

Sector Report: No. 10-II (September 2005)

ICT and Electronic Business in the

IT Services Industry

ICT adoption and e-business activity in 2005

e-business
w@tch



European
Commission

Enterprise & Industry Directorate General

The e-Business W@tch

The European Commission, Enterprise & Industry 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, EEA and Accession countries. Since January 2002 the *e-Business W@tch* has analysed e-business developments and impacts in manufacturing, financial and service sectors. Results are available on the internet and can be accessed or ordered via the Europa server or directly at the *e Business W@tch* website (www.europa.eu.int/comm/enterprise/ict/policy/watch/index.htm or www.ebusiness-watch.org).

This report is the second Sector Impact Study on electronic business in the IT services sector published by the *e-Business W@tch* in the 2005 period. It presents the results of the e-Business Survey 2005. More than 5200 companies from seven EU countries were interviewed about their use of ICT and e-business in early 2005. The results offer a comprehensive overview of the current state of e-business activity in the sector. This quantitative report is complementary to the earlier study (July 2005), which features a qualitative assessment of current developments and cases of e-business activity in individual enterprises.

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Introduction to the e-Business W@tch

e-Business W@tch – 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 of this initiative 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"*.

It is against this background that the European Commission, Enterprise Directorate General, launched the *e-Business W@tch* in late 2001. The objective of this initiative 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, the *e-Business W@tch* has published more than 60 e-Business Sector Studies on 17 different sectors of the European economy, three comprehensive synthesis reports about the status of electronic business in the European Union, three statistical pocketbooks and various other resources (newsletters, special issue reports, etc). These are all available on the website at 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 e-Business Survey 2005 covers more than 5000 enterprises from 10 different sectors across 7 EU member states. In addition, more than 70 case studies on e-business activity in enterprises from all EU, EEA and Accession countries are carried out, to complement the statistical picture by a more detailed analysis of current e-business practices.

Survey results of the previous years 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, rather than its location, are the main determinants of its e-business activity. The large demand for the various publications and statistics provided by the *e-Business W@tch*, and their exploitation by other research institutions (for example, in the EITO Yearbook 2003 and in the OECD Information Technology Outlook 2004), document the demand for sectoral e-business analysis. 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 the *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 is useful as it 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.

The *e-Business W@tch* Sector Studies 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 the Sector Studies prepared by the *e-Business W@tch*.

The role of economic analysis in the Sector Reports

In addition to the analysis of e-business developments, the *e-Business W@tch* Sector Studies also provide some background information on the respective sector. Following the configuration of the sector (on the basis of NACE Rev. 1.1 classification) at the introduction of each study, this overview includes some basic industry statistics, as well as information about the latest trends and challenges concerning the specific sector. Readers should not mistake this background information, however, as the main topic of analysis. An *e-Business W@tch* "sector report" is not a piece of economic research on the sector itself, but **a study focusing on the use of ICT and e-business** in that particular sector. The introduction to the sector is neither intended to be, nor could it be a substitute for more detailed and specific industrial analysis.

The data presented in each sector's overview are mainly derived from official statistics prepared by Eurostat, but are processed and refined by DIW Berlin. The purpose is to close the many gaps that occur in the official statistics, with missing data being imputed on the basis of extrapolations and own calculations.

The **mission** of the *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).

The *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 consists of ten sectors. Their configuration and definition are based on the NACE Rev. 1.1 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 proposed 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 the *e-Business W@tch* to focus the analysis on more specific business activities.

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 DG Enterprise & Industry.
- Roll-out strategy of 2003: New sectors (not covered in 2002/03 and/or 2003/04) have been added, as well as specific industries which have only been covered as part of a larger sector in the past

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

The 10 sectors and 4 topics analysed in 2005

The 10 sectors which are being monitored and studied in 2004/05 include seven manufacturing, construction and two service sectors. Four of these sectors (namely food and beverages, textile, machinery and equipment and tourism) were also covered in the previous years of implementation, while the other six were covered as part of (aggregated) sectors analysed during 2002-2004.

Exhibit: Sectors and topics covered by *e-Business W@tch* in 2005

	Sector Studies	NACE Rev. 1	Publication date(s) *	
1	Food and beverages	15	July 2005	Sep. 2005
2	Textile industry	17, 18	July 2005	
3	Publishing and printing	22	July 2005	Sep. 2005
4	Pharmaceutical industry	24.4	July 2005	Sep. 2005
5	Machinery and equipment	29	July 2005	Sep. 2005
6	Automotive industry	34	July 2005	
7	Aerospace	35.3	Sep. 2005	
8	Construction	45	July 2005	Sep. 2005
9	Tourism	55, 62.1+3, 92.3+5	Sep. 2005	
10	IT services	72	July 2005	Sep. 2005
Special Topic Reports				
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 Issues		Sep. 2005	
D	ICT Security and Electronic Payments		Sep. 2005	

* There will be 1 report (in 2005) on 4 of the 10 sectors, and 2 reports on the other six.

Executive Summary

Sector definition

This report explores the current state of ICT (Information and Communication Technologies) adoption and electronic business activity in the IT services sector. It provides empirical analyses that build extensively on the results of the e-Business Survey 2005 by the *e-Business W@tch*. By doing so, the report at hand complements the previous sector report (July 2005)¹, which featured a qualitative assessment of current developments as well as case studies of e-business activity in individual enterprises,

The activities of the IT services sector can be summarised by the slogan of several IT service providers to “plan, build and run” IT systems. “Planning” comprises mainly software and hardware consultancy services encompassed by NACE 72.1 (for detailed definition of the respective NACE classifications see section 1.1) and, partly, 72.2. “Building” consists of writing software as well as integrating existing software components (both part of 72.2). “Running” constitutes the actual operation of the ICT infrastructure created and is often referred to as IT outsourcing. Related activities are typically subsumed under NACE 72.3.

ICT and e-business activity in 2005

The general picture

Information technology and e-business services are not only the 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 does the IT services sector differ from the other industries analysed in the *e-Business W@tch* and lets one expect that companies in this sector are intensive users of ICT and e-business tools. The new statistical findings by the *e-Business W@tch* presented in this report support this hypothesis. 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. The IT services sector apparently sets benchmarks for the use of ICT infrastructure and customer facing e-business applications.

Studying the use of ICT in the IT services sector especially shows 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 this report, 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, like ERP, CRM and knowledge management systems.

Statistical findings on e-business key issues (discussed in the previous report)

The statistical findings by the e-Business Survey 2005 provide additional background information on the three key issues discussed in the previous sector report (July 2005), namely the establishment of offshore IT services, the increased relevance of open source software and the supply of software as a service.

Use of offshore IT services: 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 this report indicate that the establishment of offshore relationships is best be done step by step and therefore needs time. A major motivation of the users interviewed is to

¹ e-Business Sector Study on the IT services sector, July 2005, www.ebusiness-watch.org ('resources').

manage peak demands by outsourcing non-core tasks. Finally, it turned out that language skills are an important criterion for the selection of suppliers.

Relevance of Open Source Software (OSS): Open source operating systems, databases and Internet browsers are widely used in companies of this sector, 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, 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.

Usage of software as a service: The discussion of success factors for providers of software as a service (SaaS) or application service providers (ASP) in the previous sector report (July 2005) has revealed that a major challenge in this field is to offer a better value proposition than locally installed software. The new statistical findings by the *e-Business W@tch* confirm this assessment. Companies supporting trading processes by specific IT solutions do it mainly via internally installed standard software and custom solutions. Functionalities provided via Internet based services like ASPs or B2B Internet trading platforms are, in comparison, of minor importance.

Implications of e-business for the industry

As one would expect, ICT and e-business technologies are of outstanding importance for enabling innovation activities of IT services companies. In fact, most product and process innovations in this sector are triggered by ICT. Modern ICT and e-business tools often build the basis for new technological trends like the establishment of OSS businesses. In addition, case studies and business examples (presented in both sector reports) revealed that ICT-triggered innovations also help to solve critical business issues.

Moreover, ICT and e-business developments have a strong impact on the competitive situation in the IT services sector – mainly by facilitating the market entry of new players and increasing rivalry in this sector. The opportunity to supply goods and services over the Internet, for example, facilitates the establishment of new businesses independent of size and origin. Moreover, all three e-business key issues discussed in the previous sector report – offshore outsourcing, open source software and software as a service – are likely to increase competition in the IT services market. However, the new statistical results indicate that these developments are still in an early stage.

Policy implications

The policy implications discussed in this report update assessments made in the previous report (July 2005), using the new statistical results of the *e-Business W@tch*. Two issues are highlighted: the promotion of a European offshore IT services market and potential problems for SMEs and open source developers from software patents.

There are several ways for the promotion of offshore businesses in Europe: First, a “handbook” or “guide” could support SMEs in overcoming critical challenges and could diminish fears related to using offshore services. Moreover, business events on a regional basis are efficient tools to establish personal relationships and are thus likely to accelerate offshore businesses. However, the design of appropriate policy measures should be based on good knowledge about the actual impact of offshore IT services on EU business. In this regard, the statistical findings presented in this report could be taken as a starting point for a more extensive quantitative and qualitative analysis.

The short discussion on software patents presents some arguments by opponents and supporters of software patentability. There will be a need for reliable information on future OSS-related investment risks and for continuous monitoring of industry practices related to the usage of software-related patents.

Electronic Business in the IT Services Sector

1 Introduction

1.1 Objectives and scope of the study

Objectives

This report explores the current state of ICT adoption and electronic business activity in the IT services sector. Results are primarily based on the e-Business Survey 2005 by the *e-Business W@tch*. In January and February 2005, more than 5,200 companies from ten sectors and seven EU countries were interviewed about their use of ICT and e-business. The results of this representative survey offer a comprehensive overview of the current state of play in electronic business in the European Union. This report features key indicators, puts the figures into perspective and draws conclusions on e-business implications for the industry and for policy. By doing so, it is complementary to the previous sector report (July 2005), which features a qualitative assessment of current developments as well as case studies of e-business activities in individual enterprises.

Sector definition

This report focuses on IT and e-business issues in the IT services sector, defined by the following business activities subsumed under NACE² 72.

Exhibit 1-1: Business activities covered by this report (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 as such in many research and policy studies – including past reports by the *e-Business W@tch*. There are, in fact, many ties between IT and communication services. The provision of Internet or telecommunication network services, for example, serves as a basis for many IT service activities. But there are also significant differences between IT services and telecommunications in company sizes, market structure and the way in which services are produced.³

These differences also imply that IT and e-business technologies are used in different ways. Therefore, for the purpose of this report, we will focus on activities that make up the core of

² 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.

³ See *e-Business W@tch* / European Commission (2004), "Electronic Business in the ICT Services Sector" Sector Study 08-II, Chapter 2.1.1, pp. 18-19.

IT services. These activities can be summarised by the slogan of several IT service providers to “plan, build and run” IT systems.^{4 5}

“**Planning**” comprises mainly software and hardware consultancy services encompassed by NACE 72.1 and, partly, 72.2. However, the border between IT-specific consultancy, analysed in this report, and management or process consultants, which do not provide IT services in the strict sense, is difficult to draw. In fact, key characteristics such as establishing personal relationships with customers or the importance of job-specific knowledge are similar. In addition, clients increasingly demand both technological know-how as well as management and operation expertise. Consequently, several larger IT consulting companies like Capgemini or Accenture are active in both areas or have management consulting integrated into their company like IBM did by acquiring the consultancy PriceWaterhouseCoopers.

“**Building**” consists of writing software as well as integrating existing software components (both part of 72.2). According to their business approach, companies specialising in this field can roughly be divided into two types:

- *Manufacturers of standard software (systems)*: Standard software is typically sold or delivered as a product in a one-to-many model. This way, economies of scale can be exploited, i.e. an application is developed once, but can be easily duplicated and sold – at relatively low prices – to many users. This business approach also poses challenges. Access to the mass market or the management of risks in product development are crucial issues, just like in any other product business. Due to the resources needed to cope with these challenges and because of the presence of network effects in the use of software, several large global players, such as Microsoft, SAP, or Oracle, have emerged as providers of standard software.
- *Developers and integrators of custom software solutions*: The characteristics of this type are typical for professional services businesses. Major inputs are a basic ICT infrastructure, knowledge and labour. Compared to the production of standard software, economies of scale are of minor importance. In contrast, technical and organisational expertise as well as the establishment of close relationships with customers are key success factors. The low entry barriers facilitate the establishment of small and medium-sized companies in this field.

There are close links between these two approaches. Standard software often has to be implemented and customised on-site. In addition, standard software components usually lay the foundations for the development of custom software solutions. Therefore, system integrators are typically positioned between producers of standard business software and user companies. As trusted partners of the software users, they are also able to influence the sales success of standard software producers. Therefore, co-operations between manufacturers of standard software and system integrators are widespread in the software business.

“**Running**” constitutes the actual operation of the ICT infrastructure created and is often referred to as IT outsourcing. Related activities are typically subsumed under NACE 73.3. The business approach of companies active in this area again differs from the other IT service segments. First, the supply of IT outsourcing services is much more capital-intensive. Many outsourcing projects require significant investments at the beginning (e.g. in IT equipment like computing centres or in people), which are only recouped over time. Moreover, customer confidence in both the technical expertise and the financial stability of

⁴ For technical reasons, the e-business survey statistics also include companies showing activities subsumed under NACE 72.4 (database activities), 72.5 (maintenance and repair) and 72.6 (others). These might also be added to the “plan, build and run” concept, but are of lesser importance than the core segments of IT services.

⁵ For a detailed discussion of industry and size structure as well as of the economic background of this sector see section 1.1 of the previous sector report (July 2005).

the service providers is of outstanding importance. This, in turn, favours large companies, like EDS, IBM, or T-Systems in this field.

As discussed in detail in the previous sector report (July 2005), the companies active in the IT services sector can be further distinguished by their business focus. In today's IT services landscape, for example, both specialists and diversified companies coexist. But most IT services companies are not 100% specialized on one type of service. Many specialised software developers and IT outsourcing providers, for example, offer IT consulting as an additional service. In turn, IT consultancies (e.g. Accenture) also position themselves as IT outsourcing partners or carry out software integration projects for their clients. Moreover, a significant share of IT services companies follow a mixed strategy by carrying out activities in different segments of the IT services market as well as in related sectors.

1.2 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.⁶

In contrast to the surveys of 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.⁷ 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 I** and on the website of the *e-Business W@tch*.⁸

⁶ The survey was conducted using computer-aided telephone interview (CATI) technology. Field-work was coordinated by the German branch of Ipsos GmbH (www.ipsos.de) and conducted in co-operation with local partner organisations.

⁷ 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.

⁸ See www.ebusiness-watch.org/about/methodology.htm

2 Adoption of ICT and e-business activity in 2005

This chapter will present the main empirical results of the e-Business Survey 2005 by the *e-Business W@tch* for this sector. By doing so, this report complements the rather qualitative analysis of e-business key issues and developments from the previous sector report (July 2005). In fact, the statistical findings discussed in the following section build a valuable basis to check, update or revise assessments and hypotheses derived in the first sector report. Therefore, the following section 2.1 provides a brief summary of the main results presented in the previous sector report and derives from this basis research questions for the statistical analysis.

2.1 Review: main results of the first report⁹

Assessments of e-business key issues by the former report

Information technology and e-business services are not only the output of the IT services sector. Rather, 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 by the *e-Business W@tch* and lets one expect that companies in this sector are intensive users of ICT and e-business tools. In fact, the outstanding position of this sector as user and supplier of IT services should mean that IT services companies show similar large and above-average usage ratios in the e-Business Survey 2005 than those observed for the entire ICT services sector in previous surveys by the *e-Business W@tch* (2002, 2003 and 2004).

The analysis of e-business key issues in the previous report (July 2005) concentrated on current developments triggered by Internet-based technologies, namely the establishment of offshore IT services in the Europe, the increasing importance of open source software (OSS) and the maturing concept of software as a service (SaaS).

- **Offshore IT services:** An important precondition for the establishment of offshore IT service providers is a modern ICT infrastructure, including Internet connections and company websites. However, the professional use of ICT is not sufficient for success. The experiences made by the companies interviewed about this issue have shown that close, personal contacts to customers are a key success factor. Therefore language skills turned out to be important. 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 – and want to – become more than simply low cost service providers. While low prices are helpful for getting into the markets in Western Europe, they are not sufficient for long-run sustainable competitiveness of export-oriented Eastern European IT services businesses.
- **OSS development:** The open source model paves the way from product-centric software supply to new business approaches that focus on services around the software. The Internet and Internet-based platforms play an essential role in the OSS development – they provide the basis for collaboration as well as an organisational infrastructure to support the development process, and they also play an important role for marketing. In addition, the case studies on OSS presented in the previous

⁹ e-Business Sector Report on the IT services sector, SR 10-I, July 2005, www.ebusiness-watch.org ('Resources').

sector report (July 2005, see also exhibit 2-1) have demonstrated that for companies establishing businesses around OSS, setting up and managing the open source developer community is a major challenge.

- **Software as a service:** About five years after the dotcom boom, the paradigm of providing software as a service (SaaS) – also called Application Service Providing (ASP) – has had its first reality check, leading to significant changes of Internet-based service offers. The analyses on this issue have shown that the maturing concept of software as a service is primarily characterised by a better consideration of actual user needs and by a decreased emphasis on technology alone. The case studies presented (see exhibit 2-1) have demonstrated that such a re-orientation requires extensive knowledge about the actual customer needs. They have also shown that customers are not necessarily satisfied by software as a service in its purest form; often convincing service offers involve also traditional software components, e.g. integration tools that allow for higher degree of customisation.

Related research questions for the empirical analysis

The assessments of the previous sector report (July 2005) as summarized above are mainly based on desk research and case studies (see exhibit 2-1), but lack an empirical foundation. The new statistical results by the e-Business Survey 2005 as presented in this chapter will help to consolidate these analyses. In fact, there are still many open questions related to the analyses of e-business key issues in the previous sector report. Research questions to be further analyzed in light of the statistical results of the e-Business Survey 2005 cover the following areas:

- **General relevance of ICT and e-business:** Do the statistical results actually confirm the outstanding position of IT services in the use of ICT and e-business tools? How do SMEs in this sector use ICT in comparison to large players?
- **Offshore IT services:** What is the relevance of offshore IT outsourcing in the sectors surveyed by the *e-Business W@tch* 2005? To what extent do IT service companies in the old EU-15 use offshore services supplied by Eastern European providers? Are there country- or size-specific differences in the use of offshore opportunities? What is the position of Eastern European suppliers of offshore IT services compared to their Asian competitors?
- **Open source software:** How relevant are open source software (OSS) components in the IT services sector as well as in other sectors surveyed? Are there differences in the usage of OSS components between large and small companies?
- **Software as a service (SaaS/ASP):** To what extent are such services used to support trading processes on the buy side as well as on the sell side in the IT services sector and in other industries? How important are such services compared to traditional models of software usage like internally installed solutions?

The following sections 2.2 to 2.6 will present new statistical findings on the use of ICT and e-business technologies in different application areas and, by doing so, will provide evidence for the general importance of e-business activities in this sector. Section 2.3 will particularly focus on the use of offshore outsourcing opportunities and open source software. Statistical findings on the relevance of SaaS/ASP services for supplier and customer-facing applications will be presented in sections 2.5 and 2.6.

Exhibit 2-1: Case studies and business examples presented in the previous sector report (July 2005)

Key issue discussed	Title and Purpose
<p>The establishment of offshore IT services in Eastern Europe</p>	<p><i>Case Study:</i> Offshore IT services by PGS Software (Poland)</p> <ul style="list-style-type: none"> • Example of a Polish start-up that wants to establish itself as a global provider of IT outsourcing and software development services. • Insights into opportunities and challenges for Eastern European IT service companies. <p><i>Case Study:</i> Softgate – A Romanian supplier of software services for the German market</p> <ul style="list-style-type: none"> • Example of a Romanian IT services company that is experienced in developing custom software applications for the German market. • Discussion of challenges and success factors for providing offshore IT services.
<p>The increasing relevance of open source businesses</p>	<p><i>Case Study:</i> Open source based services by Open Cascade</p> <ul style="list-style-type: none"> • Example of a traditional software manufacturer that has become an open source company. • Discussion of challenges and success factors of the open source software model, particularly in creating a developer community. <p><i>Case Study:</i> Janus Software wants to establish itself as a “competitor of Oracle”</p> <ul style="list-style-type: none"> • Example of a “typical” OS company. • Discussion of challenges and opportunities of open source based business models, particularly in creating a developer community. • Insights into the potential of the Internet for marketing activities of open source companies.
<p>The maturing concept of software as a service</p>	<p><i>Case study:</i> Onventis (Germany) – The provision of supply management applications on demand.</p> <ul style="list-style-type: none"> • Example of a “Procurement Service Provider” offering its solutions on demand. • Insight into challenges and success factors for ASP (application service provider) approaches by a company that succeeded in creating a stable business. <p><i>Business example:</i> New cashier system by PMS (Poland)</p> <ul style="list-style-type: none"> • Example of an IT system developer and integrator that introduced a cashier system software as natural extension of its e-ticket service.
<p>Future developments</p>	<p><i>Business example:</i> Use of weblogs by CRM specialist Wice (Germany)</p> <ul style="list-style-type: none"> • Example of a supplier of CRM software integrating weblogs in the company's marketing mix.

2.2 Basic ICT infrastructure and skills development

ICT network infrastructure

A modern ICT infrastructure is essential for the successful supply of IT services. In fact, the analysis of key issues in the previous sector report (July 2005) has shown that the production and delivery of IT services (e.g. the provision of outsourcing services, of services around OSS and especially of software as a service) needs an efficient network infrastructure as well as powerful and secure Internet connections.

Exhibit 2-2: ICT network infrastructure and access

Weighting:	LAN		Wireless LAN		Internet access		Broadband access with more than 2 Mbit/s		VPN	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	93	87	46	36	100	100	39	20	59	32
1-9 empl.		86		35		100		19		30
10-49 empl.		97		47		100		32		54
50-249 empl.		98		52		100		47		78
250+ empl.		94		48		100		58		77
Germany	95	97	61	51	100	100	35	7	67	38
Spain	93	91	45	40	100	100	51	25	59	26
France	95	80	36	40	100	97	52	53	62	30
Italy	95	90	30	29	100	100	31	22	40	22
United Kingdom	94	89	54	40	100	100	37	12	67	40
Czech Republic	83	68	38	30	100	100	25	15	36	23
Poland	71	73	21	15	100	100	22	18	28	21
Total¹⁰ (10 sectors, EU-7)	70	44	26	13	96	91	18	9	30	9
Food & beverages	72	36	26	4	95	83	14	4	27	3
Textile	76	37	26	9	98	93	14	4	29	5
Publishing & printing	83	57	21	12	99	98	31	13	40	7
Pharmaceutical	96	60	34	14	100	96	33	11	57	16
Machinery, equipment	88	49	33	10	99	95	20	6	45	7
Automotive	97	50	45	11	100	92	40	11	62	12
Aeronautics	99	63	38	16	100	99	41	13	55	20
Construction	58	36	13	8	95	91	10	7	17	4
Tourism	56	40	27	17	92	90	14	8	20	9
IT services	93	87	46	36	100	100	39	20	59	32
Base (100%)	All									
"All" = companies using computers. N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).										
"% of employment" = firms representing ...% of employment in the sector(s) / country.										
"% of firms" = % of firms as legal units, irrespective of their size.										
LAN = Local Area Network; VPN = Virtual Private Network										

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

¹⁰ Total is the weighted average of all 10 sectors covered by the e-Business Survey 2005.

Indeed, IT services companies are well equipped with basic ICT infrastructure and Internet connections. As could be expected, the respective usage shares (see exhibit 2-2) are significantly above those in other sectors surveyed in the EU-7 by the *e-Business W@tch* in 2005. Practically all IT services companies, for example, have access to the Internet (independently of their size) and the large majority even has broadband access (see exhibit 2-3). In fact, about one fifth of IT services companies reported having Internet connections with a capacity of 2 Mb/s and higher (exhibit 2-2).¹¹

Most companies with broadband access use DSL for this purpose. DSL is able to outperform conventional access technologies like ISDN or analogue modem since it provides much higher bandwidths at mass-market prices. As a consequence, there is a broad DSL diffusion particularly among SMEs in this sector. For the majority of large IT services companies, however, the bandwidth or reliability provided by DSL are obviously not sufficient, as they mostly use other, more powerful broadband connections, such as dedicated leased lines to Internet providers.

In addition, large players in this sector also show a greater need for virtual private networks (VPNs) – an encryption technology to set up secure Internet connections. VPNs can be used, for example, to connect different companies, to let a mobile worker access the company network as if (s)he were on site, or to connect different offices worldwide cheaply and securely via the Internet.

Exhibit 2-3: Type of Internet connection used

Weighting:	Analogue modem		ISDN		DSL		Other broadband		Other	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	5	7	9	9	44	64	47	27	8	3
1-9 empl.		7		9		65		26		3
10-49 empl.		2		9		51		40		5
50-249 empl.		4		9		38		55		9
250+ empl.		6		10		23		69		16
Total (10 sectors, EU-7)	11	18	21	25	43	45	26	11	4	2
Base (100%)	Companies with Internet access									
	Base: N = 564 (IT services, EU-7), N = 5016 (Total, EU-7).									
	"% of employment" = firms representing ... % of employment in the sector(s) / country.									
	"% of firms" = % of firms as legal units, irrespective of their size.									
	ISDN = Integrated Services Digital Network; DSL = Digital Subscriber Line									

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

Since the work on IT services projects typically requires the collaboration of several employees, Local Area Networks (LANs), which connect computers within a location, are a basic requirement in this sector. Therefore almost all IT services companies have LANs, which also applies to micro enterprises.

The integration of (mobile) employees into such networks can be further facilitated by the use of Wireless LAN (WLAN) technology, which exists in roughly one third of IT services companies (see exhibit 2-2). WLANs provide a wireless (radio) access to the Internet via a

¹¹ There is no unique definition for "broadband Internet access" in terms of capacity yet. According to the European Commission: "Broadband capacity is defined as equal to, or higher than, 144 Kb/s. However in reality, the vast majority of broadband offerings are at least 512 Kb/s and often exceed this, with speeds of 2 Mb/s and above now quite common"; European Commission (2005): "Broadband access in the EU: situation at 1 January 2005, Press Release, MEMO/05/185, Brussels, 1 June 2005 (www.eu.int.org).

so-called access point. Thus, the Internet can be accessed by everyone with WLAN-enabled devices and located within the footprint of an access point. The area within the footprint of a WLAN access point is called hotspot. If the WLAN technology is deployed in a company, e.g. in an office building, employees are not bound to fixed terminal places to access the company network. Thus, WLANs can help facilitate the collaboration among employees, e.g. if programmers or consultants are meeting for a project and all need Internet access on their notebooks.

Remote access

Remote access, i.e. access to the company's computer systems from outside for traveling employees or home workers, is very common in the IT services sector. Remote access solutions provide employees with more flexibility for when and where to work. They can significantly improve the efficiency of employees working at remote locations, such as traveling managers, sales force, and technical support staff. In addition, working from home at unusual working times (e.g. in software programming) and working from remote locations (e.g. consultants at the client's site) are very common in IT services companies.

Exhibit 2-4: Remote access to the company's computer network

Weighting:	Enable remote access		Have planned to enable remote access		Remote access via fixed line connection		Remote access via WLAN		Remote access via mobile networks	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	74	61	7	4	61	54	33	24	48	40
1-9 empl.		60		3		53		24		39
10-49 empl.		74		10		58		28		43
50-249 empl.		84		4		71		31		55
250+ empl.		79		11		63		46		52
Total (10 sectors, EU-7)	40	19	6	6	69	66	29	26	52	41
Base (100%)	All		Companies with remote access							
Base: "All" = companies using computers: N = 565 (IT services, EU-7), N = 5218 (Total, EU-7);										
Companies with remote access : N = 396 (IT services, EU-7), N = 1845 (Total, EU-7).										
"% of employment" = firms representing ...% of employment in the sector(s) / country.										
"% of firms" = % of firms as legal units, irrespective of their size.										
W-LAN = Wireless Local Area Network										

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

Accordingly, more than half of the IT services companies offer remote access to (some of) their employees. In addition, data presented in exhibit 2-4 show that a considerable share of IT services companies support remote access via WLANs. In fact, the number of so-called public hotspots (i.e. WLAN Internet access points provided in public locations like hotels, restaurants, airports or petrol stations) has significantly increased during the past years. In such locations mobile workers can check their e-mails or download documents.

Moreover, remote access solutions via mobile phone networks allow employees on the go to connect to centrally stored data irrespective of time and place. In contrast to the use of fixed line Internet connections or of the WLAN technology through public hotspots, they do not depend on location. In this way, various useful applications for this sector can be supported that range from mobile e-mail access to a remote control of IT systems. In the latter case, for example, a responsible person is informed immediately via mobile phone whenever specific, predefined IT problems arise. The person may then solve the problem via mobile Internet, traditional Internet – or by immediately driving to the location where the error occurred. This way, mobile solutions can ensure a higher service level. About one fourth of IT services

companies already use a mobile solution¹², compared to about 8% on (weighted) average of all 10 sectors covered by the e-Business Survey 2005.

ICT skills recruitment and training

The specific way of using ICT and e-business in this sector would let one expect that the search for ICT specialists as well as ICT skill training are more pronounced in the IT services sector than in other industries surveyed by the *e-Business W@tch*. The statistical findings displayed in exhibit 2-5 indeed support this expectation. Nearly one fourth of IT services enterprises (comprising 40% of this sector's employees) in the EU-7 said that they tried to recruit staff with specific ICT skills during the previous 12 months. Among large IT services companies, which usually face a higher (absolute) fluctuation of employees; this share is even higher than 60%.

It should also be noted that more than half of the IT services companies which reported making recruitment efforts in the past year, said that they faced difficulties in finding qualified staff. These difficulties, however, seem to concern particularly the small and micro enterprises, which are often not able to compete with larger ones in terms of salaries, fringe benefits or career opportunities.

Time and money constraints confronted by the sector's micro and small enterprises might also explain to some extent the gap between large and small IT services companies in training employees by means of formal ICT training programs. In fact, the limited opportunities to recruit or further develop specific ICT skills may worsen the competitive position of SMEs compared to large players in this sector. One way to overcome this challenge is to concentrate on core competencies and outsource those tasks (i.e. buy the services from other companies) that do not provide immediate competitive advantages. Moreover, outsourcing such services to providers in offshore regions might even enable the companies to offer their IT services at lower prices. Whether and how (offshore) outsourcing opportunities are used by SMEs in this sector will be discussed in the following section 2.3.

Exhibit 2-5: ICT skills development

	Have made efforts to recruit ICT specialists in past 12 months		Experienced difficulties in finding qualified staff		Regular ICT training of employees	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	40	23	39	55	52	35
1-9 empl.		22		58		34
10-49 empl.		36		35		46
50-249 empl.		42		39		51
250+ empl.		61		32		76
Total (10 sectors, EU-7)	15	7	27	41	26	15
Base (100%)	All		Companies having recruited		All	
Base: "All" = companies using computers N = 565 (IT services, EU-7), N = 5218 (Total, EU-7); Companies showing efforts to recruit ICT specialists. N = 210 (IT services, EU-7), N = 675 (Total, EU-7). "% of employment" = firms representing ...% of employment in the sector(s) / country. "% of firms" = % of firms as legal units, irrespective of their size.						

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

¹² About 24% of IT services companies have a mobile solution in place. This value results from 61% of IT services firms enabling remote access times 40% of IT companies (with remote access) doing this via mobile phone networks (see exhibit 2-4).

Summary

Key messages from the analyses in section 2.2

- IT services companies are **well equipped** with basic ICT infrastructure: respective usage shares are above the weighted average of the 10 sectors studied.
- Majority of IT services companies have **broadband**: data confirm DSL success particularly among SMEs.
- More than 60% of companies in this sector provide some form of **remote access** to their employees, about one fourth of IT services companies use mobile solutions.
- There are some **difficulties in recruiting** IT staff, particularly among small IT services companies.

2.3 Outsourcing activities and integration of OS components

This section presents empirical results from the e-Business Survey 2005 that relate directly to two of the three key issues discussed in the previous sector report (July 2005): the establishment of offshore IT services businesses in Eastern Europe as well as the increasing relevance of open source software. As summarized in section 2.1, both developments may significantly impact the way in which IT services are produced. This was shown in the previous sector report based on qualitative analysis and case studies. By presenting empirical findings on the importance of these trends in the IT services sector as well as in other industries, this section aims to enrich the analysis.

2.3.1 ICT outsourcing and the use of offshore opportunities

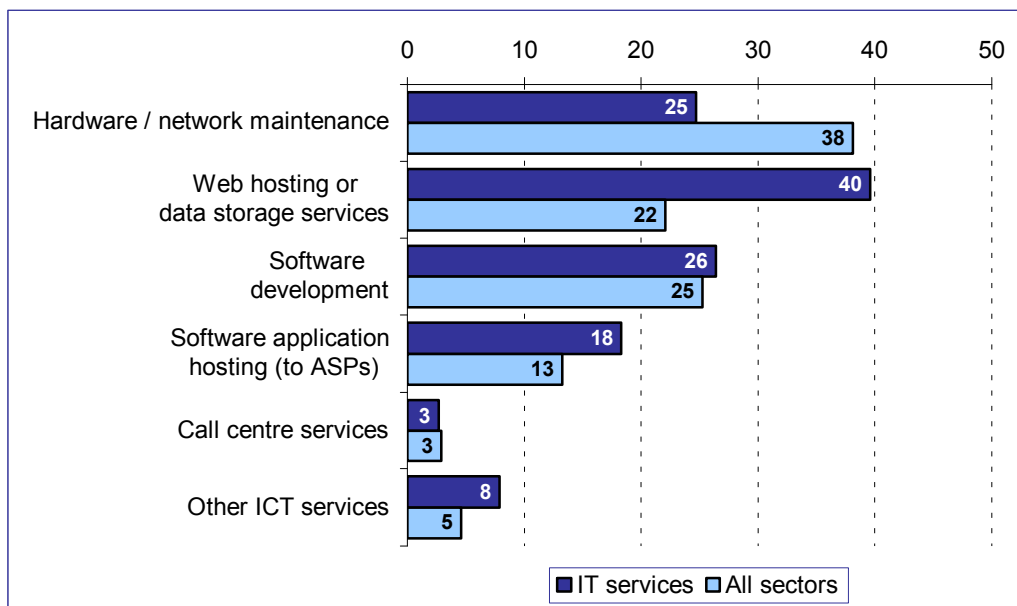
IT outsourcing in different application areas

As indicated by the statistical findings displayed in exhibit 2-6, IT services companies use outsourcing services in mainly three areas, namely for outsourcing the:

- maintenance of ICT infrastructure, which includes hardware and network maintenance, services related to web hosting and data storage,
- software development tasks, and
- hosting of software applications.

The following paragraphs will discuss in more detail the usage scenarios behind these outsourcing types.

Exhibit 2-6: Types of ICT services outsourced



Base (100%): All companies using computers.

N = 565 (IT services, EU-7), N = 5218 (Total, EU-7). In % of firms.

ASP = Application Service Provider

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

Outsourcing of ICT infrastructure services: Exhibit 2-6 shows that the IT services sector differs considerably from the weighted average of all 10 sectors in outsourcing ICT infrastructure services. While web hosting or data storage services are more often outsourced by IT services companies, hardware and network maintenance are more frequently provided internally. Particularly the relatively low share of IT services companies outsourcing hardware and software maintenance seems surprising at the first glance. However, these tasks can easily be conducted by IT services companies themselves: they are relatively small, so maintaining both is not much of an effort. In addition, they are often testing those solutions internally that are provided to clients at a later stage, so that internal maintenance may improve their competitive position.¹³ In comparison, companies in most other sectors are on average larger and can derive less competitive advantage from their hardware and network systems – they just need to run them. So outsourcing is a reasonable strategy for those companies.

In contrast to hardware and network maintenance, webhosting services are not directly relevant to IT services companies for generating a competitive advantage, but they consume significant resources nevertheless. While each IT services company needs to have a web site, these are often simple marketing-oriented sites providing basic information about the company. Hosting these internally would not improve a company's competitive position. Therefore, outsourcing the hosting is a reasonable strategy in this sector, which is pursued by about 40% of IT services companies.¹⁴

There are mainly two explanations, why the weighted average of the 10 sectors studied is significantly lower at about 22% only. Firstly, in several sectors studied (e.g. in tourism) the strategic importance of e-commerce transactions is probably higher than in the IT services sector. This makes outsourcing less reliable. Secondly, in all other sectors studied by the *e-Business W@tch*, websites are less widespread than in the IT services sector (see section 2.6). In textile and construction, for example, the majority of companies does not have a website. Thus, the demand for outsourcing services in these sectors is necessarily lower.

Outsourcing of software development tasks: It might look surprising at first sight that IT services companies outsource the development of software as much as the weighted average of all 10 sectors studied. After all, many of these companies produce software. But there are several arguments in favour of outsourcing. First of all, by outsourcing IT services, companies can overcome staff shortages, especially during peak times in a project. Secondly, many IT services companies position themselves as full-service providers or are offering fully integrated solutions, but neither have the necessary human resources nor the expertise to do all the relevant work with their own staff. By outsourcing software development jobs to other providers, they can concentrate on their core capabilities and buy everything else from the market.

Software as a service: The usage of software applications hosted by Application Service Providers (ASPs) follows a similar logic as the outsourcing of web hosting or data storage services: Companies do not have to invest in software applications, but rather pay for services according to their usage. In addition they do not have to worry about installing and maintaining the software or about acquiring and keeping the human resources with the necessary skills to do so. The above-average use of these services by IT services companies (see exhibit 2-6) might be due to a better understanding of the relatively new concept on part of these companies. In addition, IT services companies might have gained

¹³ Examples are the Linux activities of IBM and Novell. Both companies have migrated their internal desktop computers to Linux. The experiences made are the basis for helping their clients migrate.

¹⁴ Admittedly, the fact, that among the IT services companies an above-average share of about 25% reports to sell goods or services online (see section 2.6), seems to contradict this argument. However, it should be also considered that about 75% of companies do not sell goods or services via the Internet.

some (positive) experience with this concept already from outsourcing web hosting and similar services.

Particularly small IT services companies may profit from outsourcing. They do have similar requirements for their ICT infrastructure as large companies, but they do not have the size that makes installation and maintenance by internal resources economic, nor do they have the same need for customized solutions that large companies often have. Thus, outsourcing or even the use of standardized hosted solutions provides them with a competitive infrastructure at relatively low costs. In addition, they tend to have large fluctuations in their workload, so that external resources can help to cover peak demands. Outsourcing development work is such a use of external resources. Indeed, 60% of SMEs – compared to about 50% of large companies – have outsourced IT services (see exhibit 2-7).

Exhibit 2-7: ICT outsourcing and use of offshore opportunities

	Having outsourced IT services		Outsourcing of IT services to national providers		Outsourcing of IT services to Eastern European providers		Outsourcing of IT services to Asian providers	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
Weighting:								
IT services (EU-7)	57	61	50	53	2	2	2	1
1-9 empl.		61		53		1		0
10-49 empl.		59		56		2		4
50-249 empl.		58		51		2		1
250+ empl.		50		42		2		2
Germany	55	40	47	32	2	1	2	4
Spain	63	62	56	56	0	0	0	0
France	44	52	34	44	0	0	0	0
Italy	70	75	66	71	0	0	0	0
United Kingdom	64	73	56	58	6	4	6	0
Czech Republic	39	30	39	30	0	0	0	0
Poland	23	18	19	18	0	0	0	0
Total (10 sectors, EU-7)	65	52	61	50	1	0	1	0
Food & beverages	70	53	68	52	1	0	0	0
Textile	77	57	74	56	0	0	1	0
Publishing & printing	78	56	75	54	0	0	0	0
Pharmaceutical	79	69	76	66	1	0	0	0
Machinery, equipment	79	60	77	59	3	0	1	0
Automotive	66	62	52	59	0	0	2	1
Aeronautics	88	59	82	57	0	4	0	2
Construction	55	47	53	46	0	0	0	0
Tourism	66	54	63	52	0	0	0	0
IT services	57	61	50	53	2	2	2	1
Base (100%)	All							
"All" = companies using computers. N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).								
"% of employment" = firms representing ...% of employment in the sector(s) / country.								
"% of firms" = % of firms as legal units, irrespective of their size.								

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

Relevance of offshore outsourcing

Contrary to much of the public discussion, most of the outsourcing activities have been reported as taking place within national borders (exhibit 2-7). In contrast, offshore outsourcing seems to play a negligible role, even in this sector. This applies to outsourcing to both Eastern Europe and Asia.

However, these results do not necessarily mean that there are no offshore activities in the IT services sector. As discussed in the previous sector report (July 2005), companies in Western Europe may also have subsidiaries in offshore regions to benefit from lower wages there. Locating work to these subsidiaries might not be considered as outsourcing, as it stays in the same company. The subsidiaries might even be fully integrated in the company workflow. Particularly large companies in this sector, which often operate a global company network and have the resources to manage subsidiaries abroad, may exploit offshore opportunities in this way.

Offshore experiences by IT services companies

Exhibit 2-7 shows that SMEs are more focused on outsourcing to companies within their country of residence. By doing so, however, they risk falling behind in competition with large players (see also the discussion in the previous sector report). The following two business examples provide more insight into opportunities and challenges of offshore IT outsourcing from the perspective of user companies in this sector.¹⁵ The companies interviewed are both partnering with Softgate Group SRL, a Romanian provider of IT offshore services, which has been presented in a case study published in the last sector report (July 2005).

¹⁵ The two business examples will be published as joint case study on the website of *e-Business W@tch*: www.ebusiness-watch.org ('Resources').

Business example**Offshore activities by GKS IT-Services**

The GKS IT-Services mbH, which employs 10 people, defines itself as IT full-service provider offering integrated IT solutions to medium-sized clients. GKS offers consulting, integration and software development services. Moreover, the company sells ICT infrastructure and offers services and support to its clients.

GKS has started a co-operation with Softgate Group SRL at the end of 2004. The first joint project involved the development of an online music shop by Softgate and began in spring 2005. Mr. Hehrer, CEO at GKS explained that the music publisher for which the project is carried out has been a client of GKS for quite some time: "In order to maintain the relationship to this client, we have to offer him a full range of services. However, as a small company we are not able to provide all services with our own resources, and to do this at reasonable prices and in high quality". Consequently, he subcontracted software development to Softgate.

He further argues that the partnership is not only about the transfer of development activities to Romania and he expects that, with the help of Softgate, GKS might be able to expand to Romania: "Due to our established relationships in the IT equipment market we are able to endow Romanian companies with ICT infrastructure at competitive prices".

Mr. Hehrer first met representatives of Softgate at an IT trade fair in Germany. His attention was raised by the professional appearance of the company and particularly by the fact that everyone at the Softgate desk spoke German. In fact, he regards **speaking a common language** an important requirement for offshore business. Mr. Hehrer explains: "Software development tasks have to be documented in German. For this reason alone, it is not sufficient that only the CEO speaks German – as is the case in many other offshore companies trying to establish themselves in the German market".

Mr. Hehrer is also aware of some risks related to the collaboration with offshore IT service providers:

- Firstly, GKS as prime contractor has to **guarantee the quality** of the software development. In order to make sure that client wishes are taken care of correctly, he conducts telephone conferences with Softgate several times a week.
- In addition, the finished deliverables of a solution must be made **available online**. In this way, both GKS as well as the clients have more insight into the progress of the project.
- Finally, the establishment of a **common development platform on the web** is planned for the future.

He views as a potential problem the need that foreign companies have to get access to the source code of software and may exploit this knowledge for their own purposes. Admittedly this problem exists for software in general, irrespective of the service provider's location. But in case of offshore outsourcing it becomes particularly challenging due to different legal (and IPR) systems in provider and user countries. Therefore, Mr. Hehrer thinks it is important to deepen offshore relationships step by step: "We need time and experiences to find out whether the partner is trustworthy".

Sources: Interview with Hans-Dieter Hehrer, CEO at GKS IT-Services GmbH in Eislingen (Germany), July 2005; Website of GKS IT-Services: www.gks.de.

Business example**Use of offshore opportunities at VSA Group**

VSA Group represents a group of companies offering IT services for the German health sector. About 1,200 people are employed in the associated companies. VSA carries out data processing services related to the billing of prescription medicines and services for pharmacies as well as for providers of health care services in the German market. In addition, VSA develops, installs and maintains software systems supporting enterprise resource planning and administrative tasks of their customers.

Since 2001, VSA co-operates with the Romanian IT services provider Softgate 4U SRL, which now belongs to Softgate Group SRL. "We were looking for a partner who could help us out during peaks", explains Mr. Herrmann. He emphasizes that the location of the supplier was secondary for the choice of the outsourcing partner. **Sector-specific knowledge and technical expertise** have been of greater importance. "In the beginning of 2000", explains Mr. Herrmann, "we had to reorient our IT strategy due to new technical developments like the increased importance of Java-based programming. Therefore, it was important that the partner was both able to deal with conventional IT systems and willing to build up the expertise for future requirements in this field".

A specific factor in favour of Softgate was its experience in developing IT systems for the health sector. Actually, Softgate was recommended by a client of VSA. Moreover, Softgate showed the flexibility and willingness to build up resources in order to meet VSA's requirements. In fact, Mr. Kuglis – project manager at Softgate – **worked for half a year at VSA** in order to understand the needs of the German partner. In addition, Mr. Herrmann became involved in the recruitment of employees at Softgate. Last but not least, Mr. Herrmann emphasizes the ability of almost all Softgate employees to communicate in German: "Company language at VSA is German. So, I cannot presume that employees here speak English or even Romanian. As a consequence, German **language skills at the outsourcing partner are of outstanding importance**". He added that a previous co-operation with a Russian IT services company actually failed because of difficulties in communication.

Today, Mr. Herrmann considers the co-operation with Softgate a success: "Over the years we have established a well-working partnership. On this basis we are carrying out joint projects without any frictional losses". A major success factor for him is the intensive level of communication. Today, Softgate knows about the workflows at VSA and is closely tied to its client. The outsourcing partner can even access the development platform at VSA via a VPN-secured Internet connection. Mr. Herrmann, finally, is convinced that such a **fruitful partnership can only be build up over years**: "Our strategy to find and build up an outsourcing partner for the establishment of a long-term relationship has worked out".

Source: Interview with Mr. Bodo Herrmann, Member of the board at VSA Group (www.vsa.de), June 2005.

The **three key messages** from these business examples can be summarised as follows:

- *Offshore IT outsourcing is often more about dealing with peaks in resource requirements than about the shifting of the core business to offshore locations.* In fact, both interviewees emphasised that their companies are not interested in giving away the core business. Instead, the possibility to better cope with peak demands has been mentioned by both as a major reason for cooperation with an offshore partner.

- *Establishing relationships with (offshore) outsourcing partners is a long-term business.* For a successful collaboration in an outsourcing partnership, the workflows of outsourcing providers and users have to be integrated to some extent. In addition, the needs of the users have to be communicated. And finally, the outsourcing partner has to prove his trustworthiness. These requirements can only be met step by step, which needs time, particularly in cross-border partnerships. This challenge may explain to some extent the relatively low outsourcing activities shown by the e-Business Survey 2005.
- *Language skills of the offshore partners are of outstanding importance.* Both interviewees emphasize the strong importance of language skills. Especially, they point out that good skills only at the level of top management are not sufficient. Employees should also be able to document project results in the required language or to communicate with employees at the user companies.

2.3.2 Relevance of open source software

At first glance, the survey findings displayed in exhibit 2-8 seem to confirm the success story of open source software. In fact, about 40% of IT services companies use OS operating systems, databases or browsers. The perception of OSS components as serious alternatives to conventional software is further supported by the high percentages of OSS users among large IT services companies: About three quarters of companies with 250 or more employees reported using OS operating systems or databases. Finally, data from the e-Business Survey 2005 confirm that the success of the OSS is not limited to the Linux operating system; OS databases like MySQL or OS browsers like Mozilla have gained a similar popularity to the OSS flagship.

Exhibit 2-8: Use of open source software

Weighting:	OS operating systems (e.g. Linux)		OS databases (e.g. MySQL)		OS browsers (e.g. Mozilla)	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	55	39	54	42	42	37
1-9 empl.		39		42		36
10-49 empl.		43		42		40
50-249 empl.		59		55		52
250+ empl.		75		73		45
Total (9 sectors, EU-7)	19	8	16	7	14	7
Food & beverages	21	5	20	6	18	6
Textile	25	10	19	5	16	9
Publishing & printing	28	12	26	14	24	14
Pharmaceutical	24	12	24	11	17	13
Machinery, equipment	33	11	24	7	13	9
Automotive	48	10	29	9	24	8
Aeronautics	47	21	34	10	29	13
Construction	11	6	11	3	10	4
IT services	55	39	54	42	42	37
Base (100%)	All					
"All" = companies using computers. N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).						
"% of employment" = firms representing ...% of employment in the sector(s) / country.						
"% of firms" = % of firms as legal units, irrespective of their size.						

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

However, the diffusion of OS software is clearly lower in other sectors covered by the *e-Business W@tch* 2005. In fact, case studies presented in the previous sector report (July 2005, see exhibit 2-1) have shown that the supply of OSS for commercial use involves some significant challenges. The case study about Janus Software, for example, has demonstrated that OSS-based businesses often operate with low profit margins. Therefore, their resources to make customers aware of new OSS products are rather limited. In addition, building up professional services around OS software is a long-term task: it takes time to create a reputation as a reliable partner; and in order to assure a high quality of services, a well-working co-operation with the developer community has to be established. Therefore, it will probably need some more time until the open source software is as widespread in less technology-driven sectors than IT services.

However, it is possible that the findings displayed in exhibit 2-8 underestimate the usage of OSS in sectors other than IT services. The reason is that OSS is not only used as standalone product – as in the case of Linux or Mozilla, for example – but it is also increasingly integrated into commercial software though users of these commercial software packages are frequently not aware of the inclusion of OSS. For example, a crucial component of the current version of enterprise software SAP is the open source IDE (integrated development environment) Eclipse. Likewise, Apple's operating system MacOS X is build upon the open source operating system BSD, a competitor of Linux. .

The intention to integrate OS components in non-core parts of ICT solutions also explains to some extent the strategy of large IT players, like IBM or SAP, to co-operate with the OSS community. In this way, they can achieve cost advantages while at the same time being better able to focus on their core business. The following business example on Strakt shows that such strategies are also feasible for small companies in this sector.

Business example:**Open source activities by AB Strakt (Sweden)**

The software developer AB Strakt was founded in 2001 and currently employs 12 people. Core of the company's offer is a platform for handling documents and organising workflows in a real-time environment. Building on this platform, Strakt has also designed specific applications, e.g. for helpdesk management, for handling conferences, and for supporting public procurement processes.

The co-founder and chairman of the board of Strakt, Mr. Jacob Hallen, emphasises that the platform is not open source, but uses OSS components wherever possible. In particular, the platform has been developed using the OS programming language Python, which Mr. Hallen considers to be a major competitor to Java. "Compared to Java" he explains, "Python shows advantages in the possible speed of development and the ease of handling changes".

In return, Strakt supports the work of the Python open source community in various ways. The company is sponsoring member of the Python Software Foundation (www.python.org) and finances various OS projects around the Python language. In addition, Strakt participates in the Python Business Forum, a pool of about 20 companies that exchange experiences from establishing business models around Python. Mr. Hallen himself acts as chairman of this association. Moreover, Strakt is – along with five other organisations – involved in a EU-funded project that is called PyPy and focuses on the further development of the Python language. Last but not least, Strakt contributes also code modules to the OS community, where this does not conflict with business interests. This way, for example, an integration layer to OpenSSL called PyOpenSSL, has been released as open source package.

Asked for the motivation of Strakt to devote money and effort to the work of the OS community, Mr. Hallen mentions several reasons: "By intensively exchanging information with the developer community we stay at the forefront of the technology development in this field. Moreover, if a problem appears, e.g. a bug in the software, it is easy to find someone who may help in solving it". Mr. Hallen also sees advantages for Strakt in the release of non-critical components as open source software: "In this way, these software components get developed further and bugs get identified by the OS community".

However, making its entire solutions open source and offering services around them would not work out, he explains: "We have spent huge efforts on making the platform a reliable tool that supports the easy development of applications on top of it. If we released the entire platform as open source software, each IT integrator could offer services based on it. This would lead to low profit margins, probably not even high enough to refinance development costs". Instead, Strakt intends to build up a partner network supporting the distribution of the platform in vertical markets worldwide. Partners are provided with all necessary source code and documentation, which reduces vendor commitment risks.

Source: Interview with Jacob Hallen, co-founder and chairman of the board of Strakt (www.strakt.com), May 2005.

This business example will be published as full case study on the website of e-Business W@tch: www.ebusiness-watch.org ('resources')

Summary

Key messages from the analyses in section 2.3

ICT **outsourcing** and use of offshore opportunities (2.3.1)

- ICT outsourcing opportunities are **frequently** used, notably among SMEs in this sector.
- Main outsourcing areas are **web hosting and data storage services**, whereas network and hardware maintenance are less frequently outsourced in this sector.
- Offshore outsourcing – in the sense of outsourcing IT services to third party providers in offshore regions – does **not** play a role.
- Business examples indicate that the establishment of offshore businesses needs **time and** requires **language skills** from the providers.

Relevance of **open source** software (2.3.2)

- IT services companies are **intensively** using OS components.
- Popularity of OSS in this sector is **not only limited to Linux**; OS databases like MySQL or OS web browsers like Mozilla are also intensively used in this sector.
- In contrast, OSS components are **less widespread in other sectors** studied – indicating a still early stage of OSS diffusion.
- However, diffusion of OSS might be **higher than indicated** by the data: the integration of OS components in non-core parts of ICT solutions – as demonstrated in the business example – is not covered by the survey.

2.4 Integration of internal processes and cooperation with business partners

Information and knowledge management

Improving internal coordination as well as the flow and management of knowledge is vital in those sub-sectors of IT services, where skilled labour is the main input. IT consulting and software programming, for example, are knowledge-based activities in this sector, where efficient knowledge management is business-critical. The efficiency of accessing and sharing knowledge can be enhanced, for example, by the use of Intranets and Knowledge Management (KM) systems. Accordingly, the usage ratios for the two technologies in the IT services sector are above those for the weighted average of all 10 sectors surveyed by the e-Business Survey 2005.

Intranets provide access to internal applications using Internet technologies and, thus, may build the foundation for the exchange and management of company knowledge as well as for the implementation of internal training programs. Company policies and procedures ("how things are done here"), company news, or project plans, for example, can be provided on the intranet. Thus, intranets are often understood as internal websites that contain the collective company knowledge and can be accessed by the entire internal staff. The need to use an internal (knowledge) network increases with the number of employees. Correspondingly, the percentage of large IT services enterprises using an intranet is twice as large as for micro companies.

Knowledge management describes the process through which organisations generate 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. Typical examples are databases in IT consulting companies describing the expertise and project experience of individual consultants. If a new project comes up, managers can use these knowledge databases to set up the optimal project team.

Exhibit 2-9: Use of ICT for sharing information and knowledge among employees

Weighting:	Intranet		Knowledge management systems		e-Learning applications		EDM systems	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	78	50	37	17	39	27	28	15
1-9 empl.		48		16		26		14
10-49 empl.		82		29		34		20
50-249 empl.		90		42		36		31
250+ empl.		99		60		53		47
Total (10 sectors, EU-7)	47	19	13	5	18	9	15	9
Base (100%)	All							
Base: "All" = companies using computers. N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).								
"% of employment" = firms representing ...% of employment in the sector(s) / country.								
"% of firms" = % of firms as legal units, irrespective of their size.								
EDM = Enterprise Document Management								

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

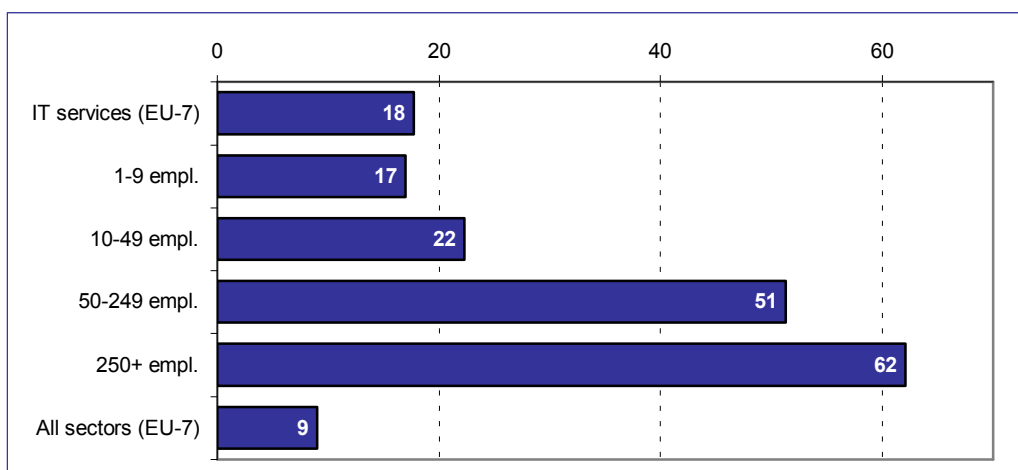
The efficient management of knowledge is important for companies of all sizes, but they are most valuable for large enterprises with a complex and often dispersed knowledge base and files that have to be accessed by many different parties in the workflow. In particular the sharing of tacit knowledge (the know-how contained in people's brains), which is done face-to-face in smaller companies, can pose a problem for large, dispersed companies. The *e-Business W@tch* results show that only 16% of micro firms, but about 60% of large companies in this sector use knowledge management systems.

E-Learning tools are used by more than one fourth of IT services companies. Keeping employees' knowledge up-to-date in a very dynamic environment with quickly changing technologies and technical innovations is an important success factor in knowledge-intensive IT services. E-learning tools that provide access to online courses can improve efficiency and save cost by cutting back secondary education costs (such as travel and seminar room expenses, etc.). In addition, e-learning offers opportunities to speed up time-to-market of new products and services or speed up the implementation of new processes and/or new software. However, due to the costs for technical implementation and for the design of courses the use of e-learning solutions becomes more cost-effective when more employees participate. This explains to some extent the gap between large and small IT services companies in the use of e-learning tools (see exhibit 2-9): Such solutions are used twice as often in large companies than in micro enterprises.

EDM and ERP systems

Particularly large companies that have to handle complex processes and information streams benefit from IT systems for integrating and organising information such as Electronic Document Management (EDM) and Enterprise Resource Planning (ERP) systems. EDM systems support creation, filing, retrieving and sharing of documents in electronic form. They are particularly helpful for companies that capture and store a large number of documents, e.g. contracts, sales orders or invoices. ERP systems are modular software solutions for the planning, management and controlling of enterprise resources. When considering the use of these systems by IT services enterprises, one has to keep in mind that large companies, for which these applications were originally developed, account for only a rather small percentage of all companies active in this sector. In fact, ERP and EDM systems are particularly widespread among large IT services companies (see exhibit 2-10).

Exhibit 2-10: Use of ERP systems



Base (100%): All companies using computers.

N = 565 (IT services, EU-7), N = 5218 (Total, EU-7). In % of firms.

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

However, this situation is likely to change, since many suppliers of enterprise software are increasingly targeting small and mid-size IT services businesses (as well as SMEs in other industries) as customers. In this light, it should be noted that about one fifth of the small and more than half of the medium-sized enterprises in this sector already have an ERP system in use (exhibit 2-10). This finding indicates that ERP systems increasingly become a major component of the ICT infrastructure in all companies, also smaller ones.

The survey results show that EDM and ERP systems are more widespread among IT services enterprises (despite the high share of micro and small enterprises) than on (weighted) average in all sectors surveyed. This underlines the forerunner position of this sector.

Support of collaborative processes

Online technologies facilitating the collaboration among employees, as well as with business partners and customers, are a key application area for the use of e-business tools in this sector. This was also a result from the analysis of e-business key issues in the previous sector report (July 2005). Offering services around OS software, for example, requires an efficient collaboration between service providers and the developer community. Moreover, an intensive collaboration with customers turned out to be a key success factor for outsourcing IT development tasks.

Accordingly, an above-average share of IT services companies use online technologies (other than e-mail) to support collaborative tasks. Here the focus is on tools that facilitate the management of projects. As displayed in exhibit 2-11, about half of IT services enterprises use online technologies for document sharing. Furthermore, about a quarter of companies in this sector support the collaborative design of products, e.g. in joint software development projects, with specific online tools. These results are consistent in comparison to other sectors studied by the *e-Business W@tch*. In contrast, tools for optimizing supply chain activities -like the collaborative forecasting of demand or capacity management- seem to be less relevant for companies in this sector.

Exhibit 2-11: Use of online technologies to support collaborative processes

	Use of online technologies for:									
	Sharing documents online		Tracking working hours online		Collaborative design processes		Collaborative forecasting of demand		Managing capacity / inventories online	
Weighting:	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	56	50	35	19	31	26	18	13	27	17
1-9 empl.		49		18		26		12		16
10-49 empl.		52		35		26		20		25
50-249 empl.		66		47		40		21		38
250+ empl.		58		45		30		18		30
Total (10 sectors, EU-7)	30	18	19	8	16	11	13	9	22	9
Base (100%)	All									
Base: "All" = companies using computers. N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).										
"% of employment" = firms representing ...% of employment in the sector(s) / country.										
"% of firms" = % of firms as legal units, irrespective of their size.										

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

Summary

Key messages from the analyses in section 2.4

- ICT and e-business technologies for coordinating internal processes and sharing knowledge are **widespread** in this sector: usage shares in relevant areas (intranet, knowledge management systems, e-learning) are above the weighted average of all 10 sectors studied.
- Even the diffusion of ERP and EDM systems is **above the weighted average** of the 10 sectors covered – despite the high share of small enterprises in this sector.
- Online technologies facilitating collaborative tasks are mainly used by IT services companies to support project management: about half of the IT services companies use online tools for **document sharing**.

2.5 Supplier-facing e-business activities

Statistical findings for supplier-facing e-business activities by IT services companies are presented in this section. The focus is on online purchasing activities and on the use of specific solutions to support procurement and sourcing processes.

Online purchasing and the use of special e-procurement systems

The preconditions for buying online are good in the IT services sector: First of all, 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, database content and research. Secondly, the familiarity of IT service companies with the possibilities of the Internet as well as the suitability of many intangible inputs for electronic delivery make online ordering a logical thing to do.

Exhibit 2-12: Online purchasing and use of specific IT solutions for e-procurement

	Make online purchases		Buy more than 5% of supplies online		Buy more than 25% of supplies online		Use specific IT solutions for e-procurement	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	76	81	60	64	37	44	29	19
1-9 empl.		81		65		44		18
10-49 empl.		80		64		38		24
50-249 empl.		76		61		33		33
250+ empl.		68		48		30		38
Germany	81	90	63	78	52	59	33	27
Spain	66	89	57	82	27	47	44	23
France	77	89	60	73	29	36	19	15
Italy	61	67	37	49	21	25	16	17
United Kingdom	84	85	73	70	46	53	38	20
Czech Republic	84	78	60	49	39	41	23	12
Poland	74	79	51	50	31	42	19	12
Total (10 sectors, EU-7)	51	44	27	25	10	10	19	11
Food & beverages	43	22	16	7	4	1	18	5
Textile	44	30	15	11	3	2	14	8
Publishing & printing	57	48	32	28	10	9	16	8
Pharmaceutical	48	38	29	19	8	7	32	14
Machinery, equipment	53	36	22	18	5	4	18	10
Automotive	60	41	34	17	2	5	39	13
Aeronautics	43	65	38	36	2	11	63	16
Construction	43	36	18	17	4	2	16	9
Tourism	57	49	36	30	17	14	14	14
IT services	76	81	60	64	37	44	29	19
Base (100%)	All							
Base: "All" = companies using computers. N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).								
"% of employment" = firms representing ...% of employment in the sector(s) / country.								
"% of firms" = % of firms as legal units, irrespective of their size.								

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

It does not come as a surprise, therefore, that 81% of IT services companies said that they purchase online. This share is almost twice as high as for the weighted average of all 10 sectors surveyed. The high relevance of online purchases in the IT services sector is even more pronounced when only those companies are considered that purchase more than a quarter of their supplies online: 44% of IT services companies in the EU-7 seem to be “intensive” online purchasers, compared to only 10% on average in all 10 sectors covered by the e-Business Survey 2005.

Although the Internet facilitates the global sourcing of inputs and suppliers, most of the online purchasing activities seem to take place within national borders. In fact, almost 80% of IT services companies purchasing online said that they use the Internet to support purchases from regional or national suppliers (see exhibit 2-13). This strong dominance of local suppliers could be due to the fact that easy access via the Internet to international suppliers alone does not imply that suddenly most inputs will be bought internationally. Issues like transport costs, tax and warranty issues or, simply, the lack of suitable products due to local peculiarities might also be keeping the share of local suppliers high. These arguments especially apply to IT services companies, where purchasing volumes are usually small and main inputs are knowledge and labour.

Exhibit 2-13: Main location of suppliers from which companies buy online

Weighting:	Mainly from regional suppliers		Mainly from national suppliers		Mainly from international suppliers	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	6	8	74	71	20	21
1-9 empl.		8		71		21
10-49 empl.		11		70		19
50-249 empl.		7		77		16
250+ empl.		0		76		24
Total (10 sectors, EU-7)	16	18	69	69	15	13
Base (100%)	Companies buying online					
	Base: N = 433 (IT services, EU-7), N = 2455 (Total, EU-7).					
	"% of employment" = firms representing ...% of employment in the sector(s) / country.					
	"% of firms" = % of firms as legal units, irrespective of their size.					

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

Data in exhibit 2-12 indicate that purchasing online could be of special importance for small companies in the IT services sector: about 44% of the micro enterprises in this sector reported that online purchases constitute more than a quarter of their total purchases. The same seems to be the case only for 30% of large companies. However, it would be premature to conclude from this finding that ICT and e-business tools to support procurement activities are not important for this sector's large companies. A factor to be considered in this respect is that the term “online purchasing” might not reflect the B2B activities of large enterprises as well as those of small companies for two major reasons:

- **B2B trade includes different processes that can all be supported by ICT:** B2B business is more than simply purchasing goods online like in a B2C web shop, where searching, ordering, paying and analysing purchases is basically done in one step. Processes in the B2B environment are much more complex and segmented. Therefore, specific software solutions and Internet-based services are needed for their support. “Ordering” a product within a framework contract, for example, might not be considered as “online purchasing”.
- **Internet-based services are only one possibility to support B2B activities:** B2B activities can be supported by both software solutions and Internet-based services. In

addition, e-business tools for the support of trading activities do not necessarily have to be provided via Internet-based platforms. Alternatively, specific software can be installed internally within the company. The use of such software solutions might not necessarily be identified with “online purchasing”.

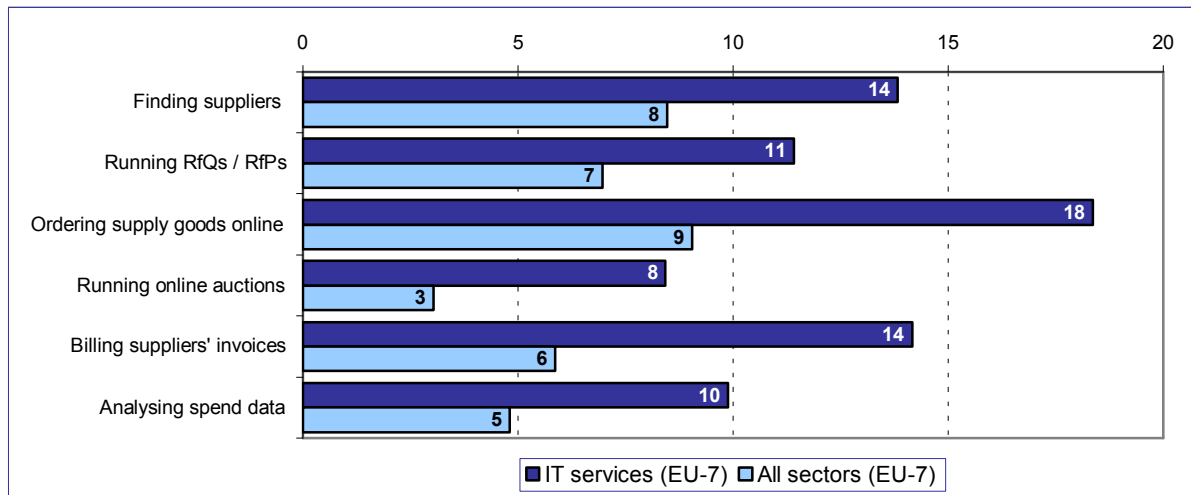
Specific IT solutions to support sourcing and procurement processes

In order to account for these differences and to obtain a deeper insight into today's reality of B2B e-business, the e-Business Survey 2005 has been extended by a further question: *“Does your company currently support the selection of suppliers or procurement processes by specific IT solutions?”*¹⁶ It has been emphasized that: *“With IT solutions we do not mean Word, Excel or plain-text e-mail, but rather specific software solutions or Internet-based services.”* The findings related to this question are displayed in exhibit 2-11. Subsequent questions concerned the type of IT solutions used and the tasks supported - results are summarized in exhibits 2-14 and 2-15.

The importance of online purchasing in this sector does not necessarily imply that purchasing processes are supported by sophisticated solutions. As many companies in this sector are small, buying manually via web sites is often more appropriate than implementing specific IT solutions that provide process support in this area. Less than 20% of IT services companies in the EU-7 use specific IT solutions, including specific software solutions and Internet based services, to support procurement and sourcing processes. Nevertheless, the usage ratios in the IT services sector are again above the weighted average for the 10 sectors covered by the e-Business Survey 2005.

The picture, however, looks different, when the use of specific IT solutions by large IT services enterprises is considered: almost 40% of large companies in this sector support sourcing and procurement processes by specific software solutions and Internet-based services. The percentage of large players having specific IT solutions for e-procurement is even higher than the percentage of those companies that have reported making more than 25% of their purchases online. These findings confirm that e-business approaches to support procurement activities differ between large and small companies. Obviously, proper process support by ICT and e-business tools is of higher importance for large companies. They need specific IT solutions to manage the collaboration of employees and departments involved in the procurement process. These tasks are less prevalent in smaller companies, where procurement activities are carried out only by a small number of people. In addition, automating steps in the procurement process with the help of specific IT solutions is more worthwhile for large IT services companies with a large number of purchase orders to be processed.

¹⁶ Since communication technologies do only play a minor role for this type of solutions, we use the term IT solutions (instead of ICT solutions).

Exhibit 2-14: Processes supported by specific IT solutions for e-procurement

Base (100%): All companies using computers. N = 565 (IT services, EU-7), N = 5218 (Total, EU-7). In % of firms.

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

When considering the different IT-supported activities as displayed in exhibit 2-14, two findings are especially noteworthy. First of all, usage ratios by IT services companies are consistently above the weighted average for all 10 sectors surveyed. Secondly, the relative importance of application areas seems to be pretty much in line with the weighted average of all sectors covered by the e-Business Survey 2005. IT services companies, as well as companies in other sectors, use specific IT solutions primarily to find new suppliers, to run RfQs/RfPs (Requests for Quotations/Proposals) and to support procurement processes like the ordering of goods and the billing of invoices. In contrast, online (reverse) auctions – which are often the focus of discussions about e-business activities on the buy-side – are of lesser importance.

In the previous sector report (July 2005) the opportunities and challenges related to the provision of software as a service have been discussed as a key issue in this sector. The case study on Onventis, an application service provider (ASP) in Germany, has shown that successful ASP offers must outperform locally installed solutions. The statistical findings, displayed in exhibit 2-15, support this view. In fact, locally installed software – standard software or company-specific IT solutions – is of larger importance than Internet-based services provided by ASPs or by B2B Internet trading platforms.

Services provided by ASPs or offers by online trading platforms, labelled in the survey as “*functionalities offered on e-marketplaces and B2B trading networks*”, are only used by a minor share of companies– despite the strong e-business affinity of this sector. One should keep in mind, though, that the low usage rates displayed might also be the result of problems in interpreting the concepts of ASP and e-marketplaces. A number of still active ASPs and e-marketplaces, for example, do not use these terms anymore for describing their business focus. Rather they position themselves as on-demand providers or providers of Internet based e-procurement solutions. Therefore the results should be interpreted as lower boundary for the popularity of such services: B2B trading platforms and ASP offers might be more widespread than indicated by the statistical findings presented in exhibit 2-15.

Exhibit 2-15: Types of IT solutions used for e-procurement

Weighting:	Standard software package		Customised company-specific IT solutions		Services provided by ASPs		Solutions provided by suppliers		Online trading platforms	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	21	14	19	15	10	5	13	8	8	6
1-9 empl.		14		15		4		7		6
10-49 empl.		14		16		8		14		6
50-249 empl.		24		21		9		11		9
250+ empl.		27		23		16		21		9
Total (10 sectors, EU-7)	13	7	12	5	5	3	7	4	5	3
Base (100%)	All companies using computers									
Base: N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).										
"% of employment" = firms representing ...% of employment in the sector(s) / country.										
"% of firms" = % of firms as legal units, irrespective of their size.										
ASP = Application Service Provider										

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

Finally companies using specific IT solutions to support procurement and sourcing processes have been asked about the impact of e-sourcing activities on the number of suppliers. There are, in fact, contradicting hypothesis related to this issue.

- On the one hand it is argued that the usage of e-sourcing tools might lead to an increase in the number of suppliers: e-business technologies help to enhance sourcing activities globally and to manage a larger number of suppliers. Companies increasing the number of suppliers on this basis might profit from more competition on the supply side.
- On the other hand, companies might reduce the number of suppliers. E-business technologies could be used to support the search for the best-qualified suppliers and to improve the collaboration with them. In this way, buyer companies could decrease administrative costs related to the management of suppliers. In addition, a deeper integration of suppliers may allow for the exploitation of efficiency gains (e.g. by the optimization of logistics processes).

However, the statistical findings (not displayed in an exhibit) do not clearly support one of these hypotheses. The majority of IT services companies using specific IT solutions for sourcing and procurement reported a stable number of suppliers (62%). Only 20% (17%) said that the number of suppliers has increased (decreased) due to e-sourcing activities.

Summary

Key messages from the analyses in section 2.5

- Online purchasing is of high relevance in this sector: more than 80% of IT services companies report to **buy online**.
- Most online purchases, however, seem to take place **within national borders**.
- Purchasing online is particularly **widespread among small** companies in this sector.
- In contrast, large IT services companies rather use **specific IT solutions** to support procurement and sourcing processes.
- Data indicate a **low relevance of reverse auctions** compared to other types of procurement process support.
- Specific IT solutions are rather **installed internally** than used as functionalities provided via the Internet by e-marketplaces or ASPs.
- Data do **not** support any hypothesis about a change in the number of suppliers from the usage of e-sourcing tools.

2.6 Customer-facing e-business activities

This section analyses the use of ICT and e-business tools to support marketing and sales processes. The following paragraphs discuss in particular statistical findings on:

- the use of websites and content management systems
- online purchasing activities and the use of specific IT solutions in this field, and
- the use of CRM systems.

Use of websites and content management systems

Exhibit 2-16: Online marketing and sales activity

Weighting:	Have a website		Use a CMS to update the website		Make online sales		Sell more than 5% of goods online		Use specific IT solutions for online marketing / sales	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	92	81	49	32	25	25	14	19	40	23
1-9 empl.		80		31		25		19		22
10-49 empl.		95		40		24		16		34
50-249 empl.		97		52		21		13		44
250+ empl.		98		70		27		9		56
Germany	94	82	49	31	29	23	11	13	45	31
Spain	94	87	58	43	32	37	29	24	38	36
France	96	87	62	35	17	23	6	11	51	23
Italy	79	66	38	36	19	21	16	21	14	11
United Kingdom	94	85	48	28	30	27	15	19	48	28
Czech Republic	95	89	41	30	25	23	22	22	19	12
Poland	93	88	34	27	30	33	20	24	33	28
Total (10 sectors, EU-7)	69	48	24	14	17	15	10	10	17	8
Food & beverages	65	33	18	8	12	8	4	2	15	6
Textile	71	52	20	14	14	10	4	6	14	7
Publishing & printing	81	54	35	17	37	18	17	10	27	9
Pharmaceutical	85	68	32	23	18	13	8	6	26	12
Machinery, equipment	88	61	28	10	11	5	4	2	17	8
Automotive	89	62	37	18	6	11	2	5	24	9
Aeronautics	63	66	10	18	8	12	2	11	6	14
Construction	49	32	14	6	4	3	2	1	8	3
Tourism	77	62	28	22	36	31	26	21	19	12
IT services	92	81	49	32	25	25	14	19	40	23
Base (100%)	All									
Base: "All" = companies using computers. N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).										
"% of employment" = firms representing ... % of employment in the sector(s) / country.										
"% of firms" = % of firms as legal units, irrespective of their size.										
CMS = Content Management Systems										

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

ICT and the Internet can be used in various ways to support marketing and sales activities of IT service companies. A simple but very effective way for companies to address current and potential clients is to provide information about products and services on their website. In fact, websites 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 (see exhibit 2-16). These values are strongly above the weighted average of the 10 sectors studied by the *e-Business W@tch*. IT service enterprises are also more likely to use Content Management Systems (CMSs). CMSs support the creation, publication and updating of website contents, hence they are considered to be an indicator for an advanced level of website usage. Particularly large companies with extensive websites may benefit from these solutions. Accordingly, about 70% of large companies in this sector (compared to only 32% on average of all sectors studied) reported using a CMS system.

However, there also exist advanced technologies for web marketing that are rather useful for small IT services companies. Company weblogs, for example, which from a technical perspective can be considered as “light” versions of content management systems, are relatively cheap and easy to use but can nevertheless support online marketing effectively. The use of company weblogs was actually discussed in the previous report (July 2005) as an e-business issue of future importance; a business example on the supplier of CRM (Customer Relationship Management) solutions Wice (see crm.blogg.de) demonstrated the usefulness of such tools, particularly for SMEs in the IT services sector.

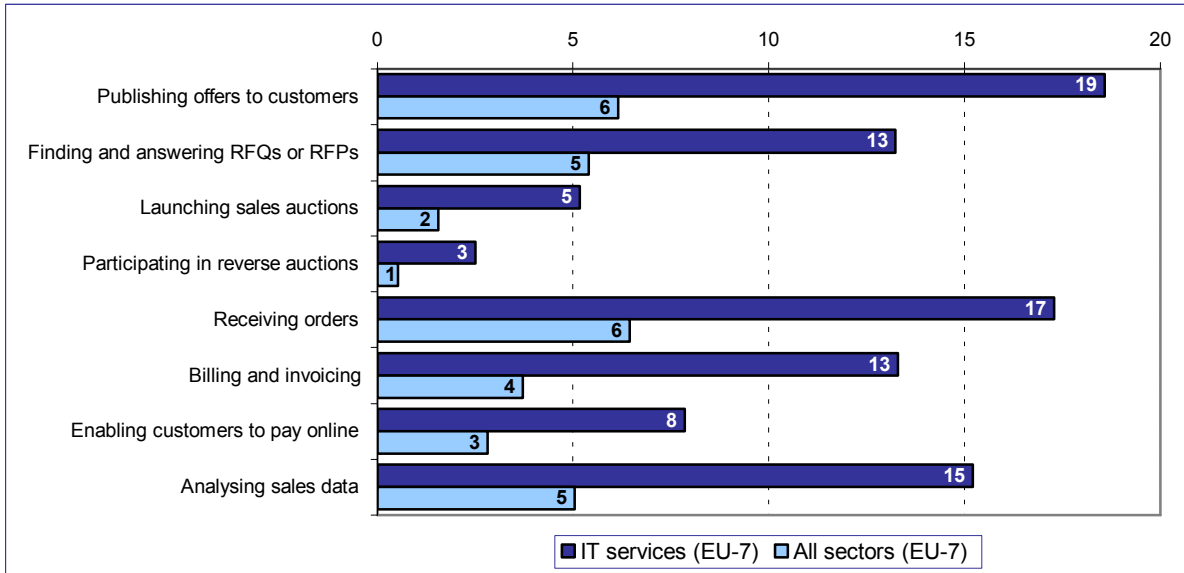
Selling online and specific IT solutions to support marketing and sales

About one fourth of IT services companies reported selling goods and/or services online. Although this usage rate is above the weighted average of all sectors surveyed, it looks rather low at first sight – especially if compared to the online purchasing activities in this sector. However, it has to be taken into account that only a fraction of the companies in this sector sell standardized software and services, which are well suited for Internet sales. Most of the products and services offered by IT services companies, e.g. consulting and integration services as well as custom IT solutions, are individual services not suited for online sales. Therefore, the web site plays a crucial role for sales and marketing, but is often not used directly as a sales channel. Moreover, as already discussed for online purchasing in the previous section 2.5, asking companies for online sales might not reveal their B2B e-business activities completely.

Therefore, in the e-Business Survey 2005, companies have in addition been asked about the use of specific IT solutions¹⁷ to support sales and marketing processes, about the different processes that are thus supported and about the kind of IT solution employed to this purpose. The results are displayed in exhibits 2-17 and 2-18.

¹⁷ Since communication technologies do only play a minor role for this type of solutions, we use the term IT solutions (instead of ICT solutions).

Exhibit 2-17: Processes supported by IT solutions for customer-facing e-business activities



Base (100%): All companies using computers.
N = 565 (IT services, EU-7), N = 5218 (Total, EU-7). In % of firms.

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

One of the first observations is that the use of specific IT solutions to support marketing and sales activities is almost three times higher in the IT services sector than on (weighted) average for the 10 sectors surveyed. The usage of these solutions – if differences by size class, sell-side activities and solution types are considered – shows similar patterns to those observed for the use of supplier-facing IT solutions (see section 2-5). The main findings can be summarized as follows:

- *Specific IT solutions seem to be best suited for large companies (see exhibit 2-16).* In fact, 56% of large IT services companies in the EU-7 (compared to only 22% of micro enterprises) use specific IT solutions to support marketing and sales processes.
- *Online auctions are of minor importance (see exhibit 2-17).* If IT solutions are used to support negotiation processes, then they are mainly used to find and answer requests for quotations/prices (RFQs/RFPs). Further key application areas are publishing offers to customers, supporting the ordering process and analysing sales data.
- *Specific IT solutions are mainly installed internally as standard software package or company-specific solutions.* In comparison, application service providers (ASPs) or B2B Internet trading platforms are of minor importance only.

Exhibit 2-18: Types of IT solutions used for customer-facing e-business activities

Weighting:	Standard software package		Customised IT solutions		Services provided by ASPs		Solutions provided by buyers		Online trading platforms	
	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms
IT services (EU-7)	26	15	26	17	7	6	6	2	6	4
1-9 empl.		14		17		6		2		4
10-49 empl.		20		25		8		5		7
50-249 empl.		34		27		11		8		10
250+ empl.		34		36		5		9		4
Total (10 sectors, EU-7)	11	5	11	5	4	3	3	1	3	2
Base (100%)	All companies using computers									
Base: N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).										
"% of employment" = firms representing ...% of employment in the sector(s) / country.										
"% of firms" = % of firms as legal units, irrespective of their size.										
ASP = Application Service Provider										

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

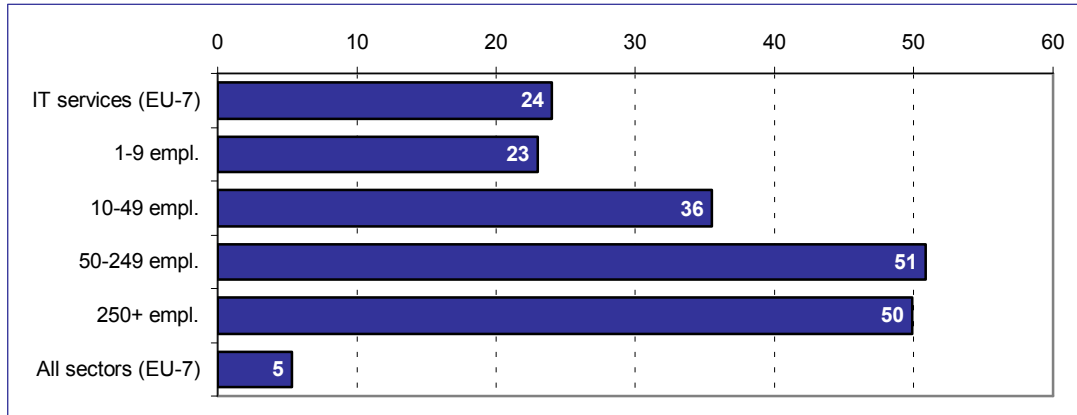
Use of CRM systems

Maximising customer satisfaction and building long-term relationships with clients is a key success factor for business services companies. This is of particular importance for those companies in this sector that offer services (project-based or standardised) on an ad-hoc basis and depend on returning customers. Customer Relationship Management (CRM) systems provide a central database containing all data related to the company's prospective and actual clients. CRM systems track all forms of contacts with the client and store information that can be used to evaluate future demand and business opportunities.

While small companies can easily maintain personal contact to their clients, the management of customer relationships is often a rather complex task in large companies with a large customer base. Here, automating client interaction with the support of CRM systems can help to make processes more efficient.

The survey results displayed in exhibit 2-19 show that the percentage of companies in the IT services sector that reported using a CRM system is about five times the (weighted) all-sector's average. In fact, about half of medium-sized and large companies in this sector said they use CRM systems. But the statistical findings also reveal that almost a quarter of micro companies and more than a third of small firms in this sector replied that they already use CRM software. This could, therefore, indicate that CRM systems are not only suited for the needs of large companies as is in general perceived.

Exhibit 2-19: Use of CRM software in the IT services sector

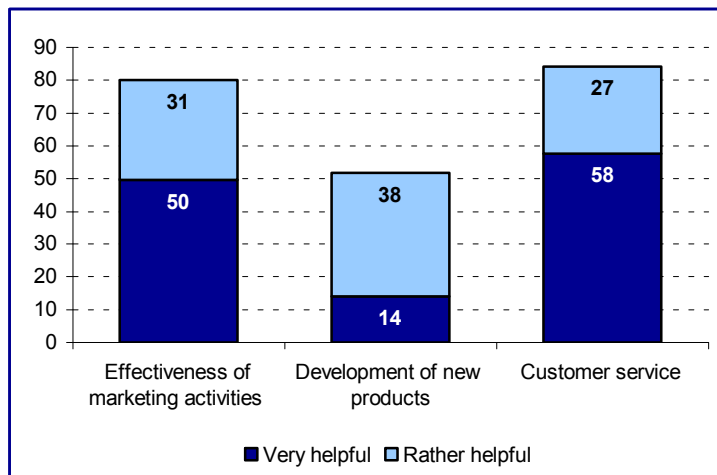


Base (100%): All companies using computers.
 N = 565 (IT services, EU-7), N = 5218 (Total, EU-7). In % of firms.

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

Companies using a CRM system were further asked to rate the benefit of these solutions in different application areas. The statistical results (exhibit 2-20) indicate that main potentials of CRM solutions are the support of marketing activities and customer care. About 81% of CRM users in this sector, for example, consider CRM software to be helpful for increasing the effectiveness of marketing activities. Marketing campaigns, for example, can be better targeted if they are carried out on the basis of customer-specific information.

Exhibit 2-20: Perceived benefit from CRM systems



Base (100%): IT services companies using CRM systems.
 In percent of firms: N=176 (due to the small number of observations, values are indicative only).

CRM = Customer Relationship Management Systems

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

To a similar extent, CRM systems are perceived as providing a useful support of customer service. IT consultants, for example, may use information from the CRM system to prepare counselling interviews with customers and to present them optimal offers based on the customer history. Finally, information stored in CRM systems may also be used to analyse client needs and to develop new products and services on this basis. More than half of CRM users in the IT services sector evaluate CRM systems as being helpful for product development.

Summary

Key messages from the analyses in section 2.6

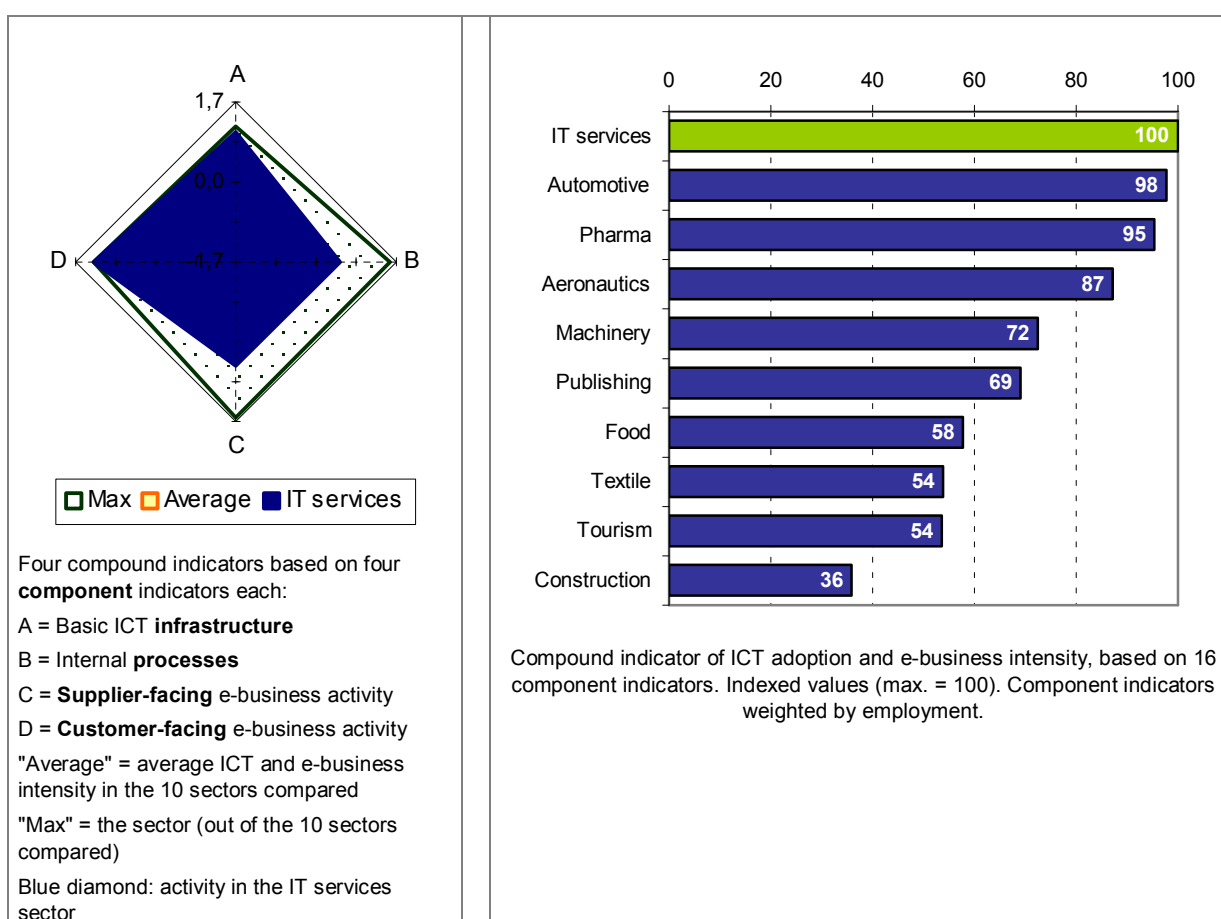
- **Websites are widespread** in this sector: about 80% of micro enterprises and more than 95% of small, midsize and large companies in this sector have one.
- About one fourth of IT services companies are **selling online**.
- Usage of specific IT solutions to support marketing and sales activities shows similar patterns as observed for those supporting procurement processes: **low relevance of auctions, e-marketplaces and ASP offers**.
- **CRM solutions** are heavily used: percentage of companies in the IT services sector that reported using a CRM system is about five times the weighted all-sectors' average.
- CRM solutions 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.
- Main benefits of the use of CRM systems are the support of **marketing** activities and **customer care**.

2.7 Summary of survey results

The general picture

The discussion of e-business issues in previous sector report (July 2005) lets one expect that the IT services sector has a leading position in the use of e-business technologies. The new statistical findings by the *e-Business W@tch* presented in the previous sections support this hypothesis (see also highlights of the statistical analysis in exhibit 2-22). As indicated by the e-business scoreboard displayed in exhibit 2-21, the usage rates for all e-business application areas are above the weighted average of the 10 sectors covered by the e-Business Survey 2005. In particular, the IT services sector sets standards for the use of basic ICT infrastructure and customer facing e-business applications.¹⁸

Exhibit 2-21: E-Business Scoreboard 2005 – ICT and e-business intensity in the IT services sector compared to other industries



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

The IT services sector is a good example for studying the potential of ICT and e-business technologies for SMEs. In fact, in almost all e-business application areas discussed in this report, 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 like ERP, CRM and knowledge management systems. This finding indicates that solutions suitable for SMEs have already entered the market. In fact, almost all major players

¹⁸ A comparison of scoreboards across the sectors surveyed is presented in **Annex II**, where the way that scoreboards have been derived is also described in more detail.

in the enterprise software market are increasingly targeting SMEs of the IT services sector as well as of other industries.

However, size-specific differences exist also in this sector. In fact, the statistical findings presented in sections 2.5 and 2.6 indicate that e-business approaches of large and small companies in this sector differ particularly for the support of B2B trading activities. Small IT services enterprises, for example, emerge as quite intense users of the Internet for online purchases and sales. On the basis of their replies to the 2005 e-Business Survey, they even show larger usage ratios than large IT services companies in this respect. In contrast, specific IT solutions to support single process steps like sourcing of suppliers and ordering of goods are primarily used by large players; they are of lesser relevance for small enterprises in this sector.

Statistical findings on e-business key issues (discussed in the previous report)

The statistical findings by the e-Business Survey 2005 also provided additional background information on the three key issues discussed in the previous sector report (July 2005):

- **Use of offshore IT services:** A large share of companies in this sector said that they outsource IT services. However, this activity seems to take place mainly within national markets, and only a marginal share of IT services companies seems to currently outsource IT services to offshore or near-shore regions like India or Eastern Europe. Moreover, the two business examples on offshore user companies presented in section 2.3 indicate that the establishment of offshore relationships is best being done step-by-step and, therefore, takes 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.
- **Relevance of open source software:** Open source operating systems, databases and Internet browsers are widely used in companies of this sector, no matter what the company size. In comparison, the use of OS components by companies in other sectors seems to be relatively low. The statistical findings presented in section 2.3.2, thus, indicate that the use of open source software, in general, is still at an early stage. However, as demonstrated in the business example on Strakt, software vendors have also the opportunity to integrate OS components into proprietary solutions and increasingly do so. Therefore, it might be the case that OS components are more widespread than this survey shows, as user companies do not know that some of their software includes OSS components.
- **Usage of software as a service:** Success factors for providers of 'Software as a Service' (SaaS) or Application Service Providers (ASP) discussed in the previous sector report (July 2005) revealed that a major challenge in this field is to offer a better value proposition than locally installed software. The new statistical findings by the *e-Business W@tch* confirm this assessment. Companies supporting trading processes by specific IT solutions do it mainly via internally installed standard software and custom solutions. Functionalities provided via Internet based services like ASPs or B2B Internet trading platforms are in comparison of minor importance.

Exhibit 2-22: Highlights of the statistical analysis for the IT services sector

Application area	Highlights
<p>Basic ICT infrastructure and skills development (chapter 2.2)</p>	<ul style="list-style-type: none"> IT services companies are well equipped with basic ICT infrastructure: respective usage shares are above the average of the 10 sectors studied. Majority of IT services companies have broadband Internet access: data confirm DSL success particularly among SMEs. More than 60% of companies in this sector provide remote access to their employees, about one fourth of IT services companies use mobile solutions. There are some difficulties in recruiting IT staff particularly by small IT services companies.
<p>Outsourcing activities and integration of open source components (chapter 2.3)</p>	<ul style="list-style-type: none"> IT outsourcing 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 in this sector. Offshore outsourcing – in the sense of outsourcing IT services to third party providers in offshore regions – does not play a role. IT services companies are intensively using OS components. 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. In contrast, OSS components 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 the data: Integration of OSS components in non-core parts of IT solutions, which are not covered by the survey.
<p>Integration of internal processes (chapter 2.4)</p>	<ul style="list-style-type: none"> ICT and e-business technologies for coordinating internal processes and sharing knowledge are widespread in this sector: usage shares in respective areas (Intranet, knowledge management systems, e-learning) are above the weighted average of all 10 sectors studied. Even the diffusion of ERP and EDM systems is – despite the high share of small enterprises in this sector – above the average of the 10 sectors covered. Online technologies facilitating collaborative tasks are mainly used by IT services companies to support project management: about half of the IT services companies use online tools for document sharing.
<p>Supplier-facing activities (chapter 2.5)</p>	<ul style="list-style-type: none"> Online purchasing is of high relevance in this sector: more than 80% of IT services companies report to buy online. Most of online purchases, however, seem to take place within national borders. Purchasing online is particularly widespread among small companies in this sector. In contrast, large IT services companies rather use specific IT solutions to support procurement and sourcing processes. Data on specific IT solutions indicate a low relevance of reverse auctions as well as of functionalities supplied by e-marketplaces and ASPs. Data do not support any hypothesis in favor of an increase or decrease in the number of suppliers from the usage of e-sourcing tools.
<p>Customer-facing activities (chapter 2.6)</p>	<ul style="list-style-type: none"> Websites 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. About a quarter of IT services companies are selling online. Usage of specific IT solutions to support marketing and sales activities shows similar patterns as observed for those supporting procurement processes: low relevance of auctions, e-marketplaces and ASP offers. CRM solutions are heavily used: percentage of companies in the IT services sector that reported using a CRM system is about five times the weighted all-sector's average. CRM solutions 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. Main benefits of the use of CRM systems are in the support of marketing activities and customer care.

3 Conclusions

Based on the new statistical results by the *e-Business W@tch*, this report has discussed the current state of e-business adoption in the IT services sector and has provided additional information related to e-business key issues analysed in the previous sector report (July 2005). Together, both sector reports (July 2005 and the report at hand) provide a comprehensive view of the current state of e-business in the IT services sector, which builds on qualitative analysis, case studies and empirical findings. On this basis, the following chapter presents consolidated conclusions as a synthesis of main findings and conclusions from both reports.

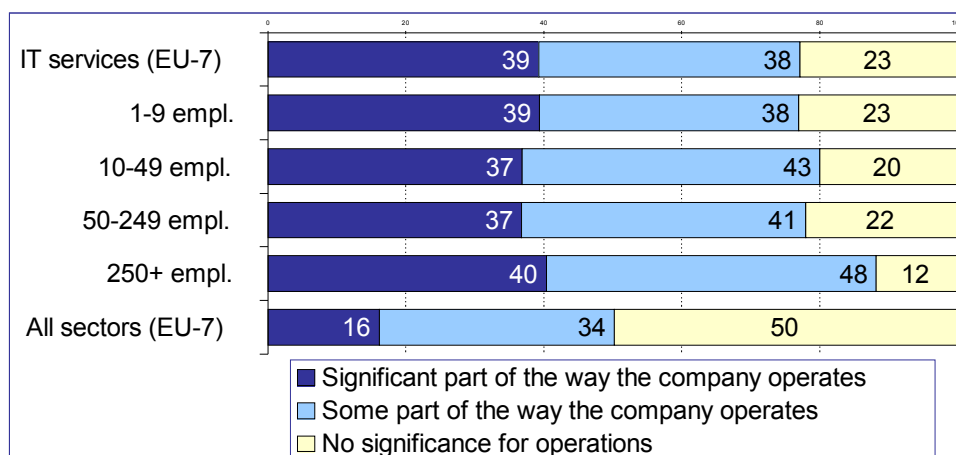
First, section 3.1 will summarize the main results while adding some statistical findings on the general relevance of e-business in this sector. Section 3.2 will analyse major implications of e-business issues for the sector using the five forces model by Michael E. Porter as analytical framework. Finally, section 3.3 will discuss implications of the findings for small and medium-sized companies in this sector. It will update the analysis of e-business related chances and challenges presented in the previous report (July 2005) based on the new statistical findings by the *e-Business W@tch* 2005.

3.1 Summary of main findings

A general assessment – the significance of electronic business for IT services companies in 2005

Among the industries analysed by the *e-Business W@tch* 2005, the IT services sector has a special position, since companies are typically not only users but also providers of ICT and e-business tools. Therefore, IT services companies are naturally familiar with the use of ICT and e-business technologies. In addition, the supply of IT services usually requires the use of a modern ICT infrastructure and advanced e-business applications. This is also supported by qualitative analysis of e-business key issues and case studies of providers of offshore IT services providers, open source companies and ASPs in the previous sector report (July 2005).

Exhibit 3-1: Perceived significance of e-business in 2005 (company perspective)



Figures in % of firms. Base = companies using computers. N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).

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

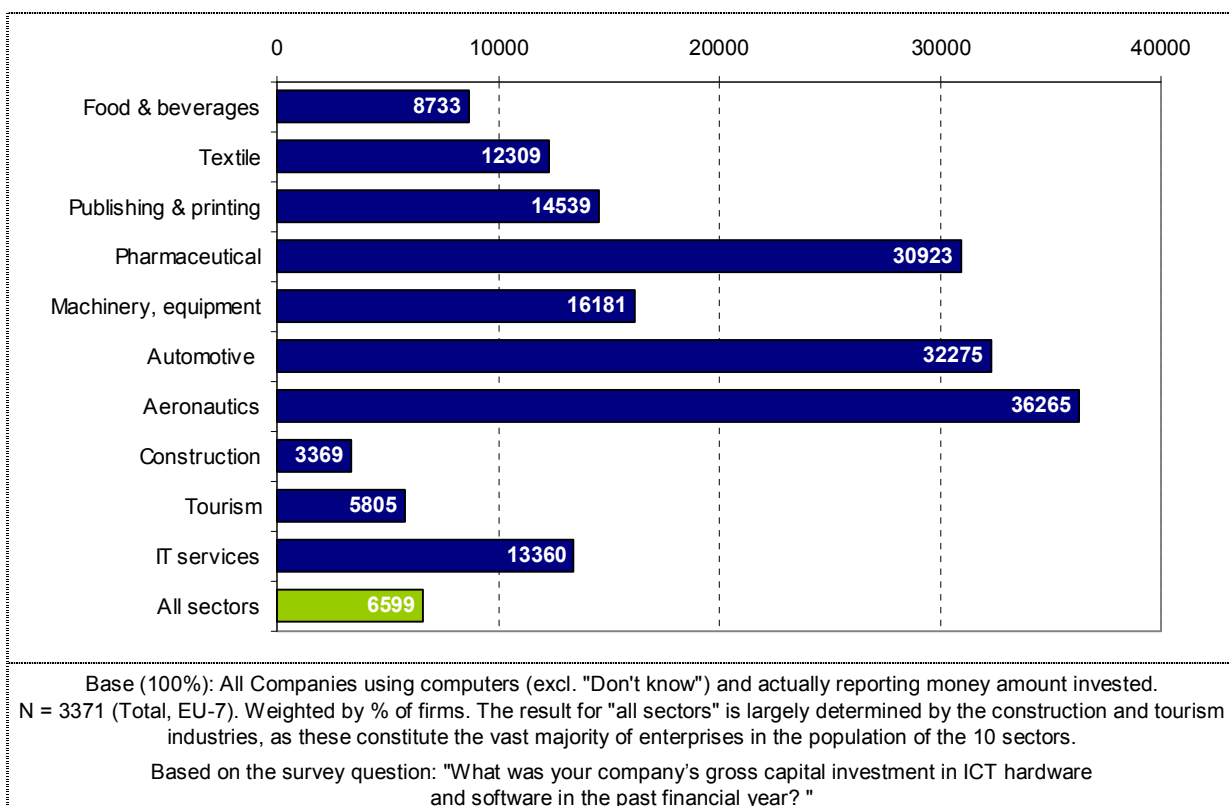
Accordingly, the percentage of IT services companies regarding e-business as important for their company business (see exhibit 3-1) is significantly above the weighted average of all 10 sectors studied. This result is also in line with the statistical findings on the diffusion of e-business technologies in several application areas as presented in chapter 2 of this report. In fact, in almost all application areas usage ratios by IT services companies are above the weighted average of all sectors covered.

A distinctive characteristic of the IT services sector – as also indicated by the statistics in exhibit 3-1 – is the high relevance of e-business issues for companies across all size-classes, notably among smaller ones. Whereas in most other e-business-intensive industries, like automotive and pharmaceuticals, large companies are the main drivers of e-business adoption, in the IT services sector most e-business technologies appear to be widely used in all size classes. A significant share of small IT services companies even use relatively complex applications like ERP, CRM or knowledge management systems.

ICT investments

Exhibit 3-2 displays the average investments in ICT infrastructure and software per company for the 10 sectors studied. At first glance, the results seem surprising as they do not reflect the forerunner position of IT services companies in the use of e-business technologies. Although average investments by IT services companies are above the weighted average of all 10 sectors studied, they are clearly below average ICT investments in sectors like automotive, pharma and aeronautics. When interpreting these numbers, however, one has to take into account that the IT services sector mainly consists of micro and small companies. Therefore, the comparison of average investments for different sizes bands, as displayed in exhibit 3-3, is more appropriate to reflect actual differences in ICT investments between the sectors studied.

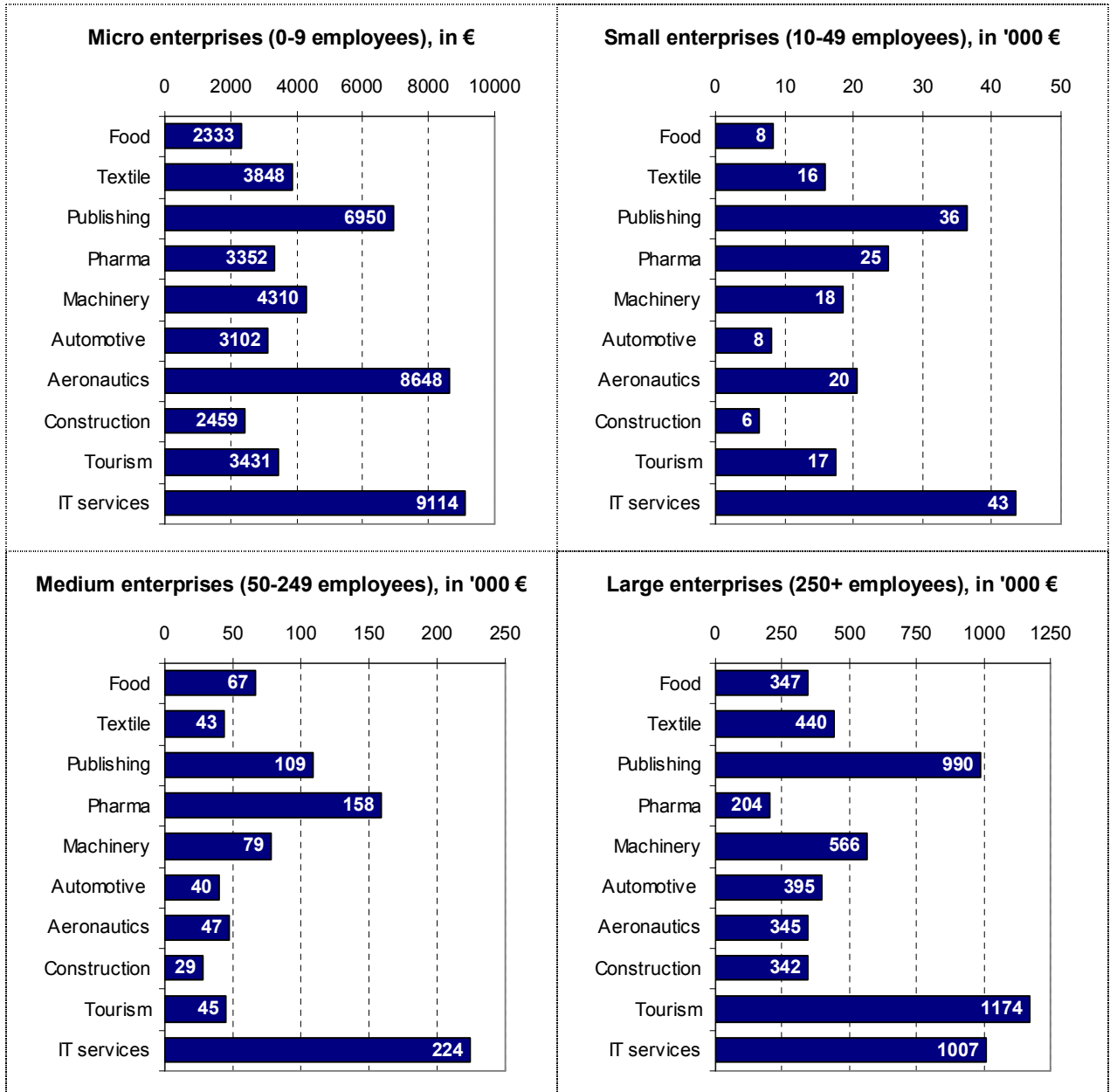
Exhibit 3-2: Average investment in ICT infrastructure and software per company in 2004 (in euros)



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

In fact, average ICT investments in the IT services sector by micro, small and medium-sized enterprises are each above those of all other industries surveyed. The results displayed in exhibit 3-3 further show that IT services companies with 250 or more employees show larger average investments than companies of the same size in the automotive, pharma or aeronautics industry.

Exhibit 3-3: Average investment in ICT infrastructure and software by firm size in 2004 (in euros)



Base (100%): All Companies using computers (excl. "Don't know") and actually reporting money amount invested.
 N = 1304 (micro firms, EU-7). N = 902 (small firms, EU-7). N = 887 (medium firms, EU-7). N = 278 (large firms, EU-7).

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

Finally, the statistical findings on expected future investments (see exhibit 3-4) indicate that the gap in the usage of e-business technologies between IT services companies and firms in other sectors is likely to increase: Nearly 40% of IT services companies plan to increase ICT expenditures – compared to only about 28% on weighed average for all 10 sectors covered by the e-Business Survey 2005. The share of companies in the IT services sector that expect stable or even decreasing expenditures is (slightly) below the average of all 10 sectors.

However, differences in ICT investments between the IT services sector and other industries should not be over-interpreted due to the special position of IT services companies as users and suppliers of ICT and e-business tools.

Exhibit 3-4: Current and (expected) future investments in ICT infrastructure and software

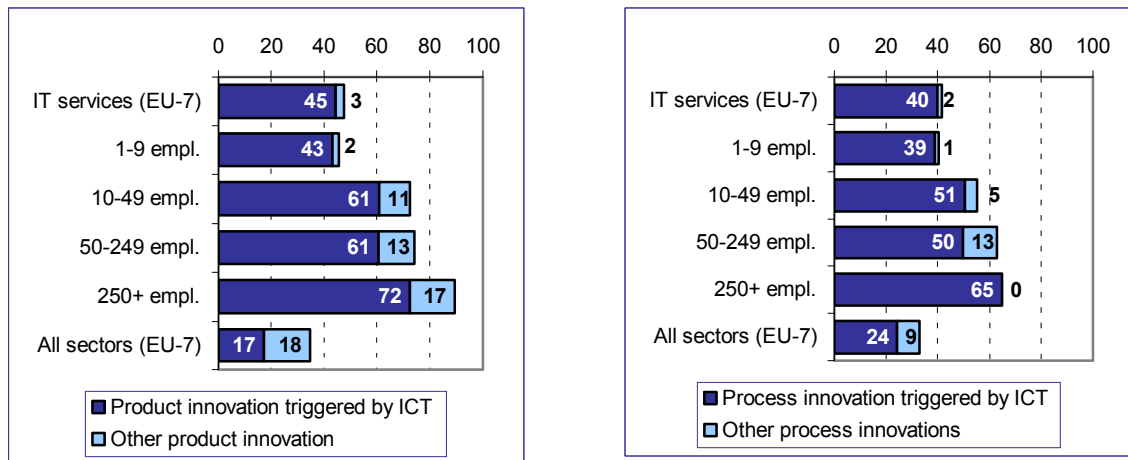
	Average investment in ICT and software	Increase of ICT expenditures expected		Constant ICT expenditures expected		Decrease of ICT expenditures expected	
		€ per firm	% of empl.	% of firms	% of empl.	% of firms	% of empl.
IT services (EU-7)	13,360	44	39	49	55	7	6
1-9 empl.	9,114		39		55		6
10-49 empl.	43,395		41		48		11
50-249 empl.	223,801		45		49		6
250+ empl.	1,006,600		48		47		5
Total (10 sectors, EU-7)	6,599	33	28	54	62	13	10
Base (100%)	All companies, excluding "Don't know"						
Base: "All" = companies using computers (excl. "Don't know"). N = 536 (IT services, EU-7), N = 4966 (Total, EU-7).							
Number of companies that actually reported investment amount: N = 305 (Pharma, EU-7), N = 3371 (Total, EU-7).							
"% of employment" = firms representing ...% of employment in the sector(s) and countries							
"% of firms" = % of firms as legal units, irrespective of their size							
Based on the survey question: " Do you think that your company will rather increase or decrease the expenditure on ICT and e-business technologies within the next 12 months, or will it stay the same?"							

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

ICT as an enabler of innovation

The IT services industry is an innovative industry. Almost half of the IT services companies have launched new products during the past 12 months (see exhibit 3-5). As could be expected, most of the product innovations are directly triggered by ICT. Technical progress and an intensive competition after the end of the dotcom boom, which becomes increasingly global, are major drivers behind the innovations by companies in this sector (see also the discussion of sector trends and challenges in the previous sector report).

An illustrative example for ICT as enabler of product innovation is open source software (OSS), as has also been discussed in the previous sector report (July 2005). In fact, both developing and marketing OSS involves the extensive use of the Internet and Internet-based collaboration tools to support production as well as marketing processes. Internet-based platforms, like Sourceforge, are the basis for initiation and coordination of OSS projects. Such platforms are necessary, since open source projects typically involve programmers from many different countries, continents and time zones. In addition, the Internet as cheap distribution and marketing channel is a central element for the commercialisation of OSS.

Exhibit 3-5: Innovation activity in the IT services industry

Percentage of firms which have launched new products / processes during the past 12 months.

Figures in % of firms. Base = companies using computers: N = 565 (IT services, EU-7), N = 5218 (Total, EU-7).

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

Companies in the IT services sector are also forerunners in using ICT for process innovations. The strong price pressure in this sector as well as the continuing consolidation process in the software market are major drivers for innovations aiming to increase process efficiency (see also the discussion of sector trends and challenges in the previous sector report (July 2005)). While such innovations are very frequent in large companies in this sector, it should be noted that also about 40% of micro enterprises and half of small and medium-sized companies in this sector have reported launching new processes triggered by ICT during the past 12 months.

Importance of business issues for innovations

The case studies and business examples presented in the previous report (July 2005) have shown that the pure use of ICT is not enough to make product and process innovations a success. The use of weblogs for the purpose of marketing and public relations (PR) is an obvious example, as the previous sector report (July 2005) has shown (business example on the use of weblogs by CRM specialist Wice, see also exhibit 2-1). While the software itself can be installed easily – if necessary at all – the true challenge is the integration of weblogs into marketing and PR processes. It has to be defined, for example, who will write contributions, which topics are not to be discussed in public and how to behave in case of justified or unjustified criticism. Therefore, both a strategy for the adoption of web-logs and clear rules for implementing them are needed.

Another example illustrating the importance of business issues for the establishment of innovative IT-based services is the development of ASPs. The case study on software on-demand in the previous sector report demonstrated, *inter alia*, that several technical as well as business challenges exist for an application service provider (case study on “Onventis – The provision of supply management applications on demand”, see also exhibit 2-1). On the one hand, the ASP technology must be able to serve various clients independently according to their needs. On the other hand, ASPs must exploit synergies that stem from the joint use of the application. This requires expertise in the application supported as well as knowledge of customer needs. In fact, many early ASPs failed since they concentrated on the technical issues alone, but neglected the importance of customer needs.

Finally, the establishment of offshore IT services – which may enable process innovations based on the global division of labour – is again both an e-business and a management

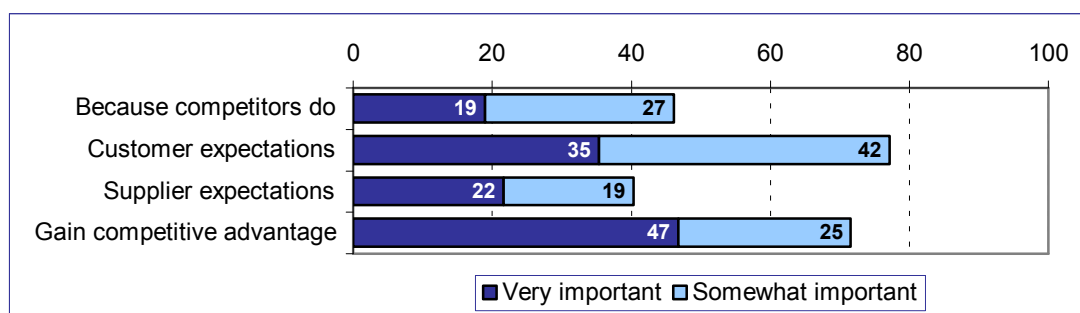
issue. ICT is an important basis for collaboration between outsourcing provider and offshore users. However, a common language and personal relationships seem to be more important. This was demonstrated by case studies of offshore providers in Eastern Europe in the previous sector report (case studies on the offshore providers Softgate and PGS Software, see exhibit 2-1) as well as by business examples of IT services companies using offshore opportunities presented in section 2.3.1 of this report.

Drivers and barriers of electronic business activity

Those IT services companies reporting that e-business impacts the way in which the company operates have been asked about why they are doing e-business (see exhibit 3-6). It turned out that the main motivations behind e-business activities are gaining a competitive advantage and meeting customer expectations.

The discussion of trends and challenges in the previous sector report (July 2005) has already shown that IT services companies operate in a rough economic environment. Companies in this sector have to deal with a strong price pressure triggered by strong competition. Moreover, after some bad experiences during the dot.com boom period, customers have become increasingly demanding. These demands concern the quality of project management, simple and incentive-providing pricing models, as well as the consideration of company-specific requirements by the service providers. These challenges are important drivers of e-business activities in the IT services sector.

Exhibit 3-6: Reasons for doing e-business in the IT services sector



Base = Enterprises saying that e-business constitutes a significant or some part of the way the company operates:
N = 447 (IT services, EU-7), N = 3115 (Total, EU-7). In % of firms.

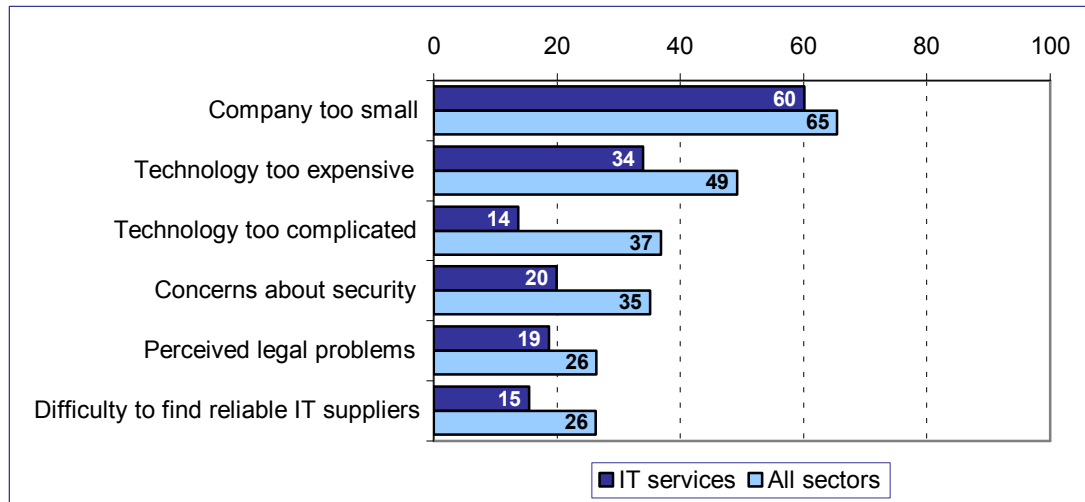
Source: *e-Business W@tch* (e-Business Survey 2005)

Exploiting the opportunities of ICT, e.g. by integrating OSS components into ICT solutions or by using offshore opportunities, may help to decrease production costs and, thus, alleviate the burden of price pressure. Moreover, the use of modern ICT and e-business tools, e.g. in the field of project management and software testing, may help to increase service quality and meet customer expectations better. However, in light of the key messages from the previous sector report (July 2005) it should be emphasized again that overcoming sector-specific challenges is not a technical issue alone. In fact, companies in this sector especially tend to underestimate business issues and focus too much on technology.

Barriers for electronic business activity

Although the IT services sector is a forerunner in using e-business technologies, exhibit 3-1 indicates that a significant share of companies is nevertheless sceptical about e-business.

Exhibit 3-7: Barriers for adopting e-business in the IT services sector



Base = Enterprises saying that e-business does not play a role in their operations:

N = 118 (IT services, EU-7), N = 2103 (Total, EU-7). In % of firms.

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

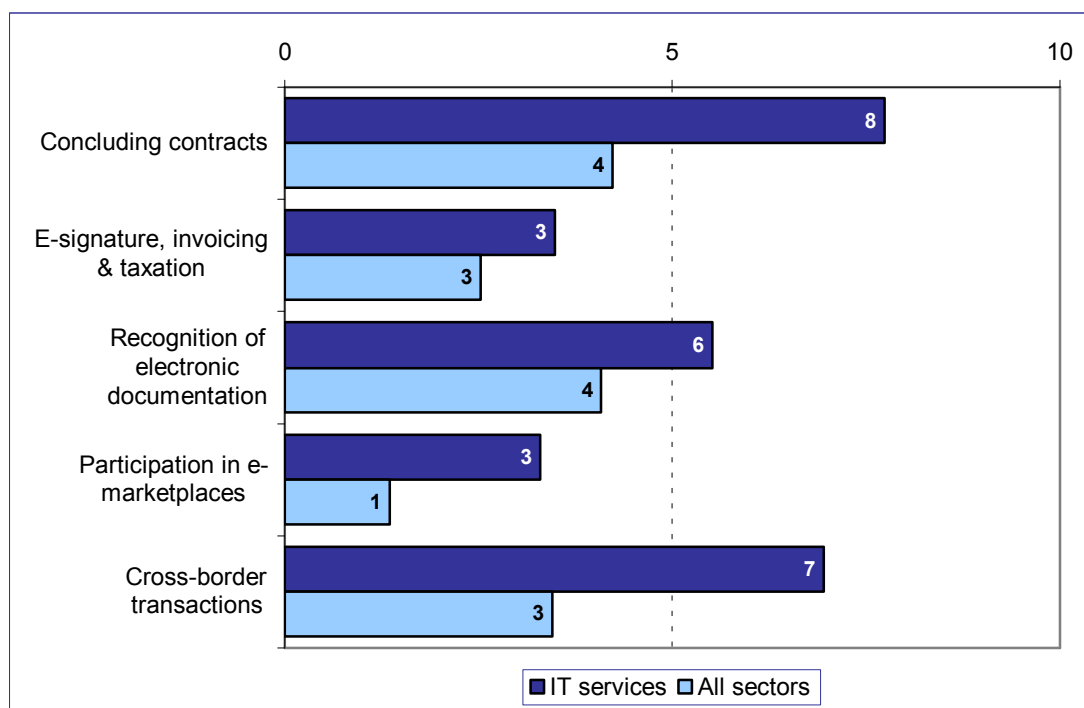
Almost a quarter of IT services companies – SMEs more than large companies – reported that e-business does not play a role for their operations. SME-specific problems, like the “*company size being too small*” and “*technologies being too expensive*” are the main reasons stated for their reluctance (exhibit 3-7). The ranking of barriers for adopting e-business is very much in line with the ranking for all sectors, with the exception of the barrier “*technology too complicated*”. As one would expect, only few IT services companies mentioned this as a barrier. As further barriers to e-business turned out:

- **Security concerns:** Notably, about 20% of e-business-sceptical IT services companies (saying that e-business does not play a role) justify their scepticism by concerns about security. Even more pronounced are security issues in other sectors covered by the *e-Business W@tch*. Therefore, the *e-Business W@tch* has set up a special report that discusses security issues in more detail.¹⁹
- **Legal problems:** Nearly one fifth of e-business-sceptical IT services companies are concerned about legal problems or complications related to e-business activities. However, as indicated by the statistical findings displayed in exhibit 3-8, these concerns rather seem to be caused by a general uncertainty about legal problems than by actual incidents. In fact, of all IT services companies doing e-business only a relatively small share (5-8%) has actually experienced legal problems or complications. Concluding contracts and conducting cross-border transactions seem to be the activities with most legal complications.
- **Difficulties in finding reliable IT suppliers:** About 15% of e-business-sceptical IT services companies report difficulties in finding reliable IT suppliers. This result is astonishing at first glance, since companies in this sector should be familiar with the supply side of the IT market. To some extent, this finding might be explained by the

¹⁹ See e-Business W@tch Special Study on ICT Security and Electronic Payment Activities (September 2005), www.ebusiness-watch.org ('Resources').

strong dynamics in the IT services sector during the past years. In fact, many IT suppliers founded during the dot.com period (e.g. as ASPs or e-marketplaces) disappeared only shortly afterwards. This might have contributed to the distrust into companies active in these areas. However, these problems should not be over-estimated as they are reported by only about 3% of all IT services companies covered by the e-Business Survey 2005.²⁰

Exhibit 3-8: Legal problems and complications experienced when doing e-business



In % of firms. Base: Enterprises saying that e-business constitutes a significant or some part of the way the company operates.
N = 447 (IT services, EU-7), N = 3115 (Total, EU-7)

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

Summarizing, it appears that SMEs in the IT services sector face similar problems to the ones faced by companies in other industries. Limited resources in terms of time and money are inhibiting e-business activities. These problems were partially reflected by the survey results. Small IT services companies, for example, face larger problems in recruiting ICT specialists and are less likely to send employees regularly to ICT training programs. New e-business developments discussed in the previous report, e.g. the establishment of offshore businesses in Eastern Europe or making use of open source software, provide opportunities to overcome these challenges. Section 3.3, which discusses e-business implications for small and medium-sized companies in this sector, will further elaborate on these issues.

²⁰ This value results from 23% e-business-sceptical IT services companies times 16% of skeptical IT services companies reporting difficulties in finding IT suppliers.

Summary of main findings:**General relevance of e-business**

- IT services companies are **intensive users** of ICT and e-business technologies. This is mainly due to their role as both users and suppliers of ICT and e-business tools and related services.
- Most e-business technologies discussed in this report are also widespread among **small** companies in this sector. A substantial share of small companies is even using rather complex software solutions like ERP or CRM systems.

ICT as enabler of innovations

- The IT services sector is **innovative**: The share of companies that have introduced new products and processes during the past 12 months is above the weighted average of all sectors surveyed.
- Most product and process innovations in the sector are, naturally, triggered by ICT. In fact, modern ICT and e-business tools often build the basis for new technological trends, like the establishment of OSS businesses.
- Moreover, case studies and business examples revealed that ICT-triggered innovations also contribute to solutions of critical business issues.

E-business drivers and barriers

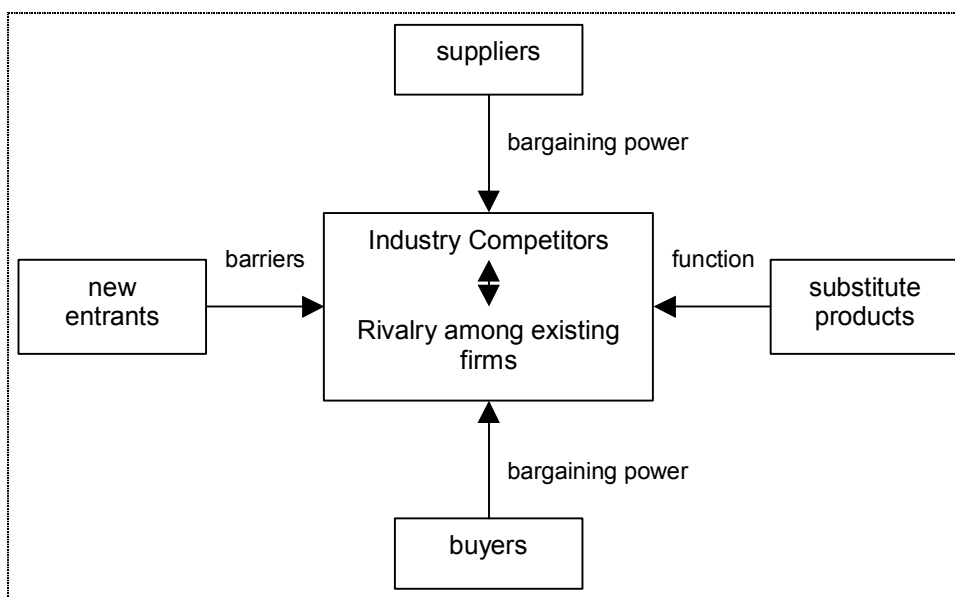
- Main drivers for e-business activities are strong **competition** and increasingly demanding customers. ICT and e-business tools may help to overcome the enduring price (and cost) pressure and improve the services quality. But there is a danger that, by focussing on new technologies alone, related e-business issues are neglected.
- A substantial share of IT services companies is sceptical about e-business. According to them, major barriers to adoption are SME-specific issues, like the **company size** being too small or technologies being too expensive.

3.2 Major implications for the industry

This section discusses major impacts of e-business developments on the IT services sector. The five forces model by Michael E. Porter is used as a framework (see exhibit 3-9 and 'excerpt' in the box below). According to this model, the competitive situation of an industry is determined by five factors:²¹

- new entrants,
- substitution of products and services,
- negotiation power of suppliers,
- negotiation power of customers, and
- rivalry in the market.

Exhibit 3-9: The Five Competitive Forces by Porter (1980)



Excerpt: Michael E. Porter's Five Forces Model

The model of the Five Competitive Forces was developed by Michael E. Porter in his book „Competitive Strategy: Techniques for Analyzing Industries and Competitors“ in 1980. Since that time it has become an important tool for analyzing an organization's industry structure in strategic processes. Porter's model is based on the insight that a corporate strategy should meet the opportunities and threats in the organization's external environment. Especially, competitive strategy should be based on an understanding of industry structures and the way they change.

Porter has identified five competitive forces that shape every industry and every market. These forces determine the intensity of competition and hence the profitability and attractiveness of an industry. The objective of corporate strategy should be to modify these competitive forces in a way that improves the position of the organization. Porter's model supports analysis of the driving forces in an industry. Based on the information derived from the Five Forces Analysis, management can decide how to influence or exploit particular characteristics of their industry.

Michael E. Porter is the Bishop William Lawrence University Professor, based at Harvard Business School.

²¹ See also: www.quickmba.com/strategy/porter.shtml (July 2005).

The following paragraphs will discuss the importance of these forces, analysing whether and how e-business may have an impact on them.

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 the 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 (see also section 2.5 and 2.6). ICT and e-business tools play an essential role for the establishment of 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). In fact, the new statistical 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 further increase the competition among providers of outsourcing services and, thus, to diminish their negotiation power.

The impact of e-business technologies on the negotiation power of suppliers is relatively low. Admittedly, the Internet may have contributed to a higher transparency of prices and, in this way, lowered the suppliers' negotiation power. Thus, IT services companies using the Internet for procurement activities may profit from a stronger negotiation power caused by a higher transparency of prices. Moreover, they could (at least in theory) further exploit their purchasing power by using online negotiation tools (e.g. online auctions). The statistical

results indicate that the majority of IT services companies use the Internet to purchase online. 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 (see section 2.4).

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 (see discussion of trends and challenges in the previous sector report).

Current e-business developments discussed in the previous report (July 2005) are likely to further improve the negotiation power of IT services customers. The increasing relevance of open source software, for example, may cause a change in the relationships between customers and providers. Firstly, the existence of open source software 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 (see also section 2.3.2). Customers can, thus, choose from a larger variety of alternatives. Secondly, the open source 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, the 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*"²². 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.

The key e-business developments discussed in the previous sector report (July 2005) are likely to further increase competition in the IT services market. The case study on Janus Software, for example, has demonstrated how a small IT services company tries to compete with IT giant Oracle 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. Finally, the delivery of software as a service (SaaS) – in the past often discussed as application service providing (ASP) and currently getting again more attention – offers new opportunities for software companies to differentiate from their competitors.

However, the results by 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).

²² As "Takeaway" of an article in TechRepublic (2004): "Survival of software's fittest", Article, 16.08.2004 (www.techrepublic.com).

Exhibit 3-10: Impact of e-business on the IT services sector, based on the "Five Forces" model by Michael E. Porter

Five forces shaping industry structure	General importance in the sector	Impact of e-business	Main arguments
New entrants	<u>High</u> : Entry barriers are low since the establishment of businesses in the IT services sector only needs few resources.	IIII	<ul style="list-style-type: none"> Supply of outputs via the Internet facilitates the establishment of new firms – independent of size and origin. New technological developments are likely to accelerate the market entry of new players.
Substitution of products / services	<u>Medium</u> : Threat of substitutes is of importance for alternatives within single market segments.	II	<ul style="list-style-type: none"> Triggered by the open source and ASP developments alternatives to the conventional software supply have emerged. Use of ICT and e-business technologies plays an important role for the establishment of OSS or ASP businesses.
Negotiation power of suppliers	<u>Low</u> : Main inputs are produced by companies active in the IT services sector itself.	I	<ul style="list-style-type: none"> The Internet may have contributed to the transparency of prices and, thus, further lowered the negotiation power of suppliers. Actually a large share of IT services companies purchase online. However, online negotiation tools are only of marginal importance.
Negotiation power of customers	<u>High</u> : Strong price pressure and demanding customers are indicators for an increased negotiation power of customers.	III	<ul style="list-style-type: none"> The open source development is likely to increase the independence of customers from software vendors and integrators.
Rivalry in the market	<u>High</u> : The rough economic environment has enforced the rivalry in the IT services market during the past years.	IIII	<p>All three e-business key issues discussed in the previous sector report (July 2005)are likely to increase the rivalry in the IT services market:</p> <ul style="list-style-type: none"> Open source opportunities enable small IT services companies to compete with large players. Establishment of offshore businesses in Eastern Europe may increase the division of labor within the IT services market in the EU. ASP / SaaS offers opportunities for differentiation. <p>However, according to the statistical results, developments are still at an early stage.</p>
I = low impact; IIII = high impact			

3.3 Implications for small and medium-sized firms

This section provides an update of chapter 3.1 in the previous sector report (July 2005), which has discussed e-business opportunities and risks for SMEs in the IT services sector. It will elaborate the analysis based on the statistical findings presented in this report.

The role of SMEs in the IT services sector

SMEs, in fact, have an outstanding importance for this sector. Almost all companies in this sector are SMEs. They account for nearly 60% of the production value and employ more than two thirds of the sector workforce in today's EU-25 (2001 numbers).²³ In addition, they are major drivers for innovation in the sector, so that they also contribute to many of the developments discussed in this report.

However, large players, although they only account for a minor share of companies, are dominating in central business segments such as software production or IT outsourcing. The currently ongoing consolidation process in the IT sector will most likely strengthen the position of large companies in many areas. Nevertheless, new opportunities provided by Internet and e-business tools also offer many opportunities for SMEs to differentiate from large software and IT service suppliers, to survive and to keep the market competitive.

Exhibit 3-11: E-business opportunities and risks for SMEs in the IT services sector (updated)

E-business key issues (as discussed in the previous report)	Assessments of opportunities and risks for SMEs (as discussed in the previous report)	Related statistical results by the e-Business Survey 2005
Offshore IT services	<ul style="list-style-type: none"> • Opportunities: SMEs may benefit from offshore IT services as both providers and users. • Risks: SMEs could fall behind their large competitors that have global partner networks in place. 	<ul style="list-style-type: none"> • A large share of SMEs in IT services actually outsource IT services. • However, offshore opportunities are hardly used – irrespective of the region (Asia or Eastern Europe).
Open source software	<ul style="list-style-type: none"> • Opportunities: Based on OSS, SMEs may find an alternative access to the software market and avoid direct competition with large players. • Risks: Patent protection of software components may inhibit OSS development. 	<ul style="list-style-type: none"> • A large share of IT services companies across all size classes uses OS operating systems, databases and web servers. • Among other sectors surveyed by the <i>e-Business W@tch</i>, OSS seems to be less widespread. • OSS might actually be more widespread as embedded components in proprietary software solutions.
Providing software as service	<ul style="list-style-type: none"> • Opportunities: Offering software as a service in a 'one-to-many' model is also an opportunity for SMEs. • Risks: Application service providers (as well as SMEs in other IT services segments) building only on technical expertise risk to fail. 	<ul style="list-style-type: none"> • Only a marginal share of IT services companies uses software functionalities offered by ASPs to support processes on both the buy- and the sell-side. • The percentage of companies that have installed specific software solutions internally is clearly larger.

²³ Source: Eurostat New Cronos / DIW Berlin; for industry statistics in detail see section 5.2.

Offshore IT services

SMEs in this sector may benefit from the establishment of a European offshore IT services market both as providers and users. As analysed in the previous sector report, Eastern European IT service providers – typically SMEs – are well positioned for exporting IT services. By establishing as offshore (better: near-shore) IT service providers for Western European clients, they may be able to gain sufficient size and expertise to export their services also beyond Western Europe.

While these companies may evolve into serious competitors to Western European IT service providers, particularly small and medium-sized IT services companies of the former EU-15 countries could also benefit. In contrast to large players, they usually do not have a global company network or the resources to start their own activities offshore, especially not in “real” offshore areas like India. The cultural and geographical closeness to Eastern Europe facilitates the co-operation with export-oriented IT service providers there. This enables SMEs to integrate offshore services into their own service offerings in order to withstand the price pressure in the IT services market and to improve their competitive position compared to large players in the sector.

However, if these opportunities are missed, the gap between small and large IT service providers may grow. Large providers making use of low-cost suppliers in neighbouring regions or in distant countries will be able to offer better value for money than small companies - in the worst case driving the latter out of business. The new statistical results by the *e-Business W@tch* indicate that offshore opportunities are, in fact, not exploited yet (see exhibit 2-7). Admittedly, a large share of small and medium-sized companies is already outsourcing IT services to other providers, but these activities mostly take place within national borders. In fact, the percentage of companies in this sector co-operating with IT services providers in offshore regions is negligible. The business examples of IT services companies using outsourcing services (see section 2.3.1) have further indicated that the establishment of co-operations with offshore providers should be done step by step and needs time.

Open source software

The analysis and case studies in the previous report have demonstrated the opportunities of the open source model as an alternative way of software development and supply. It is likely to lower barriers to entry for the software market, which in some sub-segments is dominated by large players. By building businesses based on OSS, SMEs have a chance to establish themselves as competitors of large and established players in this field. Drawing on the open source community would help these SMEs to create software as fast as and with at least the same quality as large providers of proprietary software. This also offers an opportunity for differentiation, rather than being drawn into the ongoing consolidation process in the traditional software market.

The statistical results about the relevance of OSS components are ambiguous. On the one hand, a large share of IT services companies across all size classes is using OS operating systems, databases or web browsers. On the other hand, OSS seems to be much less widespread among companies in other sectors surveyed by the *e-Business W@tch*. Admittedly, as several vendors of proprietary software have started to integrate OSS components into their solutions, the use of open source software might be more widespread than indicated by the data. Overall, however, it seems that the establishment of businesses distributing and supporting OSS for commercial use is still at an early stage. In fact, establishing OSS as serious competitor to commercial solutions appears to be long-term process. The mostly small OSS businesses first have to build up reputation as reliable and stable providers. Then, they have to deal with limited marketing budgets due to the small profit margins in this market segment.

There is also some (anecdotal) evidence that the increasing use of patents on software inhibits open source development. Software patents are often not compatible with the open source development model, e.g. if patent licenses involve the payment of royalties or require registration and are not transferable. There also exists the threat that conventional software companies may use software patents as strategic weapons against open source projects. Avoiding patent infringement, however, is rather difficult for individuals and small companies, as software solutions usually build on a large number of sub-programs and basic ideas used in similar solutions. Consequently, investigating about potential patent infringement could prove to be an extremely lengthy and costly procedure.

A way to avoid patent infringements is to build up a patent pool in order to achieve negotiation power for so-called cross-licensing. The logic of such activities is simple: In order to use a patent right of player B, player A offers B some of his own patents for use. However, the sampling of large number of patents is difficult, particularly for the usually small OSS businesses. It needs time and money to be spent on patent filing, prosecution, maintenance, litigation and licensing. The collaboration of numerous OSS projects in a joint organisation that acts as patent pool could possibly be a way out of this dilemma. Such an organisation would support single development communities in the patenting process. The organisation itself could act as counterpart in patent negotiations with large conventional software manufacturers. So far, however, considerations of open source patent pools are only hypothetical.

Therefore the currently ongoing controversial discussion about patent rules for software and software-related inventions in the EU deserves attention. The directive on computer-implemented inventions,²⁴ which has recently been rejected by the European Parliament, has played a key role in these discussions and will, therefore, be discussed in more detail in chapter 4.

Providing software as a service

The provision of one-to-many services via the Internet is an interesting business approach, particularly for SMEs. The entry barriers are relatively low compared to other IT services segments such as software production or IT outsourcing. From a software engineering point of view, web-based services can often be produced at lower costs than conventional software, since fewer peculiarities of operating systems have to be taken into account. Also they can easily be modified and extended, which makes them well suited for trying out new service offers. Traditional software can possibly be developed later, when a demand for the functionality has been proven.

During the dotcom boom, many start-ups tried to establish businesses as ASPs. However, only few of them have survived. Analyses and business examples featured in the previous sector report demonstrated that setting up Internet based services needs more than just a business idea, a modern ICT infrastructure and good technical knowledge. Transforming the ASP idea from theory to practice turned out to be more difficult than expected. It requires a detailed understanding of where economies of scale are really relevant and make ASP solutions superior to locally installed software. A deep understanding of the relevant business processes is necessary to identify the right applications. In addition, sufficient technical expertise is needed to create software that truly supports the one-to-many model.

Findings presented in sections 2.5 and 2.6 provide some insights into the relevance of ASP offers as far as specific solutions for the support of processes on buy- and sell-side are concerned. It turned out that the offers of application services providers and operators of B2B e-marketplaces are currently only of minor importance. In fact, on average of all 10 sectors covered by the e-Business Survey 2005, the share of companies using specific functionalities from ASPs is only marginal and significantly lower than the percentage of companies using internally installed solutions to support trading processes.

²⁴ See http://europa.eu.int/comm/internal_market/en/indprop/comp/ (March 2005).

4 Policy implications

Based on the new statistical results, this section will update the policy implications discussed in the previous sector report (July 2005). In that report, **two issues** derived from qualitative analysis and case studies were highlighted as particularly relevant for policy:

- the establishment of a **European offshore IT services market**, and
- potential problems for SMEs and open source developers from **software patents**.

Admittedly, other issues discussed in this report are of similarly high relevance for the IT services sector, but for many of these issues – such as the need to acquire process-specific expertise – it is enterprises themselves which have to address these challenges, not policy.

The issues discussed in this chapter tackle also problems related to e-business activities of SMEs identified by the statistical analysis. The survey results, for example, indicate that small IT services companies face larger **problems in recruiting** ICT specialists and are less likely to send employees regularly to **ICT training** programmes (see section 2.2).

As discussed in sections 3.1 and 3.3, the new e-business developments (e.g. the establishment of offshore businesses in Eastern Europe as well as the OSS model) provide opportunities to overcome these challenges. SMEs, for example, may **outsource** specific software development tasks to Eastern European providers in order to overcome difficulties in recruiting ICT specialists. Therefore, promoting these developments by appropriate policy measures (as discussed in the following sections) may also help to encounter size-specific problems of SMEs in this sector.

It has been further emphasised that the **issues discussed are still under an open debate**. For truly consolidated policy conclusions reliable empirical data on the general relevance, usage potentials 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 this report) is a major policy challenge in itself. The statistical findings by the *e-Business W@tch* as presented in this report build a starting point for consolidating the policy implications. In fact, they help to assess the current relevance of offshore outsourcing opportunities and of open source software among companies of different industries in the EU.

This chapter builds on the assessment of policy issues made in the previous report and elaborates the discussion where it is appropriate, based on the new statistical findings by the *e-Business W@tch*. The consolidated suggestions for possible policy initiatives within the IT Services industry are summarised in Exhibit 4-1 and discussed in more depth in the following sections. It should be noted, however, that the added empirical results – though they provide some insights into the current relevance of these issues – should not be considered as a sufficient basis to answer all questions related to the ongoing debate on these issues.

Exhibit 4-1: Suggestions for policy initiatives within the IT services industry

Policy issues	Suggestions for policy	Potential initiators
<p>1. Promotion of European Offshore Businesses</p>	<p>Support further investigations as basis of appropriate policy measures. Further research should focus on the:</p> <ul style="list-style-type: none"> • extent of offshore IT outsourcing in the EU • impact of offshore outsourcing. <p>Provide a handbook or guide helping SMEs to overcome critical challenges by discussing:</p> <ul style="list-style-type: none"> • Criteria for the selection of offshore IT service providers, • Business and technical requirements, • Normal, best and unfair practices related to offshore outsourcing, • Evaluation of investment risks, • Policy support and contacts. <p>Promote regional trade fairs and business events to support the establishment of relationships between providers and users of offshore IT services</p>	<p>European Commission</p> <p>Member states</p> <p>Trade promotion organisations</p> <p>Regional policy makers</p>
<p>2. Software patents</p>	<p>Provide reliable and understandable information on future OSS – related investment risks</p> <p>Support a continuous monitoring of industry practices related to the usage of software-related patents in the EU.</p>	<p>European Commission (Member States)</p>

Promotion of European offshore businesses

The previous sector report (July 2005) discussed the current situation of the offshore market in Europe. The overall consequences caused by the rise of offshore opportunities are still subject to an open debate with many controversial statements circulating. Notwithstanding differences in the assessment of the impact of offshore outsourcing, there appears to be agreement regarding the current state of usage: reports by various IT consulting companies unanimously indicate that companies in the EU – with the exception of the UK – are lagging behind in making use of offshore IT services.²⁵

Statistical findings presented in this report apparently **confirm the scepticism** of European enterprises in making use of offshore opportunities. In fact, the share of companies outsourcing IT services to providers in offshore regions like Asia and Eastern Europe, is truly small – in the IT services sector as well as in the other industries surveyed. This even holds true for IT services companies in the UK. Admittedly, the *e-Business W@tch* statistical findings do not reveal to what extent companies have established own subsidiaries for the production of IT services in offshore regions. This opportunity, however, is usually reserved for large players who have the resources that are necessary to establish and operate global company networks.

²⁵ See, for example, reports by Forrester (2004): “Two-speed europe: Why 1 million jobs will move offshore” and IDC (2004): “Impact analyses of offshore services providers on IT services spending in Western Europe, 2003-2008” as well as by OECD (2004): “OECD Information Technology Outlook 2004 – Highlights”.

Some may see the hesitance of European companies at this issue as positive – after all it seems to suggest that fewer IT jobs are moving to low-wage countries. However, it is also argued that not making use of the benefits from an international division of labour in the IT services sector may in the long run **worsen** the relative competitiveness of European IT services enterprises. In contrast, to raise their competitiveness, US companies are actively using the offshore opportunities provided by India and other countries.

The analysis and case studies in the previous report as well as the business examples on IT services companies using offshore services in section 2.3.1 of the report at hand have shown that there seems to be a chance for the establishment of an export-oriented IT services market in **Eastern Europe**. Thanks 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. A combination of the services offered in Eastern Europe – especially in the new member states as well as in the candidate countries – with their own services may increase the competitiveness of Western European IT service providers while at the same time support the development of an internationally competitive IT services sector in Eastern Europe. From a European point of view, this should strengthen the European IT services sector.

Policy could help in promoting such a development. However, the design of appropriate policy measures should be based on **good knowledge** about the actual impact of offshore IT services on EU business, knowledge of which is currently missing. Indeed, in the words of the European Foundation for the Improvement of Living and Working Conditions, “*there is currently a lack of reliable statistical indicators for offshore outsourcing*”²⁶ which would certainly help to clarify issues like:

- **The extent of offshore outsourcing in the EU:** To what extent are offshore services used and offered in single EU countries? What is the position of European offshore providers as compared to global competitors? How do offshore opportunities affect trade balances between user and provider countries?
- **The impacts of offshore outsourcing:** How do offshore opportunities influence the economic development, e.g. in terms of productivity, innovation and employment in the entire EU as well as in single member states?

Better data would help to conduct a more qualified discussion of this issue and would support the identification of needs for policy action. The e-Business Survey results presented in this report could serve as the starting point for a more extensive quantitative and qualitative analysis of this topic.

A lack of knowledge about this issue is also a major obstacle for the realisation of offshore opportunities. Admittedly, there are a number of reports by IT consulting companies that discuss challenges and success factors in using offshore IT service providers.²⁷ However, these reports are mostly directed at large companies, and not targeted to the plethora of small and medium-sized companies.

A “**handbook**” or “**guide**” could support this sector’s SMEs in overcoming critical challenges and could diminish fears related to using offshore services. Crucial questions to be discussed include the following issues:

- Criteria for the selection of offshore IT service providers,
- Business and technical requirements,

²⁶ The European Foundation for the Improvement of Living and Working Conditions (2004): “Outsourcing of ICT and related services in the EU”, Report, December 2004, pp. 23-24 (www.eurofound.eu.int).

²⁷ See, for example, A.T. Kearney (2004): „What to move offshore? Selecting IT activities of offshore markets“; AlignIT Group (2003): „Corporate IT spending and the use of offshore services“ and Forrester (2004): „Cultural challenges in offshore outsourcing“.

- Normal, best and unfair practices related to offshore outsourcing,
- Evaluation of investment risks,
- Policy support and contacts.

Finally, the business examples presented in both reports have demonstrated that personal contacts are of outstanding importance for the successful establishment of offshore business relationships. Moreover, **small trade fairs** on a regional level turned out to be efficient tools to establish new relationships. As such activities are typically initiated and implemented on the level of member states or regions, there would probably not be a direct role for the European Union in setting up such events. However, the EU could support such activities in a similar fashion as it supported **SME partnerships** in EU regions bordering the new EU member states during 2001 to 2003.²⁸

Software patents

The open source software (OSS) movement is likely to change the way in which software is produced and supplied. As discussed in section 3.2, it is likely to intensify competition in this sector and, by doing so, to increase the negotiation power of IT services customers. Related statistical findings presented in section 2.3.2 indicated, however, that the commercialisation of OSS is still at an early stage. Whereas OS operating systems, databases and browsers are **widespread in the IT services sector**, their usage **in other industries** covered by the e-Business Survey 2005 seems to be **rather low**. The case might be that this young type of software still lacks a sufficiently good reputation for commercial use outside the IT services sector.

Moreover, section 3.3 discussed risks for the OSS development model from the patentability of software. First of all, software patents – even if one found them to be beneficial in general – are typically not compatible with the open source development model. Some open source licenses even require that components, for which patent-related license fees are demanded, must be removed and exchanged. This can become quite difficult if OSS spreads further and these components are buried deep into the ICT infrastructure of many companies.

But software patents put a heavy **burden on small software companies** in general, no matter whether they are engaged in open source software development or follow a strictly proprietary model. One reason is that large companies often cross-license their patents. Company A can use company B's intellectual property without having to pay license fees and vice versa. Small companies typically do not have enough intellectual property to put on the table, which means that they have to pay for patent licenses. In this way software patents can particularly affect small enterprises. In addition, searching for patents is a complicated and expensive task, which is made even more difficult by the ambiguous wording and fuzzy descriptions in many software-related patents. This makes patent research expensive without providing reliable results. Small companies often cannot bear these high costs and this ambiguousness.

These problems –reflecting the arguments of the patent opponents in a **still open debate**– suggest that software patents do more harm than benefit to SMEs in the IT services sector. This argument built also the core of critics by patent opponents on the directive on computer-implemented inventions proposed by the European Commission and recently rejected by the European Parliament:²⁹ While it was also the aim of the proposed directive to exclude

²⁸ See <http://europa.eu.int/comm/enlargement/borderregions> (July 2005).

²⁹ See http://europa.eu.int/comm/internal_market/en/indprop/comp/ (July 2005); EurActive.com (2005): "Parliament ditches software patents", Article, 6 July 2005 (www.euractive.com).

patentability of software as such, according to many critics, this goal had not been achieved in the last version of the directive.³⁰

Nevertheless, despite these criticisms there are also SMEs that have supported this directive. Their main argument, along with large IT software companies, is that adequate **patent protection would strengthen innovation** and research in the IT services sector – this being a key competitiveness factor for the European economy as a whole.³¹ These arguments had also been highlighted in the Kok Report³² and in the Commission's Communication on the Lisbon Strategy of February 2005³³.

Without a harmonising directive, there remains a situation within the EU-25, in which a number of Member States allow the patentability of software, whereas others do not. This situation seems to **call for an independent examination and assessment** of the horizontal framework for patents across the EU.³⁴ Irrespective of the future outcomes of the political and legal dispute, there will be a need for:

- **Reliable information on future OSS-related investment risks:** The controversial discussion of the patentability of software has increased confusion particularly among users of OSS software. Therefore, reliable (and understandable) information will be needed helping to evaluate future OSS related investment risks.
- **Continuous monitoring of industry practices related to the usage of software-related patents:** An independent assessment of ongoing practices related to the usage of patents and the impact of such activities on the European software market would be a helpful basis for future political action. In fact, evaluating all impacts triggered by changes in patent law is challenging due to the complexity of this issue and the different patent protection regulations in place within the EU-25. A continuous monitoring of patent practices on the European software market as well as an independent assessment of actual impacts on innovation and competitiveness in the IT services sector would provide the factual underpinning of the current discussion on software patents.

³⁰ See <http://www.nosoftwarepatents.org> (March 2005).

³¹ See, for example, EICTA (2005): "Europe's high-tech SMEs speak out in favour of the proposed CII Patents Directive", Press Release, European Information & Communications Technology Industry Association (EICTA), April 19, 2005 (www.eicta.org).

³² European Commission / Kok High Level Expert Group (2005): "Facing the Challenge – The Lisbon strategy for growth and employment", Report from the High Level Group chaired by Wim Kok, November 2004 (http://europa.eu.int/growthandjobs/index_en.htm)

³³ European Commission (2005): "Working together for growth and jobs – A new start for the Lisbon Strategy", Commission's Communication to the Spring European Council", COM (2005) 24, 02.02.2005, Brussels.

³⁴ It is out of the scope of this report to provide such a legal and economic assessment, but a relevant special study might be needed.

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Annex I: The e-Business Survey 2005 – Methodology Report

The *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).³⁵ 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.

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.³⁶ 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.

³⁵ 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.

³⁶ Non-computer users include typically small craft firms (textile, construction), bars, restaurants or pensions (in tourism), and small food producing companies.

Table 1: Population coverage of the e-Business Survey (2005)

No.	NACE Rev. 1.1		Sector name (as used by <i>e-Business W@tch</i>)
	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 Table 2).

Table 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) and conducted in cooperation with its local partner organisations (see Table 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.

Table 3: Market research companies having conducted the fieldwork in the e-Business 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 ^a , 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

Table 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	571
Textiles and clothing	85	76	81	80	81	83	75	561
Publishing and printing	84	80	82	80	79	83	75	563
Pharmaceutical industry	54	83	81	76	81	82	75	532
Machinery and equipment	85	80	81	77	84	83	75	565
Automotive industry	85	80	81	80	81	83	75	565
Aerospace industry	20	38	15	39	23	3	25	163
Construction	84	81	83	80	80	83	75	566
Tourism	84	80	82	80	82	83	76	567
Computer related services	84	80	82	78	82	84	75	565
TOTAL	750	758	750	750	759	750	701	5218

Table 5: Interview contact protocol: completion rates and non-response reasons (2005)

		CZ	DE	ES	FR	IT	PL	UK	Total
1	Sample (gross)	2632	7247	8796	10123	5082	7825	13104	54809
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
2	Sample (net)	2153	5372	4132	7482	3874	5104	6881	34998
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
3	Successful interviews	750	758	750	750	759	750	701	5218
	Completion rate (= [3] / [2])	34.8%	14.1%	18.2%	10.0%	19.6%	14.7%	10.2%	14.9%
	Average interview time (min : sec)	17:07	19:06	17:29	17:15	20:51	21:15	19:53	19:00

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 Table 6).

Table 6: Comments by national fieldwork companies on their experience (2005)

Country		Comments
CZ	Czech Republic	<ul style="list-style-type: none"> It was more difficult to complete interviews with very small companies. They were less willing to participate in an interview. 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.
DE	Germany	<ul style="list-style-type: none"> In total fieldwork ran smoothly and the questionnaire was easy to understand and interesting for most of respondents. 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. 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. 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.
ES	Spain	<ul style="list-style-type: none"> 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. Generally the questionnaire was easy to understand. 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. 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.
FR	France	<ul style="list-style-type: none"> 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. 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. As more and more companies outsource their IT department, it is difficult to identify a responsible person within the company to answer the questions.

IT	Italy	<ul style="list-style-type: none"> • The questionnaire was considered long, but quite easy to answer. • 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. • 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. • The financial questions were difficult to answer for most of the respondents, especially the question on ICT investments.
PL	Poland	<ul style="list-style-type: none"> • Respondents from small companies often had difficulties in answering questions related to specific technical applications. • Companies are quite reluctant to provide financial information, so respondents often answer DK to the financial questions. • In many companies, IT people are not allowed to say anything about internal matters of the company. • Many companies outsource their IT department and its activities.
UK	United Kingdom	<ul style="list-style-type: none"> • As with previous surveys carried out in the context of the <i>e-Business W@tch</i> programme, fieldwork ran relatively smoothly. • However, the anticipated strike-rate was severely affected by the substantial length of the interview (20 minutes). • Gathering turnover and investment details again yielded a high proportion of don't know responses. • 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.

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.³⁷

- 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.

³⁷ 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.

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 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.

Table 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.

Table 7: Confidence intervals for all-sector and sector totals (EU-7)

	Survey result	Confidence interval		
		Weighted by employment	Weighted as "% of firms"	Unweighted
All sectors (aggregate), EU-7	10%	8.1% - 12.2%	8.7% - 11.5%	9.3% - 10.7%
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%
All sectors (aggregate), EU-7	30%	27.0% - 33.2%	27.9% - 32.2%	29.0% - 31.1%
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%
All sectors (aggregate), EU-7	50%	46.6% - 53.4%	47.7% - 52.3%	48.9% - 51.1%
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%
All sectors (aggregate), EU-7	70%	66.8% - 73.0%	67.8% - 72.1%	68.9% - 71.0%
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%
All sectors (aggregate), EU-7	90%	87.8% - 91.9%	88.5% - 91.3%	89.3% - 90.7%
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 $\alpha=.90$

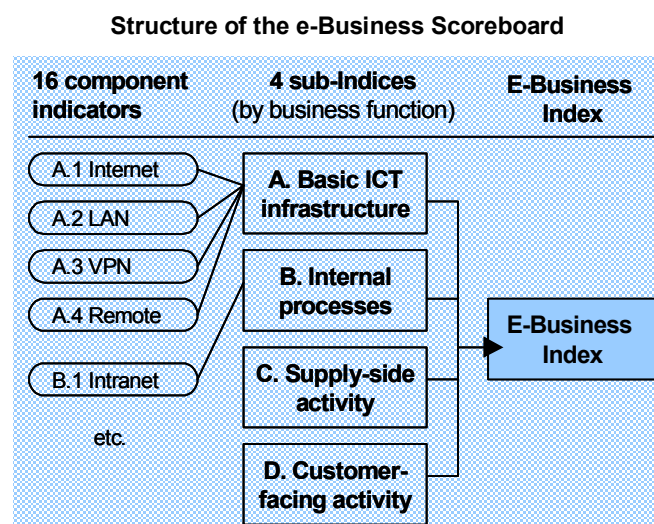
Annex II: The e-Business Scoreboard 2005

Introduction

The e-Business Scoreboard approach was developed by the *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 the *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 on the following pages show these four dimensions of e-business activity.
- The four sub-indices can then be aggregated into the (overall) e-Business Index.



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.³⁸ 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 full list of component indicators and their definition is given in Annex II.
- **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.

³⁸ 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 Scoreboard 2005

A. ICT infrastructure and basic connectivity		
A.1	Enterprises connecting computers with a LAN	= the percentage of employees from a sector working in enterprises that have connected computers with a Local Area Network (LAN).
A.2	Internet 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	Remote access 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 VPN	= 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 intranet	= the percentage of employees working in enterprises that use an intranet.
B.2	Use of online technology to track 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 EDM systems	= the percentage of employees working in enterprises that use an Enterprise Document Management system
B.4	Use of ERP 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 purchasing 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 specific IT 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 SCM systems	= the percentage of employees working in enterprises that use an SCM (supply chain management) system
C.4	Online management of capacity and inventory	= 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 CMS	= 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 CRM 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 selling 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 specific IT solutions for marketing and sales processes	= the percentage of employees working in enterprises that uses specific IT solutions to support marketing and sales processes

Results: sectors in comparison

The e-Business Scoreboards visualize that the nature and impact of electronic business differs widely between sectors, particularly between manufacturing and service sectors. There are several underlying reasons; for example, the nature of e-business activities depends on whether the focus is on B2B or B2C.

Manufacturing

- Among the 7 manufacturing sectors surveyed, 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. 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.
- 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 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.

Construction

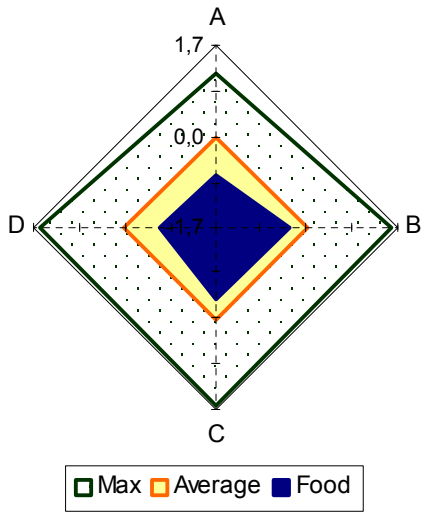
- ICT adoption and e-business activity in construction companies appears to be very limited compared to most manufacturing sectors. The structure of the industry, which includes many small craft companies, cannot fully explain this gap. An industry with a multitude of standards, technical specifications, labels, and certification marks is not an optimal forum 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

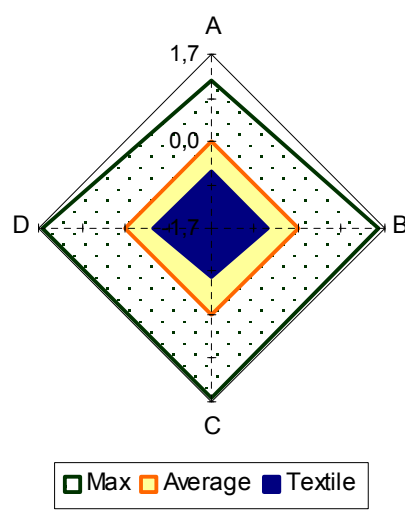
- The **computer related services** sector is a special case with regard to e-business. Although companies in this sector have Information Technology and e-business as their end product, ICT also plays a significant role in the way that this product is produced, promoted and provided. This specific way of using ICT distinguishes the IT services industry from the other sectors analysed by the *e-Business W@tch*. Here, in this sector 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.

e-Business Scoreboards for 10 sectors (2005)

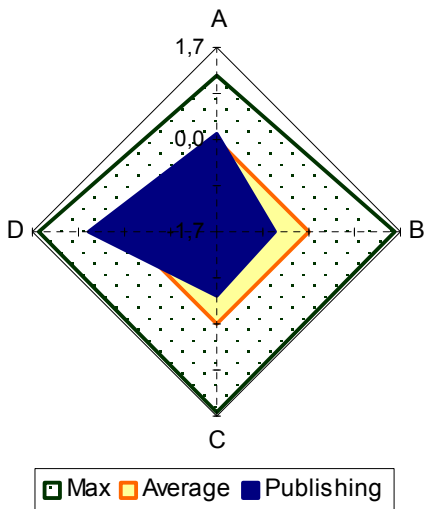
Food and beverages



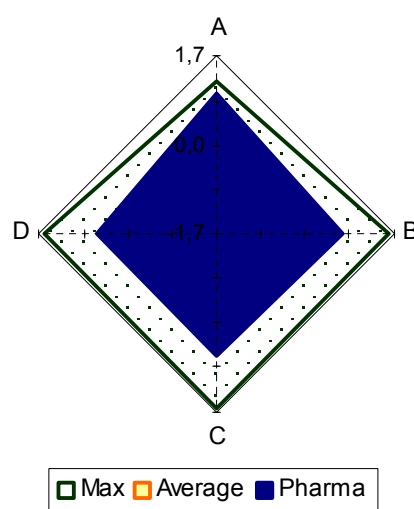
Textile and clothing industry



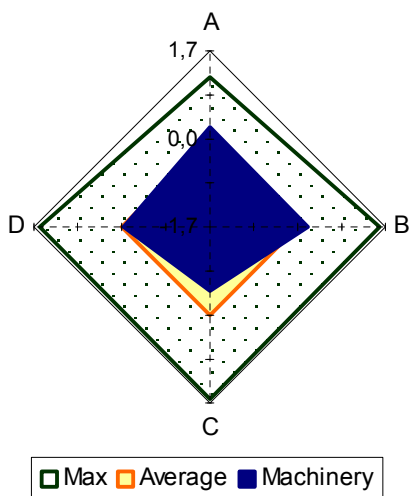
Publishing and printing



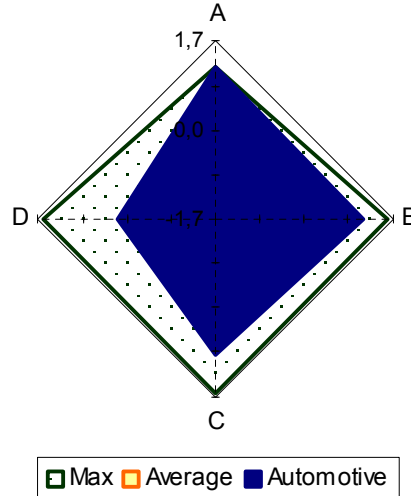
Pharmaceutical industry

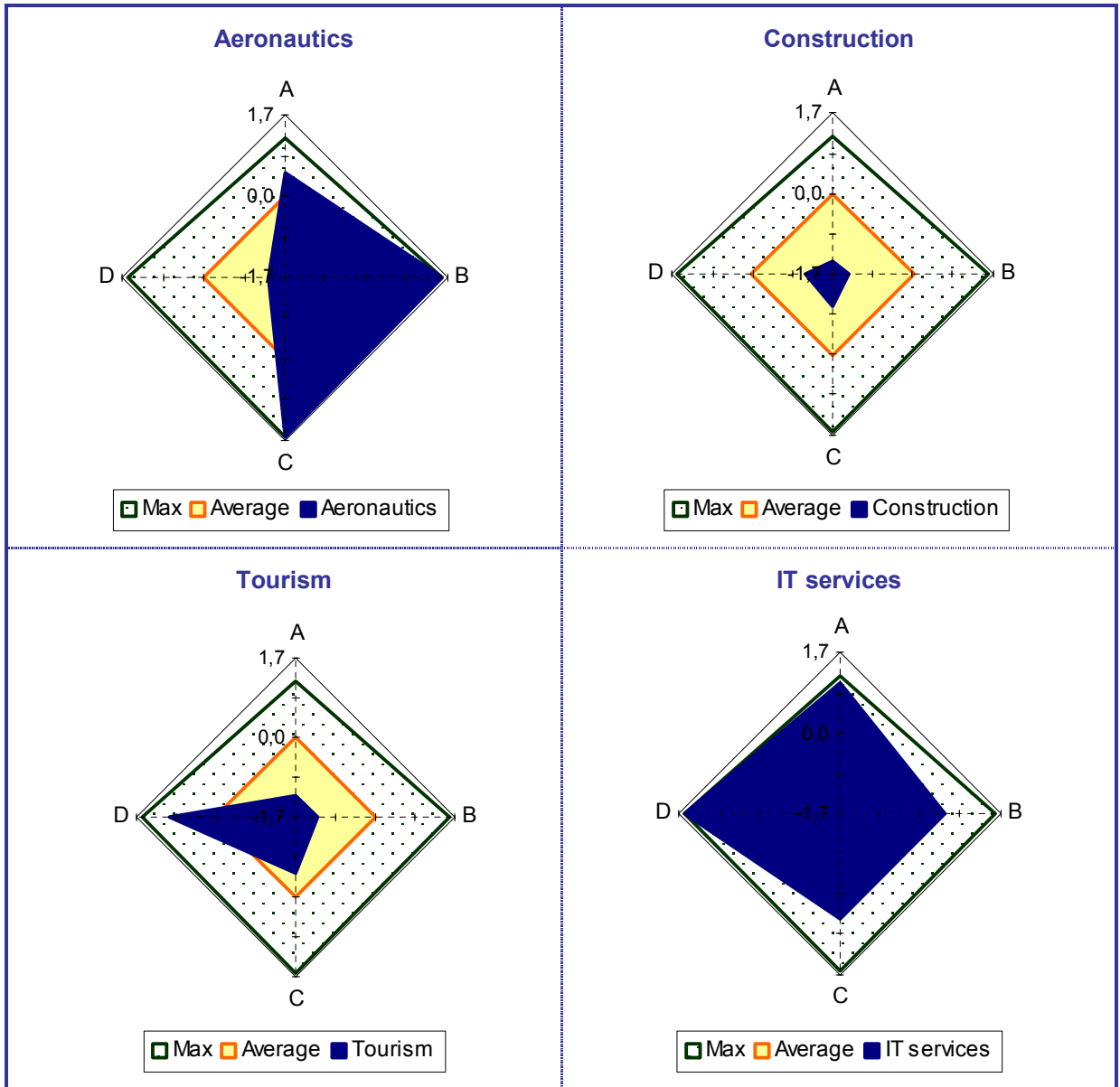


Machinery and equipment



Automotive industry



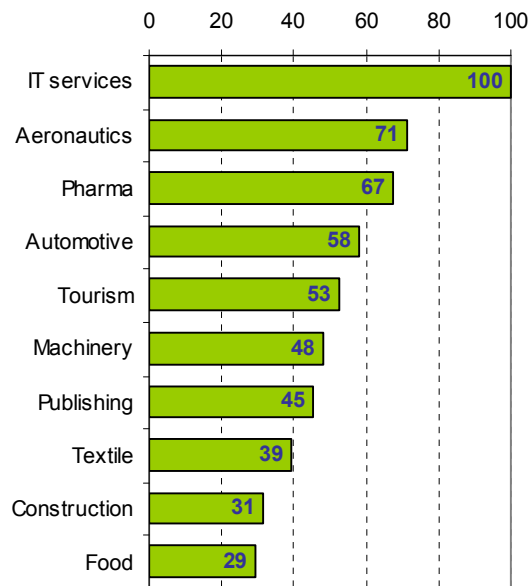


Source: e-Business W@tch (e-Business Survey 2005)

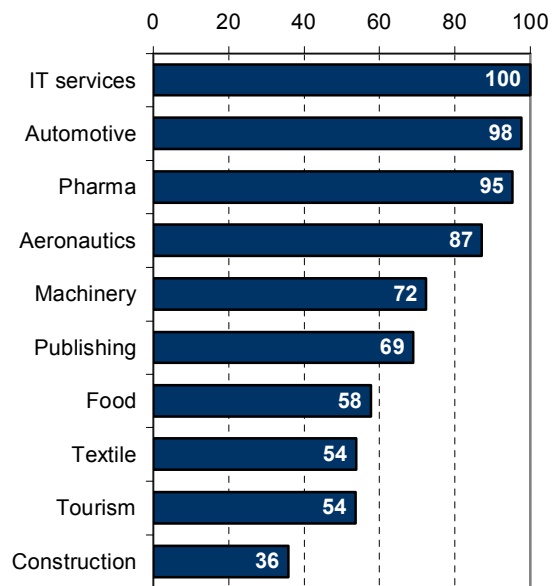
e-Business Index for 10 sectors (2005)

(Compound Index of 16 component indicators)

Benchmark based on **firm-weighted data** ¹⁾
(indexed values: highest score = 100)



Benchmark based on **employment-weighted data** ²⁾
(indexed values: highest score = 100)



- 1) **Firm-weighted** data express e-business adoption as "*% of firms in a sector with a certain activity*", irrespective of the size of the companies (i.e. small companies and large ones count equally). Results are mainly determined by the situation in small firms, as there are many more small companies than large ones in the population of enterprises.
- 2) **Employment-weighted** data express e-business adoption as "*activity in firms comprising ...% of employment in a sector*", thus emphasising the situation in larger companies.