ul>	<ul style="list-style-type: none"> <li>• e-Business competence centres</li> <li>• Ministries in charge of technology diffusion and innovation</li> </ul>
<b>Easing financial constraints</b>	<ul style="list-style-type: none"> <li>• Solid information about the costs involved with e-business projects</li> <li>• Support of financial planning</li> <li>• As projects should be economically efficient, direct financial support is not adequate</li> </ul>	<ul style="list-style-type: none"> <li>• e-Business competence centres</li> <li>• Ministries in charge of technology diffusion and innovation</li> </ul>
<b>Standardisation</b>	<ul style="list-style-type: none"> <li>• Interested parties should be supported in generating appropriate standards</li> <li>• Public governance of standardisation projects in order to defend interests of SMEs</li> <li>• Public Private Partnerships can be an adequate solution</li> </ul>	<ul style="list-style-type: none"> <li>• e-Business competence centres</li> <li>• Ministries in charge of technology diffusion and innovation</li> <li>• Industry associations</li> </ul>
<b>ICT skills</b>	<ul style="list-style-type: none"> <li>• Support ICT training for employees in SMEs</li> </ul>	<ul style="list-style-type: none"> <li>• Ministries responsible for education</li> </ul>



## 2.6 The Automotive Industry

The e-Business W@tch sector study on the automotive industry was contributed by DIW Berlin German Institute for Economic Research (contact: [pkoeellinger@diw.de](mailto:pkoeellinger@diw.de)).

The full report can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



Large enterprises in the automotive industry are advanced users of e-business technologies, mainly for automating B2B processes. Frequently used systems include ERP, SCM, and collaborative design tools. Despite the fact that numerous e-business applications are frequently used in the automotive industry, research by e-Business W@tch confirms that ICT-enabled innovations still remain a source of competitive advantage. Interestingly, the relationship between innovative activities and firm performance is independent of company size. Thus, ICT-based innovations are equally attractive for both large and small enterprises. Yet, research shows that the economic success of companies does not strictly depend on the endowment with ICT infrastructure, i.e. there is no simple relationship between ICT usage and firm performance.

### 2.6.1 Sector definition and background

#### Sector definition

According to the NACE Rev. 1.1 classification of business activities<sup>73</sup>, the automotive industry includes the following activities:

**Exhibit 2.6-1: Business activities covered by the automotive industry (NACE Rev. 1.1)**

NACE Rev. 1.1	Business Activity
DM 34	Manufacture of motor vehicles, trailers and semi-trailers
34.1	Manufacture of motor vehicles
34.2	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
34.3	Manufacture of parts and accessories for motor vehicles and their engines

NACE sub-sector 34.1 consists of final goods producers, i.e. Original Equipment Manufacturers (OEMs), and is by far the biggest in the industry.

In recent years, the industry has gone through a significant transformation. Tier One suppliers have taken over a number of sophisticated activities, e.g. product development or logistics, traditionally controlled by OEMs. Consequently, System Integrators or Tier One suppliers usually have high competence and expertise in engineering, supply chain management, and product development. As a result of this transformation, OEMs' share of industry value added decreased and the degree of integration between OEMs and Tier One suppliers increased. The level of industry concentration, however, is very high. Large enterprises, i.e. with more than 250 employees, account for nearly 90% of the industry's value added.

<sup>73</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.



## Industry background

In 2002, the industry contributed a value of € 586 billion to production in the EU countries. About 73% originated from the producers of final products, i.e. the OEMs. Nearly 2.2 million people were employed in more than 17,000 enterprises across the EU-25. Providing jobs for over 1.1 million people, the OEMs are by far the largest employers in the sector.<sup>74</sup>

The European automotive industry still struggles with sluggish demand and growing overcapacity. Production operations in Western European countries are harmed by recent developments. High labour costs reduce the attractiveness of vehicles and parts production and, consequently, most of the automakers relocate parts of their production to Central and Eastern Europe or Asia where labour costs constitute only a fraction of those in their home countries. As a result, a large share of European auto production takes place outside the former EU Member States.

Primarily large manufacturers are downsizing their operations and outsourcing them to their suppliers. It is predicted that the value added share of the automotive suppliers will increase by almost 70% to €700 billion within the next decade.<sup>75</sup> Consequently, despite the fact that car sales are stagnating and automakers struggling to remain profitable, the automotive supply industry has experienced sound growth in recent years.

## 2.6.2 ICT and e-business adoption in 2005

### ICT infrastructure

The diffusion of **internet access** has nearly reached saturation levels in the automotive industry throughout Europe. Virtually all sector employees in the firms surveyed work in companies using computers and having internet connection. Only among micro enterprises, 12% still do not have internet access. Nearly 40% of all sector employees work in companies that use an internet connection with transmission capacity of more than 2Mbit/s; 56% use connections with lower rates.<sup>76</sup>

More **advanced computer network infrastructures** are still far from being generally used by companies in the automotive sector. Whereas almost all sector employees work in companies with a local area network (LAN), wide area networks (WAN) and virtual private networks (VPN) are available to roughly 70% and 62%, respectively.

**Outsourcing** has attracted much attention in recent years. Cost savings opportunities are often cited as a prime reason why companies decide to take advantage of expertise of ICT companies. Companies employing 66% of sector employees state that they outsource ICT services. Similar patterns of outsourcing can be observed in all company size classes. The most frequently outsourced services include hardware maintenance, web hosting, data storage and software development.

### Internal business processes and collaboration with business partners

Automakers and their suppliers are far ahead of companies from other sectors in use of ICT solutions supporting internal business processes. However, there are significant variations in adoption rates with respect to firm size. For example, 30% and 40% of large companies said that they have implemented **knowledge management** and **e-learning** applications, respectively. In contrast, the respective shares among small firms were only 3% and 4%.

Similarly, large enterprises are leading in usage of **ICT solutions for product design, production planning and supply management**. 74% and 52% of large firms reported using ERP and SCM,

<sup>74</sup> Source: Eurostat New Cronos / DIW Berlin 2005. See full sector report (September 2005), chapter 6.2.

<sup>75</sup> VDA (2004). Auto annual report 2004. <http://www.vda.de/> (accessed in May 2005)

<sup>76</sup> For the remaining companies (4%), the interviewee did not answer the question about the bandwidth of the firm's internet connection.

respectively. Despite the complexity and costs of these applications, ERP systems and collaborative design tools are frequently used by medium-sized companies as well.

**Exchange of standardised data** is strongly related to firm size: micro and small enterprises seem hardly using any standards. In contrast, medium-sized and, in particular, large enterprises are the most frequent users of uniform documents and protocols. This is in line with the findings on the importance of standards and interoperability for companies in different company size classes.

### Procurement and supply-chain integration

From the very beginning of the e-business age, electronic procurement was identified as one of the most important e-business applications in the automotive industry. Promising significant reduction of transaction costs and increased transparency of market operations, e-sourcing sparked OEMs' enthusiasm, on the one hand, and raised concerns to suppliers on the other.

Despite many disappointments, as illustrated by case studies presented in the full sector report, **online procurement** together with e-marketplaces have become part of everyday business in the automotive industry. Electronic procurement belongs to the most frequently adopted e-business solution in the sector: 60% of employees in the sector work in companies that procure online. Only the IT services sector exhibits a higher adoption rate. However, online purchases in the automotive industry are rather limited in terms of transaction volume: Although the share of firms that reported buying between 5% and 25% of their inputs online is one of the highest among the 10 sectors, the group of e-purchasers that buy more than 25% of total purchases online is relatively modest in comparison to other industries studied by *e-Business W@tch* in 2005.

It still remains ambiguous **how e-procurement affects the number of suppliers**. On the one hand, it has been argued that online procurement would lower transaction costs, increase transparency, and make the search for appropriate business partners more efficient. Since more sourcing options increase firms' bargaining power, it would be advantageous for them to increase the number of firms from which they procure. On the other hand, however, firms implement some ICT applications to automate and integrate processes with selected suppliers. In order to benefit from transaction economies of scale, they might tend to reduce the number of their partners. Most companies reported in the e-Business Survey 2005 that online procurement did not have any effect on the number of their suppliers. Almost one third of large enterprises, however, saw the number of their suppliers decreasing as a result of e-sourcing.

A large share of companies surveyed prefers either **standard software or company-specific tools** over e-marketplaces. This trend is more pronounced in the automotive industry than in other sectors. The lack of standards and the delayed emergence of an industry-wide exchange platform increase the costs of doing business electronically.

### Marketing and sales

As already reported in previous reports on e-business in the transport equipment sector in 2003 and 2004<sup>77</sup>, **online sales are not a common practice** in the automotive industry. Carmakers use their internet presence mainly for marketing purposes and are rather reluctant to replace the traditional exclusive dealer networks with other forms of car sales. In addition, complex modules and subsystems produced by large automotive suppliers are not suitable for online presentation and sales.

As a result, the adoption rates of online sales in the automotive industry are clearly below the average for the 10 sectors surveyed in 2005. Currently, only 6% of this sector's employees work in companies that use the internet for selling their products. Interestingly, this sales channel has been reported more frequently by small and medium-sized enterprises than large ones. Transaction volumes of online sales by SMEs seem to have been higher than those of large firms as well: 24% of micro enterprises said that they sell more than 25% of goods online, compared to only 11% of large firms which did so.

<sup>77</sup> see [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources')

Companies seem to be quite realistic about the potential benefits of ICT solutions that facilitate online sales. Since numerous components and parts are designed and developed in cooperation between suppliers and buyers, they do not lend themselves to online sales.

Adoption rates for **CRM tools** in the automotive sector are slightly above average. Altogether, companies accounting for 24% of sector employment reported using CRM applications, compared to 15% for the weighted average of the 10 sectors studied in 2005 (EU-7). Again, there are substantial differences in CRM usage with respect to firm size.

**Exhibit 2.6-2: Main findings of the e-Business Survey 2005 for the automotive industry**

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>Nearly all companies have <b>internet access</b>, except micro enterprises (12% unconnected).</li> <li>Firms accounting for 62% of employment use a <b>Virtual Private Network (VPN)</b>.</li> <li>Companies employing 66% of sector employees have <b>outsourced ICT services</b>, mostly hardware maintenance, web hosting, data storage and software development</li> </ul>
<b>Integration of Internal processes</b>	<ul style="list-style-type: none"> <li>Significant <b>variations in adoption rates</b> with respect to firm size</li> <li>30-40% of large companies use <b>knowledge management and e-learning</b> applications</li> <li><b>Electronic standards</b> are decisive when making ICT investments.</li> <li><b>EDI</b> and other proprietary standards dominate. Interoperability within the sector is seen as a key issue.</li> </ul>
<b>Supplier-facing activities</b>	<ul style="list-style-type: none"> <li><b>Online procurement</b> is the most frequently adopted e-business application. 60% of employees in the sector work in companies that procure online.</li> <li><b>Online transactions</b> are of limited volume (if measured as a share of total supplies purchased).</li> <li>Unclear impact of <b>e-sourcing</b> on the supplier base size.</li> <li>Proprietary procurement systems preferred over <b>e-marketplaces</b>.</li> </ul>
<b>Customer-facing activities</b>	<ul style="list-style-type: none"> <li>Marginal role of <b>online sales</b>, limited volumes of online transactions.</li> <li>Small firms lead in terms of (relative) <b>online transaction volumes</b>, if measured as a percentage of a firm's total sales.</li> <li><b>International transactions</b> dominate online selling.</li> <li>Advanced use of ICT applications supporting <b>customer management</b> (CRM systems).</li> </ul>

### 2.6.3 Important topics and application areas

#### The interrelationship of innovation and performance

A previous *e-Business W@tch* sector study on e-business in the transport equipment industries (August 2004) provided empirical evidence showing that the introduction of e-business technologies enables innovation. Furthermore, a correlation analysis of financial performance measures and innovative activities revealed that innovative firms are more likely to grow. This analysis was extended in the study on the automotive sector, using the e-Business Survey 2005 data.

Three main results emerged from the analysis:

- Innovative firms are more likely to experience increasing turnover than non-innovative firms. Three of the four innovation indicators have significant positive coefficients. In particular, firms conducting product or service innovations are about 15% more likely to exhibit increasing turnover than otherwise comparable firms.

- There is a positive interrelation between ICT-related process innovations and profitability. Firms that conducted ICT-related process innovations were 7% more likely to be profitable than otherwise comparable firms. However, this result should not be over-interpreted because our analysis does not allow conclusions about the direction of causality.
- The relationship of innovation and financial performance does not vary among size classes.

Results suggest that ICT remain important enablers of innovation in the automotive industry, and that innovative firms are more likely to grow. This should improve their chance of survival in an increasingly competitive market.

### Enterprises with different technology usage patterns

An important matter for both business managers and policy-makers is to understand the relationship between technology usage and business performance: Does intensive usage of e-business technologies translate into superior business performance? The 2005 survey results of the *e-Business W@tch* show that the degree of ICT deployment and usage differs significantly among firms in the automotive industry. Are these technological differences related to differences in firm level growth and profitability?

To identify firms that are comparable in terms of the e-business technologies they use, *e-Business W@tch* conducted a cluster analysis using firm-level information about 14 e-business technologies covered in the e-Business Survey 2005. The following table summarises the main technological characteristics of firms in the four clusters.

**Exhibit 2.6-3: Description of clusters**

Cluster	Characteristics
(1) "ICT laggards"	<ul style="list-style-type: none"> <li>• comprises 75% of firms in the sample</li> <li>• average or below average usage of all ICT indicators</li> <li>• Intranet and ERP are rare among firms in this cluster</li> </ul>
(2) "ICT followers"	<ul style="list-style-type: none"> <li>• comprises 18% of firms in the sample</li> <li>• Intranet and ERP usage above average</li> <li>• Purchasing and selling online below average</li> </ul>
(3) "Advanced ICT users"	<ul style="list-style-type: none"> <li>• comprises 5% of firms in the sample</li> <li>• above average usage of most ICT indicators</li> <li>• relatively low usage of online sales, knowledge management and e-learning</li> </ul>
(4) "ICT leaders"	<ul style="list-style-type: none"> <li>• comprises 2% of firms in the sample</li> <li>• above average usage of all ICT indicators</li> </ul>

Given these pronounced differences among the four clusters in terms of technology usage and firm size characteristics, it is interesting to observe if any one of these clusters clearly outperforms the others in terms of growth and profitability. The result may come as a surprise. According to statistical tests, the null hypothesis (i.e. that all four clusters are equal in terms of performance) cannot be rejected. Thus, even though some differences among the descriptive statistics describing the average performance of these clusters can be found, none of these differences is unambiguously systematic.

Results imply that small and medium sized enterprises in the automotive industry tend to belong to the group of 'ICT laggards'. However, our empirical results do not suggest that these 'ICT laggards' automatically exhibit inferior growth or profitability measures compared to the more advanced users of ICT, which, in this sector, primarily tend to be large global players. One reason for this could be that these two kinds of enterprises often do not compete directly against each other, but rather against firms with similar profiles than their own. Yet, a technological disadvantage compared to direct competitors could be associated with inferior performance.

## ICT and the automotive supply chain

The sector study of 2005 also focuses on the increasing importance of ICT for make-or-buy decisions by companies in the automotive industry. Generally, an OEM or large automotive supplier decides whether to produce goods internally or outsource their production to external companies based on a cost-benefit assessment of the two alternatives.

On the one hand, internal production minimises coordination and transaction costs. On the other hand, external providers specialising in a specific task can have economies of scale or specialist knowledge compared to an integrated firm, which gives rise to price or quality advantages. However, outsourcing increases coordination and transaction costs, for example in order to identify suitable providers, to communicate with them, to monitor their progress and outputs, and to avoid predatory behaviour.

The availability of powerful and cheap new ICT can decrease transaction costs and therefore increase the attractiveness of outsourcing. If increased ICT usage intensifies the process of integration between separate companies and leads to more outsourcing, the supply chain of the automotive industry may change. A possible outcome would then be the emergence of a **network structure** in the industry value chain. The OEM's shift to cooperation with fewer suppliers and closer inter-firm integration is related to the emergence of strategic networks resembling industry clusters like in other sectors, e.g. textile.

A possible outcome would then be the emergence of a network structure in the industry value chain. The OEM's shift to cooperation with fewer suppliers and closer inter-firm integration is related to the emergence of strategic networks resembling industry clusters present in some sectors, e.g. textile.

Together with hybrid organization forms and a network-like structure of the value chain, new issues for competition policy emerge. For example, contrary to market organization forms where firms' profits are determined by price-quantity mechanisms, economic rents in a network structure are divided in the course of bilateral negotiations. Thus, rent allocation is determined by bargaining power and outside options of OEMs and suppliers. This, in turn, might lead to the 'hold-up problem', i.e. a situation where an OEM and a supplier may benefit from process integration, but refrain from making necessary investments due to concerns that they may give the other party increased bargaining power, and reduce their own profits.

## E-marketplaces in the automotive industry

Notwithstanding the delayed uptake and problems after the burst of the new economy bubble, online trading platforms ("e-marketplaces") now gain acceptance in the automotive industry. E-marketplaces designed for the automotive industry can be defined according to their ownership structure. For example, there are marketplaces similar to ebay, i.e. the trading platform belongs neither to a buyer nor seller and is administrated and managed by a neutral third party. Another form of e-marketplaces includes consortia established by buyers or sellers. Combining their bargaining power, the owners of an e-marketplace can reduce their transaction costs and obtain better purchasing terms. Examples of such e-marketplace include SupplyOn, a marketplace established by a group of automotive suppliers (see case study "SupplyOn"), and Covisint, a trading and cooperation network founded by the major US OEMs. A large buyer, for example an OEM, can set up a private platform for its supplier network.

The industry has 2 categories of e-markets:

- Large e-marketplaces that have developed advanced logistic services and enable companies to manage **global** transactions (e.g. SupplyOn, Covisint),
- Small e-marketplaces that have a **local** orientation and support transactions between buyers and sellers from the area in which they are located.

However, e-marketplaces also raise fears among companies in the automotive industry. Automotive suppliers often complain that OEMs use e-marketplaces as a means to increase price pressure and reduce their margins. It therefore still remains unclear what effects they will have on the market structure of the automotive industry in the future.

## Case studies and business examples

The sector report on the automotive industry (July 2005) contains short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of findings both from the survey and from desk research, and provide further insight in current e-business trends and developments. Exhibit 2.6-3 summarises the 'activity views' which are featured in more detail in the report.

**Exhibit 2.6-4: E-Business Activity Views featured in the sector study**

E-Business Activity Views	Country	Topics
Case Study: ERP at <b>Camelin Décolletage Industries</b>	France	Implementation of an ERP system at a medium sized automotive supplier to improve internal information flows as well as the monitoring of production and quality processes
Case Study: Portal integration at <b>Webasto</b>	Germany	Website consolidation of a large tier one automotive supplier based on a corporate design and infrastructure. Insights into the implementation of a portal strategy which provides standardised, target-group-oriented platforms to final customers, suppliers, dealers, and OEMS
Case Study: Spare part exchange for <b>Dutch Ford</b> car dealerships	Netherlands	Implementation of an active inventory management system which provides information on spare parts of all connected dealers via an online exchange platform
Case Study: Using RFID to achieve lean manufacturing at <b>TBB</b>	USA	Implementation of a Radio Frequency Identification (RFID) system at a school bus manufacturer in order to improve the management and handling of inventory
Case Study: E-business experiences of a <b>German automotive supplier</b>	Germany	Discussion of the benefits and problems of e-business, in particular e-procurement and e-sales, from the point of view of a tier one automotive supplier
Case Study: <b>SupplyOn</b> – an e-marketplace from suppliers for suppliers	Germany	An e-marketplace for automotive suppliers which provides various internet services in the field of sourcing, logistics, quality management, and engineering with the main goal of supporting standardisation

### 2.6.4 Anticipated implications of e-business for the industry

Based on survey results, case studies and desk research, *e-Business W@tch* has drawn conclusions on key implications of e-business for the sector. A distinction was made between opportunities and risks for large firms, for instance the OEMs, and those that are particularly relevant for small and medium-sized enterprises.

#### Opportunities and risks for large enterprises

The rapid diffusion of e-business among the large manufacturers accelerates and supports the transformation processes in the automotive industry. The integration of the value chain facilitated by e-business seems to reinforce the traditional industry market structure. On the one hand, new ICT applications enable large enterprises to outsource numerous activities to companies at lower levels of the value chain. The increasing capabilities of collaborative applications lead to a vertical decentralisation of both product development and manufacturing activities. Consequently, these applications allow large companies to focus on their core competencies and on delivering more value-added and innovative products and services. On the other hand, ICT in general and electronic procurement systems in particular permit OEMs and large suppliers to improve their processes and increase their market power at the same time.

Large enterprises have indisputably a decisive role in determining the direction of e-business development in the automotive industry and, as confirmed by the *e-Business W@tch* evidence, the diffusion of all e-business technologies follows a clear top-down pattern.

**Exhibit 2.6-5: E-business related opportunities and challenges in the automotive industry**

General opportunities	General risks
<ul style="list-style-type: none"> <li>• <b>ICT still a source of competitive advantage:</b> Internet-based innovations remain important enablers of product and process innovation.</li> <li>• <b>Success does not solely depend on ICT:</b> E-business laggards can be successful, provided they are innovative.</li> <li>• <b>Improved collaboration:</b> Firms outsourcing their activities benefit from new systems facilitating inter-firm collaboration.</li> <li>• <b>Large enterprises drive e-business diffusion:</b> Becoming key partners to the manufacturers, suppliers have to adopt applications used by their customers. Integration increases the bargaining power of OEMs and large suppliers.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Exclusion of ICT-laggards:</b> A technological disadvantage compared to direct competitors could lead to inferior performance.</li> <li>• <b>Close integration with few customers:</b> Entering into relationship-specific investments increases firm's vulnerability and raises the 'hold-up issue'.</li> <li>• <b>Implementation:</b> The way from an IT system implementation to real benefits is long.</li> <li>• <b>Opportunity costs:</b> Resources dedicated to ICT projects cannot be used in other areas.</li> <li>• <b>Risk of eroding profit margins:</b> Increased transparency and unlimited access to information leads to lower margins.</li> </ul>
Opportunities for SMEs	Risks for SMEs
<ul style="list-style-type: none"> <li>• <b>Innovativeness decisive for performance.</b> Companies lagging behind in ICT usage can be successful, provided they remain innovative.</li> <li>• <b>Closing ICT gap:</b> ICT investment trends suggest that SMEs are catching up with larger firms.</li> <li>• <b>Industry-wide platform:</b> The development of online marketplaces accelerates the adoption of e-business applications.</li> <li>• <b>Lower transaction costs – more outsourcing:</b> ICT makes outsourcing more attractive. Thus, despite the stagnant car market, automotive suppliers are growing.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>The lack of standards:</b> The absence of ICT standards hinders the diffusion of e-business and increases implementation costs.</li> <li>• <b>Numerous e-business initiatives:</b> OEMs and large suppliers force SMEs to join their e-business platforms.</li> <li>• <b>"Take IT or leave it":</b> Suppliers receive contracts only when they have implemented specific e-business standards and practices.</li> <li>• <b>The risk of opportunistic behaviour:</b> The unequal distribution of power affects the benefits and rent allocation among integrated firms.</li> </ul>

**Opportunities and risks for SMEs stemming from e-business**

An important implication for SMEs is that the relationship between innovative activities and firm performance is independent of company size. Consequently, ICT-based innovations are attractive for both large and small enterprises. Companies lagging behind in ICT usage can be successful, provided that they remain innovative and responsive to changing market conditions. Therefore, further growth and development of SMEs in the automotive industry does not depend entirely on endowment with ICT infrastructure and e-business intensity.

Possible risks include the lack of IT standards and unequal distribution of power in the sector. Despite the importance of e-business in the automotive industry, exchange of standardised data within and between sectors has not yet become a common practice. Standards are mainly used by large enterprises in the industry. However, when considering ICT investments, SMEs pay considerable attention to standards and systems interoperability. Their absence could hinder the diffusion of e-business and increase the costs for SMEs.

Although the automotive industry is already characterised by an unequal distribution of power, further inter-firm integration combined with highly relationship-specific ICT investments might have an additional effect on the benefits and rent allocation in vertical cooperation. Having built up capacities and established intra-firm communication channels, small suppliers have to ensure that they receive the successive contract for the next period.

## 2.6.5 Policy implications

**Legal barriers** still constitute an important hurdle to e-business diffusion. As the cost of legal services is particularly high for SMEs, this might hamper the adoption of e-business among SMEs. The legal framework is highly developed at the European level, but the level of awareness of the contents of the law applicable in the national context remains low. Moreover, to deal with these challenges necessitates clear distinctions between real and perceived barriers in the legal field, i.e. within existing national legal and administrative practices. Thus, policy effort is still needed to raise awareness of existing regulations among companies and to ensure that the conditions of the legal framework governing electronic transactions do not constitute additional barriers for doing e-business, in particular for SMEs.

Utilising simple and inexpensive applications can help SMEs to acquire the necessary expertise and know-how for using more advanced applications. Thus, it is important that small companies also have an understanding of e-business and are aware of the benefits it offers them. **Increasing the awareness** about the e-business potential and internet literacy remains an important challenge at both European and national level.

ICT facilitates the integration of companies and the emergence of network structures in the automotive value chain. Since the relationships between networked companies are different from market-type arrangements, the integration of supply chain raises issues that are also relevant for **competition policy**. The principal subjects of concern include the hold-up problem, protection of property rights on innovation created in the course of cooperation, and vertical restraints.

**Exhibit 2.6-6: Policy implications of e-business in the automotive industry**

Policy objectives	Concerns and suggestions	Possible initiator(s)
<b>Legal environment</b>	<ul style="list-style-type: none"> <li>• Increase the awareness of applicable law</li> <li>• Promote a uniform law framework in all EU countries</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• EU Member States</li> <li>• Industry associations</li> </ul>
<b>Standardization</b>	<ul style="list-style-type: none"> <li>• Support standardisation initiatives</li> <li>• Ensure that SMEs' interests are taken into account</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• EU Member States</li> <li>• Standardisation bodies</li> <li>• Industry associations</li> </ul>
<b>Education and e-skills</b>	<ul style="list-style-type: none"> <li>• Identify good practices and communicate their benefits to the SMEs in the sector</li> <li>• Promote initiatives addressing companies' individual needs</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• EU Member States</li> <li>• Industry associations</li> </ul>
<b>Competition policy</b>	<ul style="list-style-type: none"> <li>• Protect relationship-specific investments</li> <li>• Protect intellectual property rights</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• EU Member States</li> </ul>





## 2.7 The Aeronautics Industry

The e-Business W@tch sector study on the aeronautics industry was contributed by DIW Berlin German Institute for Economic Research (contact: [dnepelski@diw.de](mailto:dnepelski@diw.de)).

The full report can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



Despite the considerable differences in e-business adoption between firms of different sizes, the aeronautics industry emerges as one of the e-business leaders, compared to other sectors covered in the e-Business Survey 2005. Evidence confirms the strategic importance of ICT in the sector: ICT is a potential source of competitive advantage, as an enabler and driver of innovation; ICT-enabled process innovations are positively associated with increasing turnover among firms in the industry. Yet, innovative firms are not more profitable than other firms, suggesting either that profits triggered by innovations take more time to materialise in this sector than in other sectors, or that firms in the aeronautics industry have some particular problems in appropriating gains from innovative activities.

### 2.7.1 Sector definition and background

#### Sector definition

According to the NACE Rev. 1.1 classification of business activities<sup>78</sup>, the aerospace industry includes the following activities:

**Exhibit 2.7-1: Business activities covered by the aeronautics industry (NACE Rev. 1.1)**

NACE Rev. 1.1	Business Activity
DM 35	Manufacture of other transport equipment
35.3	Manufacture of aircraft and spacecraft

The emphasis of the analysis is on e-business issues in the aeronautics industry. The sub-sectors spacecraft and military transport equipment produce primarily for government agencies and differ substantially from the aeronautics industry. It must be noted, however, that the composition of the available databases does not allow the exclusion of the spacecraft sector and the data presented in the full sector report covers companies active in the space industry as well. Since this sub-sector accounts for less than 5% of the industry turnover<sup>79</sup>, neglecting it in the following analysis should not have any negative impact on the quality of the analysis.

#### Industry background

In 2001, the aeronautics industry contributed a value of about €100 billion to production in the EU countries. More than 373,000 people were employed in about 2,200 enterprises across the EU-25.<sup>80</sup> The aeronautics industry can be divided into three sub-sectors:

<sup>78</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.

<sup>79</sup> ASD (2004). 2003 facts and figures. Civil and defence aerospace. Aerospace and Defence Industries Association of Europe. <http://www.asd-europe.org/> (May 2005).

<sup>80</sup> Source: Eurostat New Cronos / DIW Berlin 2005. See full sector report (September 2005), chapter 6.2.

- The **systems and frames** sub-sector manufacturers complete systems and/or frames for aeroplanes, helicopters, gliders and ground installations. It accounts for 60% of the industry consolidated turnover.
- The **engines** sub-sector produces piston engines, turboprops, turbojets and jet engines. It accounts for 20% of the industry consolidated turnover.
- The **equipment** sub-sector is producing finished products, subsystems and parts to be installed in aircraft systems. It accounts for 20% of the total sector turnover.

The European aeronautics sector is characterised by a complex network of companies, joint ventures, international consortia and partnership agreements. Furthermore, European firms gradually increase their presence in the global aeronautics industry and create linkages with companies from other parts of the world at all levels of the value chain.

Although the contribution of SMEs to the industry's turnover and employment is relatively small, they play an important role in the industry supply chain due to their creativity and flexibility.

## 2.7.2 ICT and e-business adoption in 2005

### ICT infrastructure and outsourcing

According to results of the e-Business Survey 2005<sup>81</sup>, the availability of **internet access** has reached saturation level in the aeronautics industry. **Advanced computer networks** are, however, still far from being generally used and significant discrepancies in their use between companies of different sizes exist. Wide Areas Networks (WAN) and Virtual Private Networks (VPN) are predominantly deployed by larger firms and are virtually non-existent in smaller companies.

Similarly, there are significant differences between small and large enterprises in **the quality of internet connections**: only 13% of interviewed companies in the aeronautics sector reported using an internet connection with transmission capacity of more than 2 Mbit/s. More than a half of the surveyed companies said that they have an internet connection with transmission capacity of less than 2 Mbit/s. Moreover, 13% of firms still access the internet via analogue dial-up modems.

The survey results confirm the importance of **outsourcing** for aeronautics companies throughout Europe. A relatively large share of firms, compared to the weighted average for the 10 sectors studied by *e-Business W@tch* in 2005, reported employing external organisations to perform ICT activities: about 60% of the surveyed companies said that they outsourced some ICT services to external firms.

### Internal business processes and collaboration with business partners

Companies from the aeronautics industry are far ahead of their counterparts in other sectors studied in using ICT solutions to support business processes. The wide usage of **knowledge management** and **e-learning tools** is in line with the knowledge-intensive characteristics of the aeronautics industry. Furthermore, despite their complexity and costs, medium-sized companies frequently use **ERP** systems as well.

The importance of the value chain integration is clearly illustrated by the intensive use of applications supporting inter-organisational processes such as **product design, demand forecasting** and **capacity management**.

The most frequently reported **standards** for document exchange in the sector are proprietary and XML-based standards. Micro and small firms, in particular, pay attention to standards when making ICT investments, but little to **interoperability**, which is more important for larger companies.

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<sup>81</sup> Due to the small population of enterprises in the aeronautics industry, only 163 interviews could be realised in the seven EU countries in which the survey was carried out. Thus, survey results must be used cautiously, as the confidence interval is larger than in other sectors.

**Exhibit 2.7-2: Main findings of the e-Business Survey 2005 for the aeronautics industry**

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>• <b>Internet access</b> is available in virtually every company.</li> <li>• Advanced <b>computer networks</b> are still not generally used.</li> <li>• Average adoption of <b>broadband</b> connections.</li> <li>• <b>ICT training</b> of employees at average level.</li> <li>• High propensity to <b>outsource ICT services</b>.</li> </ul>
<b>Integration of Internal processes</b>	<ul style="list-style-type: none"> <li>• Intensive use of applications supporting <b>inter-firm collaboration</b>.</li> <li>• Above average use of <b>ERP systems</b>.</li> <li>• High level of adoption of online tools for <b>capacity management</b>, collaborative design and demand forecasting.</li> <li>• Low adoption level of <b>SCM systems</b>.</li> <li>• Following <b>proprietary standards</b>, the XML-based standards dominate.</li> <li>• Micro and small firms are not concerned with <b>interoperability</b>. The reverse is true for medium-sized enterprises.</li> <li>• Companies pay attention to standards when making <b>ICT investment</b> decisions.</li> </ul>
<b>Supplier-facing activities</b>	<ul style="list-style-type: none"> <li>• 65% of companies in the sector <b>procure online</b>.</li> <li>• No significant differences between company size bands with respect to <b>e-sourcing</b>.</li> <li>• <b>Online transactions</b> are of limited volume.</li> <li>• <b>E-sourcing</b> was reported as increasing the number of suppliers.</li> <li>• Proprietary <b>procurement systems</b> preferred over e-marketplaces.</li> </ul>
<b>Customer-facing activities</b>	<ul style="list-style-type: none"> <li>• Average diffusion rate of <b>online sales</b>.</li> <li>• Limited volumes of <b>online transactions</b>.</li> <li>• Adoption of solutions supporting sales and marketing activities dependent on <b>firm's size</b>.</li> <li>• Transactions with <b>international customers</b> dominate online sales.</li> </ul>

**Procurement and supply-chain integration**

In an industry such as aeronautics, cooperative e-procurement platforms are more appropriate than simple e-marketplaces. In addition to input exchange, online platforms in the sector serve as tools to support the process of inter-firm collaboration. This, however, makes the transformation from traditional operation to e-sourcing more difficult. In spite of these difficulties, **65% of companies procure online** compared to 44% of the weighted average for the 10 sectors covered by the e-Business Survey 2005. Interestingly, there are no significant differences in adoption rates between companies of different sizes. Nonetheless, similarly to other sectors, online purchases in the aeronautics industry appear to be rather limited in terms of transaction volume.

Online procurement in the aeronautics industry developed in two ways. On the one hand, **industry-wide online marketplaces** were established. An example of that is *Exostar*, a marketplace launched by a consortium of firms from the aeronautics industry. E-marketplaces are being actively used in the aeronautics industry, compared with the EU-7 all-sectors average. On the other hand, some large firms decided to introduce their **own internet platforms** for their suppliers.

## Marketing and sales

**Online sales** are not a common practice in the aeronautics industries. Complex and custom-engineered modules and subsystems are not easily exchangeable online. However, the adoption rate of online sales among SMEs in the aeronautics industry is close to the all-sectors average. A large share of companies **selling online to international customers** reflects the international dimension of the value chain in this particular sector.

Transaction volumes of online sales are above or equal to the weighted average for the 10 sectors studied in 2005. However, with the exception of some micro-enterprises which appear to specialise in online trading, hardly any company sells more than 25% of its output online.

## 2.7.3 Important topics and application areas

### Electronic business and innovation

According to the 2005 survey results, 45% of aeronautics' enterprises in the sample **introduced substantially improved products or services** to their customers in the previous year. 40% of the enterprises that carried out product or service innovations reported that at least some of these innovations had been directly related to or enabled by ICT. 43% of enterprises in the aeronautics industry said that they conducted **process innovations** in 2004. About 60% of these firms reported that at least some of their process innovations were triggered by ICT. These results emphasise the strategic importance of information technologies: ICT still matter as a potential source of competitive advantage.

This is illustrated by the case study on *Aerostar*, a large Romanian company (see Exhibit 2.7-3), manufacturing light aircraft for civil aviation and operating in aeronautic construction, maintenance and modernisation of aircrafts. In order to improve the efficiency of information utilisation and meet the requirements of its customers, *Aerostar* implemented an ERP system. As a result of process reengineering and use of an appropriate ICT tool, the company benefited from improvements in quality level, information flows and use of resources.

The case study on *MTU Aero Engines*, a German tier one supplier, developing and manufacturing aircraft engines, shows how a company can use e-business applications to support cooperation with its suppliers and customers.

Both case studies indicate that, despite the highly complex industry value chain and cyclical nature of the aeronautics market, companies in the sector can use new technologies to their advantage.

### Innovation and performance

*e-Business W@tch* investigated evidence for the joint occurrence of two financial performance indicators (turnover development and profitability) with different kinds of innovative activities in the aeronautics industry. Interestingly, *none of the product/service innovation indicators is significantly correlated with turnover development or profitability*. This result diverges from the findings for the joint transport equipment industries.<sup>82</sup> However, given that the correlations are based on a small sample of firms, this does not necessarily imply that product innovations in the aeronautics industry do not pay off.

On the other hand, process innovations are positively associated with increasing turnovers and negatively with stagnating turnover. In particular, this holds for ICT-enabled process innovations, while non-ICT-related process innovations do not exhibit significant relationships. This supports the evidence presented in an earlier sector report on transport equipment manufacturing (August 2004),

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<sup>82</sup> e-Business Sector Study on the Transport Equipment Sector, August 2004. [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources').

but the correlation coefficients show even higher values for the aeronautics industry compared to the joint transport equipment sector.

This suggests firstly that there are market- and sector-specific differences in the relationship between innovation and performance variables, emphasising the importance of a sector-specific analysis. Secondly, it could be that firms in the aeronautics industry have more trouble in appropriating profits from innovation in general.

### **Integration of the supply chain**

The aeronautics industry is characterised by a unique structure shaped by complex relationships between firms in the value chain and the small number of system integrators, i.e. primes. The industry supply chain has been further evolving in recent years and the transformation of the aeronautics industry closely resembles the changes that have taken place in other manufacturing industries, for example, in the automotive sector. The process of industry transformation has some important implications to the development of e-business in the aeronautics sector.

Searching for a greater flexibility and leaner organisational structures, prime contractors and system integrators perceive outsourcing as an attractive alternative to producing inputs in-house. However, smooth data exchange between separate enterprises has not been achieved. Different companies use different ICT systems and data stemming from one firm could be used only within that entity and its system. Sending data to another company that uses a different ICT system requires a translation of the input into the language used by the latter's applications. In practice, this means that a company's employee has to manually insert the data into the system. Such a method is very costly and error-prone. Industry-wide standards have been perceived as the best way to overcome the problems related to the use of heterogeneous data exchange formats and protocols.

SMEs in the aeronautics sector face an increasing pressure from their customers to implement ICT applications that support the integration of inter-firm processes. However, as different companies use different systems, smooth data exchange between separate companies has not yet been achieved. Thus, in order to comply with customers' technical requirements, SMEs face the dilemma of adopting several systems and bear the costs and workload or risk losing a customer. A possible solution to this problem is, again, the development of industry-wide standards.

The development of such standards is, however, still in progress. 28% of companies said that they utilise proprietary standards and only 12% that they have XML-based applications. This therefore justifies such industry initiatives as the *Boost Aero* project. The project aims at creating industry-wide web-based standards for supply chain data exchange formats and technological architecture. The underlying intention behind this initiative is to address the problem of multiple and heterogeneous applications deployed in the aeronautics industry.

The case studies on *Mecahers* (France), the *Polish aeronautics industry*, and on *e-PME*, a project by AFNeT (French Association of Internet Users), highlight some of the issues relevant to the integration of the supply chain in the aeronautics industry.

### **Case studies and business examples**

The sector report on the aeronautics industry (July 2005) contains short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of findings both from the survey and from desk research, and provide further insight in current e-business trends and developments. Exhibit 2.7-3 summarises the 'activity views' which are featured in more detail in the report.

**Exhibit 2.7-3: E-Business Activity Views featured in the sector study**

E-Business Activity Views	Country	Topics
Case Study: <b>Aerostar</b> - Information integration at a large aeronautics company	Romania	Implementation of an ERP system by a large aeronautics company
Case Study: <b>E-business at MTU Aero Engines</b>	Germany	Description of e-business activities and benefits in one of the major global aero engine producers
Case Study: <b>Dassault Aviation</b> – product development revolution	France	An ambitious e-business project that brought together a number of companies to work simultaneously in a digital environment. Insights into the potential benefits of inter-firm integration and cooperation facilitated by ICT
Case Study: <b>MECAHERS</b> – implementation of an ERP system	France	Motivation and lessons learned from the implementation of an ERP system in a medium-sized aeronautics company
Case Study: <b>The Polish Aeronautics Industry</b> – e-business initiatives	Poland	Field research on e-business attitudes and practices. Insights into the barriers to e-business development
Case Study: <b>e-PMS / Boost Aero</b> : SME projects by AFNeT (French Association of Internet Users)	France	An SME-support initiative; description of a standardisation project

## 2.7.4 Anticipated implications of e-business for the industry

Based on survey results, case studies and desk research, *e-Business W@tch* has drawn conclusions on key implications of e-business for the aeronautics industry. A distinction was made between opportunities and risks that seem to hold for all companies in the sector independent of their size, and risks that are particularly relevant for SMEs from the industry.

### General opportunities and risks related to e-business

Opportunities	Risks
<ul style="list-style-type: none"> <li>• <b>Strategic importance of ICT prevails:</b> ICT remains an important enabler of innovations.</li> <li>• <b>ICT positively affects firm's performance:</b> ICT-related process innovations are positively associated with increasing turnover.</li> <li>• <b>Lack of legacy technologies:</b> The development of e-business is not impeded by the presence of legacy applications.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Problems with realising benefits from innovation:</b> Due to industry-specific factors, firms might not be able to appropriate benefits from innovation.</li> <li>• <b>Overinvestment in ICT may threaten a firm's stability:</b> Attracted by potential benefits of ICT, companies might tend to over-invest.</li> <li>• <b>Exclusion of ICT-laggards:</b> As the process of supply chain integration progresses, firms failing to adopt required e-business standards might be forced to abandon the business.</li> </ul>

**Strategic importance of ICT prevails.** The results of the empirical analysis clearly indicate that ICT still remains an important enabler of innovation in the aeronautics industry. The survey results on motives for engaging in e-business activities also indicate that companies in the aeronautics sectors are motivated by the strategic potential of ICT.

**ICT positively affects firm’s performance.** Confirming theoretical expectations, the results show that firms introducing ICT-related innovations are more likely to exhibit increasing turnover.

**Lack of legacy technologies.** Compared to other sectors, for example the automotive industry, the adoption level of legacy systems, such as EDI, is relatively low among companies in the aeronautics industry. Thus, not having to discard existing applications, companies in this industry can immediately adopt the best ICT systems. This, in turn, would be of a great benefit to all industry players and, in particular, to SMEs.

**Problems with realising benefits from innovation.** The results of the empirical analysis suggest that due to industry-specific factors, firms in the aeronautics industry might not be able to appropriate benefits from innovation. As a result, companies might fail to recoup their ICT investments carried out to improve their performance. This might, in turn, discourage them from undertaking costly and risky ICT projects. What is more, these conditions might have also a negative impact on the cost of capital for financing such projects.

**Over-investment in ICT may threaten a firm’s stability.** Despite financial constraints, companies might tend to over-invest in e-business projects, being attracted by potential benefits of ICT. Since the cost of ICT is still perceived as a significant factor of e-business projects, this might strain a firm’s financial position. Furthermore, every ICT project carries a certain amount of risk and its successful completion cannot be guaranteed.

**Exclusion of ICT-laggards.** The digitalisation of data exchange between companies and the automation of processes at all levels of the supply chain are crucial for further efficiency improvements at a firm level and, in the long term, for the competitiveness of the entire sector. As supply chain integration progresses, firms will have to maintain or even increase the speed of the digitalisation process. Firms failing to adopt required e-business practices at the right time may eventually be forced to abandon the business.

**Opportunities and risks for SMEs**

Opportunities for SMEs	Risks for SMEs
<ul style="list-style-type: none"> <li>• <b>E-business helping hands:</b> Numerous initiatives help SMEs understand the benefits of e-business and adapt to the e-world.</li> <li>• <b>Integration:</b> Companies integrated with their suppliers and customers benefit from improved process efficiencies.</li> <li>• <b>Collaboration:</b> SMEs investing in technologies facilitating inter-firm collaboration will be preferred by larger firms in the value chain.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Integration increases interdependence:</b> Integration with suppliers and customers requires relationship-specific investments which increases SMEs’ vulnerability and the risk of opportunistic behaviour.</li> <li>• <b>ICT requirements will increase:</b> e-business progress will require more technological competencies.</li> <li>• <b>ICT increases production costs:</b> A priority of numerous SMEs is to offer a quality product attractively priced. It is of secondary importance by what processes this is achieved.</li> </ul>

**E-business helping hands.** It has been recognised that, in many cases, SMEs are overloaded with the complexity of e-business solutions and the cost of their implementation. Furthermore, SMEs frequently lack the know-how and expertise necessary to assess the right combination of technologies whose implementation make economic sense.

Thus, initiatives taken by public and non-profit organisations aimed at assisting firms in the transformation to e-business are of great importance to many SMEs. Successful examples of such projects designed to the needs of firms in the aeronautics industry include not only the e-PME project discussed above. For instance, a similar programme was launched by the UK Council for e-Business



in cooperation with the Society of British Aerospace Companies.<sup>83</sup> The Practical Electronic Business Leadership (PeBL) Programme has been set up to help executives achieve measurable outcomes from their e-business strategy.<sup>84</sup> Such programmes help SMEs to benefit from the use of electronic business through giving them access to competent advice and assistance.

**Integration.** Companies integrated with their suppliers and customers benefit from improved process efficiencies. By integrating and automating inter-firm processes such as logistics or product development companies benefit from improved information flow and process quality.

**Collaboration.** SMEs investing in technologies facilitating inter-firm collaboration will be preferred by larger firms in the value chain. Though large firms do not offer SMEs considerable support while implementing ICT solutions, they require them to implement certain technologies and practices as a condition for cooperation. SMEs investing in collaborative technologies will have an advantage over other firms.

**Integration increases interdependence.** Industry integration is well on the way in the aeronautics sector, but investments in ICT applications facilitating inter-firm collaboration are a necessary condition to achieve it. For example, the representatives of Aerostar and Mecahers explicitly said that the main reason why their firms decided to implement ICT solutions were the requirements of their customers. *Since creating electronic links with selected customers increases companies' vulnerability and the risk of opportunistic behaviour, this issue is particularly important for SMEs.*

**ICT requirements will increase.** Diffusion rates of most ICT applications have not yet reached saturation level. In line with the progressing integration of the industry value chain, predominantly small enterprises will have to adopt a number of complex tools. Thus, further progress of e-business will require more technological competencies and e-skills. This, in turn, will create additional barriers for companies doing business in the aeronautics industry. Taking into account that, today, 22% of firms in the sector see the complexity of ICT systems as an important barrier to e-business development, the problem of the availability of qualified workforce will become vital to the competitiveness and innovativeness of SMEs. Today, however, SMEs are already facing difficulties in attracting and keeping skilled personnel.

**ICT increases production costs:** As indicated by companies' representatives, a priority of numerous SMEs in some markets is to offer an attractively priced quality product. It is of secondary importance by what processes this is achieved. *Investments in ICT solutions increase the production cost and may, thus, have an adverse effect on companies' competitiveness.*

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<sup>83</sup> UKCeB (2005). UK Council for Electronic Business. <http://www.ukceb.org.uk/> (June 2005).

<sup>84</sup> Cf. <http://www.accenture.com/xdoc/uk/locations/uk/insights/industry/aerospace.pdf>

## 2.7.5 Policy implications

ICT-driven innovations play an important role in the competitiveness of companies in the aeronautics sector. It is, therefore, a priority to encourage companies to implement e-business solutions to introduce new products, services and ways of doing business. However, any action supporting innovativeness should particularly address the issue of appropriation of benefits from innovation. In this context, the subject of fair benefit sharing between electronically cooperating companies is of great importance. Further issues that should be considered by policy are indicated in the summary table below.

**Exhibit 2.7-4: Policy implications of e-business in the aeronautics industry**

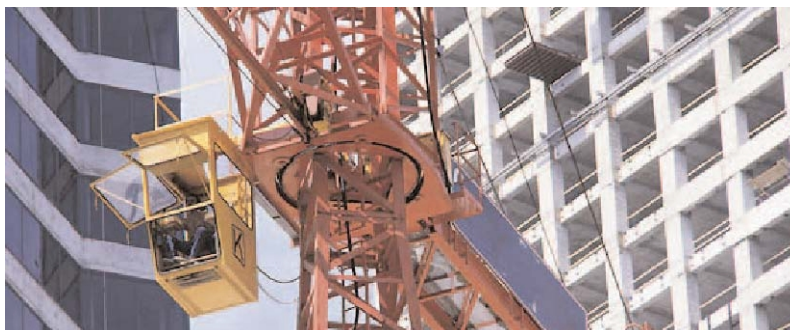
Policy objectives	Concerns and suggestions	Possible initiator(s)
<b>Climate for innovation</b>	<ul style="list-style-type: none"> <li>• Encourage SMEs to increase their innovative efforts</li> <li>• Emphasise the innovative potential of e-business applications</li> <li>• Create a level playing field for cooperation between large companies and SMEs</li> <li>• Promote cooperation between companies and fair benefit sharing practices</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• Member States</li> <li>• Industry associations</li> </ul>
<b>Standardisation initiatives</b>	<ul style="list-style-type: none"> <li>• Support standardisation initiatives</li> <li>• Ensure that the SMEs' interests are taken into account</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• Member States</li> <li>• Standardisation bodies</li> <li>• Industry associations</li> </ul>
<b>Raising awareness of e-business benefits</b>	<ul style="list-style-type: none"> <li>• Highlight the benefits of e-business for companies in the sector</li> <li>• Promote initiatives addressing companies' individual needs</li> <li>• Encourage larger companies to support SMEs in e-business projects</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• Member States</li> <li>• Industry associations</li> </ul>
<b>Dialogue between the sector and ICT service providers</b>	<ul style="list-style-type: none"> <li>• Support communication platforms for manufacturing firms and ICT providers</li> <li>• Promote regional clusters between ICT providers and aeronautics companies</li> </ul>	<ul style="list-style-type: none"> <li>• Industry associations</li> </ul>
<b>E-business know-how</b>	<ul style="list-style-type: none"> <li>• Support employee ICT training</li> <li>• Encourage employee mobility</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• Member States</li> <li>• Industry associations</li> </ul>



## 2.8 The Construction Industry

The e-Business W@tch sector study on construction was contributed by Rambøll Management A/S (contact: [info@r-m.com](mailto:info@r-m.com)).

The full reports (parts 1 and 2) can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



Electronic business activity in construction is limited compared to the other sectors studied by e-Business W@tch in 2005. Many companies prefer to be reactive rather than proactive in their use of ICT. The construction industry has yet to show the same level of ICT-driven productivity improvement as in other industries. This can partly be explained by the nature of the work and the type of production involved in construction processes. It is also related to slow uptake of ICT in a sector which is dominated by SMEs. Large enterprises in the industry and new sector entrants have adopted ICT based production methods. However, there is still great potential for further ICT uptake, for example: production planning systems, ERP systems with financial components, inventory management systems, supply chain management (SCM) and mobile solutions. Business process integration may be a key driver for ICT adoption in the future. Most companies in the sector tend to organise work around individual construction projects, which has led to a fragmentation in ICT use and e-business activity, characterised by a lack of commonly accepted standards, technical specifications and labels.

### 2.8.1 Sector definition and background

#### Sector definition

The construction industry (CI) is defined to include enterprises covered by NACE Rev. 1 Codes 45.1-45.5.<sup>85</sup> The sector comprises a wide range of companies with various functional tasks within the construction process. These tasks fall into three main groups: 1) site preparation, construction supply lines and concrete work, design and construction of buildings, building elements and steelwork, 2) building installation and joinery, and 3) maintenance and repair.

#### **Exhibit 2.8-1: Business activities covered by the construction industry (NACE Rev. 1.1)**

NACE Rev. 1.1	Business Activity
DE 45	Construction
45.1	Site preparation
45.2	Building of complete constructions or parts thereof; civil engineering
45.3	Building installation
45.4	Building completion
45.5	Renting of construction or demolition equipment with operator

<sup>85</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.

## Industry background

The CI consists mainly of small and medium-sized companies: 96% of construction enterprises in Europe have less than 20 employees. However, CI is one of the largest industrial employers in the European Union. In 2003, the European CI employed a total of 11.8 million people while the jobs held by 26 million workers in the EU depended, directly or indirectly, on construction. A total of 2.3 million enterprises in the CI provided € 1.1 million of the total European production value.<sup>86</sup> Hence, despite the average small and medium size of construction companies, the CI is of significant importance to the European economy and European employment.

## 2.8.2 ICT and e-business adoption in 2005

### ICT infrastructure and skills development

While basic internet access has been established in the CI, the basic ICT infrastructure in general is poorly developed. Despite the fact that the sector is characterised by remote and mobile work processes, the usage of remote access, and remote access via mobile networks is significantly low. Moreover, the many SMEs in the CI do not focus on ICT skills development and/or on employing ICT experts.

### Internal business processes and external cooperation

Despite the potential of ERP systems to increase productivity and internal ICT efficiency, construction enterprises hesitate to adopt these ICT solutions. The CI is not making full use of the potential of collaborative systems for information sharing and coordination with external partners either. Also, enterprises do not take full advantage yet of mobile systems or ICT solutions for digital information exchange and sharing documents online.

### Electronic procurement and supply chain integration

E-procurement has not yet matured in the CI and further promotion of a single European market for construction services via e-procurement appears to have longer-term perspectives than anticipated in the first full sector report. This holds true, in particular, in the area of materials procurement. Currently, e-procurement appears to be used primarily in transactions with regional and particularly national suppliers.

### Electronic marketing and sales

Customer Relationship Management (CRM) systems and online sales and marketing activities are not widespread. Surprisingly few construction companies reported having a website. Because of the characteristics of construction services, typical e-commerce activities such as selling online on the internet might be of limited relevance to many construction enterprises. However, having a website for advertising company capabilities or for electronic payments could become important to (especially SME) sub-contractors in the future.

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<sup>86</sup> Source: Eurostat New Cronos / DIW Berlin. See *e-Business W@tch* Sector Study on Construction, July 2005 ([www.ebusiness-watch.org](http://www.ebusiness-watch.org))

**Exhibit 2.8-2: Main findings of the e-Business Survey 2005 for the construction industry**

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>• <b>Basic internet access</b> has been established.</li> <li>• More advanced forms for access such as <b>W-LAN and VPN</b> still offer unused potential.</li> <li>• Few construction enterprises allow <b>remote access</b> to their ICT system and those that do, use a fixed line connection.</li> <li>• Despite the fact that the sector is characterised by remote and <b>mobile work processes</b>, usage of remote access and remote access via mobile networks is significantly low.</li> <li>• <b>Recruitment of ICT staff</b> is, in general, low.</li> <li>• Little focus on <b>ICT skills development</b> – regular training is not taking place.</li> <li>• The most common form for digital connection is <b>DSL</b>; the <b>analogue modem</b> seems to be on its way out.</li> <li>• <b>Broadband</b> is not widely diffused in the sector.</li> </ul>
<b>Integration of Internal processes</b>	<ul style="list-style-type: none"> <li>• Less than a third of construction firms have an <b>intranet</b>.</li> <li>• <b>Knowledge management</b> and e-learning applications are not widely diffused.</li> <li>• The uptake of <b>ERP systems</b> and applications to manage capacity/inventories online is low.</li> <li>• Low uptake of <b>EDM systems</b> and applications to track working hours online.</li> <li>• <b>Sharing documents online</b> is not an application that is commonly used.</li> <li>• <b>Collaborative work</b> processes such as collaborative design processes and collaborative forecasting of demand are not widely diffused in the sector.</li> </ul>
<b>Supplier-facing activities</b>	<ul style="list-style-type: none"> <li>• Almost a third of construction firms (representing less than half of employment in the sector) have <b>purchased supplies online</b>.</li> <li>• Very few construction firms buy more than 25% of <b>supplies online</b>.</li> <li>• Online procurement is primarily taking place <b>within national borders</b>.</li> <li>• The use of <b>specific ICT systems</b> for e-procurement is not widely diffused.</li> <li>• Whenever used, e-procurement systems seem to be used primarily for the initial phases of procurement, i.e. for finding suppliers, running <b>RfQs / RfPs</b>, and ordering supply goods.</li> <li>• The primary type of special ICT solutions for e-procurement is a <b>standard software package</b>.</li> </ul>
<b>Customer-facing activities</b>	<ul style="list-style-type: none"> <li>• Only about a third of small enterprises have a <b>website</b>.</li> <li>• <b>Online sales</b> do not seem to be widespread in the sector</li> <li>• Very few construction firms use <b>specific ICT solutions</b> for online marketing/sales.</li> <li>• <b>Online customers</b> seem to be either regional or national.</li> <li>• The construction enterprises that use ICT systems for e-marketing/e-sales use these systems primarily for publishing offers to customers, answering <b>RfQs/RfPs</b> and facilitating online ordering - and they do so quite intensively.</li> <li>• <b>Cultural and practical barriers</b> might still hamper cross-border cooperation and online payments.</li> </ul>

## 2.8.3 Important topics and application areas

### E-business activity

In terms of ICT uptake and e-business deployment, the CI today is characterised by the following features:

- Highly **fragmented** ICT usage.
- A **multitude of standards**, technical specifications, labels, and certification marks as well as diversity in local, regional and national regulations.
- A **low adoption and integration** of relevant ICT in most business processes, especially by SMEs, which are often characterised by communication and knowledge sharing based on personal or telephone contact.
- **High sensitivity to changes** in economic conditions in market and society.
- Many **remote and mobile** work processes.
- **Many small-sized companies** which are typically either organisers of projects and project flows or suppliers to larger project-managing companies, with different ICT requirements.
- **Industrialisation**, based on pre-fabricated elements and new concepts (e.g. pre-fabricated houses).
- **Internationalisation**, including new market opportunities and increased competition from new market entrants.

### Conservative attitudes towards ICT

Attitudes towards ICT in the sector have traditionally been of a conservative nature. Reluctance to invest in ICT is still strong, and most companies are reactive rather than proactive in using ICT as a tool to increase competitiveness. Four areas can be identified as important drivers for the development of electronic business in the CI: productivity, internal integration, external cooperation and further establishment of a European construction market via e-procurement.

### Productivity gains through ICT still to be realised

The CI has yet to show the same level of e-business productivity improvements as other, mainly manufacturing industries. This delay is partly due to the line of work and type of production involved in construction processes, but is also related to the slow ICT uptake in a sector dominated by small and medium-sized players. Large enterprises in the industry and new sector entrants alike have adopted ICT-based production improvements, but there is still untapped potential for ICT uptake, e.g. in production planning systems, in combining Enterprise Resource Planning (ERP) systems with financials, Manufacturing Resource Planning (MRP) systems, inventory management systems, Customer Relationship Management (CRM) systems, Supply Chain Management (SCM) systems and mobile solutions.

### Internal business processes not much integrated

Internal integration is an important driver for ICT development in the CI. The internal (and external) business processes of many companies are poorly integrated as work is usually organised around unique construction projects. This leads to fragmented business processes, supported by “home-made” ICT systems that are not integrated across the basic ICT landscape of the company.

SMEs in the sector are especially lagging behind in terms of system integration, not only in comparison to their larger counterparts but also compared to SMEs in other sectors studied by *e-Business W@tch*. However, new sector-specific solutions for smaller companies are being developed, and ICT vendors are taking a growing interest in the CI.

## External collaboration very important – implementation of collaborative systems hampered

Collaborative systems are important as the CI brings together many different organisations and is, consequently, highly dependent on external coordination and cooperation to achieve a common goal. Effective systems to distribute and share information externally are thus critical for raising productivity and managing resources and costs. There is vast potential for generating benefits and savings by introducing digital solutions to improve external collaboration. However, the implementation of collaborative systems is hampered by a number of barriers, ranging from lack of shared standards for information exchange to social or cultural issues.

## Location-bound nature of construction limits development of European market

Development and support of a single European market in the CI is limited by the location-bound nature of construction. However, e-procurement (e-tendering and e-ordering) – as well as e-collaboration (e-communication and e-SCM) – can contribute to the creation of a more transparent European market by facilitating cross-border communication and coordination.

## Case studies and business examples

The sector reports on the construction industry (July / September 2005) contain short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of findings both from the survey and from desk research, and provide further insight in current e-business trends and developments. Exhibit 2.8-3 summarises the 'activity views' which are featured in more detail in the two reports.

**Exhibit 2.8-3: E-Business Activity Views featured in the sector studies**

E-Business Activity Views	Country	Topics
<i>Case Study: Bygg og Industri-service A/S</i> – Increased efficiency and productivity through mobile solutions.	Norway	How SMEs, with the correct external ICT expert assistance, can benefit from <b>mobile</b> ICT solutions
<i>Case Study: Digital Construction</i> – Public-private partnership on sector-specific ICT initiative.	Denmark	Insight into a programme to <b>promote</b> ICT in the CI
<i>Case Study: IJ Regeltechnik GmbH</i> – Enterprise cooperation on e-commerce solution.	Germany	A joint <b>collaboration</b> between an installation service provider and a manufacturer, establishing an e-commerce solution to reach new market segments
<i>Case Study: Skanska A/S</i> – e-procurement	Sweden	How <b>e-procurement</b> can be used to reduce material costs and increase productivity
<i>Case Study: Termonica Ltd</i> – ICT-supported and integrated business processes.	Poland	How construction SMEs can use ICT to <b>integrate business process</b> , in order to improve their competitive position in the market
<i>Business Example: Bravo Solution / BravoBuild</i> – ICT tools for e-procurement	Italy	Examples of <b>internet-based procurement</b> tools
<i>Business Example: Intertime Continental</i>	Bulgaria	How an enterprise has developed its <b>own software</b> to become more efficient



## 2.8.4 Anticipated implications of e-business for the industry

The sector report of September 2005 assessed the implications of ICT and e-business adoption on the structure of the CI. It applied the 'five-forces-model' developed by Michael E. Porter (1980) as a framework to do so. This chapter summarises the main findings.

### Possible cross-border market entrants

Construction services are primarily purchased and delivered locally. First and foremost on a national level, secondly at the regional one, and seldom cross-border. This does not mean, however, that there is no internationalisation of the European CI. For example, statistics do not show the extent to which construction companies buy shares in foreign local counterparts or enter into cross-border partnerships. Typically, insights into local circumstances, speaking the language, and having local business contacts are necessary for project completion. Furthermore, buildings are built on-site and work is in essence done locally – connected to the construction site. Hence, entrance barriers facing potential cross-border market entrants are high.

However, low wage construction companies from the new Member States could become a new competitive force across borders – possibly as sub-contractors to large local construction enterprises. If e-tendering grows in importance in the CI, this could ease international market access – and thereby increase competitive pressure across borders.

### Market entrants with productivity advantages

Other possible new market entrants are enterprises from other sectors entering the CI with automated repetitive production methods. One example is IKEA, the Swedish furniture company, which has entered the construction market offering pre-fabricated houses: building parts are mass-produced and pre-fabricated to be erected on a concrete platform within a few days. Using ERP and SCM systems is likely to be part of the competitive advantage of such companies in the future.

### Substitution of products/services

Construction work falls into three main groups: 1) site preparation, construction supply lines and concrete work, design and construction of buildings, building elements and steelwork, 2) building installation and joinery, and 3) maintenance and repair. None of these services is easily substituted. Construction services are to a large extent manual and, consequently, ICT solutions play a limited role in terms of substitution of products or services in this sector.

### Negotiation power of suppliers

There is a mutual dependency between suppliers (of materials and services) and 'producers/integrators' in the CI. This dependency is accentuated by the fact that construction projects typically involve multiple suppliers that stand for vital parts of project inputs. Moreover, many suppliers are highly specialised and it can be difficult to change them in the middle of a running construction project.

E-business is expected to weaken the negotiation power of suppliers as a result of the following:

- Increased **transparency** in the market: The internet makes it easier to find competing offers from suppliers.
- Growing use of **e-market places**: Online information about prices and quality of suppliers' products increases competition between suppliers and lower their negotiation power.
- **E-procurement** systems facilitate working with multiple suppliers and automatic price comparisons on a large scale.

### **Negotiation power of customers**

For customers, purchasing construction services is usually a considerable investment. For construction enterprises the investment of a small private customer might be of limited value to the total business. However, construction companies – and especially SMEs – can be highly dependent on larger customers' single construction projects. In these cases, the negotiation power of the customer is considerable.

The impact of e-business on the negotiation power of customers is low. Neither e-procurement nor e-tendering has yet had a significant impact on customers' negotiation power. However, increased online access to information about construction services from different suppliers could strengthen customer negotiation power in the longer-run.

### **Rivalry in the market**

The CI in Europe is stagnating with a high level of rivalry characterised by low profit margins. Today, the impact of e-business and ICT on rivalry in the CI is medium. However, there is a growing use of ICT applications, e.g. mobile solutions and ERP systems, to increase competitiveness of construction enterprises. Also, in a stagnating market the ability to increase efficiency and to cooperate in consortia is likely to grow in importance. Hence, collaborative ICT and productivity enhancing systems could impact rivalry in the market to a larger extent in the future.

### **Possible trends towards increased ICT impact**

All in all, the impact of ICT and e-business on the five industry forces that shape the construction industry is low at this point. However, there are possible trends towards an increased impact of ICT and e-business – especially in the following areas:

- Negotiation power of suppliers and customers because of enhanced transparency in the market via e-procurement.
- Internal competition in the market via productivity-enhancing ICT solutions such as ERP-systems and mobile solutions.
- Possible impact in the form of new market entrants with automated construction manufacturing processes supported by e.g. ERP and SCM systems.

However, the comparatively low ICT diffusion in the sector does not warrant any marked increase in ICT-related impacts in the immediate future.

### **Particular implications for SMEs**

The most important opportunities and risks of e-business for SMEs in construction are the following:

- A single European market via e-procurement seems less likely than originally anticipated. Data from the e-Business Survey 2005 show that e-procurement is far from mature in the CI.
- The trend towards an internationalisation of the European market for construction services is even slower than initially anticipated. International networking is an area of opportunity for construction SMEs. Hence, the potential of increased cross-border market access, via for example electronic project fora should be down-graded.
- The risk of low ICT uptake seems to be particularly relevant in areas such as collaboration, internal integration and productivity improvements, and mobile work processes. In other areas, such as marketing and sales, low ICT uptake does not necessarily constitute an issue for construction enterprises.
- Unsolved issues in terms of legal validity of contracts, ownership of information, access rights, assured data validity, etc. seem to be of less importance to construction SMEs than initially anticipated. Only 22% of construction enterprises consider legal problems a barrier for adopting e-business.

**Exhibit 2.8-4: Anticipated impact of e-business on the construction industry**

Five forces shaping industry structure	General importance in the sector	Impact of e-business	Main arguments
<b>New entrants</b>	<u>Low / medium</u> Primarily local production of services. Possible new entrants: low wage construction companies from the new member states and players with automated repetitive production methods.	II	<ul style="list-style-type: none"> <li>• If e-tendering grows in importance in the CI, this could ease market access across borders – and thereby increase competitive pressure from low-wage construction companies from the new member states</li> <li>• Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) systems could become important tools for automated production/industrial production methods</li> <li>• The impact of e-tendering, ERP, and SCM in the CI is low at this point</li> </ul>
<b>Substitution of products / services</b>	<u>Low:</u> Construction services are not easy to substitute.	I	<ul style="list-style-type: none"> <li>• Construction services are inherently manual. ICT does not play a major role today in developing substitute products.</li> </ul>
<b>Negotiation power of suppliers</b>	<u>Medium:</u> Mutual dependency, suppliers have a vital role in the construction process.	II	<ul style="list-style-type: none"> <li>• Lower negotiation power of suppliers because of increased transparency in the market via internet access - including e-market places</li> <li>• E-procurement systems facilitate working with multiple suppliers and automatic price comparisons on a large scale</li> </ul>
<b>Negotiation power of customers</b>	<u>Medium / high:</u> High investments per project.	II	<ul style="list-style-type: none"> <li>• E-business, e-procurement, and e-tendering have not yet had a significant impact on customers' negotiation power</li> </ul>
<b>Rivalry in the market</b>	<u>Medium / high:</u> Low profit margins and strong competition. However, less competition in highly specialised areas.	II	<ul style="list-style-type: none"> <li>• Medium impact of e-business.</li> <li>• Growing use of mobile solutions and ERP systems to increase competitiveness of construction firms.</li> <li>• Collaborative ICT and productivity enhancing systems could impact rivalry in the market to a larger extent in the future.</li> <li>• Currently, lack of shared standards hamper the dissemination of collaborative ICT</li> </ul>
Impact of ICT and e-business: I = low; II III = high			

### 2.8.5 Policy implications

Although there are signs of maturing e-business technology for the construction industry, the pace of uptake continues to be slow. Case studies and desk research point at a number of barriers other than economic ones that influence the adoption of ICT. It is recommended to promote a faster uptake of e-business technologies via the following policy measures: identification of best practices, benchmarking, developing tools for cost/benefit analysis of IT investments, training and communication.

**Exhibit 2.8-5: Policy implications of e-business in the construction industry**

Policy objectives	Concerns and suggestions	Possible initiator(s)
<b>Improving ICT skills</b>	<ul style="list-style-type: none"> <li>• Development of e-learning tools</li> <li>• Training directed at SMEs to improve understanding of ICT</li> <li>• Training directed at stakeholders such as business associations, industry federations and consultants</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• Member States</li> <li>• Construction industry associations</li> </ul>
<b>Increasing the awareness of ICT benefits and potential</b>	<ul style="list-style-type: none"> <li>• Benchmarking of companies and IT investments.</li> <li>• Identify best practices and communicate potential business benefits</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• Member States</li> <li>• Construction industry associations</li> </ul>
<b>Facilitating the process of interoperability</b>	<ul style="list-style-type: none"> <li>• Agree on standards for the basis of e-collaboration practices</li> <li>• Agree on standards for product classification</li> </ul>	<ul style="list-style-type: none"> <li>• EU Commission</li> <li>• International and national standardisation bodies</li> <li>• EU Member States</li> <li>• Construction industry associations</li> </ul>



## 2.9 The Tourism Industry

The e-Business W@tch sector study on the tourism industry was contributed by ETC – eTourism Center at Salzburg Research (contact: [lassnig@salzburgresearch.at](mailto:lassnig@salzburgresearch.at)).

The full report can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



ICT are an important facilitator of competitive advantage in the tourism industry. There is enormous customer-driven demand for e-business products and services, and the trend is that demand will continue to rise. The focus of e-business engagement in tourism is on customer-facing activities, encompassing all areas of marketing and sales. Online booking and reservation services have become widely accepted among consumers and business travellers. The adoption rate of selling online in tourism is approximately twice as high as on average among the 10 sectors surveyed by e-Business W@tch in 2005.

### 2.9.1 Sector definition and background

#### Sector definition

Tourism is most commonly understood as the provision of services for people travelling to and staying outside their usual environment for less than one consecutive year for leisure or for business purposes. The e-Business W@tch sector study of 2005 focuses on the accommodation sub-sector, gastronomy, travel agencies and tour operators.

**Exhibit 2.9-1: Business activities covered by tourism (NACE Rev. 1.1)**<sup>87</sup>

NACE Rev. 1.1	Business Activity
H 55	Hotels and restaurants
H 55.1	Hotels
H 55.2	Camping sites and other provision of short-stay accommodation
H 55.3	Restaurants
H 55.4	Bars
H 55.5	Canteens and catering
I 63	Supporting and auxiliary transport activities; activities of travel agencies
I 63.3	Activities of travel agencies and tour operators; tourist assistance activities not elsewhere covered

#### Industry background

The tourism sector as a whole is one of the fastest growing economic sectors in Europe and worldwide. In recent years, the growth rates in the tourism sector have been higher than in the overall world economy and do not seem to be slowing down in the near future. In the EU more than 1.4 million tourism enterprises employ about 8.1 million people contributing more than €419 billion of

<sup>87</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.

production value.<sup>88</sup> The sector is dominated by SMEs: 99% of companies in the tourism sector are micro and small enterprises.

One major area of travel growth is the taking of shorter and more frequent trips in addition (but possibly also contrary) to the traditional summer holidays. This trend is driven by busy, stressed and time-poor executives and their partners.

Notwithstanding the growth experienced, tourism is also facing new challenges worldwide. These are triggered not only by developments in the social and age structure of travellers, but also by a change in leisure attitudes, structural economic shifts, technological innovation and – not least – a new awareness of security issues. Furthermore, the growing experience of tourists and of consumer influence on the market are also transforming the travel and tourism industry.

The increased use of ICT in the tourist industry has extensive effects on market processes and structures in supply and demand. It modifies the value chain, changes market shares, affects jobs and working conditions as well as the competitiveness of destinations.

## 2.9.2 ICT and e-business adoption in 2005

### ICT infrastructure

The diffusion of **internet access** in tourism companies is still lagging behind penetration rates in other sectors of the European economy. From the 10 sectors covered in the e-Business Survey 2005, tourism registers the lowest internet diffusion rate of only 92%, while the other sectors range between 95% and 100%, i.e. close to saturation level. This is due to the dominance of small firms in the tourism sector, which constitute the vast majority of employment. Yet, even large companies in tourism with more than 250 employees record an internet diffusion of only 95%. Given that internet connection costs are not prohibitively high, there appears to be a lack of awareness of the potential benefits of the internet by many enterprises in tourism.

The take-up of **broadband** internet is clearly linked to the size of the company. While only 9% each of micro and small enterprises reported using broadband access with more than 2 Mbit/s, 21% of medium and 31% of large enterprises (with more than 250 employees) did so.

The share of employees working in tourism companies that implemented technologies enabling **remote access** of the firm's computer system is slightly below the average across all economic sectors surveyed: 34 % of tourism enterprises compared to the cross-sector average of 40%.

The picture regarding the **recruitment of IT staff** in tourism is similar to the one drawn for other sectors studied by *e-Business W@tch* in 2005. On average, 12% of tourism enterprises have recruited or were trying to recruit staff with special IT skills in the past twelve months. 28% of these companies said that they experienced difficulties in finding qualified staff.

### Internal business processes and collaboration with business partners

As reported in previous *e-Business W@tch* studies, the tourism industry is a **rather slow adopter** of ICT solutions to support internal work processes. This situation has not changed. The use of an intranet, or systems for knowledge management, Electronic Document Management (EDM) and Enterprise Resource Planning (ERP) is below the EU-7 average for the 10 sectors surveyed in 2005. It must be considered, however, that some of these applications (e.g. ERP systems) are of more use for manufacturing than for service sectors.

For similar reasons, the use of ICT solutions for internal and external **collaboration** with business partners is less developed in tourism than on average in the 10 sectors. This applies to electronic design tools, collaborative demand forecasting, and tools for managing inventories online.

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<sup>88</sup> Source: Eurostat New Cronos / DIW Berlin 2005. See full sector report (September 2005) for more details.

**E-learning** is an application where the usage in tourism approaches the level of other sectors. About 19% of tourism companies reported using e-learning applications for their employee's training. Variations due to firm size, however, are substantial.

### Procurement and supply-chain integration

**Online purchasing** is widespread in the tourism sector. 57% of the companies said that they procure online. Only companies from the IT services and automotive industries have exhibited a higher adoption rate in 2005.

Compared to previous sector studies on e-business in tourism<sup>89</sup> online purchasing activities have increased along with the **transaction volumes**. About 36% of tourism companies said that they purchase more than 5% of their supplies online and approximately 17% reported managing more than one quarter of their procurement activities online in 2005. Both figures are significantly above the EU-7 average for the 10 sectors surveyed.

Yet tourism companies are less likely to use specific **ICT solutions for e-procurement** activities. Instead, they are more likely to use services offered by suppliers or offered on e-marketplaces or trading networks. While in the EU-7 average for all 10 sectors standard software packages for e-procurement dominate with 61% and only a minority of 27% of enterprises use e-marketplaces, the importance of these solutions is basically different in the tourism sector: Here, 49% of companies reported using standard software packages and a striking 38% said that they use e-procurement via e-marketplaces.

### Marketing and sales

As already reported in previous reports prepared by *e-Business W@tch*, the main application of e-business in tourism is the field of e-marketing and sales, i.e. **communication and transactions with customers**. Initially, tourism companies used the internet primarily for information and communication, but are recently exploiting it ever more for online transaction services. The adoption rate of **online sales** in tourism is approximately twice as high as the EU-7 average for all 10 sectors: 36% of tourism companies reported selling online, compared to the cross-sectoral average of 17%.

Similar to e-procurement, the composition of customers interacting online with companies in the tourism sector indicates that the internet helps to overcome geographical barriers. The number of tourism enterprises which reported selling online **mainly to international customers** is significantly above the EU-7 average for all 10 sectors. This internationalisation of the customer base by the internet is consistent with the common trend towards an increasing variety of tourists' country of origin in most European countries.

Nearly every fifth company in tourism said that it uses **specific ICT systems** for e-marketing and sales processes. A closer look at ICT solutions used by tourism companies for e-marketing and sales reveals three main distinguishing features compared to other sectors of the economy:

- customised, company-specific IT solutions for online sales are less common in tourism,
- the use of software services provided by ASPs is significantly higher and
- the application of functionalities offered on e-marketplaces is much more widespread in the tourism sector.

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<sup>89</sup> Published in 2003 and 2004, available at [www.ebusiness-watch.org](http://www.ebusiness-watch.org) ('resources')



**Exhibit 2.9-2: Main findings of the e-Business Survey 2005 for the tourism industry**

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>• <b>Internet access</b> is still lagging behind penetration rates in other sectors. Comparatively many micro and small firms are non-adopters.</li> <li>• Even among large companies, “only” 95% reported having <b>internet access</b>.</li> <li>• Take-up of <b>broadband</b> internet is clearly linked to the size of the company.</li> <li>• The picture regarding the <b>recruitment of ICT specialists</b> in tourism is rather similar to other sectors of the European economy.</li> </ul>
<b>Integration of Internal processes</b>	<ul style="list-style-type: none"> <li>• Tourism industry is a rather slow adopter of ICT solutions to support <b>internal work processes</b>.</li> <li>• The use of ICT solutions for <b>internal and external collaboration</b> with business partners is less developed in tourism than on average in the 10 sectors studied.</li> <li>• <b>E-learning</b> is comparatively widespread: about 19% of tourism companies reported using e-learning applications.</li> </ul>
<b>Supplier-facing activities: procurement and supply-chain integration</b>	<ul style="list-style-type: none"> <li>• <b>Online purchasing</b> is widespread in the tourism sector: 57% of companies said that they procure online.</li> <li>• The relative share of <b>supplies bought online</b> (as % of the total volume of supplies) has increased compared to 2003.</li> <li>• Nearly 40% of those firms that use <b>special ICT systems</b> for e-procurement use functionalities of e-marketplaces.</li> </ul>
<b>Customer-facing activities: marketing and sales</b>	<ul style="list-style-type: none"> <li>• <b>Communication and transactions</b> with customers is the key application area of ICT and e-business in tourism.</li> <li>• The share of companies <b>selling online</b> in tourism is approximately twice as high as on average for all 10 sectors studied in 2005.</li> <li>• 36% of tourism companies reported making <b>online sales</b>.</li> <li>• About 20% use <b>special ICT systems</b> to support e-marketing or sales processes.</li> </ul>

### 2.9.3 Important topics and application areas

#### **ICT-supported destination management and operation of destination portals on the internet**

A peculiarity of the tourism industry is that its product consists of a bundle of products and services provided in different parts by numerous stakeholders. As tourism services are complementary, due to their mutual horizontal and vertical interdependencies, this bundle of services constitutes the marketable unit of a destination.<sup>90</sup> A destination consists of an area geographically and textually defined in a way that it covers the needs and demands of a common or specific target group of tourists. Thus, destinations are competitive units defined spatially, considered as products or bundles of products or services, which tourists regard as determinant of their sojourns.<sup>91</sup>

In recent years, the idea has taken root that destinations in tourism can be managed the same way as – or at least similar to – companies. This concept, developed in academic business administration circles, has come to be known as destination management. In many European countries Destination Management Organisations (DMOs) form a hierarchical network, with local tourist offices at the bottom and with regional and national tourist boards, including international branch offices, at the top.

Given that the internet has already become a primary source of information for planning travel and holidays in the major tourism markets, it is critical for DMOs to achieve a broad distribution of their

<sup>90</sup> Cf. Bieger, T. (2002). Management von Destinationen. 5., neu bearbeitete und ergänzte Auflage. München / Wien: Oldenbourg.

<sup>91</sup> Cf. Pechlaner, H. (2000). Managing tourist destinations. In: Manente, M. / Cerato, M. (eds.). From Destination to Destination Marketing and Management – Designing and Repositioning Tourism Products. Cafoscarina.

online product, i.e. their internet portal. The first and most obvious task is to maximise the number of visitors to the destination's website.

In recent years, however, the exponential growth in travel and tourism information available on the internet may also be challenging for many users. Individual tourism companies have set up their own websites, but comparing prices and facilities across a number of different service providers can be very difficult for the prospective tourist. To counter this, DMOs have set up their own portals, on which (registered) tourism service providers in the region are featured, much as they are in the equivalent printed brochures.

Another issue is dis-intermediation, where traditional intermediaries such as travel agencies and tour operators are skipped in the tourism value chain as tourists may deal with service providers directly. DMOs may strengthen the trend towards dis-intermediation by means of their Destination Management Systems (DMSs). These systems are expected to be instrumental in achieving a certain degree of independence from travel agencies and tour operators, by encouraging consumers to book directly with local service providers.

### **Customer Relationship Management (CRM) in tourism destinations**

CRM involves building up in-depth customer information. Normally, this information includes customers' socio-demographic profiles, interests and activities, as well as their past and possible future requirements. With this type of information most efficiently stored in an electronic database, tourism service providers could ideally be:

- knowledgeable and efficient in servicing enquiries,
- proactive in targeting best prospect customers with products specifically appropriate to their needs, and
- establishing the basis for a lifetime relationship with the customer, and maintaining it even where transactions are not involved.

*e-Business W@tch* surveyed the diffusion of CRM systems and how satisfied companies are with their effects. The outcome is striking: only 7% of tourism companies reported using a CRM system, which is significantly below the EU-7 average of 15% for all 10 sectors surveyed. The difference to sectors leading in CRM usage is substantial.

Obviously, there is a correlation between the application of CRM systems and company size in tourism as in general. Medium and large companies are about twice as likely to apply CRM as micro and small companies. Given the weight of micro and small enterprises in tourism, this partly explains the low take-up of CRM in the sector.

Yet, in spite of this modest diffusion of ICT-supported CRM solutions in tourism, many researchers underline the importance of CRM on the sector. Indeed the issue is heavily discussed by experts in the field and it is on the agenda of numerous conferences, workshops and other events targeted at decision-makers in tourism.

This discrepancy between the modest adoption of CRM by tourism companies and the perceived significance of this issue is also empirically evident. Overall, tourism companies using a CRM system consider CRM much more helpful than companies from other sectors surveyed. Differences in CRM assessment are significant: in tourism, 51% of companies perceive CRM as 'very helpful for the effectiveness of marketing' compared to 41% on average in the 10 sectors studied in 2005.

In fact, tourism has witnessed the introduction of many relationship management and relationship marketing practices. Airline frequent flyer programmes and hotel frequent guest programmes are at the forefront of CRM applications in tourism, trying to 'lock' customers systematically to the supplier because of bonus systems or beneficial pricing systems. Such CRM systems work very well with large players in the industry. Yet most examples of best practice for a CRM system concern large enterprises such as the airline industry, intermediaries or hotel chains.

### **Innovative mobile and location-based services for tourists**

The use of ICT in tourism is most advanced in the field of customer-facing e-business activities. This applies particularly to e-marketing and online sales. Yet most of these activities occur in the pre-trip phase. Here, the provision of e-services for customers is already a mature market – in the sense of sophistication of offered applications and not in the sense of customer demand, which is expected continue growing even further.

But the situation changes in the next phase of a holiday or business trip – on the location of the destination during the trip itself. The provision of mobile e-services on-the-spot is still at an early stage of market development. Similar to other immature markets, this provides a multitude of business opportunities – with often risky investments, but considerable prospects of success alike.

The sector study analyses the market maturity and potential of mobile and location based services. A comparison with other economic sectors reveals the importance of mobile services for the tourism and leisure sector. According to market studies, m-commerce is perceived as most important in the tourism and transport sectors.<sup>92</sup> Tourists constitute a substantial target group for m-commerce providers.

Thus, there could be a need for upcoming mobile e-services by tourists, especially when travellers are on their way to or at a destination. Yet, similar to any immature market, there are still some barriers to overcome: at the beginning, many potential users will be sceptical in adopting innovative new services. Studies find that pricing of such services and addressing the appropriate needs of tourists in the conceptual design of e-services are the most important market success factors.

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<sup>92</sup> Figures quoted from Egger, R. (2005). Grundlagen des eTourism. Informations- und Kommunikationstechnologien im Tourismus. Aachen, Shaker Verlag.

## Case studies and business examples

The sector report on the tourism industry (September 2005) contains short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of both the survey and from desk research, and provide further insight in current e-business trends and developments. Exhibit 2.9-3 summarises the 'activity views' which are featured in more detail in the report.

**Exhibit 2.9-3: E-Business Activity Views featured in the sector study**

E-Business Activity Views	Country	Topics
<i>Case Study:</i> ICT-supported destination management and e-marketing at <b>Ski amadé</b>	Austria	A destination management organisation founded by a number of cableway operators, spanning several tourism regions with a multitude of formally independent stakeholders.  Focus is on a common internet platform for e-marketing and e-sales with first steps towards e-collaboration of different stakeholders.
<i>Case Study:</i> The online destination management system of <b>Gulliver</b>	Ireland	An online destination management system (DMS) developed and operated in public-private partnership; insights into numerous lessons learned and future challenges for DMS.
<i>Business Example:</i> <b>Limba.sk</b> – a reservation portal of accommodation services	Slovakia	A tourism information and reservation portal in a new EU member state successfully operated by a private tourism company.
<i>Case Study:</i> <b>ENGADINcard</b> – CRM on the basis of a destination card	Switzerland	A CRM system realised in the form of a customer card for a whole destination spanning numerous stakeholders in tourism.  In spite of considerable efforts spent on the card system, the analysis of the performance of the CRM system delivers mixed results and insights into a lot of lessons learned.
<i>Case Study:</i> <b>SkiStar</b> – consolidation of and CRM for four skiing destinations by means of ICT	Sweden / Norway	A private tourism company acting like a public DMO, where ICT helps to consolidate four skiing destinations into one.  Preparatory work for a future CRM system.
<i>Case Study:</i> A <b>mobile tour-guide</b> with GPS-based navigation for mountain bikers in Southern Tyrol	Italy	Best practice example of a mobile electronic tour-guide with satellite navigation combined with a web platform positioning South Tyrol as a perfect destination for mountain bike holidays.
<i>Case Study:</i> <b>Ski-Nav and the 3Djà-Vu Portal</b> – A location-based system and a geo-referenced web service in the “Portes du Soleil”	France / Switzerland	A mobile electronic guide for skiers which failed to meet sufficient demand due to an inadequate business model. Therefore, it was substituted by the 3Djà-Vu Portal – a geo-referenced web service, which is no longer location-based.
<i>Case Study:</i> <b>London Taxi Point</b> – an SMS based personalised taxi-on-demand service	UK	A rather low-tech solution for a personalised <b>taxi-on-demand</b> service; insights into usage patterns of SMS texting versus an interactive voice response system.

## 2.9.4 Anticipated implications of e-business for the industry

Based on survey results, case studies and desk research, *e-Business W@tch* has drawn conclusions about opportunities and risks which e-business may bring about for SMEs from the tourism industry.

Opportunities	Risks
<ul style="list-style-type: none"> <li>• <b>ICT is still a source of competitive advantage:</b> ICT remains an important enabler of product and process innovation in tourism.</li> <li>• <b>Customer-driven demand for e-business products and services:</b> Investment in e-business is needed to meet the steady increase in demand for online services.</li> <li>• <b>E-business may upgrade destination management:</b> Destinations as some kind of virtual enterprises are predestined for e-business applications.</li> <li>• <b>ICT may help to establish high-quality CRM:</b> The application of CRM in the information intensive customer-driven tourism market may prove very profitable.</li> <li>• <b>Innovative mobile e-services:</b> Mobile (location-based) services may serve tourists conveniently while travelling and at the destination during their stay.</li> <li>• <b>Re-intermediation and dis-intermediation in parallel:</b> New e-intermediaries drive innovation in the market while traditional intermediaries may lose ground. This bears opportunities and risks simultaneously, e.g. for travel agencies.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Exclusion of IT-laggards:</b> Tourism companies reluctant to introduce ICT in their business may lose market share.</li> <li>• <b>Inadequate ICT solutions for SMEs:</b> Sophisticated applications like CRM or instant online-booking functionalities are tailored for large companies.</li> <li>• <b>Lacking cooperation within e-business networks:</b> Different stakeholders within one destination may focus on competition amongst them instead of supporting a cooperative e-business solution for the destination.</li> <li>• <b>Asymmetrical adoption of e-business across tourism sub-sectors:</b> The uneven uptake of e-business in different types of tourism companies which should work together may cause difficulties.</li> <li>• <b>Lack of sustainable business models for mobile e-services:</b> Innovative mobile systems for tourists operate on a promising market fraught with many risks.</li> </ul>

### Opportunities and motives

Results of the e-Business Survey 2005 confirm the view that ICT is still a source of competitive advantage in tourism. A majority of enterprises consider e-business important to gain a competitive advantage (40% very important and 36% somewhat important). The second most important reason for doing e-business is customer expectations (about 69%), followed by the perception that a tourism company must adopt e-business because competitors do so (about 59%).

**E-business may help to further improve destination management.** Most European destinations consist of a very heterogeneous structure of independent tourism companies. These individual enterprises do well in joining forces for national and international marketing of the destination as a whole. Since tourists choose the destination for their holidays first, before deciding on the kind of services they would like, there, destinations are the main units of competition in tourism. ICT may support the internal coordination, e-marketing and online selling of products and services provided within the destination. At the same time, DMOs may operate destination portals on the internet enabling direct contacts between tourists and service providers.

**ICT may help to establish high-quality CRM:** Tourism is a business rich in information and most service providers are in close contact with their customers, allowing them to gain knowledge about their needs and preferences. Yet currently only a minority of tourism companies collect, store and analyse their customer data systematically, to improve the quality of offers, respond more quickly to the changing needs of customers, and finally to ensure customer retention. As the European tourism market changed from a sellers' market to a buyers' market, a more customer-centric approach becomes an important ingredient for success. The application of CRM may prove promising, and ICT provides smart tools for CRM. Destination management systems (DMSs) implementing some kind of

CRM application may prove profitable for individual service providers and the destination as a whole alike.

**Innovative mobile e-services.** Mobile digital services may serve tourists conveniently while travelling and during their stay. While most established e-commerce applications deal with customer needs in the pre-trip or after-trip phases, there is a lack of applications serving the tourist on-the-spot or on the way to the destination. Some m-commerce applications are already available today, but the quality of their contents, the technological implementation and the ease of using such services varies considerably. The market for such services is still in its infancy. However, location-based systems promise to flood the market with new and innovative e-services.

**Re-intermediation and dis-intermediation** are likely to occur in parallel in this industry, which can be regarded as an 'opportunity' or 'risk' – depending on the perspective. From the perspective of an accommodation provider, dis-intermediation may be positive: skipping of traditional intermediaries, such as travel agencies, and interacting directly with potential guests online may save commissions and increase profitability. On the other hand, travel agencies and tour operators perceive dis-intermediation as an existential threat.

### **Risks and barriers**

However, there are still barriers to further uptake, for example **asymmetrical adoption of e-business across tourism sub-sectors**. Apart from disparities in e-business adoption of due to different size of companies, the uptake of e-business in tourism also varies between its different sub-sectors. This may create barriers for the networking of different types of tourism companies, which is important, for instance, for dynamic packaging of bundles of products or services for customers online.

**Inadequate ICT solutions for SMEs.** Not surprisingly, large companies are applying ICT and e-business solutions more vigorously than SMEs. This is especially true for sophisticated applications such as CRM. Many SMEs tend to consider such technologies too expensive and too complicated for usage in their daily business environment. Overall, today's software suppliers and ICT service providers seem like neglecting SMEs in the tourism sector, although the latter might constitute an important ICT market in the near future.

**Lacking cooperation within e-business networks.** In tourism, the product usually consists of a bundle of services from different stakeholders within the sector. Therefore, it is much more efficient for service providers to create networks for their business operation and marketing than trying to act individually. DMOs may be a visible form of such cooperation. Yet, DMOs often lack the support of important stakeholders within their region, which may hamper destination management seriously. Especially in the online economy, which is a networking economy by nature, disparate collaboration between tourism companies within a destination limits the prospects for successful e-business networks.

## 2.9.5 Policy implications

There are still a number of tourism enterprises completely refusing to engage in e-business. Often, these IT-laggards lack the basic ICT infrastructure. Initiatives to raise the awareness of the potential benefits of ICT and e-business may help to overcome such barriers. Policies supporting the **roll-out of broadband infrastructure** may also prove highly beneficial. The same is true for training policies which should try to include e-skills in vocational curricula and foster respective activities also for staff in the tourism industry.

Another field for policy action is the **support of standardised internet-based systems**. In contrast to existing Computer Reservation Systems (CRS) and Global Distribution Systems (GDS) tailored for large enterprises, new systems may open up opportunities for applications in an open network like the internet, which may be more adequate for SMEs. Yet, many e-marketplaces set up barriers due to different standards used. Thus, standardisation-targeting projects, enhancing the interoperability of all sorts of web services for the tourism sector, should be supported.

Furthermore, policies should encourage **initiatives for networking** and cooperation in e-business among tourism enterprises. It is fundamental for SMEs to form networks with other players in the market to satisfy the needs of customers, which have become more demanding and empowered by the internet. Policy measures should stimulate the participation of SMEs in business networks targeted at cooperation in daily business, training activities and the transfer of know-how.

**Exhibit 2.9-4: Policy implications of e-business in the tourism industry**

Policy objectives	Concerns and suggestions	Possible initiator(s)
<b>Diffusion of basic ICT infrastructure</b>	<ul style="list-style-type: none"> <li>Activities for raising the <b>awareness</b> of the potential benefits of ICT by tourism companies</li> <li>Initiatives promoting the roll-out of broadband (e.g. tax incentives or support for the development of broadband infrastructure in rural regions)</li> </ul>	<ul style="list-style-type: none"> <li>European Commission</li> <li>Member States</li> <li>Tourism sector associations</li> <li>Telecommunication industry associations</li> </ul>
<b>Standardised internet-based systems</b>	<ul style="list-style-type: none"> <li>Supportive actions on how to handle technical <b>interoperability</b> e.g. by e-marketplaces</li> <li>Support for <b>research</b> projects targeting standardised internet-based systems</li> <li>Support for industry initiatives like the Open Travel Alliance (OTA) in order to tailor their work also for <b>SMEs</b> in tourism</li> </ul>	<ul style="list-style-type: none"> <li>European Commission</li> <li>Member States</li> <li>International and national standardisation bodies</li> <li>Tourism sector associations</li> </ul>
<b>Education and e-skills</b>	<ul style="list-style-type: none"> <li>Support for the inclusion of <b>e-skills</b> in curricula for education for the tourism sector</li> <li>Support for <b>training</b> activities procuring e-skills</li> <li>Initiatives for raising the <b>awareness</b> of entrepreneurs for the necessity of personnel "fit in ICT"</li> </ul>	<ul style="list-style-type: none"> <li>European Commission</li> <li>Member States</li> <li>Tourism sector associations</li> </ul>
<b>Networking and cooperation</b>	<ul style="list-style-type: none"> <li>Encouraging initiatives for networking and cooperation, e.g. in <b>competence centres</b></li> <li>Stimulating the participation of SMEs in <b>business networks</b></li> </ul>	<ul style="list-style-type: none"> <li>European Commission</li> <li>Member States</li> <li>Tourism sector associations</li> </ul>

## 2.10 The IT Services Industry

The e-Business W@tch sector study on IT services was contributed by Berlecon Research GmbH (contact: [info@berlecon.de](mailto:info@berlecon.de)).

The full reports (parts 1 and 2) can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) at the 'resources' section.



Information technology and e-business services are not the only output of the IT services sector. Rather, they crucially influence the way in which this output is produced, promoted and provided. This specific use of ICT distinguishes the computer related services industry from the other sectors analysed by *e-Business W@tch* in 2005. Online channels have become key for marketing, communication and interaction with customers. A necessary requirement for such services is a powerful ICT infrastructure, such as broadband connections between service providers and users. Hence, it is no surprise that companies from the IT services sector are well equipped with such infrastructure. As many products and services from this sector are delivered online, the border between "product" and "service" is becoming less distinct. In the software industry in particular, service orientation has increased along with e-business activity: user needs are better understood and considered, while the focus on technology is decreasing.

### 2.10.1 Sector definition and background

#### Sector definition

The IT services sector, as defined for the *e-Business W@tch* studies, contains the following business activities subsumed under NACE 72.<sup>93</sup>

#### **Exhibit 2.10-1: Business activities covered by the IT services industry (NACE Rev. 1.1)**

NACE Rev. 1.1	Business Activity
Part of 72	Computer and related activities
72.1	Hardware consultancy
72.2	Software consultancy and supply
72.3	Data processing

IT services are part of the entire ICT sector, which has been analysed in many research and policy studies – including past reports published by *e-Business W@tch*. There are, in fact, many ties between IT and communication services. Internet or telecommunication network services, for example, are the basis for many IT service activities.

However, these two ICT areas differ significantly in terms of company sizes and market structure, as well as in the way services are produced. This also means that IT and e-business technologies are

<sup>93</sup> NACE revised version 1.1 – final draft 2002. See glossary for explanation.



used in different ways. Therefore, the two reports of 2005 have focussed on the analysis of e-business key issues which are related to activities that build the core of IT services. These activities can be summarised in the slogan of several IT service providers to “*plan, build and run*” IT systems.

### **Industry background**

The IT services sector is of significant importance for the prosperity and growth of the European economy. The IT services industry itself has a substantial economic power: in 2001, there were about 445,000 IT service companies in today's EU-25. These companies generated a production value of more than €260 billion, created a value added of about €140 billion and employed about 2.4 million people.<sup>94</sup>

The IT services industry, as a knowledge intensive sector, plays an important role for the creation of high-skill jobs. More importantly, goods and services provided by IT services companies affect the productivity and competitiveness of other industries. The deployment of IT-based solutions throughout the value chain may increase the overall efficiency and competitiveness of the user companies. Thus, innovations within the IT services sector can enhance the prosperity and growth of the entire economy.

## **2.10.2 ICT and e-business adoption in 2005**

### **IT service companies are intensive users of ICT and e-business tools**

Information technology and e-business services are not the only output of the IT services sector. Rather, they influence crucially the way in which this output is produced, promoted and provided. In this specific way of using ICT, the IT services sector differs from the other industries analysed by *e-Business W@tch*. Companies in this sector are intensive users of ICT and e-business tools. The usage rates for all main e-business application areas discussed are above the weighted average of the 10 sectors covered by the e-Business Survey 2005. Companies from the IT services sector apparently set benchmarks for the use of ICT infrastructure and customer facing e-business applications.

Results also prove the potential of ICT and e-business technologies for SMEs, which account for about 99% of enterprises in this sector. In fact, in almost all e-business application areas discussed in the sector studies of 2005, small IT services enterprises constitute a significant share of users. This holds true even for the use of more complex software that was initially designed for the needs of large companies, such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and knowledge management systems.

### **Use of offshore IT services by marginal share of IT services companies**

A large share of companies in this sector actually outsources IT services. However, this activity takes place mainly within national markets. Only a marginal share of IT services companies currently outsources IT services to offshore or near-shore regions like India or Eastern Europe. Business examples of offshore user companies presented in the sector reports indicate that the establishment of offshore relationships is best done step by step and therefore needs time. A major motivation of the users interviewed is to manage peak demands by outsourcing non-core tasks. Finally, it turned out that language skills are an important criterion for the selection of suppliers.

### **Open Source Software (OSS) widely used**

Open source operating systems, databases and internet browsers are widely used by this sector's companies, regardless of the company size. In comparison, the use of OSS components by companies in other sectors seems to be relatively low. However, software vendors also have the opportunity to integrate OSS components into proprietary solutions and increasingly do so. Therefore,

<sup>94</sup> Source: Eurostat New Cronos / DIW Berlin 2005. See sector report (July 2005) for more details.

it might be the case that OS components are more widespread than this survey shows, as user companies do not know that some of the software they use includes OSS components.

**Exhibit 2.10-2: Main findings of the e-Business Survey 2005 for the IT services industry**

Application area	Main findings
<b>Basic ICT infrastructure and skills development</b>	<ul style="list-style-type: none"> <li>IT services companies are well equipped with <b>basic ICT infrastructure</b>: respective usage shares are above the average of the 10 sectors studied.</li> <li>Majority of IT services companies reported having <b>broadband</b> internet access: data confirm DSL success particularly among SMEs.</li> <li>More than 60% of IT services companies said that they provide <b>remote access</b> to their employees; about a quarter of companies use mobile solutions.</li> <li>There are some difficulties in <b>recruiting IT staff</b> particularly by small companies.</li> </ul>
<b>Outsourcing and the integration of open source components</b>	<ul style="list-style-type: none"> <li><b>IT outsourcing</b> opportunities are frequently used, notably by SMEs in this sector. Main outsourcing areas are web hosting and data storage services, whereas network and hardware maintenance are less frequently outsourced.</li> <li><b>Offshore outsourcing</b> – in the sense of outsourcing IT services to third party providers in offshore regions – does not play a role.</li> <li>IT services companies are intensively using <b>OS components</b>. Popularity of OSS in this sector is not only limited to Linux; OS databases like MySQL or OS web browsers like Mozilla are also used frequently in this sector.</li> <li>In contrast, <b>OSS components</b> are less widespread in other sectors studied – indicating a still early stage of OSS diffusion. However, the diffusion of OSS might be higher than indicated by survey data due to the integration of OSS components in non-core parts of IT solutions.</li> </ul>
<b>Integration of internal processes</b>	<ul style="list-style-type: none"> <li>ICT and e-business technologies for coordinating <b>internal processes</b> and knowledge sharing are widespread in this sector: usage shares of Intranet, knowledge management systems, e-learning are above the weighted average of all sectors.</li> <li>Even the diffusion of <b>ERP and EDM (Electronic Document Management) systems</b> is – despite the high share of small enterprises in this sector– above the average of the 10 sectors covered in 2005.</li> <li>Online technologies that facilitate <b>collaborative tasks</b> are mainly used by IT services companies to support project management: about half of the IT services companies use online tools for document sharing.</li> </ul>
<b>Supplier-facing activities</b>	<ul style="list-style-type: none"> <li>Online purchasing is of high relevance in this sector: more than 80% of IT services companies reported <b>buying online</b>. Most of online purchases, however, seem to take place within national borders.</li> <li><b>Purchasing online</b> is particularly widespread among small companies in this sector. In contrast, large IT services companies reported using specific IT solutions to support procurement and sourcing processes.</li> <li>Data on specific IT solutions indicate a low relevance of reverse auctions and functionalities supplied by <b>e-marketplaces or ASPs</b> (Application Service Providers).</li> <li>Data do not support any hypothesis in favour of an increase or decrease in the number of suppliers from the usage of <b>e-sourcing tools</b>.</li> </ul>
<b>Customer-facing activities</b>	<ul style="list-style-type: none"> <li><b>Websites</b> are widespread in this sector: about 80% of micro enterprises and more than 95% of small, midsize and large companies in this sector have one.</li> <li>About a quarter of IT services companies reported <b>selling online</b>.</li> <li>Usage of specific IT solutions to support <b>marketing and sales</b> activities shows similar patterns as observed for those supporting procurement processes</li> <li>The percentage of companies in the IT services sector that reported using a <b>CRM system</b> is about five times the weighted all-sector's average.</li> <li><b>CRM solutions</b> are also suited for small IT services companies: almost a quarter of micro companies and more than a third of small firms in this sector replied that they already use CRM software.</li> <li>Main benefits from using CRM systems are in the support of marketing activities and <b>customer care</b>.</li> </ul>

### 2.10.3 Important topics and application areas

#### **Close, personal contacts to customers key for successfully offshoring IT services**

The 'activity views' collected by *e-Business W@tch* in 2005 indicated that a modern ICT infrastructure, including internet connections and company websites is an important precondition for setting up shop as an export-oriented IT service provider. However, these short case studies have also shown that the professional use of ICT is not sufficient. There are further success factors, namely quality assurance and personal contacts. Measures that ensure the quality of the project are, admittedly, of general importance, independent of the location of the IT services provider. But in contrast to many domestic IT service providers, most of today's offshore suppliers cannot build on reputation. Moreover, they are often confronted with prejudices with respect to their service quality.

Furthermore, the experiences made by the companies interviewed in the context of case studies show that close, personal contacts to customers are a key success factor. Firms consider the establishment of personal and long-term relationships to (potential) customers in the target market to be a key priority. This makes language skills important, too. In particular smaller customers prefer to discuss their needs and problems in their mother language. Furthermore, bilateral co-operations and trade fairs can help IT services companies to establish personal relationships.

Finally, it turned out that offshore IT service providers in Eastern Europe have to become more than simply low cost service providers. While low prices are essential for getting into the markets in Western Europe, they are not sufficient for sustainable competitiveness of export-oriented Eastern European IT services businesses.

#### **OSS: managing the open source developing community is a major challenge**

Open source paves the way from product-centric software supply to new business approaches that focus on services around the software. In this way, small companies gain access to a software segment that is increasingly dominated by large players. Moreover, established software companies can side-step the strong competition stemming from an ongoing consolidation in the traditional software market.

IT users can also benefit from this development. OSS enhances the adoptability of software products for the specific needs of companies and thus supports their efficient use. Furthermore, OSS-using companies gain some independence from software manufacturers while, in many cases, also benefiting from cost savings.

The internet and internet-based platforms play an essential role in the OSS development as they provide the basis for collaboration and an organisational infrastructure to support the development process. In addition they play a role in marketing.

The case studies have further demonstrated that quality assurance and the ability to react promptly to emerging customer needs are of outstanding importance. Managing the developer community turned out to be a key challenge of OSS businesses. It appears that the widespread perception of OSS communities as groups of altruistic programmers working in their leisure for free does not hold anymore, at least if large and professional OSS projects are considered.

#### **Software as service: extensive knowledge about customer needs required**

About five years after the dotcom boom, the paradigm of providing software as service has had its first reality check, leading to significant changes of internet-based services. Some providers of B2C e-commerce sites increasingly tend to support the entire sales process of suppliers. Thus, the support of actual business processes and actual needs of customers has become more important than the realisation of new technical paradigms. This also applies to application service providers. Many early ASPs failed despite the potential of this concept. Their services offered were very much technology-driven and neither addressed company specific requirements sufficiently nor offered a compelling advantage compared to local installations. In fact, there is a trade-off between the necessary degree

of standardisation in order to exploit economies of scale and the customisation of the solution in order to meet process-specific needs of the users.

Case studies indicate a possibility of overcoming this challenge, namely the exploitation of synergies. Users can enjoy cost savings from the one-to-many-design of the software solution. Moreover, by collaborating via the internet synergies arise that could not be exploited in case of a local installation. A supplier, for example, once connected to the platform, can be made available to all connected buyers.

The maturing of software as service is primarily characterised by a better consideration of actual user needs and wants and by a lesser focus on technology alone. Case studies demonstrated that this requires extensive knowledge about the actual customer needs and the applications to be supported. An outcome satisfying customers often is not software as service in its purest form, but may involve certain traditional software components.

### Case studies and business examples

The sector reports on the IT services industry (July / September 2005) contain short case studies and examples of e-business activity in companies from the sector. These 'activity views' support the analysis of findings both from the survey and from desk research, and provide further insight in current e-business trends and developments. Exhibit 2.10-3 summarises the 'activity views' which are featured in more detail in the two reports.

**Exhibit 2.10-3: E-Business Activity Views featured in the sector studies**

E-Business Activity Views	Country	Topics
<i>Case Study: Offshore IT services by <b>PGS Software</b></i>	Poland	A start-up seeking to establish itself as a global provider of <b>IT outsourcing</b> and software development services; insights into opportunities and challenges for Eastern European IT service companies.
<i>Case Study: <b>Softgate</b> – A Romanian supplier of software services for the German market</i>	Romania	An IT services company that is experienced in <b>developing custom software</b> applications for the German market; discussion of challenges and success factors for providing offshore IT services.
<i>Case Study: Open source based services by <b>Open Cascade</b></i>	France	A traditional software manufacturer that has become an <b>open source company</b> ; discussion of challenges and success factors of the OSS model, particularly in creating a developer community.
<i>Case Study: <b>Janus Software</b> wants to establish itself as a “competitor of Oracle”</i>	Netherlands	Example of a “typical” OS company; discussion of challenges and opportunities of OS-based business models, particularly in creating a developer community; insights into the potential of the <b>internet for marketing purposes</b> of OS companies.
<i>Case Study: <b>Onventis</b> – The provision of supply management applications on demand.</i>	Germany	A “Procurement Service Provider” offering its <b>solutions on demand</b> ; insight into challenges and success factors for ASP (application service provider) approaches by a company that succeeded in creating a stable business.
<i>Business example: New cashier system by <b>PMS</b></i>	Poland	An IT system <b>developer and integrator</b> that introduced a cashier system software as natural extension of its e-ticket service.

## 2.10.4 Anticipated implications of e-business for the industry

The second sector report (of September 2005) assessed the implications of ICT and e-business adoption on the structure of the IT services industry. It applied the 'five-forces-model' developed by Michael E. Porter (1980) as a framework to do so. This chapter summarises the main findings.

### New entrants

In general, barriers to entry are low in most IT services segments. Setting up shop in software development and consulting requires only labour, knowledge and a basic ICT infrastructure as major inputs. Therefore, only limited resources are needed for establishing an IT services business. As a consequence, most companies are small: more than 90% of companies active in this sector are micro enterprises. The internet makes it even easier for small companies to enter the markets, as it decreases costs for obtaining information as well as for marketing and communicating even to distant (potential) customers.

Moreover, new e-business developments are likely to even further facilitate market entry by new players and thus to increase competition in this sector. In fact in past years nearly every new technological trend, e.g. the provision of centrally hosted software applications via the internet (ASP), was accompanied by a large number of new players entering the market and trying to establish a business in this new niche. Although many of them disappeared only shortly afterwards, some survived and increased competitive pressure in the IT services market.

### Substitution of products and services

In Porter's model, substitutes refer to products or services in other industries. From an economist's view, a threat of substitutes exists when a product's demand is affected by the price change of a substitute product. From this perspective, there are no serious threats of substitutes if the entire IT services sector is considered. Simply spoken, investments in new ICT or e-business technologies cannot be substituted by services or products supplied by other industries.

A threat of substitutes, however, is of importance within different sub-segments of IT services, particularly in the software development market. Open source based software products, for example, are increasingly becoming serious alternatives to conventional software. In addition, customers can choose between different types of software provision. They may, for example, install solutions internally or use centrally hosted applications provided via the internet by ASPs or B2B internet trading platforms. Hence, ICT and e-business tools are essential for establishing open source or ASP businesses as alternatives to conventional software.

### Negotiation power of suppliers

Main inputs to IT services, apart from labour and knowledge, are products and services delivered by other IT services companies (e.g. software development and hosting services). The 2005 survey results have shown that a large share of IT services companies are outsourcing IT services to other providers. However, the negotiation power of IT outsourcing providers is limited, as a large number of competing companies offer outsourcing services today – especially if it comes to basic commodity services. In addition, the establishment of offshore IT outsourcing businesses in Eastern Europe is likely to intensify competition among outsourcing service providers and, thus, to diminish their negotiation power.

However, the impact of e-business technologies on the negotiation power of suppliers is relatively low. The main implication is that the internet has contributed to a higher transparency of prices and, in this way, slightly lowered the suppliers' negotiation power. Thus, IT services companies using the internet for procurement activities may profit from a stronger position. They could (at least in theory) further exploit their purchasing power by using online negotiation tools (e.g. online auctions). However, specific IT solutions likely to further exploit the strong position of IT services companies towards their suppliers (e.g. online auctions) are only of minor importance in this sector.

## Negotiation power of customers

The plunge in IT expenditures after the end of the dot.com hype has certainly increased the competitive pressure in the IT services sector. Consequently, the negotiation power of customers has steadily increased during the past years as is indicated, for example, by the continuing price pressure in this sector. As further consequence of the increased negotiation power of IT services customers, their demands on quality, pricing and the consideration of process-specific needs have increased.

Current e-business developments are likely to further improve the negotiation power of IT services customers. The increasing relevance of OSS, for example, may affect the relationships between customers and providers. Firstly, the existence of OSS has increased competition in the software supplier market. In fact, various open source products, e.g. the operating system Linux or the database software MySQL, have become serious alternatives to conventional software. Customers can, thus, choose from a larger variety of alternatives. Secondly, the OS model also impacts the IT consulting and software integration market. Since the source code is open, almost all skilled IT services providers may offer integration services around the software. This further contributes to the independence of customers from specific software vendors and their integration partners.

## Rivalry in the market

Triggered by the long-lasting economic downturn after the end of the dotcom boom, rivalry in the IT services market has significantly increased during the past years. The recent consolidation process in the software market, for example, has driven the merger & acquisition dynamics and led to headlines like *"In the flat enterprise software market the message is clear: It's time to hunt or to be hunted"*<sup>95</sup>. A prominent example of this development was the hostile takeover of PeopleSoft by Oracle (both active in the ERP market). As a consequence, IT services companies have to deal with a continuously changing industry structure.

Key e-business developments discussed in the sector report of July 2005 are likely to intensify competition in the IT services market. Case studies show how even small IT services companies try to compete with "IT giants" by making use of the open source model. Likewise, an emerging IT offshore market in Eastern Europe is likely to lead to more competition in established IT services markets. In addition, the delivery of SaaS – in the past often discussed as application service providing and currently getting again more attention – offers new opportunities for software companies to differentiate from their competitors.

However, results of the e-Business Survey 2005 indicate that these developments are still at an early stage. While open source software (OSS) is already much used by IT services companies themselves, it is much less widespread in other sectors surveyed. At the same time, the percentages of companies outsourcing IT services to Eastern European providers or using specific software applications offered by ASPs are negligible (across all sectors studied in 2005).

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<sup>95</sup> As "Takeaway" of an article in TechRepublic (2004): "Survival of software's fittest", Article, 16.08.2004 ([www.techrepublic.com](http://www.techrepublic.com)).

**Exhibit 2.10-4: Anticipated impact of e-business on the IT services industry**

Five forces shaping industry structure	General importance in the sector	Impact of e-business	Main arguments
<b>New entrants</b>	<u>High</u> : Entry barriers are low since the establishment of businesses in the IT services sector only needs few resources.		<ul style="list-style-type: none"> <li>Supply of outputs via the internet facilitates the establishment of new firms – independent of size and origin.</li> <li>New technological developments are likely to accelerate the market entry of new players.</li> </ul>
<b>Substitution of products / services</b>	<u>Medium</u> : Threat of substitutes is of importance for alternatives within single market segments.		<ul style="list-style-type: none"> <li>Alternatives to the conventional software supply have emerged, triggered by the OS and ASP developments.</li> <li>Use of ICT and e-business technologies plays an important role for the establishment of OSS or ASP businesses.</li> </ul>
<b>Negotiation power of suppliers</b>	<u>Low</u> : Main inputs are produced by companies active in the IT services sector itself.	I	<ul style="list-style-type: none"> <li>The internet has increased prices' transparency and so further lowered the negotiation power of suppliers. Actually a large share of IT services companies purchase online.</li> <li>However, online negotiation tools are only of marginal importance in this sector.</li> </ul>
<b>Negotiation power of customers</b>	<u>High</u> : Strong price pressure and demanding customers are indicating an increased negotiation power of customers.		<ul style="list-style-type: none"> <li>The open source development is likely to increase the independence of customers from software vendors and integrators.</li> </ul>
<b>Rivalry in the market</b>	<u>High</u> : The rough economic environment has intensified rivalry in the IT services market during the past years.		<p>Three e-business issues discussed in the July 2005 full report are likely to intensify rivalry in the IT services market:</p> <ul style="list-style-type: none"> <li><b>Open source</b> opportunities, enabling small IT services companies to compete with large players.</li> <li><b>Establishment of offshore businesses in Eastern Europe</b> may increase the division of labour within the IT services market in the EU.</li> <li><b>ASP/ SaaS</b> offer opportunities for differentiation.</li> </ul> <p>However, according to survey results of 2005, developments are still at an early stage.</p>
Impact of ICT and e-business: I = low;      = high			

## 2.10.5 Policy implications

Case studies collected by *e-Business W@tch* in 2005 show that an export-oriented IT services market might be established in Eastern Europe. Due to cultural and geographical proximity it is easier for Western European companies – even for SMEs – to use the “near-shore” service offers from these companies than those from real offshore service providers located in distant countries. Promoting these developments by appropriate policy measures may help to encounter size-specific problems of SMEs in this sector.’

The issues discussed are still under an open debate. For truly consolidated policy conclusions reliable empirical data on the general relevance, usage potential, as well as on problems and challenges related to these issues are needed. Actually the need for reliable empirical data and empirically well-founded assessments (which are beyond the scope of the sector studies by *e-Business W@tch*) is a major policy challenge in itself.

**Exhibit 2.10-5: Policy implications of e-business in the IT services industry**

Policy objectives	Concerns and suggestions	Possible initiator(s)
<b>Promotion of European Offshore Businesses</b>	<p>Support <b>further investigations</b> as basis of appropriate policy measures. Further research should focus on the:</p> <ul style="list-style-type: none"> <li>• extent of offshore IT outsourcing in the EU</li> <li>• impact of offshore outsourcing.</li> </ul> <p>Provide a <b>handbook</b> or guide helping SMEs to overcome critical challenges by discussing:</p> <ul style="list-style-type: none"> <li>• Criteria for the selection of offshore IT service providers,</li> <li>• Business and technical requirements,</li> <li>• Normal, best and unfair practices related to offshore outsourcing,</li> <li>• Evaluation of investment risks,</li> <li>• Policy support and contacts.</li> </ul> <p>Promote <b>regional trade fairs</b> and business events to support the establishment of relationships between providers and users of offshore IT services</p>	<ul style="list-style-type: none"> <li>• European Commission</li> <li>• Member states</li> <li>• Trade promotion organisations</li> <li>• Regional policy makers</li> </ul>
<b>Software patents</b>	<p>Provide reliable and understandable <b>information</b> on future OSS – related investment risks</p> <p>Support a continuous <b>monitoring</b> of industry practices related to the usage of software-related patents in the EU.</p>	<ul style="list-style-type: none"> <li>• European Commission</li> <li>• (Member States)</li> </ul>





## Part 3: Contributions

### Introduction

As in previous editions of the European E-Business Report, *e-Business W@tch* has invited distinguished colleagues who work on e-business related topics in their organisation to contribute an article to the report. For this year's edition, we asked for contributions that outline e-business developments from a national perspective of one of the EU Member States. Authors give an overview of the main e-business related policies in the respective countries, and comment on the state-of-play in e-business adoption by firms, based on the most recent available data.

The first article of this part features selected results of a current study conducted for DG Enterprise & Industry about the impacts of national and regional e-business policies.<sup>96</sup> The study shows that common good practices in e-business policy making can be identified, although the different nature and objective of individual policies clearly requires different implementation mechanisms. For example, it makes a big difference whether the focus is on *general awareness raising*, or whether policies have moved to the 'next phase' on the e-maturity ladder by tailoring their support activities to the need of *individual SMEs*. The policies studied (from **Finland, France, Sweden** and the **UK/Wales**) include both types of initiatives.

In the subsequent chapter, *Stefanos Karapetsis* (of Mellon Group) comments on e-business developments in **Greece**. Most data indicate that Greek enterprises, despite substantial Government efforts, are still lagging behind in terms of ICT adoption and e-business activity compared to the EU average. However, the author concludes with an optimistic scenario, arguing that "*Greece is at a crossroads as an economy and as 'e-conomy'*", and presents reasons why "*one can expect the acceleration of ICT use and e-business growth in the future*".

In contrast to Greece, the **Netherlands** is an advanced country in information society development. *Ronald Batenburg* from Utrecht University concludes that the Netherlands can be described as a traditional, but progressive and service-oriented country and economy, both in terms of e-business adoption and policy. He argues that The Netherlands hold "*a tradition in both ICT and inter-organizational cooperation*", and that the nature of "*e-business smoothly aligns with many Dutch interests and industries*".

*Tomas Sabol, Radoslav Delina* and *Viliam Vajda* from the Technical University of Košice introduce relevant developments in **Slovakia**. The country, which joined the EU in 2004, adopted a national Action Plan based on the eEurope 2005 Action Plan with e-business related tasks. The authors outline the activities launched within this framework, and point out the challenges involved and the mixed outcomes. As in the case of Greece, e-business activity by firms is still limited in Slovakia, in particular among SMEs. The authors explain some of the barriers to a more rapid uptake.

An interesting case study in e-business development is **Spain**, possibly one of the most decentralized European countries. *Jesús Galván*, Professor at the Schiller International University, Madrid Campus, confirms the general assessment by *e-Business W@tch* regarding the dynamic development in this country<sup>97</sup> and he concludes that "*e-business has a promising future in Spain*". Notwithstanding some challenges, he argues that ICT infrastructure is evolving at a good rate, that "*most of the companies*

<sup>96</sup> Results are based on the first Interim Report of the EC study "Impact Assessment of National and Regional e-Business Policies", which is currently being conducted by Databank Consulting, IDATE and empirica GmbH on behalf of the European Commission, DG Enterprise and Industry. The Interim Report contains the evaluation results for five policies. The final study report (with results for 10 policy initiatives) is expected for early 2006.

<sup>97</sup> Cf. Part 1 of the report, and *e-Business W@tch* (2005), Pocketbook of e-Business Indicators, p. 14: "Dynamic development in Poland and Spain"

are aware of the importance of the internet for survival", and that some lagging Spanish regions are catching up quickly.

The selection of countries reflects the objective of featuring profiles both from supposed 'front-runners' in e-business adoption and policy, and from 'laggards'. It can be assumed that ICT related policies differ according to the relative progress of a national economy. Another consideration was to include views from some of the smaller countries which were not covered by the e-Business Survey 2005. This overview does not claim covering the whole range of e-business policies which are being implemented in different Member States. However, it can safely be assumed that ICT related policies differ according to the relative progress of a national economy.

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empirica GmbH

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Editors, October 2005





## 3.1 Impact Assessment of National and Regional e-Business Policies

### 3.1.1 Background

This chapter presents some results of the current study "Impact Assessment of National and Regional E-Business Policies", which was commissioned by the Enterprise & Industry Directorate General in 2004.<sup>98</sup> This study assesses the outcomes and impacts of 10 e-business policy initiatives from different European countries, which had been pre-selected by the European e-Business Support Network (eBSN)<sup>99</sup> for evaluation. The main objectives of the study are to present a consolidated view on these policy initiatives in their respective policy frameworks, and to facilitate the identification of good practices and 'lessons to be learned', thus stimulating policy exchange among EU Member States.

The findings presented here are based on the assessment of four (out of the 10 commissioned by the eBSN) policies which are presented in the study's interim report:

**Exhibit 3.1-1: E-business policies selected by the eBSN for impact assessment**

Country	Scope	Name of the policy	Initiators and main objectives
 Finland	national	eAskel	Launched by the Ministry of Trade and Industry (KTM) in cooperation with private sector organisations in October 2001; policy is ongoing. eAskel offers SMEs subsidised consulting services to explore e-business related opportunities, already on a rather advanced level.
 France	regional	AchatVille	Launched in 2000 by the Chamber of Commerce and Industry of Grenoble (CCI); main goals was to provide marketing and commercial support to local retailers (micro and small enterprises) at an initial stage of e-business.
 Sweden	national	SVEA	Launched in 2000; run by GEA (The Swedish Alliance for Electronic Commerce), a private enterprise voluntary association. Focus on awareness raising and increasing the understanding and knowledge on IT among Swedish SMEs.
 UK (Wales)	regional	Opportunity Wales	Policy ran from 2001-2004, driven by a mixed public/private partnership, involving all the major regional governmental actors. Main goal was to help SMEs in the Objective 1 assisted region of Wales to understand the benefits of e-commerce, focusing primarily on low adopters.

Source: Impact Assessment of e-Business Policies (Study by DG Enterprise & Industry, Interim Report).

Reflecting the eBSN mandate, the following summary highlights some of the lessons learned and good practices identified in the study.

<sup>98</sup> Study by Databank Consulting, IDATE and empirica GmbH. The final study report (with results for 10 policy initiatives) is expected for early 2006.

<sup>99</sup> The European Commission established the European e-Business Support Network (eBSN) as a platform for e-business experts in Europe, for sharing experiences and good practices in support of e-business for SMEs. The e-business policies portal ([www.e-bsn.org](http://www.e-bsn.org)) is the backbone of the eBSN.

### 3.1.2 Good practice elements and their facilitators

During the analysis of the different policy initiatives, some factors and approaches emerged as important **facilitators** to achieve an effective implementation of the policy and the desired outcomes. These were sometimes inherent in the policy design and in the chosen management and implementation modalities. In other cases, they concerned more the policy's ability to overcome barriers, and were intrinsically linked to the alignment of the policy to the SMEs' needs and expectations.

**Good practice elements** for which relevant facilitators could be defined include:

- Use of existing or new **local networks** for promotion and delivery of services
- Creation of **public-private partnerships**
- Delivery of **independent** advice
- Delivery of information and services **tailored to the stakeholders' needs** and expectations

The policies analysed have in common that they made – on the whole – good use of facilitators to achieve these good practices. Exhibit 3.1-2 shows the strengths and weaknesses of individual policies with regard to the identified facilitators.

**Exhibit 3.1-2: Facilitators for good practice elements**

Facilitator	AchatVille	eAskel	Opport. Wales	SVEA
Effective internal communication	++	+	++	+
Decentralisation combined with strong central management	+	-	++	-
A well-structured policy design and clearly defined tasks between stakeholders	++	+	++	+
Mechanisms for quality assurance, in order to gain credibility among the target group	-	++	++	-
Mechanisms to preserve impartiality of the services and avoid the creation of 'unfair' competition	--	++	+	--
The delivery of tailored support services	++	++	++	+
The delivery of tailored information	++	+	++	+
The use of local intermediaries and multipliers	++	++	++	++
Nature of the initiative leading to immediate and observable results	++	+	+	++
Lean procedures	++	+	++	++
Concept of a longer-term relationship, considering follow-up activities	++	++	++	--

Source: Impact assessment of regional and national e-business policies, September 2005 (draft)

### The use of local public and private networks and support organisations

- ▶ It is commonly considered 'good practice' to enhance the cost-efficiency and the effectiveness of a public policy initiative by making **use of existing or creating new local networks** for the promotion and delivery of the policy's services.
- ▶ All of the assessed policy initiatives applied this practice, even if with different intensities and at different levels. The most extensive and integrated approach to such collaboration was noted in the Opportunity Wales initiative and in the Greek Go-Online<sup>100</sup> Training Support Scheme; these policy initiatives also showed the apparently most effective implementation.
  - Relevant factors allowing for efficiency from this perspective were the **quality of the internal communication** and the strong relationship between the **central management and the local actors**.
  - Both initiatives were also characterised by the **set-up of a solid infrastructure**, combining a decentralisation of the activities with a strong central management, thus achieving a balanced mix.
  - The Opportunities Wales initiative consistently invested in the 'backbone' to this structure, i.e. the **technology sustaining the back office** activities. Stakeholders stated that this investment turned into a core facilitator for the smooth implementation of the initiative's activities.
  - In the case of SVEA, a broad **network of 'informers'** helped to disseminate information material and to communicate locally with the projects, thus providing the 'link' between these projects and the overall policy initiative.

### The creation of public-private partnerships, preserving the credibility and impartiality of the services

- ▶ In the assessed policy initiatives, the above-mentioned local networks are all based on public-private partnerships. The **involvement of private partners** in the implementation of public policies is an advantage, because their competence and expertise tends to be more easily recognised by the beneficiaries (the SMEs).
- ▶ However, there are also some risks inherent to such partnerships. For example, the involvement of private sector companies may compromise the '**neutrality**' of the support providers, for instance their **independence of IT suppliers** which is normally considered an important success factor for policies.
  - Neutrality here relates to the **criteria** adopted by the policy management **for the selection** of support providers; these criteria are often determined by the perceived level of importance of quality to gain credibility.
  - The neutrality issue becomes especially tricky when the policy support involves IT equipment or internet connection service providers. In these cases, the assessed policy initiatives had quite differing approaches. Some chose not to implement a selection at all but **leave the choice of provider** entirely up to the SMEs (e.g. Opportunity Wales, and eAskel). Others 'imposed' on the SMEs those private service providers which they **considered most competent** for the task (e.g. the Achatville policy). Arguments can be found to sustain either of these divergent approaches.
- ▶ The 'good and shared understanding' is intrinsically linked to a well-structured policy design **clearly assigning different tasks** to the various stakeholders, and to the quality of the internal communication; an example of such 'good practice' can be found in the Achatville

<sup>100</sup> The Go-Online initiative, which was one of the five policies assessed in the study, is introduced in Stefanos Karapetsis' contribution on e-Business in Greece.

policy initiative. In this initiative, the collaboration between the public and the private partners was based on common interests, leading to a 'win-win' situation.

- ▶ The assessed policy initiatives implemented several mechanisms in order to **guarantee the quality** of their services. These ranged from a rigid selection of the business consultants (e.g. the eAskel policy) to the development, implementation and constant monitoring of rigorous quality thresholds and guidelines for the service delivery (e.g. the Opportunity Wales initiative).

### **The delivery of information and services tailored to the stakeholders' needs and expectations**

- ▶ **Adapting support and information services and their delivery mechanism** to the specific needs of SMEs (or even groups of SMEs) is a key success factor in order to achieve the desired outcomes.
  - On the one hand, such user-orientation requires taking into account the **local situation**, the specificities of the **sector** in which the SME is active, and the characteristics of the enterprise itself
  - On the other hand, it also involves the **modalities of the service delivery**, its swiftness and user-friendliness.
- ▶ All of the assessed policy initiatives have adopted this 'good practice' approach, taking into account the business realities as well as the industry sector of the individual SMEs, and delivering tailored services. In essence, the policy initiatives had developed distinct **core packages of services**, differentiated in order to meet the needs of different types of SMEs.
  - A policy initiative that made a major effort to provide tailored information was Opportunity Wales. Based on its database management approach, this initiative paid extensive attention to the **diverse e-business requirements** among the different sectors in its more general awareness raising activities.
  - eAskel firmly based its approach on the standpoint that adoption of e-business applications need to be determined by the overall business strategy of the company; the consultation is therefore based on a sound analysis of the **company's individual business situation**, strategy and objectives.
  - Similarly to eAskel, Achatville planned a '**diagnosis**' as the very first step in its service delivery, in order to define the effective **suitability** of different e-business tools **for a particular retailer**. Alternative services were considered for those retailers for whom e-commerce activities were not deemed appropriate.
- ▶ Stakeholders in the Greek Go-Online programme considered one of the major strengths of the initiative the direct and immediate nature of the programme, with lean procedures and **immediate and observable results**.
  - This, by no means, implies that a longer-term focus of the policy initiatives or policy frameworks is not appropriate; however, it reflects that the strategic and operational planning of SMEs normally cannot be as long-term oriented as the strategy of large companies. Thus, support measures should include a '**direct reward**' component.

### 3.1.3 Learning points

For each policy assessed, the study has identified some learning points that could be of relevance and interest to policy, in particular in the context of "e-policies". Some of these key learning points are presented in the following paragraphs.

- ▶ **Creating a win-win situation in public-private partnerships** (AchatVille): A win-win situation is essential to ensure the commitment of stakeholders involved in the policy implementation. To this end, roles need to clearly be defined between public and private partners. An overlap of activities can lead to potential competition and conflicts among them.
- ▶ **The project managers' leadership and commitment** (AchatVille): The project managers' skills and commitment have significantly contributed to the success of AchatVille. Thus, the selection of the right project manager can be a crucial success factor in policy initiatives to mobilise partners, particularly if close cooperation of public and private partners is needed.
- ▶ **Base ICT and e-business development of SMEs on their general business strategy** (eAskel): A feature that positively distinguishes eAskel from many other e-business initiatives was that it always starts with analysing the concrete, individual business activities and needs of a company. The formulation of e-business strategies would then be derived from the general strategy and objectives. Consultants confirm that this approach is key. Experience shows that companies find it confusing – if not annoying – when consultants start from the other end, i.e. by focusing on hardware and software issues from the beginning ("What technologies are already in place, and what else could be used?").
- ▶ **The company's management must be involved** (eAskel): Decisions on electronic business strategies tend to have important implications for business processes in general, for example on internal work processes. Therefore, it is necessary that the management of a small company is directly involved in the planning and decision-making process. The main decision on an e-business strategy cannot be delegated to a department (for instance to marketing or IT). eAskel consultants found that whether the issues debated would be pursued in reality correlates with management involvement.
- ▶ **A portfolio strategy for implementing SME services** (eAskel): A general lesson to be drawn from the assessment of eAskel concerns the overall policy framework rather than eAskel itself. The approach of creating a whole portfolio of (branded) SME 'service products' which are complementary to each other has some clear advantages, for example in terms of coordination, synergy and flexible budgetary provisions.
- ▶ **Separating the central co-ordination and management role from delivery** is good practice and avoids conflicts of interest. Similarly the constitution of a legal entity to oversee the funds and the programme ensured a high level of transparency as well as a platform for real co-operation. (Opportunity Wales)
- ▶ **A central driving force** is important that knows what it is doing, with enough experience to understand the market from the client (i.e. SME) perspective. Furthermore, it requires IT knowledge to understand 'the art of the possible' for the client as well as management systems to deliver this on a consistently high quality basis. The driving force must also ensure partnership with the relevant influential actors, usually funders. (Opportunity Wales)
- ▶ **Direct reward / short-term benefit** (SVEA): Small and medium sized companies usually have a tight agenda and cannot afford to participate in projects that are not directly related to their core business activity. Therefore, small companies need to perceive a very strong benefit in order to participate in projects and initiatives. Such benefits must be considered and planned from the beginning, in order to create momentum.



## 3.2 e-Business in Greece

*By Stefanos Karapetsis, Mellon Group*

### Introduction

This chapter presents relevant e-business policy initiatives of Greece and evidence on the uptake of ICT and e-business among Greek enterprises. The presentation consists of three parts. The first part outlines the general policy framework and initiatives taken on national and regional level. The second part refers to Greece's position amongst the EU-25 Member States to the basic initiatives taken by enterprises in certain sectors and, where available, to their impact and results. The last part offers some concluding remarks regarding policy and ICT uptake, as well as some previsions.

The author would like to thank Mr. Ilias Hatzakis, eBusiness Forum Steering Committee Co-ordinator, and Dr. Yannis Larios, Advisor to the Special Secretary of Information Society, for their input and remarks.

### 3.2.1 The policy framework

At a time when Greece is trying to move upscale in e-readiness in order to catch up with its European counterparts, a major issue confronts the economy as a whole: Greece lags behind a very large number of countries in developing business opportunities and in competitiveness. In a recent World Bank report on "Doing Business in 2006" Greece ranks 80<sup>th</sup> out of 155 countries in ease of doing business and 121<sup>st</sup> in ease of starting a new company.<sup>101</sup>

A number of identified barriers discourage entrepreneurship in all its forms, including those founded on an innovative, ICT, basis. Bureaucracy, long periods in establishing a company, multiple and often contradicting laws and regulations as well as latent corruption in the public sector all hold back business and e-business development.

Governments may try to overcome these barriers, but the challenge and effort are enormous, the implementation times are long and the results are marginal. Central Government plays the major role in policy, as it controls financially and from an administration perspective the regions and local authorities that have relative and restricted autonomy.

For the transition to eGreece, Government is using major programmes of the 3<sup>rd</sup> Community Support Framework in order to stimulate ICT uptake in the country. The support comes from the higher Government level – both the current Prime Minister and his predecessor have emphasised the importance of these programmes. On a ministerial level, the most senior person is the Special Secretary for Information Society, in the Ministry of Economy and Finance.

In 2001 the Government established a National Committee for Electronic Commerce; however, the committee has never produced any applicable policy recommendation or concrete result.

In order to overcome cross-departmental co-ordination difficulties in the field of ICT, a high-level governmental ICT Committee was established in June 2004 by the new Cabinet. The ICT Committee presented in July 2005 a diagnosis of the 20 root-causes which led to low technology-penetration and use in the past decade, and developed a first draft of the Digital Strategy 2006-2013 which is now under public consultation.

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<sup>101</sup> World Bank, Doing Business, Economic Rankings. For full report and ranking methodology <http://www.doingbusiness.org/EconomyRankings/>

The vision of the Digital Strategy is to perform a “Digital Leap to Productivity and Quality of Life” and comprises two main strategic objectives:

- Enhanced business productivity through the use of ICT, and new skills,
- Improved quality of life through ICT.

The two strategic objectives are further divided into 6 main directions and over 65 tangible actions addressing ICT uptake by businesses, provision of digital services to businesses, support for the ICT sector as a pillar of the Greek economy, support for entrepreneurial activity in ICT-enabled ventures, improvement of citizen welfare through ICT and the development of digital services for the citizen.

Another important instrument in place is the Greek Information Society Observatory which aims to measure the impact of ICT at the level of both citizens and businesses and become the focal point for all ICT-related benchmarking and policy-proposals. The Observatory started operations as late as July 2004, after almost 2 years of delays, and its benchmarking and dissemination activities are bearing fruit in October 2005 (eEurope benchmarks studies, Best-practices dissemination, etc). The Greek Information Society Observatory is considered a best-practice approach at a European-wide level.

### **3.2.2 E-business policy initiatives in Greece**

#### **Operational Programme for the Information Society**

In 2005, the country is concluding the design of all ICT projects within the “Operational Programme for the Information Society”, which has a total budget of €2.98 billion spanning from its inception in 2000 to its conclusion in 2008. 19% of this budget consists of private contribution and the rest is in part funded (74%) by CSF-III and from national resources. Within the period 2006-2008, all relevant ICT projects should be implemented and put into operation, according to the CSF-III regulations.

A considerable part of the total spend (41% of the funded part) goes to e-Government, with 36% going towards the development and employment in the digital economy. The programme was based on the Government White Book, published in 1999, aimed at driving Greece into the digital economy. Following eEurope 2002 launch in June 2000 in Feire, Portugal, the Greek Government aligned its Strategy and Actions to those of eEurope. At a second phase, it also adjusted its objectives and priorities according to the eEurope 2005 Action Plan. The new Information Society policy initiatives of the European Union, entitled “i2010” are catered for more actively by the new Digital Strategy for the period 2006-2013.

By December 2005, 100% of the total budget of the “Information Society” Programme will have been allocated to ICT projects, almost 30% of the total budget will have been consumed, and the total contracted projects will amount to almost 50% of the budget. The Operational Programme for the Information Society has been severely delayed in the past, having consumed in four years only 11. 8% of its budget. The impact of this delay has been considerable in many aspects, and directly and indirectly affected the uptake of e-business:

- Major projects aimed at improving public services have been delayed due to prolonged tenders, evaluations, appeals and long contractual negotiations, preventing enterprises and citizens from increasing their online interaction for a number of public services
- The ambitious Information Society Programme created great expectations for the IT sector which failed to focus on alternative business opportunities (such as differentiating between products and territory) of expansion. In this way many listed companies have faced net losses and have accumulated large debts. The new government (in office since March 2004) has tried to accelerate the Programme implementation but, despite some progress, there have been no spectacular results in the overall outlook of the sector.

A number of major policy actions have been elaborated and launched for the development of Information Society, including the following initiatives:

**Exhibit 3.2-1: Greek information society initiatives**

<b>DIKTYOTHITE</b> (Go-Online) <a href="http://www.go-online.gr">http://www.go-online.gr</a>	Joint Action Line of the Operational Programmes "Information Society" and "Competitiveness", both funded by CSF III for Greece (2000-2005). The focus is on helping micro-firms to connect to the internet and make their first steps into e-business. The acquisition of minimum terminal equipment which is necessary to go online is subsidised. The target group of Go-Online consists of about 50,000 firms. The initiative has a total budget of € 90 million. By mid 2005, about 37,500 companies had been approved to participate to Go-Online, and about 22,400 of them have received formal training (by close to 1,500 specialised e-business consultants).
<b>METEHO</b> (I Participate) <a href="http://www.metexo.gr">http://www.metexo.gr</a>	This initiative is addressed to relatively larger firms – with up to 20 employees. This was a more sophisticated project also financing part of the implementation of basic e-business solutions. METEHO had an important regional dimension and the response from SMEs across the country surpassed the initial expectations.
<b>EPIHEIREITE ILEKTRONIKA</b> (Do Business Electronically) <a href="http://www.e-pixeireite.gr">http://www.e-pixeireite.gr</a>	This initiative finances the acquisition of ERP, CRM and other systems and the integration of e-business solutions for larger SMEs, with up to 200 employees. This projects finances part of the investments of up to € 250,000 for around 2,500 business plans.

Additionally, there has been a **major training support project** through which consortia of Academic and Technological Institutions, Chambers of Industry and Commerce, under the coordination of Greek Research and Technology Network (GRNET), support small enterprises that ask to participate. Three visits from a consultant of a total duration of seven hours each are provided and a call centre plus a web-based help-desk with nationwide coverage are operated.

These initiatives were undertaken by the Government and in particular the Ministry of Finance and the Ministry of Development. A major role in defining these initiatives, as well as making recommendations to the Government for various policies, is played by the **e-Business Forum** ([www.ebusinessforum.gr](http://www.ebusinessforum.gr)). This forum was started in 2001 by the Secretariat of Industry of the Ministry of Development and has gathered every single player involved: Government, Academics, Users and Suppliers from the Private Sector. The numerous deliverables of more than 35 working groups are a valuable resource to anyone investing in or using ICT to develop further e-business.

Another important initiative from the central Government is the **Programme for Competitiveness** ([www.antonistikotita.gr](http://www.antonistikotita.gr)) with a total budget of € 6.6 billion, of which 50% is private funding. Part of this broad-scope programme involves the modern technologies adoption that will boost competitiveness, which is at a very low level in Greece.

Other important indirect initiatives the Government has taken in the framework of its Information Society Programme are:

- The **National Electronic Public Procurement System**, which is currently in the design phase and expected to be in operation by 2007.
- The provision of electronic services from the **Chambers of Commerce** at central and regional level. The Chambers of Commerce role is complementary to the central Government efforts, and is more important in the regions than in Athens.
- Financing **private investments** for **wireless networks**.
- The design and development of **Metropolitan Area Networks** (Broadband Optical Rings) in over 65 municipalities across Greece.

- Financing **Research and Development** – e-business and e-learning projects launched by the General Secretariat of Research and Technology. There are a number of RTD on-going projects based on collaboration between academic institutions and the private sector in Greece.
- A series of **e-government services** such as “Taxation Online” (TAXIS) and “VAT on Line” that have been very popular as shown below. “Police on Line” – public security online – is still in the contractual phase, while a €70 million project to interconnect public administration (Syzeffixis) started this year.
- The implementation of **digital services for Municipalities** across Greece.

### 3.2.3 Development of e-business

#### Survey results on ICT adoption among citizens and enterprises

Greece is ranked quite low in most e-business uptake related indexes.

- The **citizen’s connectivity** is lagging behind the EU-25 average, which is 43% of households, but 17% for Greece. High telecommunication costs and the absence of any direct or indirect incentive for citizens to obtain a PC or to connect online, are disincentives for a critical mass of consumers.<sup>102</sup>
- The percentage of enterprises employing more than 10 persons with **access to internet** is 87% of total, very close to the EU-25 average of 89% (Eurostat). Even when taking into account that the number of enterprises with more than 10 employees is very small in Greece (around 2%), the level of total enterprise connectivity to the internet must be considered as very low: it is only 29% of firms according to a recent study by eBusiness Forum.<sup>103</sup>
- Only 5% of all enterprises have a **website/homepage** in Greece and most of them (90%) use it primarily for product promotion and company information.

#### They exercise very little e-commerce activity as:

- Only 14% purchased anything online, while the EU-25 average is 27%
- Only 6% received orders, while the average the EU-25 average is 13%
- The total turnover of enterprises from e-commerce was only 1.6% while in the EU-25 it was 8.4%

#### They significantly use some public services where:

- 61% of Greek enterprises sourced information while the EU-25 average was 45%
- 58% of Greek enterprises obtained forms, with the EU-25 average 41%
- 45% return the forms in Greece, considerably higher than the 29% for the EU-25 average

A large number of SMEs submit their **VAT declaration online** as a mandatory monthly task. A large number of very small enterprises do this through the accounting companies which are keeping their books. They are increasingly submitting their fiscal, social security and other declarations, as shown by a recent incident: when the Government gave a small tax refund as an incentive for making fiscal declarations online, the systems were blocked due to heavy online traffic!

The uptake of e-business is also influenced by the low penetration and high cost of broadband services. The costs for connection and use are extremely high and Greece has a penetration of 1% of broadband connections. Of all enterprises connected to the internet, only 21% use **broadband** connection. This is less than half compared to the EU-25 average (52%).

<sup>102</sup> The data come from Eurostat portal on Science and Technology tables.

<sup>103</sup> E-Business Forum, “eBusiness Survey”, 4<sup>th</sup> Year, 2005. Prepared for GRNET. March 2005.

High telecommunication costs are shown in the overall ICT expenditure as well: For 2004, **IT expenditure** was only 1.3% of GDP, while the EU-25 average is 3%. This low percentage is almost the same over the last 3 years. In contrast, Greeks spend 3.8% of GDP on telecommunication, more than their EU-25 counterparts (3.4% of GDP on average). Most of the expenditure is for services rather than for investment in infrastructure.

### Private sector initiatives

A number of electronic marketplaces were constructed four or five years ago. Two of them, Business Exchanges and CosmoOne, were created by major banks and telecommunication operators<sup>104</sup> and are used for the procurement of a variety of products, including office automation, IT equipment and others. They have significantly increased the amount of B2B exchanges to several billion euro. Their growth trend is clear, and one may expect these initiatives to grow further both in number and revenue.

Some examples of other marketplaces and portals focused on their particular sector needs are:

- [www.yassas.com](http://www.yassas.com) which is assisting goods procurement for the hotel industry matching 400 suppliers with 600 hotels for a total number of more than 50,000 goods;
- [www.b2bconstruct.gr](http://www.b2bconstruct.gr) which acts as a portal for the construction companies; and
- [www.greekfashion.gr](http://www.greekfashion.gr) for the textile industry.

All the banks in Greece have developed web-banking services in one way or another. The number of users of their services is still relatively small in percentage compared to the EU-25 average, but those who start using these services become permanent users.

Some IT retailers – such as [www.plaisio.gr](http://www.plaisio.gr) – have very frequented websites and are constantly increasing their online sales. The tourist industry is still at the first stage of e-commerce, providing basic information but without allowing visitors to make online reservations and payments – except the big hotels.

Last, but not least, there are only a few examples of e-business integration of all internal processes and interaction with the outside world such as customers suppliers, resellers, public services, banks and other service providers. The best cases are in the retail market, in some manufacturers and in some hotel chains.

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<sup>104</sup> CosmoOne was founded in June 2000 as a joint venture between OTE Hellenic Telecommunications Organisation (30,87%), COSMOTE Mobile Telecom (30,87%), Alpha Bank (15%), Dienekis Informatics (13,18%) (a distributor in Greece for Commerce One Inc.), and the National Bank of Greece (10,08%). See <http://www.cosmo-one.gr/en/company.htm>

### 3.2.4 Summary and conclusions

The Greek governmental initiatives aim at promoting the information society development in society, in business and in the public sector. Among the public, the critical mass of ICT users will be increased. In business, SMEs are being trained to use new technologies and e-business. Larger enterprises are encouraged to adopt advanced Information Systems and to reorganise their business processes. In the public sector, key public services will be offered online, and backend integration in the administration will be advanced and accelerated.

Despite the above efforts, and despite concerted private sector investments on a national and sectoral basis, most e-business indicators show that Greek enterprises, on average, are still lagging behind in terms of ICT adoption and e-business activity compared to the average state-of-play in the EU.

#### Barriers and challenges

Some barriers that have hindered a more rapid information society development in Greece in the past have been identified, such as:

- Broadband is slow to pick up due to high prices, slow uptake of complete deregulation in telecommunication and a lack of all necessary investments. In order to face this issue the Operational Programme for the Information Society has made provisions (total budget of €184 million) for funding private firms in order to develop broadband infrastructure in more distant urban and suburban areas (excluding Athens and Thessaloniki, the two largest cities).
- There is a considerable gap in informing the interested parties about the different funding programmes. According to eBusiness Forum survey, only 1% of the enterprises learned about the “Meteho” programme, 14% about “Doing eBusiness” and 25% about Go-Online
- Several parties refer to a syndrome of “techno-phobia” that does not help the rapid and essential familiarization of citizens and professionals with the use of ICT at home or at work. This is illustrated by the high percentage (42% in 2004) of enterprises claiming lack of knowledge and awareness about the introduction of new technologies.
- Lack of training, specialised personnel and sufficient funding are also important problems faced by enterprises confronted with the new technologies introduction.

#### Optimistic scenario: acceleration of ICT adoption and e-business growth

In summary, Greece is at a crossroads as an economy and as an ‘e-economy’. Notwithstanding the barriers mentioned above, one can be optimistic about the acceleration of ICT use and e-business growth in the future, mainly for the following reasons:

- Key economic sectors that can significantly drive the country’s economy, such as tourism, received the strategic attention of the State for the first time. A Ministry of Tourism was established and, in 2005, Greece received at least 18% more visitors as a tourist destination than the previous year. The multiple links in the tourist industrial chain will become, increasingly assisted by ICT in order to cope with further increases in the number of visitors. In turn, this will lead to improvement of the quality of the services provided.
- The delay of the Information Society programme is coming to an end, thanks to the accelerating efforts of the last months and a greater consensus among all players about the benefits of ICT. The long-awaited benefits of these investments will create rapid changes in the ICT use in both C2G and B2G and vice versa.
- The new Digital Strategy for 2006-2013 puts ICT technology high on the agenda, and considers it as strategic element for the country’s growth. This new effort, coupled with a consistent diagnosis and more than 65 practical interventions to reverse the root-causes of technology delay, provide scope for optimism in the years to come.

- The rapid penetration of mobile telephony and the increased sophistication of the new devices and services assist in the familiarisation of citizens, of all age and education level, with ICT. M-commerce and m-business becomes a parallel reality with e-Business.
- At the same time, international developments allow some leap-frogging, in particular in terms of maturing standards, open source code, mobile commerce and the avoidance of mistakes made by the innovators and first runners of e-business and e-commerce in other countries.

The Greeks are used to starting slow and accelerating at a later phase. As a joke, some draw a parallel with the preparations for the Athens 2004 Olympic Games – a very slow start and a hectic rhythm as opening day came close – similar to the rhythm of the syrtaki dance. The positive outcome is that the Olympic Games were extremely well organised, everything was ready and everybody – including the Greeks – were amazed with the achievements that required such huge mobilisation of resources. One may therefore anticipate a similar pleasant surprise in the giant leaps needed for the e-business transition.

## **The author**

### **Stefanos Karapetsis**

*Executive Director of Mellon Group of Companies from Greece, he represented SEPE (the Greek ICT Companies Association as head of its eBusiness working group and as a member of its Board of Directors) in the elaboration of several Government initiatives, like Go-Online and Do Business Electronically. He was a member of eBusiness Forum Steering Committee and Convenor of one of its working Groups. He led several IST and RTD projects related to eBusiness and eCommerce. He contributed to e-Business W@tch with case studies in 2005.*

## 3.3 e-Business in the Netherlands

by Ronald Batenburg, Utrecht University, The Netherlands

### Introduction

This article presents some of the current trends and initiatives with respect to e-business in the Netherlands. Without claiming to be complete, we will attempt to provide a balanced picture of both the market developments and policy-related e-business projects. The chapter is divided into three sections. Firstly, the ICT-sector is described including the role of governmental and policy initiatives to support and enable ICT research and development in the Netherlands. This description is completed with a policy initiative example to enhance ICT for the elderly. The second section of this chapter addresses the actual state of and trends in ICT and e-business adoption. These developments are presented against other European countries in order to describe the Dutch situation in international perspective. The article finishes with a summary and concluding remarks.

### 3.3.1 The ICT sector and E-business policy and in The Netherlands

We start this section by describing the organisations that develop, build, sell, consult and support the actual products and services of the Dutch e-business industry, i.e. the ICT companies. The Netherlands holds a prominent tradition in mathematics and theoretical computer science, and as of now there is an active community of programmers, software developers and even hackers. Just before and after the year 2000 however, the Dutch ICT industry transformed more and more into clusters of industries dedicated to high-skilled activities as research, product development and consultancy in IT and ICT.

#### The ICT industry in the Netherlands

With some exceptions, the mainstream of Dutch initiatives in IT and ICT is oriented to embedded software, product software and related services. A spectacular example of product software entrepreneurship is the BAAN company, which managed to achieve a significant market share of the specialised market for Enterprise Resource Planning (ERP). As of now, BAAN and its ERP-software is part of the larger SSA Global, as it did not recover from a dramatic drop in shareholder support after financial failures in 2000.

At the same time however, many other Dutch IT-vendors such as Exact, Unit4Agresso, AFAS and Grote Beer have successfully applied the business model of "product software"; developing standard software and IT-solutions once and then selling it many times, thereby optimising the principle of the network or information economy. In embedded software, Philips and ASML are prominent players, as well as the recent success story of navigation software producer Tom Tom. In addition, several major international ICT (consultancy) companies have important branches in the Netherlands, for example Atos Origin (including Sogeti), Accenture, Cap Gemini, CISCO, Deloitte, EDS, IBM, KPMG, Microsoft, Oracle, SAP, as well as ICT companies like Ordina and Pentascope that are national-oriented.

As of 2003, nearly 24,000 ICT-companies were active in the Netherlands, over 276,000 persons employed in ICT-related professions and 4.4 million employees are PC-users (Statistics Netherlands, 2005). Up to 2003, the proportion of ICT-companies within the Dutch population of enterprises increased constantly to 3.5%. In terms of economic value, it is estimated that 20% of the economic growth between 1996 and 2000 was accounted for by the ICT-sector, in particular because of high annual investments. The value added of the ICT-sector to the Dutch General Domestic Product (GPD) is about 1% and decreases after the year 2001. As is internationally the case, the Dutch ICT-sector significantly changed from a rapidly growing mode to a state of consolidation and, in some cases, reduction.



Unlike most of the economic sectors in the Netherlands, the ICT industry has been weakly organised for a long time. At the beginning of the 1990's, the Dutch ICT sector was sharply divided between the hardware and software producers. Hardware vendors aimed at being differentiated from software companies as being the 'real' technology initiators, while the software firms in return considered the hardware firms as over-skilled 'box-producers'.

This changed with the emergence of the internet, enterprise information systems and network technology. As the distinction between hardware and software became irrelevant, the two former branches merged in the mid nineties and were named respectively 'the Dutch IT Federation', 'ICT Netherlands' and currently (Dutch) 'ICT Services'. There are many challenges for the Dutch ICT Services organisations, as the industry holds a somewhat disadvantageous image for its immature customer service and personnel management. Although most of the ICT companies in the Netherlands have grown to become highly professional organisations (or have been taken over by professional multinational corporations), the industry is still known for its unintended fluctuations in job opportunities and severe difficulties in communicating the benefits of their product and services for society, enterprises and individuals.

### **Research on ICT**

With regard to the ICT domain itself, a steady number of policy initiatives within the Netherlands are being taken to coordinate and drive its research and development in both business and academia. A good example is the 'National Research Agenda for ICT', a joint initiative of the Council for Physical Science of the National Science Foundation and the Technology Foundation of the Ministry of Economic Affairs. In their latest report, the agenda is defined for 2005-2010 by the following themes:

- Design and development methods
- Digital security
- The network society
- The data explosion
- The digital experience
- Intelligent systems
- The invisible computer
- The virtual laboratory
- The computer of the future

As can be seen, the themes hold strong anchors in the hardware and software technology, but also include additional domains such as society, the economy, entertainment and even arts. This is doubtless strongly intertwined with the particular mission of the Ministry of Economic Affairs that has set its focus on boosting innovation within the Dutch society and economy. In line with this, recently the "ICT Director Organization for ICT Research and Innovation" has been founded to provide additional budgets for innovation and economic proliferation. Its major aim is to improve the leverage of ICT for citizens, business and governments.

### **ICT use in the public sector**

In the recent years, the Dutch government is catching up on its adoption and usage of ICT but still holds a moderate position compared to other European countries. In 2000, the Dutch expenditure on public administration ICT on central, local and regional levels was 0.27% of its GDP, while 0.3% was the EU-15 average (EU, 2005). Since then, large investments have been made in online governmental services. In 2003, 65% of the Dutch governmental services were online, against 45% at the average EU15-level (EU, 2005). Other figures published by Statistics Netherlands showed that 70% of the Dutch basic public services were available on the internet in 2004 while the European average appeared to be 72% in that same year (Statistics Netherlands, 2005).

In any case, the Dutch government has recently enlarged its role in determining the ICT research policy by defining its own ICT agenda for all public and governmental organizations. This agenda contains the following spear points:

- Single point of data entry
- Electronic identification
- Internet speed and capacity
- Security and reliability
- Standards
- Consumer policy
- ICT within the public domain

Here, it is interesting to note that this agenda contains both practical items (single point of entry, internet speed) and themes that are focused on target groups (consumers, governmental organizations). While the ICT research agenda is driven by the exploration of new developments and the making of future trends, the governmental ICT agenda is focused on the current leverage of ICT, to the benefit of its own organizations, or specific societal target groups.

### 3.3.2 Development of e-business in The Netherlands

Within Europe, the Netherlands traditionally hold an average position in the adoption, implementation and use of ICT. This generally applies for individual consumers, professionals and organizations. In this section, we particularly focus on the e-business activities of Dutch enterprises in comparison with the European (EU15) average in 2003 and 2004. The following table presents figures based on a combination of Statistics Netherlands and Eurostat publications.

**Exhibit 3.3-1: e-Business Activity: Comparison of Dutch companies to the EU-15**

	The Netherlands		EU-15		Difference	
	2003	2004	2003	2004	2003	2004
Share of enterprises having access to the internet <sup>a</sup>	86	88	86	90	0	-2
Share of enterprises having a broadband connection <sup>a</sup>	37	54	40	55	-3	-1
Share of enterprises having a website <sup>b</sup>	66	.	60	.	6	.
Share of enterprises having teleworkers <sup>b</sup>	25	.	18	.	7	.
Share of enterprises having received sales orders online <sup>a</sup>	17	17	10	15	7	2
Share of enterprises having sent out purchase orders online <sup>a</sup>	20	.	13	.	7	.
Online sales as proportion of the total turnover <sup>b</sup>	7	.	10	.	3	.
Annual expenditure on IT hardware, equipment, software and other services as % of GDP <sup>c</sup>	3,8	3,8	3,1	3,0	0,7	0,8
<sup>a</sup> Enterprises with 10 employed persons or more. Source: Survey on Information and Communication Technologies in enterprises, Eurostat.						
<sup>b</sup> Source: Statistics Netherlands 2005.						
<sup>c</sup> Source: European Information Technology Observatory 2003 (EITO).						

With regard to the presence of basic ICT-infrastructure indicators (the first three rows of Exhibit), Dutch enterprises are more or less equal to the EU-15 average. As in many European countries, access to the internet is high and nearly reaching its saturation point. With regard to the adoption of broadband connections, Dutch firms are making up their relative arrears compared to the European average adoption rate in 2003. In 2004, 54% of the Dutch companies had broadband access and adoption is expected to increase at a similar pace in the coming years. In this context it can be noted that the Netherlands is one of the leaders in internet and broadband adoption among households, together with Denmark (Statistics Netherlands, 2005; not in Exhibit). Having a website is the case for 66% of the Dutch enterprises, that is 6% higher than the EU15-average.

One of the applications of internet infrastructure is the enabling of tele-working in organizations. Although it is known that the decision to enable tele-working is a complex socio-technical matter (Batenburg and Petners, 2005) (see Exhibit 3.3-1), the fact that the Netherlands hold a high proportion (25%) of organizations with teleworkers in 2003 might be connected to its relative high level of internet-use within both organization and households. This is confirmed by other studies that rank the Netherlands as one of the frontrunners in Europe with over 20% home-based teleworkers among its working population (Gareis, 2002; Benschop and Menting, 2005).

The application of internet technology for B2B applications is restricted here to online sales ('e-commerce') and online purchasing ("e-procurement"). As shown in Exhibit 3.3-1, the proportion of Dutch enterprises that conducted both types of B2B e-business was clearly above the European average in 2003. In 2004 however, the leading position of the Netherlands in e-commerce is less prominent as the growth in online sales stabilised. If the level of online sales is related to the total turnover, the Dutch position in 2003 was actually below EU-15 average.

A final estimation for the development of e-business in European perspective is the annual expenditure of enterprises on ICT products and services proportioned by the countries' GDP. This indicator supports the statement that the Netherlands is a ICT-intensive economy with a constant and high investment level in ICT, whereas the European average slightly dropped between 2003 and 2004. The (beginning of the) economic drawback does not seem to hamper the Dutch enterprises, although the differences with the EU15-average are quite small to be able to draw a firm conclusion on this.

### 3.3.3 Summary and conclusions

Both by 'objective indicators' and by its own 'policy agenda', the Netherlands can be described as:

- a traditional, but progressive and service-oriented country and economy,
- that particularly creates added value through intermediary activities in the extended, global economy,
- where innovation, research and development are the driving forces behind these activities,
- and hence ICT, including e-business, is key to enable the innovation, flexibility and agility of enterprises, professionals, consumers and the government.

Obviously one might argue that – as with all summaries of mission and core competence statements – this is applicable (or even desirable) for most European countries. As is described in this chapter however, the Netherlands holds a certain tradition in both ICT and inter-organisational cooperation. Therefore, it might not be surprisingly that e-business smoothly aligns with many Dutch interests and industries. While not much of the hardware, software and network technologies are brought to the world market by Dutch ICT-firms, within the Netherlands the ICT-sector holds a prominent position in terms of development, application, consulting and educational activities.

Since the collective organisation and support of the ICT-sector has emerged rather late – after the internet hype year 2000 – many issues are (still) present on the national policy agenda. In particular,

the Dutch government has launched many initiatives during the last years to stimulate ICT-projects for business, society and its own governmental organization. The international figures presented in this chapter imply that e-government might run behind the advantageous position of the Netherlands in e-business. As of now, the main objective should be to execute the formulated ICT research and policy agendas, and practise innovation by developing applications for e-business, within both the public and the private sector.

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## 3.4 e-Business in Slovakia

*by Tomas Sabol, Radoslav Delina and Viliam Vajda, Technical University of Košice (TUK)*

### Introduction

As a new member, joining the EU in 2004, the Slovak Republic committed itself to creating a competition-based business environment compliant with all the EU principles. The use of information and communication technologies (ICT) represents an efficient tool for achieving this goal. In the area of promoting the Information Society (in Slovak more commonly termed the “informatisation of society”), the Slovak government adheres to the principles of the eEurope Action Plan. Until April 2004, before joining the EU, the Slovak government was actively involved in the eEurope+ initiative (a programme specifically designed for then candidate countries) officially introduced in June 2001. The Ministerial conference, held on April 26-27, 2004, in Budapest, marked a milestone between the transition period and the EU membership.

### 3.4.1 E-business policy initiatives in Slovakia

Slovakia adopted the eEurope programme and established its own Action Plan covering 56 areas. According to a monitoring report by the Ministry of Transport, Posts and Telecommunications, the government succeeded in 16 areas, failed in 23 and the rest is being implemented on a continuous basis. The following paragraphs summarise the current state of the e-business-related tasks defined in the Action Plan.

#### Objectives related to e-business in the Slovakian eEurope Action Plan

##### To increase the public confidence in electronic commerce

The Ministry of Economy and the Ministry of Transport, Posts and Telecommunications reported the task to be successfully completed, and the Law on Electronic Business was adopted in February 2004. However, there was no concentrated effort in promoting and increasing the public awareness of e-commerce. Low consumer awareness is also shown by the survey carried out by the GfK Slovakia which revealed that 95% of the Slovak population had never had any experience of online shopping, and only 3.1% had used the internet for buying products at least once. On the other hand, some positive trends also appeared. The use of electronic banking is gradually rising – nowadays, 17.1% of Slovak internet users use such services at least once a week.

##### To stimulate the creation of e-commerce infrastructure, using electronic signature and promoting its use within the public sector

This task is believed to be fulfilled, despite the fact that electronic signature is being tested within the tax administration system and only on temporary basis. It can actually be used in other areas, but due to the lack of public acceptance for electronic signatures, the real use is very limited (for example, banks perform secure payments using signatures of their own). The whole idea of using e-signatures should have been promoted by allowing the return of tax forms online. During the testing period, however, tax payers who used online forms are also required to hand over a signed hard copy of the summary sheet of their tax return forms. Moreover, in order to obtain authorised electronic signature, one must go through an enormous amount of bureaucracy. Therefore, it is simpler and cheaper to provide the tax return form in paper copy.

### To stimulate the flexibility of electronic commerce regulation and to support SMEs' computerization

Reinforcing the competition in local access networks to increase public connectivity turned out to be problematic because of legal obstructions from the Slovak Telecom. Therefore, the problem had to be handled by the National Anti-trust Bureau and the Slovak Supreme Court. Resulting improvements are expected to appear by the end of 2005. As for electronic commerce promotion, it was intended to establish the National Centre for Electronic Commerce, but this was later turned down by the government. Problems got still worse because of the late appointment of the Commissioner for Information Society – a “compensation” for the non-existing Ministry of Informatics.

To improve things, the government introduced some programmes within the framework of EU Structural funds in order to support e-commerce development in the industry (promotion of competitiveness, innovation and technology take-up). Their impact, however, is yet to be assessed.

State funded activities also include promotion of educational programmes contributing to the development of knowledge-based society, support of various innovation schemes and research. For example, the Technical University of Košice (TUK) participates in a project of the State Programme of Research and Development entitled “ANPROBA – Analysis of the business environment and barriers of regions' absorption capabilities”. One part of the project also analyses electronic commerce issues. Some indicators developed within this project are presented in Exhibit 3.4-1.

**Exhibit 3.4-1: Overview of e-commerce-related policies in Slovakia**

<b>Human resources policy</b>	
<i>Training</i>	<i>Educational programmes, seminars and counselling service, Support scheme for SME's counselling and training</i>
<b>Targeted awareness promotion</b>	
<i>Promoting public awareness</i>	<i>Obcan.sk portal, seminars and round table sessions organised by the Slovak Association for Electronic Commerce (<a href="http://www.saec.sk/">http://www.saec.sk/</a>) with participation of the Slovak Ministry of Economy, Infovek, SANET II, Support scheme for SME counselling and training, Phare and ESF focuses</i>
<b>Innovation policies</b>	
<i>Financing R&amp;D</i>	<i>Grant scheme for acquiring innovation technologies and setting up quality management systems</i>
<i>Public procurement</i>	<i>The public electronic procurement project is in its first stage</i>
<i>Subventions</i>	<i>Targeted subventions and state innovation programmes (at present the Act on Innovation is under consultation.</i>
<i>Awards and premiums</i>	
<b>Promotion of SME support networks</b>	<i>NADSME (National Agency for Development of Small and Medium Enterprises), <a href="http://www.nadsme.sk">http://www.nadsme.sk</a></i>
<b>SME support for participating in e-markets</b>	<i>None</i>
<b>Taxation policy</b>	<i>None</i>
<b>Legislation framework</b>	<i>Laws on Electronic Commerce, Electronic Signature, Electronic Communications, Personal Data Protection, Copyright, Free access to information.</i>

**To simplify electronic administration procedures for business, e.g. start-up companies**

Outcomes in this area are not satisfactory. The Ministry attributes this to the late appointment of the Commissioner for Information Society. Still, some pilot projects are already in use, for example the Slovak business register ([www.orsr.sk](http://www.orsr.sk)) and the Cadastre online (<https://www.katasterportal.sk>). The main barrier to broader use of electronic services is the low rate of electronic signature acceptance.

**To create a public procurement internet portal that will enable online tendering**

The portal is expected to increase efficiency of the public procurement process and improve companies' awareness and experience with implementing e-commerce solutions. The task was not finished due to the late appointment of the Commissioner for Information Society and the fact that the European legislation on this matter is expected to be adopted in 2006. However, a study of good practices in the EU public electronic procurement was elaborated.

**To create standards for information security and educational programmes focusing on the secure internet use**

The Ministry of Transport, Posts and Telecommunications pronounced this task to be completed as it carried out a survey entitled "Security of Information technologies", elaborated a proposal for the Law on Public Information Systems and prepared the "System of standard classification". Besides, it also works on the National strategy for internet security. Based on these facts it seems that the task is already finished, although the practical implementation has not even started.

**To enhance the overall security of internet transactions**

The Ministry of Transport, Posts and Telecommunications argues that online transactions are non-viable at the moment, due again to the late appointment of the Commissioner for Information Society.

**Adaptations in the regulatory framework**

E-commerce legislation is currently not as it should be. While the EU framework covers 33 e-commerce related areas<sup>105</sup>, in Slovakia there are only six – electronic commerce (Law on electronic commerce), electronic signature (Law on electronic signature), privacy protection (Law on privacy protection, on protection of secret facts and on personal data protection), copyrights (Copyright law), telecommunication policy (Law on electronic communications) and citizens' rights (Law on free access to information).

In total, the extent of Slovak legislation represents only about 18% of the EU volume. As mentioned above, a new Law on Innovation is ready for adoption and is expected to also promote research in e-commerce. However, the legal support of the information society development is currently based on more or less isolated laws. The whole process lacks a systematic approach, i.e. a framework describing what kind of laws should be adopted, what are their mutual interrelations and what is the time schedule for their elaboration. It also calls for the general support of electronic invoicing and documentation standards for book-keeping purposes.

E-commerce development should be also backed up by initiatives in the area of education and online public services, such as JASPI (<http://jaspi.justice.gov.sk> – unified automated system of legal information), Infovek ([www.infovek.sk](http://www.infovek.sk) – connecting schools to the internet), SANET ([www.sanet.sk](http://www.sanet.sk)), GOVNET (discontinued), the project of library computerisation, or obcan.sk (public information portal).

According to the OECD which evaluated Slovak's economics in September 2005, Slovakia has still gaps in innovation capacity and informatisation. Minister of Finance Ivan Mikloš considers the new governmental programme – MINERVA ([www.iminerva.sk](http://www.iminerva.sk)) to be a solution. It focuses on investments in education and research, informatisation, and business environment improvement.

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<sup>105</sup> For further information see <http://europa.eu.int/ISPO/ecommerce/legal/legal.html>

### 3.4.2 Adoption of e-business activity in the Slovak industry

The European e-Business Readiness Index, constructed on the basis of data collected in a survey in 2004, ranked Slovakia lowest of all 25 EU Member States. This result reflects the historically low support of internet development in Slovakia. One of the causes might be insufficient political support, which eventually resulted in not creating the Ministry of Informatics. Instead, as a sort of compromise, the post of Commissioner for Information Society was set up. But this move might prove to be insufficient for accelerating ICT and e-business adoption among Slovak enterprises. The current situation of electronic commerce in Slovakia can be characterised by the following evidence:

#### **Demand side: vicious circle due to little incentive for consumers**

40% of the Slovak population (aged 15+) uses the internet regularly. This fraction is, according to the Office of Statistics, growing dynamically. However, in 2005, only 5% of Slovaks used the internet for online shopping and just 3.1% of them had used the internet for online shopping more than once. This represents a very weak consumer power that affects the development of business-to-consumer models. This phenomenon also has negative implications on prices of products and related delivery services.

As a result, the majority of companies use a website only as a supplementary distribution channel with product prices very similar to those of traditional stores. Consequently, the same prices and higher distribution costs generate weak consumer interest for online shopping, which creates a vicious circle.

The problem is also caused by the small potential of the domestic market and the globalisation process that is driving Slovak companies out of the game. The publishing industry is a good example of this phenomenon. The prices of Czech books (a language very similar to Slovak) are often lower by 30%. Once the distribution logistics of Czech companies are resolved, the Slovak publishing industry will be seriously jeopardized. The same trends appear in electronics and other industries.

#### **Difficulties for electronic portals**

Low awareness of electronic commerce, but mainly of electronic markets, meant that some Slovak electronic portals went bankrupt (e.g., b2b.mibicon.sk). Their resulting use is very low (only 0.5%). Unfortunately, only a few larger companies are familiar with vertical markets. This may eventually cause trouble because the Slovak industry is gradually focusing on the automotive industry. For example, the world leader in automobile electronic markets, Covisint, is unknown among the majority engineering companies.

#### **Developments in e-business**

Fortunately, the development of internet use for business purposes is gradually changing for the better. Compared to 2004, when, according to the European e-Business Readiness Index, 71% of companies used the internet, in 2005 it is 80%. Companies use the internet mainly for communication with business partners (77%). The share of firms present on the web increased from 47% to 56%.

However, the total number of orders and payments carried out through the internet is still low. According to the survey carried out within the ANPROBA project during the first half of 2005 (on the sample of 725 companies), the possibility of making orders and payments through the company website was reported in only 10% and 1.6% of the cases respectively.

The highest number of companies with web-supported online payments was within small enterprises (2%), which represent a major part of traditional B2C e-shops. 85% of large companies, 80% of middle sized companies, 63% of small and 35.6% of micro companies had a web presence. If we compare the results of the European e-Business Readiness Index in 2004 with the results of the ANPROBA survey, the most significant increases are visible in the rate of adoption and the use of internet technologies for procurement, from 3% to 17%.

Online sales were offered by 12% of companies in 2005. The use of the internet for screening sale offers, on the other hand, is used by 65% of companies. Despite some positive trends between 2004



and 2005, it is not encouraging that 61% (48% large, 56% medium, 66% small and 59% micro companies<sup>106</sup>) of the respondents declared that they do not intend to implement any other e-commerce solutions into existing business systems. However, approximately 10% of the surveyed companies reported plans to invest into e-procurement solutions, and 16% into online sales within the coming year.

Barriers for using ICT to support business processes were also examined. The largest barrier is represented by the high costs of acquiring ICT (24%) and costs for internet connection (17%). Significant improvement has been reported in the issue of internet security – 74% of companies do not consider internet security as a major barrier for IT implementation. In past years, this barrier ranked significantly higher and had been reported by more than 60% of companies.

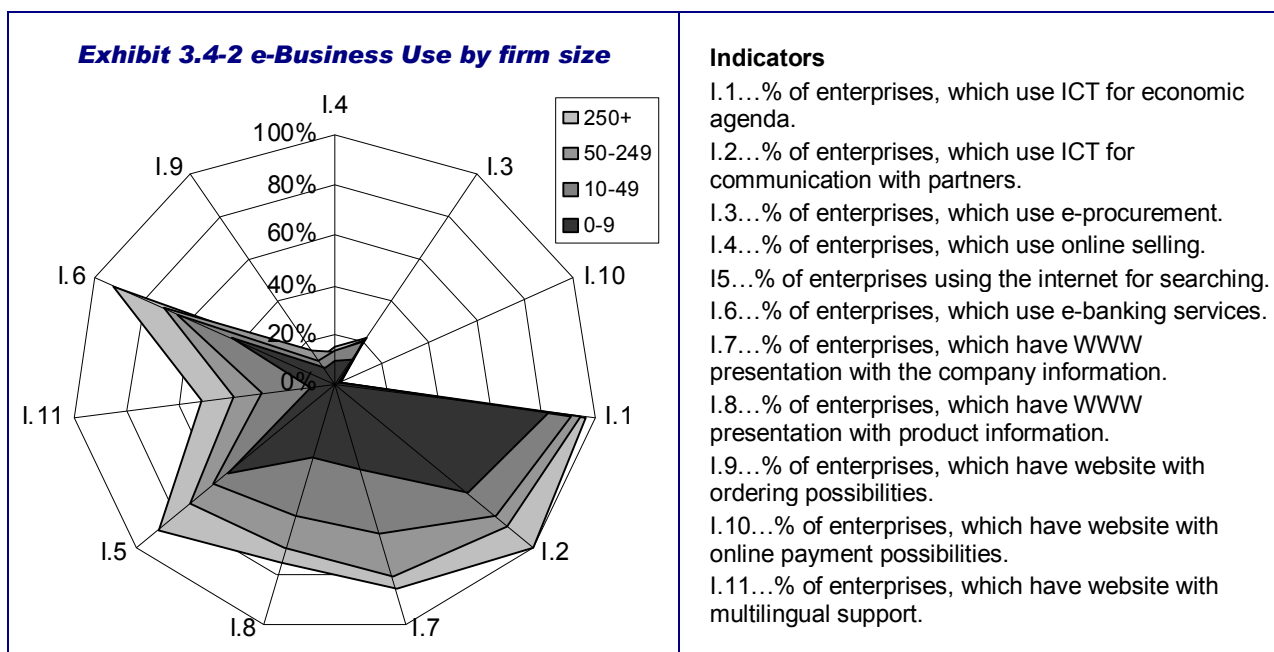
### Online procurement activity mainly confined to national suppliers

Looking at business relations from a globalisation perspective, it is interesting that 75% of companies using electronic procurement systems in Slovakia have Slovak suppliers. This indicates that the internet, as a global communication tool, may be used insufficiently. This figure is quite in contrast with the high percentage of companies seeking business offers on the internet. This might indicate strong cultural relations among Slovak companies, or low awareness of opportunities to search for better offers in other regions or countries. This was confirmed during interviews conducted with managers of several larger companies. In addition, less than 1% of companies participate in e-markets.

On the other hand, 63% of companies buying online and 59% of those selling online reported significant profit increase over the last three years.

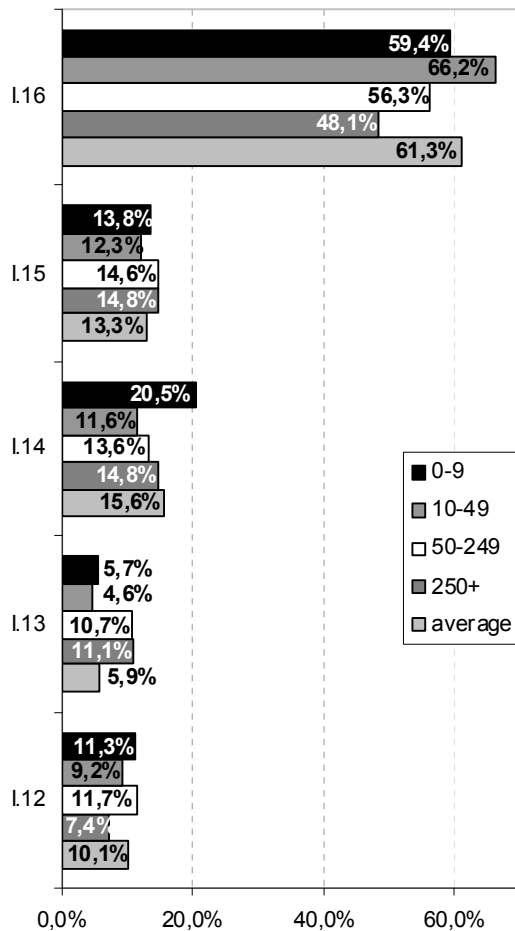
### Key indicators

The following charts present some other indicators derived from the ANPROBA research.



<sup>106</sup> Segmentation is performed according to the e-Business W@tch methodology.

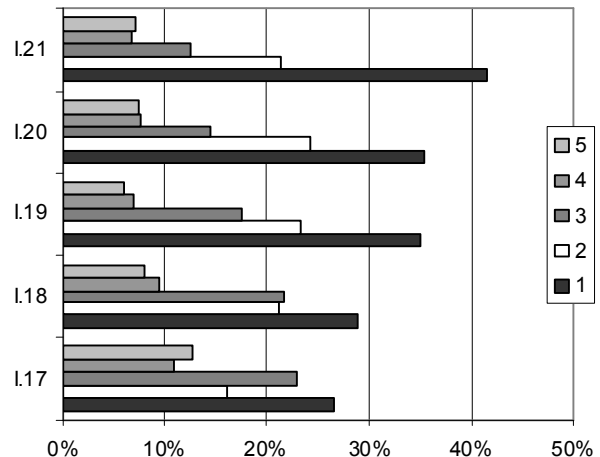
**Exhibit 3.4-3: Plans to implement e-commerce**



**Indicators**

- I.12...% of enterprises which plan to implement e-procurement within a year.
- I.13...% of enterprises which plan to implement e-procurement within 3 years.
- I.14...% of enterprises which plan to implement e-sales within a year.
- I.15...% of enterprises which plan to implement e-sales within 3 years.
- I.16...% of enterprises which don't plan to implement e-procurement or e-sales.

**Exhibit 3.4-4: Barriers for ICT adoption**



**Indicators**

- Main barriers in ICT adoption (1 – not significant, 5 – critical significance):
- I.17...Average significance of “high cost on ICT purchasing” as barrier in ICT usage.
- I.18...Average significance of “high cost on internet connection” as barrier in ICT usage.
- I.19...Average significance of “ICT skills of employees” as barrier in ICT usage.
- I.20...Average significance of “missing strategy/vision” as barrier in ICT usage.
- I.21...Average significance of “low confidence in security issues” as barrier in ICT usage.

**Outlook: sectoral analysis in Slovakia using e-Business W@tch methodology**

TUK is currently studying the use of electronic commerce in major Slovak industries (such as chemical and engineering), applying e-Business W@tch methodology. Final results will be available by the end of 2005 at <http://ebiz.tuke.sk/ebizen>. According to preliminary results, e-procurement and e-sales are used by 23% and 11% of engineering companies respectively. In the chemical industry, figures are 17% for e-procurement and 14% for online sales.

### 3.4.3 Summary and conclusions

Various surveys and interviews indicate that Slovakia is lagging behind in the use of electronic commerce compared to other EU countries (the current rank within the index of e-business readiness reflects the situation). Although companies in Slovakia are progressing in the adoption of procurement mechanisms, better knowledge of strategies and mechanisms for achieving higher efficiency and cost reduction (e.g., reverse auctions, electronic markets, spend management tools) is still absent.

A major difficulty is represented by the size of local market which is, in a global environment, a disadvantage for local companies. This is most obvious in the publishing industry, where most online buyers prefer foreign online shops to local ones mainly because of prices. The Slovak industry in general is still affected by traditional business relations based on past experience or friendship.

A factor that might positively affect the use of e-commerce development, mainly within the mechanical engineering industry, is foreign direct investments of world automobile producers such as Kia, Citroen, Peugeot and Ford. All of them are members of world's most significant automobile electronic market Covisint.

Advancements in e-business adoption are mainly driven by the intrinsic motivation of enterprises to increase their process efficiency and competitiveness, rather than by national policies. Despite the fact that the financial support of educational programmes and training for the knowledge-based society has increased, the public awareness of electronic commerce and its potential is still very low. Even though companies have confidence in the internet security of online shopping, the general public still does not. This might be critical in the further development and adoption of electronic commerce by other companies.

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## 3.5 e-Business in Spain

by Jesús Galván, Prof. Schiller Int. University, Madrid Campus

### Introduction

The chapter provides an overview of the main policies that are being deployed in Spain in an effort to promote e-business amongst companies. A brief analysis is presented of the relative situation of e-business as compared with EU-15 countries and its time projection. Finally some general conclusions attempt to show what could be the future of e-business in the country.

### 3.5.1 E-business policy initiatives in Spain

#### The policy framework

Spain is one of the most decentralised European countries. For policy-making, this means that both the regional governments and the national government have designed and implemented their own innovation promotion campaigns. This is the case with the promotion of e-business between companies. However, European Regional and Development Fund (ERDF) contribution to the development of innovation and information society has so far been extremely positive in the following aspects:

- It has contributed with financial resources to the development of information society and e-business.
- It has contributed to the development of a certain discipline, by which the involved public administrations must agree, during the design and implementation phases of the Operational Programmes, about objectives and policies, stating them clearly on a five year basis.

The main actions undertaken in order to promote e-business by public administrations during the period 2001-2006 fall within the following categories:

- The promotion of sector-level e-business collective solutions for SMEs
- Training in ICT for workers and managers
- Diffusion of the possibilities provided by e-business to companies
- Direct loans for companies wanting to invest in ICT
- Tax deductions in the corporate income tax for companies investing in ICT

The main players of these initiatives are the national and regional governments, the individual companies (wherever it applies) and the industry associations. In most cases the eligible recipients for funding must be non-profit organisations representing groups of companies.

#### Artepyme II, a comprehensive national initiative for the promotion of e-business

ARTEPYME II is a programme launched in 2001, co-financed by the EFRD, which promotes the implementation of e-business solutions in Objective 1 regions, even though companies from other regions can be included within the projects. The main policy objectives are to generate collective e-business solutions for SMEs that may solve the lack of technical and financial resources of small companies for the adoption of ICT and e-business. The programme partially funds investment projects of four different types: diffusion of the possibilities of e-business for SMEs; feasibility projects; pilot experiences in e-business; and Implementation projects of e-business solutions. The projects must be presented by non-profit institutions representing the interests of SMEs, favouring a sectoral approach.

Since 2001, the ARTEPYME II has funded 215 projects. and the number of SMEs that have, so far, participated add up to 29,580, from 40 different sectors, with a total investment of the central administration of, roughly, €60 million.

Among the quality control measures that have been implemented, the results from the surveys point out that, after one year of a project having been funded, the number of participating SME's is multiplied by a factor of 2.7. This leads to the overall conclusion that this programme contributes, roughly, to a yearly increase of something more than 1% of companies incorporating to e-business.

### 3.5.2 Development of e-business in Spain

The national government decided in 2004 to launch an important initiative regarding innovation and the development of the information society in Spain. A lot a work has been developed since, trying to analyze Spain's relative position within Europe and to design new ways by which to promote innovation and e-business. This effort has led to the creation of the Avanz@ Initiative for the period 2006-2010.

The background work was, basically, a diagnosis of the situation of e-business in the country, based on the values of the existing e-Europe 2005 e-business indicators. The overall performance of the country was measured making use of the composite H indicator ("e-Business Indicator"), created as part of the e-Europe 2005 initiative for benchmarking purposes.<sup>107</sup>

This composite indicator includes 12 sub-indicators related to the adoption and use of e-business by companies that are described in the following Exhibit.

**Exhibit 3.5-1: eEurope 2005 e-Business Index for Spain: component indicators**

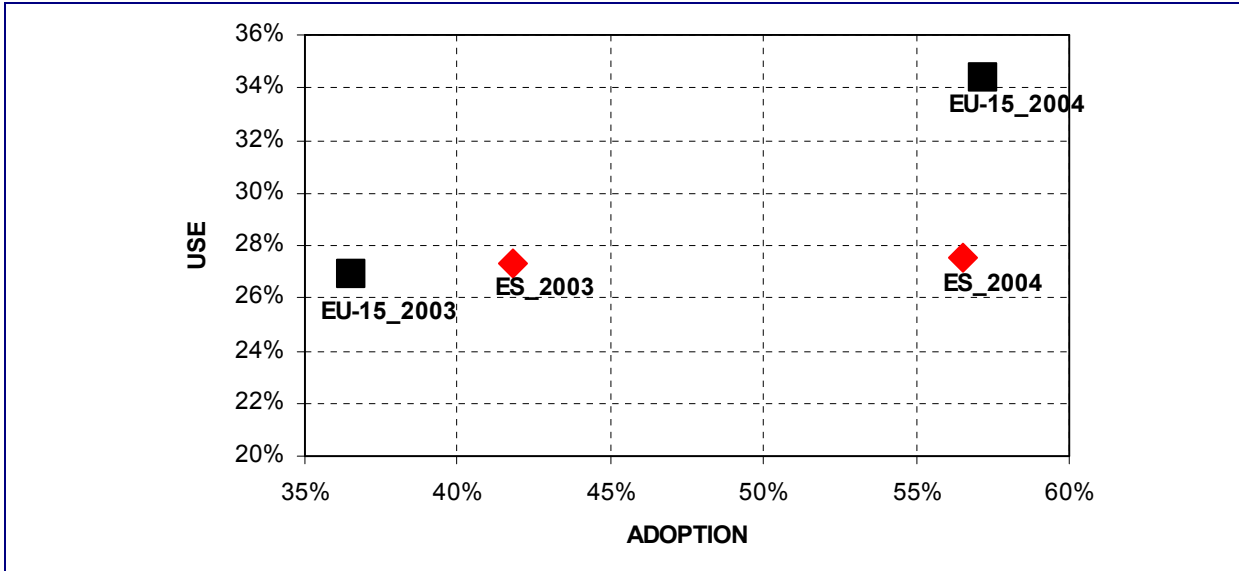
Weights	Adoption of ICT by companies	
0.10	a1	Use internet in reference year
0.10	a2	Have a website or a homepage
0.20	a3	Security facilities used: have used at least two of the above
0.20	a4	Use any computer
0.20	a5	Connects to the internet via broadband
0.20	a6	Use (LAN and (Intranet or Extranet)) in reference year
Weights	Use of e-business by companies	
0.15	b1	Used internet, EDI or other networks, in reference year, for purchases
0.15	b2	Used internet, EDI or other networks, in reference year, for sales
0.15	b3	Have IT systems for orders & purchases which link to any of the following internal IT systems
0.15	b4	Have IT systems for orders & purchases which link to IT systems of suppliers or customers outside the company
0.30	b5	Purpose of the internet (as a customer): banking and financial services
0.10	b6	Have sold to other enterprises via B2B internet market places in reference year

At the time when the analysis took place, two full years of statistics were available for most of the countries included in the EU-15. Taking as reference years 2003 and 2004 (which are really 2002 and 2003, due to the delay of Eurostat in relation with the data gathered by the National institutes of Statistics), the following table shows the relative positions, in terms of adoption and use of e-business by companies, of the EU-15 mean and Spain.

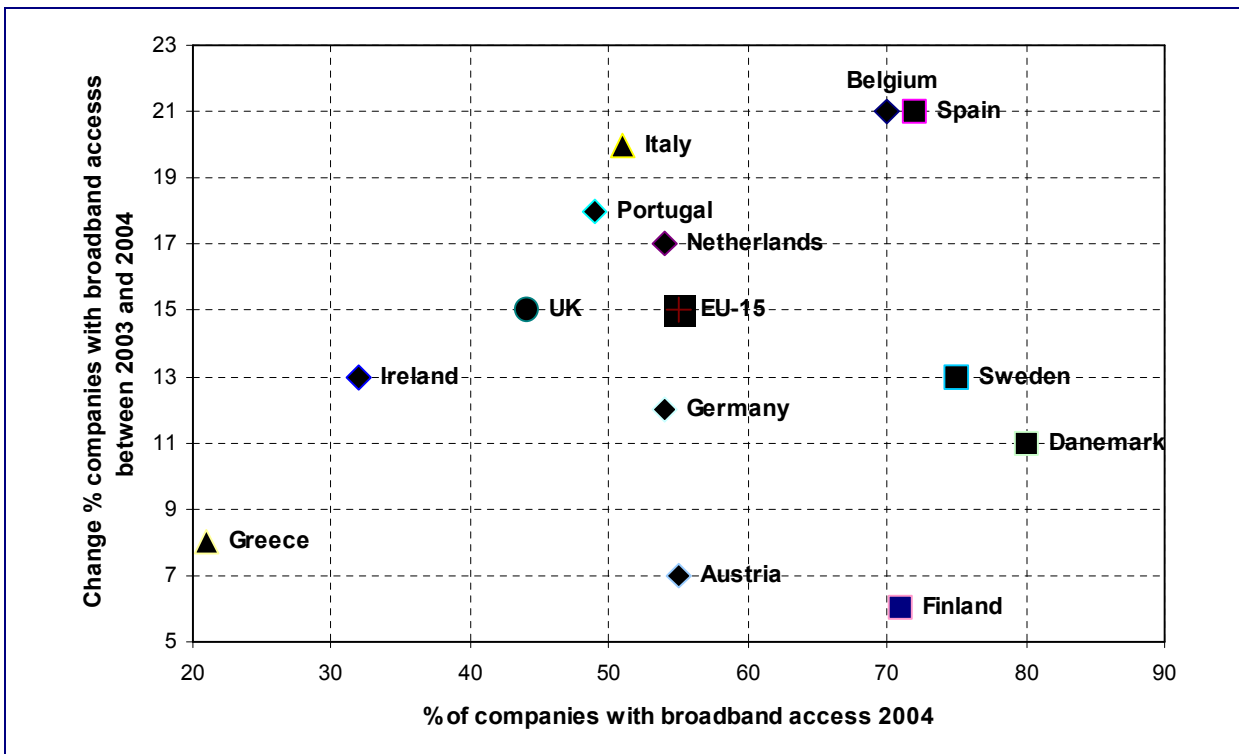
<sup>107</sup> See the Communication of the Commission to the Council and Parliament in [http://europa.eu.int/information\\_society/eeurope/2002/news\\_library/documents/benchmarking05\\_en.pdf](http://europa.eu.int/information_society/eeurope/2002/news_library/documents/benchmarking05_en.pdf)

The graph shows something interesting: In 2003, Spain was above the EU-15 mean both in adoption and use of e-business by companies. However, in 2004 this situation changed, and the country lagged behind this mean.<sup>108</sup>

**Exhibit 3.5-2: eEurope e-Business Index for Spain: 2003, 2004**



**Exhibit 3.5-3: Broadband adoption among firms in EU countries: 2003 – 2004**



Further analysis points at the strong and weak points of the Spanish situation. The country is clearly above the mean in broadband access to the internet and in the use of internet based financial services by companies. On the other hand, Spain is clearly below the mean in purchases and sales carried out

<sup>108</sup> Editors comment: Interestingly, the results of the e-Business Survey 2005 by e-Business W@tch rather point at a dynamic development of e-business in Spain. Thus, findings are mixed, probably depending on sectors covered and indicators focused on.

through the internet as well as in the number of companies that have linked their information systems with either customers or suppliers.

There seems to be no problem with infrastructure, as the country is in the leading group in the adoption of broadband (see Exhibit 3.5-3).

Denmark, Sweden, Spain, Finland and Belgium are the leading countries within the EU-15 in the level of use of broadband for companies accessing internet, and Spain is the leading country in the adoption rate, measured as the change in the number of companies having adopted it from 2003 to 2004.

## Conclusions

Several interesting conclusions can be drawn from this simple analysis:

1. Companies in Spain are aware of the importance of adopting ICT and e-business
2. In fact, they have invested substantially during the last years in order to incorporate ICT into the daily management of businesses
3. However, the cultural changes needed to really assume ICT and e-business as a new way of organizing businesses needs more time to fully affect the structure of the companies.
4. There is no telecommunications infrastructure problem that could negatively affect the development of e-commerce

## Some forecasting

Using the EU-15 composite indicator data, a forecast was done during the aforementioned background work. The forecasting methodology was based on the development of a logistics type model for the different subindicators that are included within the H composite indicator. The main conclusions obtained from the exercise were the following:

- By year 2010, Spain will have fallen behind the EU-15 mean level using the H indicator if no additional action is implemented.
- The amount of investment needed by companies to keep pace with the mean of the EU-15 performance was roughly estimated at about €1,300 million from 2005 to 2010.
- The performance of the different regions varies widely, ranging from regions that compare themselves very favourably with the best regional performers in Europe, to others that lag behind. However, the different intensity in the efforts developed by several regional governments in the promotion of e-business seem to lead to a dramatic change in the evolution of this situation in a five year period. The spatial distribution of e-business seems to be changing quite rapidly in the country.
- As in every other European country, the adoption and use of e-business by smaller companies is not as high as in the bigger companies. Taking into account that 94% of Spanish companies have less than 10 employees, this means that a great number of companies are not achieving the levels of the published indicators (that always refer to companies with more than 10 employees). However, it seems that the rate of adoption of smaller businesses is greater than the one observed in the bigger companies.
- The corporate world seems to experience a fast growth process in Spain. Since 1999, the annual growth rate of Spanish companies is close to 4%. It is a sufficiently high rate to affect the statistics on the adoption of e-business.

Based on the above, a new set of initiatives were designed so as to achieve full convergence of the country by 2010. They are all part of the AVANZ@ initiative for the development of e-business and information society in Spain.



### 3.5.3 Summary and conclusions

It can be concluded that e-business has a promising future in Spain. The positive points are the following:

- Most of the companies are aware of the importance of internet for survival.
- The available infrastructure is evolving at a good rate, both in terms of telecommunications and in terms of hardware or software equipment.
- Some lagging regions are catching up quickly.
- The intensity of the adoption rate of e-business differs greatly between different industries. Some of them do quite well, compared with their counterparts in other countries.

The main negative aspects have to do with:

- Enormous diversity in terms of the geographical development of e-business, some advanced regions, others lagging behind.
- Difficulties in adopting new technology-based business models have to do with the cultural difficulties of adopting organisational changes within companies.
- Since 94% of companies have less than 10 employees, added difficulties are envisaged for the widespread use of e-business due to the lack of technical and financial resources.

During recent years, Spanish figures for productivity growth have been deceiving. Some experts argue that certain delays in the adoption of ICT and new business models by companies are an important cause of this performance. It is true that organisational innovation is driving improvements in the productivity performance of companies, and e-business is part of it. However, some other structural and cultural elements must be taken into account. The Spanish economy is being vigorously driven by the construction industry and by household expenditure, where innovation does not play a dominant role. Moreover, as in other southern European countries, the cultural habits play against the practices implicit in the development of e-commerce.<sup>109</sup>

The public administrations' policies should push forward (and in fact they seem to be doing so) sectoral collective e-business solutions in order to overcome the difficulties stemming from the small mean size of Spanish companies. Moreover, important efforts must be made in order to use the buying power of large corporations as a lever for the adoption of e-business by smaller companies. Training and e-business potential diffusion efforts must be maintained.

#### The author

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<sup>109</sup> For example, in these countries there is no tradition at all of catalogue sales, which could be considered the technology-free ancestor of e-commerce, probably due to the fact that consumers like to buy at the shops, walking around in the good weather.

## Annex I: Glossary of Technical Terms

Term	Definition <sup>110</sup>
<b>Access</b>	The ability to retrieve information and to communicate online through the use of digital information and communication technologies.
<b>B2B</b>	Business to Business. Electronic transactions between companies.
<b>B2B e-marketplace</b>	Electronic trading platforms on the internet where companies can sell and/or buy goods or services to/from other companies. They can be operated by a single buyer or seller or by a third party. Many marketplaces are industry-specific. Some marketplaces require registration and membership fees from companies that want to conduct trade on them.
<b>B2C</b>	Business to Consumer. Electronic transactions, between companies and consumers.
<b>Bandwidth</b>	The physical characteristic of a telecommunications system that indicates the speed at which information can be transferred. In analogue systems, it is measured in cycles per second (Hertz), and in digital systems in binary bits per second. (Bit/s).
<b>Broadband</b>	High bandwidth internet access. In <i>e-Business W@tch</i> reports, broadband is defined as the capacity to transfer data at rates of 2 Mbit/s (megabits per second) or greater.
<b>Channel</b>	In communications, a physical or logical path allowing the transmission of information; the path connecting a data source and a receiver.
<b>CRM</b>	Customer Relationship Management. Software systems that promise the ability to synthesize data on customers' behaviour and needs and thus to provide a universal view of the customer.
<b>Dial-up</b>	The process of establishing a temporary connection (to the internet) via the switched telephone network.
<b>DSL</b>	Digital Subscriber Line. A family of technologies generically referred to as DSL, or xDSL, capable of transforming ordinary phone lines (also known as "twisted copper pairs") into high-speed digital lines, capable of supporting advanced services. ADSL (Asymmetric Digital Subscriber Line), HDSL (High data rate Digital Subscriber Line) and VDSL (Very high data rate Digital Subscriber Line) are all variants of xDSL.
<b>E-business</b>	Electronic business. The <i>e-Business W@tch</i> uses the term "e-business" in the broad sense, relating both to external and to company internal processes. This includes external communication and transaction functions, but also ICT supported flows of information within the company, for example, between departments and subsidiaries.
<b>ebXML</b>	Electronic business using XML. A proven framework and unified set of internationally agreed upon technical specifications and common XML semantics designed to facilitate global trade.
<b>E-commerce</b>	Electronic commerce. As distinct from the broader concept of e-business, e-commerce refers to external transactions in goods and services between companies (B2B), between companies and consumers (B2C), or between companies and governments (B2G) and may therefore be seen as a subgroup or component of e-business activities.
<b>EDI</b>	Electronic Data Interchange. A way for unaffiliated companies to use networks to link their businesses by using a common technical standard for exchanging business data. While electronic mail between companies is common, electronic data interchange passes bigger bundles that replace large paper documents such as bills and contracts.
<b>EDM</b>	Electronic Document Management. The management of different kinds of documents in an enterprise using computer programmes and storage devices. An EDM system allows an enterprise and its users to create a document or capture a hard copy in electronic form, store, edit, print, process, and otherwise manage documents.

<sup>110</sup> Some of the definitions in this glossary are derived from or based on definitions suggested by Whatis?com, a leading online ICT encyclopedia and learning centre. See <http://whatis.techtarget.com>.

<b>ERP</b>	Enterprise Resource Planning. A software system that helps to integrate and cover all major business activities within a company, including product planning, parts purchasing, inventory management, order tracking, human resources and finance.
<b>Extranet</b>	A network using internet protocols that allows external organisations (for example customers or suppliers) access to selected internal data. Essentially it is an Intranet which gives external users restricted access (often password protected) to information through the firewall.
<b>ICT</b>	Information and communication technology. ICT includes networks, computers, other data processing and transmitting equipment, and software. The application of ICT in business processes leads to e-business, if non-proprietary networks are used.
<b>Information security</b>	Measures taken to protect information systems against unauthorised use and attacks
<b>Internet</b>	The world's largest computer communication system, with an estimated 700 million users worldwide. <sup>111</sup> The internet is a loose confederation of principally academic and research computer networks. It is not a network but rather the interconnection of thousands of separate networks using a common language.
<b>Interoperability</b>	The technical features of a group of interconnected systems (includes equipment owned and operated by the customer which is attached to the public telecommunication network) which ensure end-to-end provision of a given service in a consistent and predictable way.
<b>Intranet</b>	An internal internet, that is an internal network running using TCP/IP, which makes information available within the company. Most Intranets are connected to the internet, and use firewalls to prevent unauthorised access.
<b>ISDN</b>	Integrated Services Digital Network. An international telecommunications standard for transmission of voice and data over dial-up lines running at 64 Kbit/s (kilobits per second). It allows sharing of multiple devices on a single line (for example, phone, computer, fax).
<b>KM</b>	Knowledge Management. ICT solutions that support enterprises in systematically gathering, organising, sharing, and analysing their knowledge in terms of resources, documents, and people skills. Knowledge management software typically involves data mining and some method of operation to push information to users.
<b>LAN</b>	Local Area Network. The most common way of connecting computers in a small area (typically inside a building or organisation) for sharing databases and communication facilities. The two most common versions are Ethernet and Token Ring. Implementation is based on coaxial cables or plain wires. Speed achieved ranges from 10 Mbps to 100 Mbps.
<b>Leased line</b>	A private communication channel leased from the common carrier. It is usually a dedicated fixed-route link (e.g. point-to-point frame relay).
<b>M-commerce</b>	Mobile commerce. E-commerce that takes place using mobile connection devices and through data transmission via technical standards for mobile communication.
<b>Micro enterprise</b>	A company with less than 10 employees.
<b>Modem</b>	Modulator/Demodulator. A device that modulates outgoing digital signals from a computer or other digital device to analogue signals suitable to be transmitted through a conventional telephone line (copper twisted pair telephone). The reverse procedure takes place for incoming signals.
<b>MRO goods</b>	Maintenance, repair and operating goods. Supplies which companies need to maintain their operations, for example office supplies, in contrast to "direct production goods" which are components of the goods and services the company produces.
<b>Processes</b>	Business processes are operations that transform the state of an object or a person. This can, for example, be an order placed via the internet. Ordering an object or a service creates a liability for the supplier to deliver, and initiates the transfer of property rights from one entity to another. The electronic handling of processes is likely to speed them up and to introduce new processes in the realisation of the same transaction.
<b>Remote access</b>	The ability of a company computer network's transmission points to gain access to a computer at a different location.

<sup>111</sup> Cf. Global Internet Statistics by Global Reach, [www.greach.com](http://www.greach.com)

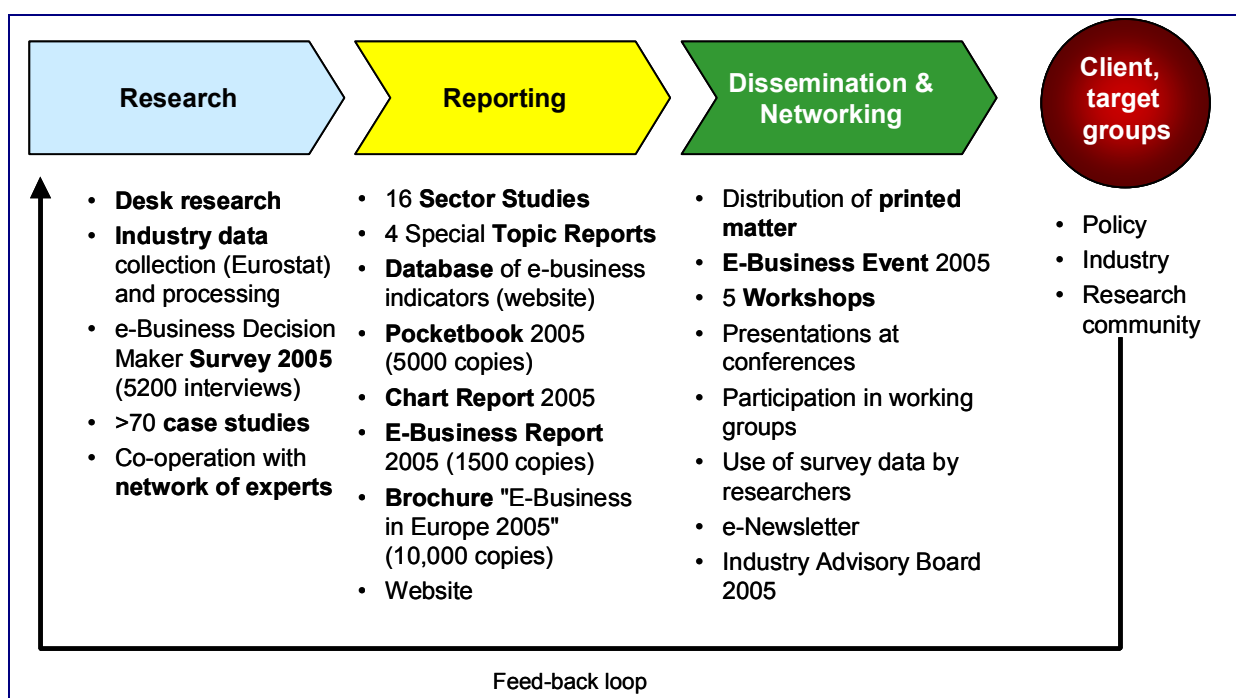
<b>RFID</b>	Radio Frequency Identification. A wireless technology which is used to uniquely identify an object, animal, or person. RFID is coming into increasing use in industry as an alternative to the bar code. The advantage of RFID is that it does not require direct contact or line-of-sight scanning.
<b>SCM</b>	Supply Chain Management. Software that helps businesses to match supply and demand through integrated and collaborative planning tools.
<b>Sector</b>	Sectors of the economy with comparable business activities. These constitute the main research unit of the <i>e-Business W@tch</i> . Aggregated information at the industry level is used to document the diffusion of activities within the industries as well as the overall importance of the observed phenomena for changes in the economy as a whole. The definition of sectors follows NACE Rev.1 classifications.
<b>SME</b>	Small and medium-sized enterprises with 0-249 employees. To be classed as an SME, an enterprise has to satisfy the criteria for the number of employees and one of the two financial criteria, i.e. either the turnover total or the balance sheet total. In addition, it must be independent, which means less than 25% owned by one enterprise (or jointly by several enterprises) falling outside the definition of an SME or a micro-enterprise, whichever may apply. The thresholds for the turnover and the balance sheet total will be adjusted regularly, to take account of changing economic circumstances in Europe.
<b>Transaction</b>	Electronic transactions can be subdivided into several steps, each of which initiates a process. There are pre-sale (or pre-purchase) phases, sale and after-sale phases. Typically a transaction starts with information gathering, price and quality comparisons and possibly pre-sale negotiations. During the sale phase contracting and delivery are the core processes, and payment is the final stage of this phase. After-purchase transaction stages comprise customer service, the administration of credit payments and the handling of returns as well as marketing activities preparing for the next purchase.
<b>UMTS</b>	Universal Mobile Telecommunications Service. A third-generation (3G) digital standard for mobile communication, enabling packet-based transmission of voice, text and video at data rates up to 2 megabits per second (Mbps).
<b>Value added</b>	Gross output minus intermediate inputs. It is valued at producers' prices and includes all indirect taxes, but excludes VAT and subsidies.
<b>VPN</b>	Virtual Private Network. A way to use a public telecommunication infrastructure, such as the internet, to provide remote offices or individual users with secure access to their organisation's network.
<b>WAN</b>	Wide Area Network. A network allowing the interconnection and intercommunication of a group of computers over a long distance.
<b>WAP</b>	Wireless Application Protocol. A communication protocol for delivering data over mobile telephone systems, allowing cellular phone sets and other mobile hand-set systems to access WWW pages and other wireless services.
<b>Website</b>	A related collection of World Wide Web files that includes a beginning file called a home page.
<b>W-LAN</b>	Wireless Local Area Network. An implementation of a LAN with no physical wires, using wireless transmitters and receivers. It allows a mobile user to connect to a LAN or WAN through a wireless (radio) connection. A standard, IEEE 802.11, specifies the technologies for wireless LANs.
<b>WWW</b>	World Wide Web. The collection of pages in HTML format which reside on web-servers. Although WWW and the internet are different, the terms are increasingly becoming interchangeably used.
<b>XML</b>	Extensible Mark-up Language. A standard to describe the contents of a page or file. XML is a way to create common information formats and share both the format and the data on the World Wide Web, intranets, and elsewhere.



## Annex II: e-Business W@tch Activities in 2004/05

This Annex summarises activities of *e-Business W@tch* in the period from September 2004 to November 2005.<sup>112</sup> After a brief introduction, which describes the context of the initiative, the annex is structured in three main parts. The first part summarises the main research activities, which include the e-Business Survey 2005 and the collection of case studies. The second part presents an overview of reports and other documents published by *e-Business W@tch* in 2005. The third part summarises the main dissemination and networking activities during the same period.

### Exhibit: Research, reporting and dissemination activities of e-Business W@tch in 2004/05



### A2.1 Research activities

#### Decision-Maker Survey on e-business activity: the e-Business Survey 2005

Most of the data presented in *e-Business W@tch* reports are results of the e-Business Survey 2005, a decision maker survey about the adoption of ICT and e-business among European enterprises.<sup>113</sup> The e-Business Survey 2005 was the third survey after those of 2002 and 2003. It had a scope of 5,218 telephone interviews with decision-makers in enterprises from seven EU countries (Czech Republic, France, Germany, Italy, Poland, Spain and the UK). Interviews were carried out in January and February 2005, using computer-aided telephone interview (CATI) technology.

In contrast to the surveys of 2002 and 2003, the 2005 survey considered only companies that used computers. Thus, the highest level of the population was the set of all computer-using enterprises

<sup>112</sup> *e-Business W@tch* is based on a contract between the European Commission, DG Enterprise and Industry, and empirica GmbH.

<sup>113</sup> See Annex III (Methodology Report) for detailed information about the survey.

which were active within the national territory of one of the countries covered, and which had their primary business activity in one of the 10 sectors specified on the basis of NACE Rev. 1.1 categories. Evidence from previous surveys shows that this does not make a noticeable difference for medium-sized and large firms, as the share of firms that use computers can be expected to be 99% or more in all sectors and countries covered. Differences are relevant, however, for micro and small enterprises, in particular in the food and beverages industry, the textile industry, construction and tourism.

### **e-Business Activity Views**

In order to complement the statistical picture gained from the e-Business Survey with a more in-depth analysis on the use of specific e-business applications, *e-Business W@tch* collected more than 70 e-Business Activity Views in the 10 sectors covered. This collection included cases from nearly all EU Member States, the USA, Bulgaria, Romania, Turkey and Switzerland, which are based on personal interviews and desk research. A synopsis of these case studies is presented in the first part of this report. Activity Views were published in sector reports and on the website.<sup>114</sup>

Activity Views can be considered as short case studies. They provide snapshots of real-life e-business activity in companies from the sectors studied. As such they indicate business impacts of this activity, to the extent that companies were able and willing to share their experience with *e-Business W@tch*.<sup>115</sup>

*e-Business W@tch* cooperated with local correspondents in the EU Member States for the collection of Activity Views. Correspondents selected examples according to the following criteria:

- **Best practices:** Activity Views that represent good e-business practice within the respective industry. Assessment could be based on the citation of the case in media (for example in e-business magazines), or in references from technology providers.
- **Innovative e-business approach:** Activity Views that represent innovative approaches and methods of e-business, particularly if this practice reveals some insight about future developments in the sector.
- **Lessons learned:** Activity Views containing an interesting experience of a company, i.e. lessons to be learned from the described activities. In this context, it is also possible to present a case of "e-business failure".
- **Typical example:** Activity Views that represent typical state-of-the-art e-business activity in the respective sector. Not all case studies, however, need to be about exceptional activities.
- **SME dimension:** A quota of at least 60% of Activity Views from small and medium-sized enterprises was to be achieved, considering the overall rationale of *e-Business W@tch*.

Any Activity View had to comply with at least one of the criteria above. Overall, the examples collected in 2005 represent a well-balanced mixture in terms of their content and focus, the location of companies, their size, and the sector they operate in.

### **Industry statistics from secondary sources**

As in the previous years, the Eurostat New Cronos Database was the main source of macro-economic data about the sectors covered. *e-Business W@tch* used data from New Cronos as background information and for the elaboration of sector profiles. New Cronos is structured in nine parts

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<sup>114</sup> Case studies are published in the series of sector reports of July 2005, with the exception of the reports on tourism and aeronautics which were published in September 2005. Selected case studies are also available on the website ([www.ebusiness-watch.org/resources/casestudies.htm](http://www.ebusiness-watch.org/resources/casestudies.htm)).

<sup>115</sup> The willingness of firms to provide information about their e-business activities, and to share lessons learned, differs to the extreme, without a clear pattern across sectors. While some companies refuse to provide any information (either due to confidentiality rules or because of the time effort required to sit for an interview and to review the edited case), others welcome the opportunity to present themselves in the context of a European study.

("themes"). Most of the data used for the sector studies are derived from theme 4 "Industry, trade, and services", and here from the collection sbs (structural business statistics).

All statistics presented in the background chapter of sector studies were prepared by DIW Berlin, which obtained the most recent available data from Eurostat in December 2004. Gaps in the official statistics resulting from missing data for individual countries or the respective year in the time-series of a country were imputed, based on economic calculations and estimates by DIW. The most recent official statistics available for industry-wide macro-economic indicators are those for 2002 at best. For the new EU Member States, the most recent national accounts usually date back to 2001.

## A2.2 Publications of 2005

### Sector Studies and Special Reports

The main publications of *e-Business W@tch* – apart from this report – are the e-Business Sector Studies. In 2005, two studies were published on six out of the 10 sectors covered during this period, and one study on the other four sectors. In addition, *e-Business W@tch* published four cross-sector studies ("Special Reports") in 2005. These Special Reports focus on a particular e-business topic and present findings across all studied sectors, rather than within a specific industry. An overview of sector studies and special reports of 2005 is included in the introduction of this report. All these studies can be downloaded from the website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org), 'resources') where earlier issues are also available. Printed copies are not available.

### Synthesis publications

The four main synthesis publications of *e-Business W@tch* in 2005 are the E-Business Report 2005, the Pocketbook 2005, the brochure and the Chart Report 2005. Except for the chart report which is only available in electronic format on the website, printed copies of the other publications can be ordered from *e-Business W@tch* or from DG Enterprise & Industry.

#### Exhibit: Other publications of e-Business W@tch in 2005

Publication	Description	Time
<b>The European e-Business Report (2005 edition)</b>	The European e-Business Report (2005 edition) is the fourth synthesis report of the <i>e-Business W@tch</i> . It features summaries of the 20 Sector Studies and Special Reports conducted in 2005, as well as invited contributions on national perspectives of e-business development in various EU countries (230 pages, 1500 copies).	November 2005
<b>Pocketbook of e-Business Indicators</b>	The statistical pocketbook 2005 is the third edition (after those of 2003 and 2004). It features key indicators from the e-Business Survey 2005 and compound indicators ("e-Business Scoreboard") for the 10 sectors covered (72 pages, 5000 copies).	May 2005
<b>Brochure: E-Business in Europe - 2005</b>	While the pocketbook focuses on the quantitative results, the brochure highlights results and conclusions from the sector studies. studies (24 pages, 10000 copies).	September 2005
<b>Chart Report 2005</b>	The Chart Report 2005 compares to the pocketbook, as it focuses on the main results of the e-Business Survey 2005. The Chart Report is available only electronically on the website, but slides can be printed out. The presentation consists of 51 slides. Its charts can be used as a whole, or, alternatively, individual graphs can be extracted from charts and be used in other presentations.	September 2005



## Website

The *e-Business W@tch* website ([www.ebusiness-watch.org](http://www.ebusiness-watch.org)) was redesigned and relaunched in 2005. The site is the main archive of the initiative, providing users with free access to all publications and workshop proceedings available since the launch of *e-Business W@tch* in late 2001. Users can also register for the *e-Business W@tch* e-newsletter on the site. The website has about 13,000 visitors per month (2<sup>nd</sup> and 3<sup>rd</sup> quarter 2005).

## A2.3 Dissemination and networking activities

### Workshops and main annual event

In 2005, *e-Business W@tch* organised five workshops and its annual main event to discuss findings with target audiences from industry, policy and research. As in previous years, *e-Business W@tch* has actively sought cooperation with other organisations in arranging the workshops, for example with universities and business intermediaries. Experience in the past has proven that this form of cooperation greatly benefits the quality and scope of events, by enabling synergies, mobilisation of participants, and the exploitation of results. Proceedings from these events, and a synopsis of main results and conclusions from the discussion with participants, are available on the website.

#### Exhibit: e-Business W@tch Events in 2005

Date	Place	Event	In cooperation with
26-10-2005	Brussels	Main Annual Event: Electronic Business Trends in 2005: <b>Industry Perspectives</b>	EC, DG Enterprise & Industry
14-10-2005	Milan	Workshop: E-Business in the <b>Textile Industries</b> : Can ICT Help to Overcome the Crisis?	Euratex (The European Apparel and Textile Organisation)
10-06-2005	Brussels	Workshop: ICT and E-Business in the <b>Construction Industry</b> : Implications for Firm Productivity and Policy	NORMAPME, the European Office of Crafts, Trades and SMEs for Standardisation
31-05-2005	Athens	Workshop: <b>Electronic Payments and E-Invoicing</b> : Opportunities, Challenges and Security Issues	ELTRUN (eBusiness Centre at the Athens University of Economics and Business)
27-05-2005	Athens	Workshop: E-Business in the <b>Food Industry</b> : Opportunities and Challenges for SMEs	Agricultural University of Athens, the Greek Informatics Society
11-05-2005	Berlin	Workshop: E-Business in <b>Manufacturing Industries</b> : A source of competitive advantage?	DIW Berlin – Industrial Conference

### Various dissemination and networking activities

- In addition to organising its own events, members of the *e-Business W@tch* team presented findings at various **international conferences** in 2004/05, such as SCMIS 2005 (International Conference on Supply Chain Management, Salonica, 6 July 2005), CIB 2005 Helsinki Joint Symposium (13 June 2005), 18th Bled eConference "eIntegration in Action" (7 June 2005), European Conference on Innovation & e-Business (Brussels, 26 May 2005), or INFORMS Annual Meeting (Denver, USA, 25 October 2004). A major forthcoming event where results will be presented is the European Conference "e-Business – The Way Forward", which will be held in Cambridge (UK) on 5-6 December 2005.
- *e-Business W@tch* contributes actively to the **international debate on e-business measurement** by participating in interest groups and in related workshops which are coordinated by

OECD or Eurostat. An example is the presentation of the e-Business Scoreboard methodology at the JRC Workshop on European Composite Indicators, Brussels, 25 October 2005.

- *e-Business W@tch* grants researchers and students **access to survey data** (case level) for research purposes, for instance for carrying out further empirical analysis on the economic impacts of ICT and e-business use in enterprises.
- Printed copies of the e-Business **Sector Study on the Tourism** Industry were distributed to representatives of EU Member States at the European Tourism Forum in Malta (19-21 October 2005).
- **e-Newsletter:** *e-Business W@tch* sends out electronic newsletters to its subscriber base (about 600) and to industry associations and federations across the EU (about 450 addresses). Newsletters inform about new publications and forthcoming events.

### The Industry Advisory Board in 2004/05

As in previous years, *e-Business W@tch* cooperated in 2005 with international experts possessing excellent knowledge either on one of the sectors covered or on a special area of electronic business. Advisory Board members were asked to provide critical and constructive support and input in relation to the various tasks which had to be carried out during the period, for example by reviewing draft sector studies. Cooperation and networking with these experts strengthens ties with industry, academia and official statistics.

#### Exhibit: Members of the e-Business W@tch Advisory Board in 2004/05

Advisory Board Member	Affiliation	Appointed for sector / topic	Country
Mr Jean Arcamone	FIM (Fédération des Industries Mécaniques)	Machinery	France
Mr Jürgen Behlke	VDMA – Association of the German Machine Tool Industries	Machinery	Germany
Ms Françoise Bousquet	ZFIB Conseil	Standards	France
Mr Dimitrios Buhalis	University of Surrey	Tourism	UK
Mr Stefano Cattaneo	Bel Group	Food	Italy
Mr Tony Clayton	UK Office for National Statistics	ICT statistics	UK
Mr Thomas Fischer	Institut für Textil- und Verfahrenstechnik Denkendorf	Textile	EU / DE
Ms Silke Gabriel	Claas GmbH	Machinery	Germany
Mr Jesús Galván	Schiller International University (Madrid)	Publishing	Spain
Mr Michael Goebel	MAN Nutzfahrzeuge AG	Automotive	Germany
Mr Artur Górecki	Logotec Enterprise S.A.	Automotive	Poland
Mr Markus Gratzner	Österreich Werbung	Tourism	Austria
Mr Dirk Krischenowski	Chiron	Pharmaceutical	Germany
Mr Photis Nanopoulos	Advisor to the Ministry of National Economy and Economics, Greece	ICT statistics	Greece
Mr Stig Nordqvist	Swedish Newspaper Publishers' Association; IFRA	Publishing	Sweden
Mr John Sarborg Pedersen	ITEK - Confederation of Danish Industries	Construction	Denmark
Mr Ulrich Paetzold	FIEC - European Construction Industry Federation	Construction	EU
Mr Axel Pols	BITKOM	IT services	Germany
Mr Freek Posthumus	NORMAPME	Construction	EU
Mr George Sciadas	Statistics Canada	ICT statistics	Canada
Mr Gerrit Tamm	University of St. Gallen	IT services	Switzerland
Mr Salvo Testa	Bocconi University, Milan	Textile	Italy
Mr Ilias Vlachos	Athens University	Food	Greece



## Annex III: Methodology Report: The e-Business Survey 2005

*e-Business W@tch* collects data on the use of ICT and e-business in European enterprises by means of representative surveys. The e-Business Survey 2005, which was the third survey after those of 2002 and 2003, had a scope of 5,218 telephone interviews with decision-makers in enterprises from seven EU countries (Czech Republic, France, Germany, Italy, Poland, Spain and the UK).<sup>116</sup> Interviews were carried out in January and February 2005, using computer-aided telephone interview (CATI) technology.

### Questionnaire

The general design of the questionnaire builds on the ones used in the previous surveys of 2002 and 2003 in order to ensure a basic continuity of the research approach. However, new modules on security and interoperability have been added, while other modules have been reduced (mostly the ones on perceived impacts of e-business, where little new evidence was to be expected compared to the findings of 2003).

New questions were also introduced in the e-commerce related modules, reflecting the developments in electronic business and changing perspectives in research, in particular the emphasis on electronic business processes. An important focus of the 2005 survey was on the use of ICT systems to support e-procurement and online sales processes. These questions complement the previously used questions on online purchasing and selling activity.

The questionnaires of all three surveys (2002, 2003, 2005) can be downloaded from the *e-Business W@tch* website at [www.ebusiness-watch.org/about/methodology.htm](http://www.ebusiness-watch.org/about/methodology.htm).

### Population

In contrast to the surveys of 2002 and 2003, the 2005 survey considered only **companies that used computers**. Thus, the highest level of the population was the set of all computer-using enterprises which were active within the national territory of one of the 7 countries covered, and which had their primary business activity in one of the 10 sectors specified on the basis of NACE Rev. 1.1 categories.

Evidence from previous surveys shows that this does not make a noticeable difference for medium-sized and large firms, as the share of firms that use computers can be expected to be 99% or more in all sectors and countries covered. Differences are relevant, however, for micro and small enterprises, in particular in the food and beverages industry, the textile industry, construction and tourism. In these four sectors, 10-30% of micro enterprises and 4-15% of small firms (depending on the country and sector) do not use a computer.<sup>117</sup> Therefore it makes a difference if a figure represents a percentage of "all companies" (as in 2003) or a percentage of "companies using computers" (as in 2005). Differences are much less pronounced, though, when figures have been weighted by employment.

The 10 sectors that have been selected for the 2005 survey are extremely heterogeneous in terms of their size. Construction is by far the largest with about 2.3 million enterprises in the EU-25. At the other end of the range are the aerospace and pharmaceutical industries with only about 2,200 and 3,900 firms respectively in the EU-25. This is a factor of about 100 between the largest and smallest sector. This imbalance has clearly implications for the achievement of survey quota and the impact of weighting on sector data and on aggregate results.

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<sup>116</sup> These seven countries are frequently referred to as the "EU-7" in this report. They account for roughly 75% of the EU-25 population and GDP.

<sup>117</sup> Non-computer users include typically small craft firms (textile, construction), bars, restaurants or pensions (in tourism), and small food producing companies.

**Exhibit A.III-1: Population coverage of the e-Business Survey (2005)**

No.	NACE Rev. 1.1		Sector name (as used by e-Business W@tch)
	Section	Division / Group	
01	DA	15	Manufacture of food products and beverages
02	DB	17, 18	Manufacture of textiles (17), wearing apparel; dressing & dyeing of fur (18)
03	DE	22	Publishing, printing and reproduction of recorded media
04	DG	24.4, 24.5	Manufacture of pharmaceuticals (24.4), soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations (24.5)
05	DK	29.1 – 29.5	Manufacture of machinery and equipment (not included: Manufacture of weapons and ammunition, domestic appliances)
06	DM	34	Manufacture of motor vehicles, trailers and semi-trailers
07	DM	35.3	Manufacture of aircraft and spacecraft
08	F	45	Construction
09	H, I, O	55, 62.1, 63.3, 92.3+5	Tourism, including hotels and restaurants (55), parts of air transport (62), travel agencies and tour operators (63.3), and parts of recreational, cultural and sporting activities (92)
10	K	72	Computer and related activities

**Sampling frame and method**

No cut-off was made in terms of minimum size of firms. The sample drawn was a random sample of companies from the respective sector population in each of the seven countries, with the objective of fulfilling minimum strata with respect to company size class per country-sector cell. Strata were to include a 10% share of large companies (250+ employees), 30% of medium sized enterprises (50-249 employees), 25% of small enterprises (10-49 employees) and up to 35% of micro enterprises with less than 10 employees. Samples were drawn locally by fieldwork organisations based on widely recognized business directories and databases (see Exhibit A.III-2).

**Exhibit A.III-2: Directories from which samples were drawn (2005)**

Country	Directory / database	
CZ	Czech Republic	Albertina Business Database (database of economic subjects with >1m entries)
DE	Germany	Heins und Partner Business Pool
ES	Spain	Dun & Bradstreet
FR	France	SIREN file from INSEE (the French National Statistics Institute)
IT	Italy	Dun & Bradstreet
PL	Poland	Kompass Polska
UK	United Kingdom	Dun & Bradstreet

The survey was carried out as an enterprise survey: data collection and reporting focus on the enterprise, defined as a business organisation (legal unit) with one or more establishments. In some of the sectors, target quota in the larger enterprise size-bands could not be accomplished in each of the countries. In these cases, interviews were shifted to the next largest size-band (from large to medium-sized, from medium-sized to small).

**Fieldwork**

Fieldwork was coordinated by the German branch of Ipsos GmbH ([www.ipsos.de](http://www.ipsos.de)) and conducted in cooperation with its local partner organisations (see Exhibit A.III-3) on behalf of e-Business W@tch. Pilot interviews prior to the regular fieldwork were conducted with 12 companies in Germany in December 2004, in order to test the questionnaire (structure, comprehensibility of questions). The survey had a scope of 5,218 interviews, evenly spread across the seven countries covered. About 565 interviews per sector were conducted (see Table 4), except for the aeronautics and the pharmaceutical industry. Due to the small population of firms in these sectors, it was not possible to achieve the target quota. In the aerospace industry, only 163 company interviews could be realised in the seven countries covered. In this sector, practically the entire population of companies was contacted.

**Exhibit A.III-3: Market research companies which have conducted the fieldwork of the survey (2005)**

Country	Fieldwork organisation	
CZ	Czech Republic	Ipsos Czech Republic, Skolska 32/694, 110 00 Praha 1
DE	Germany	Ipsos GmbH, Papenkamp 2-6, 23879 Mölln
ES	Spain	Ipsos ECO Consulting, Avda. de Burgos, 12.-8 <sup>a</sup> , 28036 Madrid
FR	France	Ipsos Insight Marketing, 99, rue de l'Abbé Groult, 75739 Paris Cedex 15
IT	Italy	Demoskopea S.p.A., Via Salaria 290/ Via Rubicone 41, 00199 Rome
PL	Poland	Ipsos, ul. Pulawska 39, 02-508 Warsaw
UK	United Kingdom	Continental Research, 132-140 Goswell Road, EC1V 7DY London

The survey was carried out as an enterprise survey: data collection and reporting focus on the enterprise, defined as a business organisation (legal unit) with one or more establishments. In some of the sectors, target quota in the larger enterprise size-bands could not be accomplished in each of the countries. In these cases, interviews were shifted to the next largest size-band (from large to medium-sized, from medium-sized to small).

**Exhibit A.III-4: Number of interviews conducted by sector and country (2005)**

Sector	CZ	DE	ES	FR	IT	PL	UK	TOTAL
Food and beverages	85	80	82	80	86	83	75	<b>571</b>
Textiles and clothing	85	76	81	80	81	83	75	<b>561</b>
Publishing and printing	84	80	82	80	79	83	75	<b>563</b>
Pharmaceutical industry	54	83	81	76	81	82	75	<b>532</b>
Machinery and equipment	85	80	81	77	84	83	75	<b>565</b>
Automotive industry	85	80	81	80	81	83	75	<b>565</b>
Aerospace industry	20	38	15	39	23	3	25	<b>163</b>
Construction	84	81	83	80	80	83	75	<b>566</b>
Tourism	84	80	82	80	82	83	76	<b>567</b>
Computer related services	84	80	82	78	82	84	75	<b>565</b>
<b>TOTAL</b>	<b>750</b>	<b>758</b>	<b>750</b>	<b>750</b>	<b>759</b>	<b>750</b>	<b>701</b>	<b>5218</b>

**Exhibit A.III-5: Interview contact protocol: completion rates and non-response reasons (2005)**

		CZ	DE	ES	FR	IT	PL	UK	Total
<b>1</b>	<b>Sample (gross)</b>	<b>2632</b>	<b>7247</b>	<b>8796</b>	<b>10123</b>	<b>5082</b>	<b>7825</b>	<b>13104</b>	<b>54809</b>
1.1	Telephone number does not exist	126	880	680	373	340	959	870	4228
1.2	Not a company (e.g. private household)	42	130	220	200	44	214	115	965
1.3	Fax machine / modem	40	56	10	0	359	248	116	829
1.4	Quota completed > address not used	191	361	3357	1623	351	1161	3856	10900
1.5	No target person in company	57	344	186	98	72	109	691	1557
1.6	Language problems	2	16	14	14	1	0	0	47
1.7	No answer on no. of employees	10	8	3	1	0	0	8	30
1.8	Company does not use computers	11	80	194	332	41	30	567	1255
	Sum 1.1 – 1.8	479	1875	4664	2641	1208	2721	6223	19811
<b>2</b>	<b>Sample (net)</b>	<b>2153</b>	<b>5372</b>	<b>4132</b>	<b>7482</b>	<b>3874</b>	<b>5104</b>	<b>6881</b>	<b>34998</b>
2.1	Nobody picks up phone	212	366	335	892	1080	1333	6	4224
2.2	Line busy, engaged	60	52	6	68	60	438	0	684
2.3	Answering machine	42	133	20	1208	79	137	463	2082
2.4	Contact person refuses (refusal at reception, switchboard)	472	931	2010	2024	755	1613	1695	9500
2.5	Target person refuses	388	2125	184	693	142	122	2591	6245
2.6	No appointment during fieldwork period	42	13	395	202	0	261	298	1211
2.7	Open appointment	77	935	363	1584	968	371	1008	5306
2.8	Target person is ill / not available	10	3	47	0	2	0	0	62
2.9	Interview abandoned	91	56	22	57	28	79	119	452
2.10	Interview error, cannot be used	9	0	0	4	1	0	0	14
	Sum 2.1 – 2.10	1403	4614	3382	6732	3115	4354	6180	29780
<b>3</b>	<b>Successful interviews</b>	<b>750</b>	<b>758</b>	<b>750</b>	<b>750</b>	<b>759</b>	<b>750</b>	<b>701</b>	<b>5218</b>
	Completion rate (= [3] / [2])	<b>34.8%</b>	<b>14.1%</b>	<b>18.2%</b>	<b>10.0%</b>	<b>19.6%</b>	<b>14.7%</b>	<b>10.2%</b>	<b>14.9%</b>
	Average interview time (min : sec)	<b>17:07</b>	<b>19:06</b>	<b>17:29</b>	<b>17:15</b>	<b>20:51</b>	<b>21:15</b>	<b>19:53</b>	<b>19:00</b>

**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. Table 5 shows the completion rate by country (completed interviews as percentage of contacts made) and reasons for non-completion of interviews. Higher refusal rates in some countries, sectors or size bands (especially among large businesses) inevitably raises questions about a possible refusal bias. That is, the possibility that respondents differ in their characteristics from those that refuse to participate. However, this effect cannot be avoided in any voluntary survey (be it telephone- or paper-based).

### Feedback on the fieldwork

No major problems were reported from the fieldwork with respect to interviewing (comprehensibility of the questionnaire, logical structure). The overall feedback from the survey organisations was that fieldwork ran smoothly and that the questionnaire was well understood by most respondents. The main challenge was the fulfilment of the quotas, which was difficult or impossible in some of the sectors, in particular among the larger size-bands. Specific remarks from fieldwork organisations, however, point at some differences in the local situation (see Exhibit A.III-6).

#### Exhibit A.III-6: Comments by national fieldwork companies on their experience (2005)

Country		Comments
CZ	Czech Republic	<ul style="list-style-type: none"> <li>It was more difficult to complete interviews with very small companies. They were less willing to participate in an interview.</li> <li>Respondents often felt that questions about a firm's profit or turnover are not adequate. The interviewers mentioned that these questions were several times a cause of abandoning the interview.</li> </ul>
DE	Germany	<ul style="list-style-type: none"> <li>In total fieldwork ran smoothly and the questionnaire was easy to understand and interesting for most of respondents.</li> <li>Answering the question about turnover as well as the investment on ICT was often problematic for the respondents and yielded a high proportion of non-replies.</li> <li>Respondents of small companies often had difficulty in answering questions related to specific technical terms and application. In cases where they used only one or few computers, some questions (e.g. regarding networks) were not relevant for them.</li> <li>Positive resonance comes from the respondents when they know that the survey is being done on behalf of the European Commission. The reference to the website at the end of the interview was welcome and helpful.</li> </ul>
ES	Spain	<ul style="list-style-type: none"> <li>Interviews in very small companies were more difficult to complete due to the lack of knowledge about ICT. On the other hand, the participation of respondents in big companies was difficult to achieve.</li> <li>Generally the questionnaire was easy to understand.</li> <li>About a quarter of the firms contacted have subcontracted most of their ICT tasks, which made it difficult for the respondents to answer specific technical questions.</li> <li>Questions regarding the turnover and investments were difficult to answer for the respondents and yielded a high proportion of don't know responses. This is also often experienced in other B2B surveys.</li> </ul>
FR	France	<ul style="list-style-type: none"> <li>Small companies often do not have much ICT equipment. Respondents therefore sometimes had difficulty in answering some of the questions, since the questionnaire was not adapted to these companies. Small companies often answered "don't know" to more detailed questions.</li> <li>Respondents from larger companies had difficulty answering questions concerning turnover, benefits and other financial issues. These questions would be better put to somebody from the financial department.</li> <li>As more and more companies outsource their IT department, it is difficult to identify a responsible person within the company to answer the questions.</li> </ul>

IT	Italy	<ul style="list-style-type: none"> <li>• The questionnaire was considered long, but quite easy to answer.</li> <li>• However, a few sections (mainly D and E) were considered more complicated than others. In particular technical terms that referred to security and to online services were difficult to understand.</li> <li>• Interviews were carried out without any problems in medium-sized enterprises where it is easier to identify and contact an IT manager. Those respondents had the best grasp of what was being talked about in the interview.</li> <li>• The financial questions were difficult to answer for most of the respondents, especially the question on ICT investments.</li> </ul>
PL	Poland	<ul style="list-style-type: none"> <li>• Respondents from small companies often had difficulties in answering questions related to specific technical applications.</li> <li>• Companies are quite reluctant to provide financial information, so respondents often answer DK to the financial questions.</li> <li>• In many companies, IT people are not allowed to say anything about internal matters of the company.</li> <li>• Many companies outsource their IT department and its activities.</li> </ul>
UK	United Kingdom	<ul style="list-style-type: none"> <li>• As with previous surveys carried out in the context of the <i>e-Business W@tch</i> programme, fieldwork ran relatively smoothly.</li> <li>• However, the anticipated strike-rate was severely affected by the substantial length of the interview (20 minutes).</li> <li>• Gathering turnover and investment details again yielded a high proportion of don't know responses.</li> <li>• As a final point, it is becoming increasingly difficult to secure interviews with IT/DP professionals, and we suspect that this situation will only worsen in the future.</li> </ul>

### Weighting schemes

Due to stratified sampling, the sample size in each size-band is not proportional to the population numbers. If proportional allocation had been used, the sample sizes in the 250+ size-band would have been extremely small, not allowing any reasonable presentation of results. Thus, weighting is required so that results adequately reflect the structure and distribution of enterprises in the population of the respective sector or geographic area. *e-Business W@tch* applies two different weighting schemes: weighting by employment and by the number of enterprises.<sup>118</sup>

- **Weighting by employment:** Values that are reported as employment-weighted figures should be read as "enterprises comprising x% of employees" (in the respective sector or country). The reason for using employment weighting is that there are many more micro-enterprises than any other firms. If the weights did not take into account the economic importance of businesses of different sizes in some way, the results would be dominated by the percentages observed in the micro size-band.
- **Weighting by the number of enterprises:** Values that are reported as "x% of enterprises" show the share of firms irrespective of their size, i.e. a micro-company with a few employees and a large company with thousands of employees both count equally.

### The use of filter questions in interviews

In the interviews, not all questions were asked to all companies. The use of filter questions is a common method in standardised questionnaire surveys to make the interview more efficient. For example, questions on the type of internet access used were only asked to those companies that had replied to have internet access. Thus, the question whether a company has internet access or not serves as a filter for follow-up questions.

The results for filtered questions can be computed on the base of only those enterprises that were actually asked the question (e.g. "in % of enterprises with internet access"), but can also be computed on the base of "all companies". In this report, both methods are used, depending on the indicator. The base (as

<sup>118</sup> In the tables of this report, data are normally presented in both ways, except for data by size-bands. These are shown in % of firms within a size-band, where employment-weighting is implicit.



specified in footnotes of tables and charts) is therefore not necessarily identical to the set of companies that were actually asked the underlying question.

### **Statistical accuracy of the survey: confidence intervals**

Statistics vary in their accuracy, depending on the kind of data and sources. A "confidence interval" is a measure that helps to assess the accuracy that can be expected from data. The confidence interval is the estimated range of values on a certain level of significance. Confidence intervals for estimates of a population fraction (percentages) depend on the sample size, the probability of error, and the survey result (value of the percentage) itself. Further to this, variance of the weighting factors has negative effects on confidence intervals.

Exhibit A.III-7 gives some indication about the level of accuracy that can be expected for industry totals (EU7 totals based on all respondents) depending on the weighting scheme applied. For totals of all-sectors, an accuracy of +/- 2 percentage points can be expected for most values that are expressed as "% of firms", and of +/- 3 percentage points for values that are weighted by employment. The confidence interval for industry totals (EU-7) is about +/- 5 percentage points (in both weighting schemes). Employment-weighted results for the pharmaceutical, the automotive and the aeronautics industry have higher confidence intervals, because these sectors are more sensitive to weights due to their structure (i.e. the dominance of large firms in a comparatively small population). In the aeronautics industry, employment-weighted figures should not be used.

The calculation of confidence intervals is based on the assumption of (quasi-) infinite population universes. In practice, however, in some industries and in some countries the complete population of businesses consists of only several hundred or even a few dozen of enterprises. In some cases, literally each and every enterprise within a country-industry and size-band cell was contacted and asked to participate in the survey. This means that it is practically impossible to achieve a higher confidence interval through representative enterprise surveys in which participation is not obligatory. This should be borne in mind when comparing the confidence intervals of *e-Business W@tch* surveys to those commonly found in general population surveys.

Exhibit A.III-7: Confidence intervals for all-sector and sector totals (EU-7)

	Survey result	Confidence interval		
		Weighted by employment	Weighted as "% of firms"	Unweighted
<b>All sectors (aggregate), EU-7</b>	<b>10%</b>	<b>8.1% - 12.2%</b>	<b>8.7% - 11.5%</b>	<b>9.3% - 10.7%</b>
Food and beverages	10%	7.2% - 13.8%	6.9% - 14.3%	8.1% - 12.3%
Textile industries	10%	7.4% - 13.3%	6.9% - 14.3%	8.1% - 12.3%
Publishing and printing	10%	7.2% - 13.7%	7.2% - 13.8%	8.1% - 12.3%
Manufacture of pharmaceuticals	10%	5.3% - 18.0%	7.5% - 13.1%	8.1% - 12.4%
Manufacture of machinery and equipment	10%	6.5% - 15.1%	7.1% - 13.9%	8.1% - 12.3%
Automotive industry	10%	4.6% - 20.2%	7.7% - 12.8%	8.1% - 12.3%
Aerospace industry	10%	1.7% - 41.3%	5.7% - 16.9%	6.8% - 14.6%
Construction	10%	7.7% - 12.8%	7.0% - 14.1%	8.1% - 12.3%
Tourism	10%	7.2% - 13.8%	6.9% - 14.3%	8.1% - 12.3%
IT services	10%	7.3% - 13.6%	6.5% - 15.2%	8.1% - 12.3%
<b>All sectors (aggregate), EU-7</b>	<b>30%</b>	<b>27.0% - 33.2%</b>	<b>27.9% - 32.2%</b>	<b>29.0% - 31.1%</b>
Food and beverages	30%	25.2% - 35.2%	24.7% - 35.9%	26.9% - 33.3%
Textile industries	30%	25.7% - 34.6%	24.7% - 35.8%	26.9% - 33.3%
Publishing and printing	30%	25.3% - 35.1%	25.3% - 35.2%	26.9% - 33.3%
Manufacture of pharmaceuticals	30%	21.5% - 40.2%	25.9% - 34.4%	26.8% - 33.4%
Manufacture of machinery and equipment	30%	23.9% - 36.9%	25.1% - 35.4%	26.9% - 33.3%
Automotive industry	30%	19.9% - 42.6%	26.3% - 34.0%	26.9% - 33.3%
Aerospace industry	30%	10.5% - 61.0%	22.3% - 39.0%	24.4% - 36.2%
Construction	30%	26.3% - 34.0%	24.9% - 35.7%	26.9% - 33.3%
Tourism	30%	25.2% - 35.2%	24.7% - 35.9%	26.9% - 33.3%
IT services	30%	25.5% - 35.0%	23.9% - 36.9%	26.9% - 33.3%
<b>All sectors (aggregate), EU-7</b>	<b>50%</b>	<b>46.6% - 53.4%</b>	<b>47.7% - 52.3%</b>	<b>48.9% - 51.1%</b>
Food and beverages	50%	44.6% - 55.4%	43.9% - 56.1%	46.6% - 53.4%
Textile industries	50%	45.2% - 54.8%	44.0% - 56.0%	46.5% - 53.5%
Publishing and printing	50%	44.7% - 55.3%	44.6% - 55.4%	46.5% - 53.5%
Manufacture of pharmaceuticals	50%	39.8% - 60.2%	45.4% - 54.6%	46.4% - 53.6%
Manufacture of machinery and equipment	50%	42.9% - 57.1%	44.4% - 55.6%	46.5% - 53.5%
Automotive industry	50%	37.7% - 62.3%	45.8% - 54.2%	46.5% - 53.5%
Aerospace industry	50%	23.2% - 76.8%	40.9% - 59.1%	43.6% - 56.4%
Construction	50%	45.8% - 54.2%	44.1% - 55.9%	46.5% - 53.5%
Tourism	50%	44.5% - 55.5%	43.9% - 56.1%	46.5% - 53.5%
IT services	50%	44.8% - 55.2%	42.9% - 57.1%	46.5% - 53.5%
<b>All sectors (aggregate), EU-7</b>	<b>70%</b>	<b>66.8% - 73.0%</b>	<b>67.8% - 72.1%</b>	<b>68.9% - 71.0%</b>
Food and beverages	70%	64.8% - 74.8%	64.1% - 75.3%	66.7% - 73.1%
Textile industries	70%	65.4% - 74.3%	64.2% - 75.3%	66.7% - 73.1%
Publishing and printing	70%	64.9% - 74.7%	64.8% - 74.7%	66.7% - 73.1%
Manufacture of pharmaceuticals	70%	59.8% - 78.5%	65.6% - 74.1%	66.6% - 73.2%
Manufacture of machinery and equipment	70%	63.1% - 76.1%	64.6% - 74.9%	66.7% - 73.1%
Automotive industry	70%	57.4% - 80.1%	66.0% - 73.7%	66.7% - 73.1%
Aerospace industry	70%	39.0% - 89.5%	61.0% - 77.7%	63.8% - 75.6%
Construction	70%	66.0% - 73.7%	64.3% - 75.1%	66.7% - 73.1%
Tourism	70%	64.8% - 74.8%	64.1% - 75.3%	66.7% - 73.1%
IT services	70%	65.0% - 74.5%	63.1% - 76.1%	66.7% - 73.1%
<b>All sectors (aggregate), EU-7</b>	<b>90%</b>	<b>87.8% - 91.9%</b>	<b>88.5% - 91.3%</b>	<b>89.3% - 90.7%</b>
Food and beverages	90%	86.2% - 92.8%	85.7% - 93.1%	87.7% - 91.9%
Textile industries	90%	86.7% - 92.6%	85.7% - 93.1%	87.7% - 91.9%
Publishing and printing	90%	86.3% - 92.8%	86.2% - 92.8%	87.7% - 91.9%
Manufacture of pharmaceuticals	90%	82.0% - 94.7%	86.9% - 92.5%	87.6% - 91.9%
Manufacture of machinery and equipment	90%	84.9% - 93.5%	86.1% - 92.9%	87.7% - 91.9%
Automotive industry	90%	79.8% - 95.4%	87.2% - 92.3%	87.7% - 91.9%
Aerospace industry	90%	58.7% - 98.3%	83.1% - 94.3%	85.4% - 93.2%
Construction	90%	87.2% - 92.3%	85.9% - 93.0%	87.7% - 91.9%
Tourism	90%	86.2% - 92.8%	85.7% - 93.1%	87.7% - 91.9%
IT services	90%	86.4% - 92.7%	84.8% - 93.5%	87.7% - 91.9%

confidence intervals at  $\alpha=0.90$

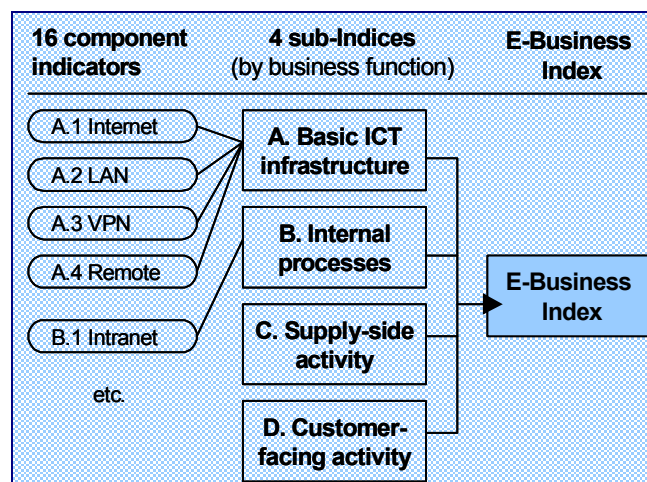
## The E-Business Scoreboard – a two-level compound index

The e-Business Scoreboard approach was developed by *e-Business W@tch* in 2004. It is an instrument to compare and visualize the intensity of e-business activity across different sectors, countries or size-bands, in different areas of business activity. Conceptually, the Scoreboard owes to the Balanced Scorecard (BSC) approach, which suggests that an organisation should be viewed from four perspectives, and that metrics (and targets) are to be defined for each perspective. Similarly, the e-Business Scoreboard looks at ICT use by enterprises from four (inter-related) perspectives. Component indicators represent the metrics for these perspectives.

The Scoreboard is composed of component indicators which are taken from the e-Business Survey 2005 by *e-Business W@tch*. These indicators can be aggregated on two levels:

- ▶ 16 component indicators are, in a first step, aggregated into **four sub-indices** that represent major application areas of e-business. The diamond charts in the Chart Report (coloured section) of this report show these four dimensions of e-business activity.
- ▶ The four sub-indices can then be aggregated into the **(overall) e-Business Index**.

Structure of the e-Business Scoreboard



The E-Business Scoreboard takes into account the percentages (diffusion rates) from all sectors and show how a specific sector differs from the all-sector-average. An index value is based on mean values and standard deviations.<sup>119</sup> Thus, index values express the multiple of the standard deviation (1 or (-1)) for a specific sector and the selected indicator. 0 equals the mean value for all sectors.

Indexes simplify multi-dimensional concepts. To correctly assess the validity and shortcomings of the Scoreboard and its e-Business Index, the following notes are important to be taken into account:

- ▶ **Weighting:** Results are influenced by the selection of the underlying weighting scheme. In the computation presented in this chapter, employment-weighted figures were used. This emphasizes e-business activity in large firms and has an impact on the Index for sectors with dominant large players (for instance the automotive and pharmaceutical industry).
- ▶ **Component indicators:** The selection of component indicators may have a bias towards manufacturing activities, as some indicators in dimension B ("internal process") are more relevant for manufacturing than for service sectors (e.g. ERP). The list of component indicators and their definition is shown on the next page.
- ▶ **Relative comparison:** The e-Business Index and the Scoreboards do not represent absolute measures of e-business activity. The Scoreboard results depend on the respective set of sectors (or countries etc.) that are compared to each other, as figures are derived from computing standard deviations from the average of the respective set.

<sup>119</sup> Constituting values are z-values, i.e.  $z = (x - \text{mean}(x)) / \text{stddev}(x)$ . This procedure results in a distribution with  $\text{mean}(z)=0$  and  $\text{stddev}(z)=1$ .

## Component indicators of the E-Business Scoreboard 2005

A. ICT infrastructure and basic connectivity		
A.1	Enterprises connecting computers with a <b>LAN</b>	= the percentage of employees from a sector working in enterprises that have connected computers with a Local Area Network (LAN).
A.2	<b>Internet</b> connectivity	= the percentage of employees working in enterprises that are connected to the internet, with a supplementary indicator for the type of internet connection in terms of bandwidth. The percentage of employees working in enterprises that are connected with a bandwidth of less than 2 Mbit/s is computed with a factor of 0.5, enterprises connected with at least 2 Mbit/s bandwidth with a factor of 1.0. The maximum value of 100 would be returned if all employees from a sector work in enterprises connected to the internet with more than 2 Mbit/s bandwidth.
A.3	<b>Remote access</b> to the company network	= the percentage of employees from a sector working in enterprises where it is possible to access data from the company's computer system from a remote location.
A.4	Enterprises with a <b>VPN</b>	= the percentage of employees from a sector working in enterprises that use a Virtual Private Network (VPN)
B. Internal business process automation		
B.1	Use of an <b>intranet</b>	= the percentage of employees working in enterprises that use an intranet.
B.2	Use of online technology to <b>track</b> working hours and/or production time	= the percentage of employees working in enterprises that use online technologies (other than e-mail) to track working hours and/or production times
B.3	Use of <b>EDM</b> systems	= the percentage of employees working in enterprises that use an Enterprise Document Management system
B.4	Use of <b>ERP</b> systems	= the percentage of employees working in enterprises that have implemented an ERP (enterprise resource planning) system
C. Procurement and supply chain integration		
C.1	Enterprises <b>purchasing</b> at least 5% of their supplies online	= the percentage of employees working in enterprises saying that they purchase at least 5% of their supplies online via the internet or other computer-mediated networks (for example via EDI based connections to their suppliers)
C.2	Use of <b>specific ICT</b> solutions for e-procurement	= the percentage of employees working in enterprises that use specific IT solutions to support the selection of their suppliers and/or procurement processes
C.3	Use of <b>SCM</b> systems	= the percentage of employees working in enterprises that use an SCM (supply chain management) system
C.4	Online management of <b>capacity and inventory</b>	= the percentage of employees working in enterprises that use technologies to manage capacity and inventory online
D. Marketing and sales processes		
D.1	Enterprises maintaining a website with a <b>CMS</b>	= the percentage of employees working in enterprises that have a website and use a content management system to maintain and update the website
D.2	Use of <b>CRM</b> software systems	= the percentage of employees working in enterprises that use a CRM (customer relationship management) software to organise data about their customers electronically
D.3	Enterprises <b>selling</b> at least 5% of their goods & services online	= the percentage of employees working in enterprises saying that online sales via the internet or other online networks (for example via an extranet) constitute at least 5% of their total sales volume
D.4	Use of <b>specific ICT</b> solutions for marketing and sales processes	= the percentage of employees working in enterprises that uses specific IT solutions to support marketing and sales processes

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