

Sector Report: No. 01-II, August 2004

Electronic Business in the Textile, Clothing and Footwear Industries

Key issues, case studies, conclusions

**e-business
w@tch**



European
Commission



Enterprise publications

The e-Business W@tch

The European Commission, Enterprise Directorate General, launched the *e-Business W@tch* to monitor the growing maturity of electronic business across different sectors of the economy in the enlarged European Union and in EEA countries. Since January 2002 the *e-Business W@tch* has analysed e-business developments and impacts in 17 manufacturing, financial and service sectors. Results are continuously being published 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 textile industries published by the *e-Business W@tch* in the 2003/04 period. It builds on the first study from May 2004 which presented mainly the quantitative picture, focusing on the results of the e-Business Survey 2003. This study analyses in more detail specific issues which were found to be particularly relevant for the sector at stake.

Disclaimer

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information. The views expressed in this report are those of the authors and do not necessarily reflect those of the European Commission. Nothing in this report implies or expresses a warranty of any kind. Results from this report should only be used as guidelines as part of an overall strategy. For detailed advice on corporate planning, business processes and management, technology integration and legal or tax issues, the services of a professional should be obtained.

Acknowledgements

This report was prepared by Databank on behalf of the European Commission, Enterprise Directorate General. It is part of a deliverable in the context of the *e-Business W@tch*, which is implemented by a team consisting of empirica GmbH (co-ordinating partner), Berlecon Research, Databank Consulting, DIW Berlin, IDATE, RAMBØLL Management and Saatchi & Saatchi Business Communications on behalf of the European Commission based on a service contract running from July 2003 until September 2004.

Contact

For further information about this Sector Study or about the *e-Business W@tch*, please contact:

 <p>Databank S.p.A. Corso Italia, 8 IT-20122 Milan, Italy Fax: (39-2) 72107402 databank@databank.it</p>	 <p>e-Business W@tch c/o empirica GmbH Oxfordstr. 2 DE-53111 Bonn, Germany Fax: (49-228) 98530-12 info@ebusiness-watch.org</p>	 <p>European Commission Enterprise Directorate-General e-Business, ICT Industries and Services Fax: (32-2) 2967019 entr-ict-e-commerce@cec.eu.int</p>
---	--	--

Rights Restrictions

Any reproduction or republication of this report as a whole or in parts without prior authorisation is strictly prohibited.

Milan / Brussels, July 2004

Table of Contents

Index of tables and charts	4
Introduction to the <i>e-Business W@tch</i>	5
The Role of Electronic Business in the Textile, Clothing and Footwear Industries in 2004: Main Issues and Challenges	9
1 Introduction	9
2 The role of electronic business in the textile industries – analysis of selected issues.....	14
2.1 Key application areas of electronic business in the sector	14
2.2 Comparison in e-business usage between the textile industry and the clothing & footwear industry	19
2.3 E-business activities and product/process innovation	23
2.4 Adoption of e-business and business success	25
<i>Case Study: GEOX</i>	28
2.5 Integration along the value chain	30
<i>Case Study: Hennes & Mauritz</i>	33
2.6 Role of standards in B2B communication	35
<i>Case Study: Textilebusiness.it</i>	38
3 Conclusions: Opportunities and challenges, drivers and barriers	42
3.1 Opportunities and challenges	44
3.2 E-business drivers and barriers.....	45
4 Policy challenges.....	46
4.1 General considerations on electronic business as a policy challenge.....	46
4.2 Policy challenges at the sectoral level.....	51
4.3 Sector specific challenges	58
References.....	59
Annex I: Glossary of technical terms	60
Annex II: Methodological Notes on the e-Business Survey 2003	63
Annex III: Sector Impact Studies of the <i>e-Business W@tch</i> in 2003/04	67

Index of tables and charts

<i>Exhibit 1-1: Configuration of the textile, clothing and footwear industries (NACE Rev.1)</i>	9
<i>Exhibit 1-2: Textile, clothing & footwear industries: structure by kind of activity, 2001</i>	10
<i>Exhibit 1-3: Size class distribution in the NACE 17, 18, 19 sectors in the EU, 2000</i>	11
<i>Exhibit 1-4: Employment, productivity and labour cost in the NACE 17, 18, 19 sectors in European countries in 2001...</i>	12
<i>Exhibit 1-5: Production value and value added in the textile, clothing and leather industries in European countries</i>	12
<i>Exhibit 1-6: Strategic challenges for the textile, clothing and footwear sector</i>	13
<i>Exhibit 2-1 Breakdown of the survey sample by size class in the textile, clothing and footwear sector</i>	15
<i>Exhibit 2-2: The E-Business Scoreboard for the textile, clothing and footwear industries</i>	15
<i>Exhibit 2-3: Summary overview: Importance of e-business applications in the textile, clothing and footwear industries..</i>	18
<i>Exhibit 2-4: Breakdown of enterprises by type of customer in the textile, clothing and footwear industries</i>	20
<i>Exhibit 2-5: Use of physical infrastructure in the textile and clothing & footwear sector</i>	21
<i>Exhibit 2-6: Internet access and use of basic internet applications in the textile and clothing & footwear sectors</i>	21
<i>Exhibit 2-7: Quality on internet connection in the textile and clothing & footwear sectors</i>	21
<i>Exhibit 2-8 Companies using an ERP system</i>	22
<i>Exhibit 2-9: Innovation in the textile, clothing and footwear sector 2003</i>	24
<i>Exhibit 2-10: Financial performance of enterprises in the textile, clothing, footwear sector 2002/2003: Change of turnover in past year</i>	25
<i>Exhibit 2-11: Correlation of innovative activities and financial performance</i>	26
<i>Exhibit 2-12: IT integration with suppliers in the textile, clothing & footwear sectors</i>	31
<i>Exhibit 2-13: IT integration with customers in the textile, clothing & footwear sectors</i>	31
<i>Exhibit 2-14: Use of online technologies for business processes between companies in the textile, clothing & footwear sectors</i>	31
<i>Exhibit 2-15: Exchange of standardised data between companies by sub-sector</i>	36
<i>Exhibit 2-16: Exchange of standardised data between companies by size class (2003)</i>	37
<i>Exhibit 2-17: Exchange of standardised data between companies: critical issues</i>	37
<i>Exhibit 3-1: Overall significance of e-business for companies in 2003</i>	42
<i>Exhibit 3-2: Reasons why e-business does not play a role in companies</i>	43
<i>Exhibit 3-3: Assessment by companies: The expected future importance of e-business</i>	43
<i>Exhibit 3-4: Overview of e-business opportunities and challenges in the textile, clothing and footwear sector</i>	44
<i>Exhibit 3-5: Overview of e-business enablers and barriers in the textile, clothing and footwear sector</i>	45
<i>Exhibit 4-1: E-business policy objectives and categories identified in the EU in 2002</i>	53
<i>Exhibit 4-2: A framework for SME specific e-business policies</i>	54
<i>Exhibit 4-3: Relevance of SME e-business policy objectives by sector</i>	55
<i>Exhibit 4-4: Suggestions for policy actions mapped by objectives and level</i>	57

Introduction to the *e-Business W@tch*

The *e-Business W@tch* - observatory and intermediary since late 2001

The *e-Business W@tch* monitors the adoption, development and impact of electronic business practices in different sectors of the European economy. The eEurope 2002 Action plan 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, endorsed by the Seville European Council in June 2002, 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, with the objective of providing sectoral analysis based on sound empirical research, including annual enterprise surveys in all countries of the enlarged European Union. Special emphasis is placed on the implications for SMEs.

Since its launch, the *e-Business W@tch* has published e-Business Sector Studies on 17 sectors of the European economy, two comprehensive synthesis reports about the status of electronic business in the European Union, statistical pocketbooks and further resources (newsletters, presentations, special issue reports). These are all available on the website at www.ebusiness-watch.org.

The quantitative analysis about the diffusion of ICT and e-business is based to a large extent on annual, representative surveys among decision-makers of European enterprises. The 2002 survey included 9,264 enterprises from the former 15 EU Member States. In 2003, the regional scope of the survey was extended to the new EU Member States and EEA countries, with about 10,500 companies in total.

Survey results confirm 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 are main determinants of its e-business activity, rather than the location of a company. 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), documents that there has clearly been a 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: the *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 concisely defines e-business in 2004 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.

In such a context, it becomes practically impossible to cover in depth all areas and facets of e-business in one study. The scope of such a study needs to be carefully defined and – to use the analogy of photography – it must be decided whether to "zoom in" or to use a "wide-angle" perspective. "Zoom-in" studies investigate one specific aspect of electronic business in much detail. "Wide-angle" studies adopt a broader perspective and investigate more issues at the same time, which necessarily puts limits on the level of detail in which each single issue can be 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

The first chapter of each *e-Business W@tch* Sector Study provides background information on the respective sector. This overview includes the definition of the sector (on the basis of NACE Rev. 1 classification), some basic industry statistics, as well as information about the latest trends and challenges concerning the specific sector.

It appears that this practice, combined with the growing interest in the *e-Business W@tch* analysis, has caused some confusion: Some readers mistakenly consider that an *e-Business W@tch* "sector report" is a piece of economic research on the sector itself, and not a report focussing on the use of e-business in that particular sector. It is, therefore, necessary to underline that, while some background information is provided in order to better understand the context and the economic impact of e-business, the *e-Business W@tch* reports are neither intended to, nor could, be substitutes for more detailed and specific industrial analysis and statistics on each particular industry.

The same applies to the industry statistics presented in this first, introductory chapter of the *e-Business W@tch* reports. These data are mainly derived from official statistics prepared by Eurostat. However, in order to close the many gaps in the official statistics, DIW Berlin imputed missing data based on extrapolations and their own calculations. The *e-Business W@tch* cannot go beyond the presentation of this consistent set of statistics in the context of its principal assignment.

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 the *e-Business W@tch*. In 2003/04, the sample consists of ten sectors. Their configuration and definition are based on the NACE Rev. 1 classification of business activities. The aggregation of various NACE divisions and groups into a "sector" was guided by the aim to produce results which are relevant for the dynamics of the economy as a whole as well as with the intention of covering the most important features of e-business provision and adoption in Europe. The configuration of sectors partly followed aggregations that are also used in the "Panorama of European Businesses" published by Eurostat.

In the context of its “wide-angle” perspective, the *e-Business W@tch* analysis covers a large part of the European economy rather than focusing on very specific (sub-)sectors. Therefore, the statistics presented in these reports need to be carefully treated when making comparisons between countries and, occasionally, companies’ size-classes. Against the previously described background, some generalisation and approximation has to be accepted, while the definition of sectors could be revisited during the implementation of the *e-Business W@tch*.

The 10 sectors analysed in 2003/04

The 10 sectors which are being monitored and studied in 2003/04 include eight sectors that were already covered in 2002/03 (thus allowing the continuous monitoring of changes and progress), as well as two new ones (namely the textile, clothing and footwear industries and the craft and trade sector).

Exhibit: Sectors covered by the e-Business W@tch in 2003/04

Title	NACE	Short Description
Textile, clothing and footwear industries	17, 18, 19	The textile, clothing and footwear industries account for about 5% of total value added in manufacturing in the former EU-15 and about 9% of employment. SMEs and co-operative SME networks play a vital role.
The chemical industries	24,25	ICT and the Internet in particular have fuelled the globalisation of markets for chemical products. E-business may have considerable future impact on this sector which accounts for ~15% of the production value of EU manufacturing.
The electrical machinery and electronics industries	30, 31, 32	The electronics industry is very suitable for e-business because of the high degree of standardisation of products, globalisation of production, and specialisation of firms along the value chain. Its dynamic development calls for continuous monitoring.
The manufacture of transport equipment	34, 35	The transport equipment industries are precursors for economic development in Europe. Large companies are forerunners in using e-business, with considerable implications for all stakeholders in the value chain.
Craft & trade	(17-19), 20, (30-32), (34-35), 36, 45	The craft sector, which includes firms with less than 50 employees from a number of business activities, is vast, in terms of number of enterprises, employment and value added. E-business may become crucial for many craft firms to stay competitive with industrial production.
Retail	52	The retail sector represents a cornerstone of economic activity within Europe, with around 3 million retail enterprises currently in the EU, employing nearly 14 million people. As there is still untapped potential, ICT may eventually have major implications for the retail value chain.
Tourism	55.1-5, 62.1, 63.3, 92.33, 92.52+53	Hotels, restaurants, travel agencies and tour operators (NACE 55 and 63.3) employ about 2.2 million people in the EU. SMEs play a very important role. In some respects, the tourism sector has always been a forerunner in using ICT. E-commerce is exerting a huge impact, challenging intermediaries.
ICT services	64.2, 72	The ICT services sector in many respects is the leading sector and a kind of benchmark with respect to e-business application. E-business can change the nature of ICT services, which has important implications for other sectors which use them.
Business services	74	Business services are a huge sector, involving more than two million enterprises (99% are SMEs), and employing close to 13 million people. ICT and e-business have significant implications for those areas of the business services sector that are based on information and knowledge.
Health and social work	85.1, 85.3	As national health systems suffer from increasing costs and political pressures to constrain these, it is hoped that strategies for the development of an e-health and e-business infrastructure will become key drivers of change.

Rationale for the selection of sectors to be monitored in 2003/04

The selection of the ten sectors to be monitored in 2003/04 was guided by the aim of producing results relevant to tracking the dynamics of the economy as a whole as well as with the intention of covering the most important features of e-business provision and adoption in Europe. There are, however, additional factors that have been taken into consideration for the selection process. An important aspect to be considered is that any sector which is not going to be covered during the 2003/04 period is a candidate for analysis in 2004 onwards, provided that the *e-Business W@tch* contract will be renewed.

Primary selection criteria

- (a) **The economic importance of the sectors for the EU economy.** For the representation of e-business impacts in the economy as a whole, "large" sectors play a major role, since changes in their production models, their purchasing and marketing behaviour as well as their productivity and dynamics of growth have a very major effect on the performance of the entire economy. The assessment of the economic importance was mainly based on two standard economic indicators: the sector's share of employment and the amount of value-added by the sector.
- (b) **The relative importance of electronic business within the sector.** As the *e-Business W@tch* has demonstrated in the first phase (2002/03), the intensity and nature of ICT and e-business usage differs considerably between sectors. Some sectors, although still small in absolute terms, are growing rapidly and/or illustrate the role which ICT and electronic business may play in other sectors in the future. The statistical proxy for the relative importance of e-business in a sector is the Pilot Index which was computed for 15 sectors (cf. European E-Business Report 2003), based on the eEurope 2005 E-Business Index.

Secondary selection criteria

In addition to these two fundamental criteria, some other selection criteria were applied in cases where the economic and e-business relevance appeared to be equal or similar. These criteria were:

- **Balance of business activities.** There should be a balanced mix of manufacturing and service sectors. Sectors could include a public service sector for comparison.
- **The continued importance of the SME dimension.** Sectors with a higher share of SMEs could therefore be given priority over sectors where large companies dominate.
- **Policy relevance.** The selection needs to consider the policy relevance from the perspective of DG Enterprise and, in particular, sectors for which the DG has responsibility.
- **Roll-out strategy.** Some new sectors (not covered in 2002/03) should be included in order to broaden the monitoring scope of the *e-Business W@tch*. Among sectors with a comparable economic size, new sectors (not yet covered) may be given priority.

In order to come to an initial ranking of economic importance, the *e-Business W@tch* has computed a simple Index using two component indicators: the number of people employed, and value added. The Index reflects the contribution of the sector to the total of all sectors compared.

The next step in the selection process was an attempt to make a joint consideration of the sector's contribution to employment and value added, together with the relative importance of ICT and e-business in the sector. For this purpose, the *e-Business W@tch* has computed an Index that combines the two components. In such a ranking, Business Services comes out on top, followed by Health, Retail, the Financial Services sector and ICT Services.

Based on this statistical evidence and the considerations presented above, the *e-Business W@tch* proposed a roll-out plan and a configuration of 10 sectors for the period 2003/04 that provide good coverage of relevant business activities, issues and countries, as well as being manageable in the organisation designed for the *e-Business W@tch* and the resources available.

The Role of Electronic Business in the Textile, Clothing and Footwear Industries in 2004: Main Issues and Challenges

This report is the second Sector Impact Study on electronic business in the textile industries published by the *e-Business W@tch* in the 2003/04 period. It builds on the first study from May 2004 which mainly presented the quantitative picture, focusing on the results of the e-Business Survey 2003. This study analyses in more detail specific issues which were found to be particularly relevant for the sector at stake. The analysis is supported by case studies. The conclusions summarise the main business implications for firms in the sector stemming from ICT and e-business, and assess the main drivers and impediments for the future development of electronic business in the sector. Finally, the study points at ICT related policy challenges, starting with considerations about the overall implications of ICT for policy and leading to more sector specific aspects.

1 Introduction

For the purposes of this study, the sector “Textile, clothing and footwear Industries” has been defined as those business activities described by NACE rev.1 divisions 17, 18 and 19 (cf. Exhibit 1-1). NACE 17 comprises the manufacture of textiles and NACE 18 the manufacture of clothing (wearing apparel, dressing and dyeing of fur). NACE 19 comprises the manufacture of leather products, out of which this study will cover the manufacturing of footwear only. For the purposes of this study, the term “textile industries” will be understood to cover the textiles, clothing and footwear sectors.

The statistics about the structure and size of the total (aggregated) industry as reported in this chapter include a few sub-sectors (18.3, 19.1, 19.2) which have not been included in the e-Business Survey and are consequently not part of the subsequent analysis on e-business impacts. Thus, the macro-economic statistics do not mirror exactly the configuration of the sector. However, they nevertheless provide a good proxy and are certainly a good enough approximation as a background for the e-business analysis.

Exhibit 1-1: Configuration of the textile, clothing and footwear industries (NACE Rev.1)

NACE Rev. 1 Division	Group	Activity
17		Manufacture of textile and textile products
	17.1	Preparation and spinning of textile fibres
	17.2	Textile weaving
	17.3	Finishing of textile
	17.4	Manufacture of made-up textile articles except apparel
	17.6	Manufacture of knitted and crocheted fabrics
	17.7	Manufacture of knitted and crocheted articles
18		Manufacture of wearing apparel, dressing and dyeing of fur
	18.1	Manufacture of leather clothes
	18.2	Manufacture of other wearing apparel and accessories
19		Manufacture of leather and leather products
	19.3	Manufacture of footwear

The combined textile industries represent a core industry of the traditional consumer goods manufacturing. While the textile and leather sectors produce mainly raw materials, the downstream industries (clothing and footwear) produce consumer goods.

Industry structure

The textile, clothing and footwear industries in the old member states generate a combined production value of about 218 m Euro, accounting for about 4.5% of total European manufacturing (the production of the textile, clothing and leather sector as a whole is about 240 m Euro). More than 185,000 companies active in these industries employ 2.2 million people, representing 7.3% of total manufacturing employment.

Of the 185,000 enterprises active in textile, clothing and footwear in EU-15, a clear majority operate in the clothing sector. The manufacturing of wearing apparel and accessories is by far the most important sub-sector, followed by the manufacturing of footwear. More than 90% of enterprises, across all the sub-sectors, have less than 50 employees.

There has been a sharp decline in employment over the past decades, together with a substantial rise in productivity brought about by deep restructuring and the introduction of new technologies.

The textile, clothing and footwear industry is dominated by SMEs, a large share of which is concentrated in regional clusters. It is one of the most fragmented industries, and is possibly one of the most global industry sectors. More than 50% of employees work in micro and small enterprises. This figure reaches 60% in the leather industry. SMEs also account for more than 40% of production value.

The industry structure in the new EU Member States mirrors the picture of EU-15. Fragmentation and size distribution, in fact, show very similar patterns, while as far as the structure of employment is concerned, large companies account for a much wider share of employment.

Exhibit 1-2: Textile, clothing & footwear industries: structure by kind of activity, 2001

Textile , clothing & footwear industries in EU-15 (old MS) in 2001					
Structure by kind of activity					
		Number of enterprises	Production Value	Value added at factor cost	Persons employed
NACE		Number	Euro (million)	Euro (million)	Number
17	Manufacture of textiles	66,386	115,173	35,318	1,026,064
18	Wearing apparel; dressing; dyeing of fur	101,493	77,481	22,610	887,411
19.3	Manufacture of footwear	22,717	27,404	8,080	310,185

Source: Eurostat New Cronos 2003, estimates and calculation by DIW Berlin (2003)

Exhibit 1-3: Size class distribution in the NACE 17, 18, 19 sectors in the EU, 2000

		Enterprises with ... people employed			
		1-9	10-49	50-249	250+
NACE	Number of enterprises	Structure in % of total			
17	69,135	74.4	19.8	5.0	0.8
18	108,838	81.0	16.4	2.3	0.3
19	41,477	74.3	22.3	3.1	0.3
Total (former EU-15)	219,450	77.7	18.6	3.3	0.4
17	10,724	84.8	8.5	4.9	1.8
18	35,061	87.5	9.1	3.0	0.4
19 ²⁾	1,239	71.6	18.9	8.0	1.5
new EU Member States	-	-	-	-	-
		Structure in % of total			
Number of people employed		Structure in % of total			
17	1,053,600	13.6	26.9	34.0	25.5
18	963,400	22.3	36.1	25.5	16.1
19	460,000	19.6	39.2	25.9	15.2
Total (former EU-15)	2,476,900	18.1	32.7	29.2	19.9
17	108,858	5.2	9.6	22.3	62.9
18	132,000	9.7	23.6	24.8	41.9
19 ⁴⁾	20,502	5.6	19.0	33.0	42.4
new EU Member States ⁵⁾	-	-	-	-	-
		Structure in % of total			
Value added at factor costs		Structure in % of total			
17	36,295.0	9.8	24.8	35.5	29.9
18	23,191.5	15.0	32.2	28.0	24.7
19	12,337.3	14.8	34.4	28.5	22.2
Total (former EU-15)	71,823.8	12.4	28.8	31.9	26.9
17	1,422.7	8.5	8.9	24.9	57.7
18	1,529.3	19.6	19.5	25.8	35.1
19 ⁴⁾	89.0	2.7	18.0	33.6	45.7
new EU Member States ³⁾	-	-	-	-	-

1) CZ, EE, LT, LV, PL, SK only; 2) CZ, EE, LT, LV only; 3) CZ, LT, PL, SK only; 4) CZ only.- 5) CZ, LT, SK only.

Source: Eurostat New Cronos 2003, estimates and calculation by DIW Berlin (2003)

Exhibit 1-4: Employment, productivity and labour cost in the NACE 17, 18, 19 sectors in European countries in 2001

	Employment		Productivity		Labour Costs	
	Persons employed	In % of manufacturing total	Value added per person employed	In % of manufacturing average	per employee (1000 Euro)	In % of manufacturing average
NACE 17						
former EU-15	1,026,064	3.6	34,421	67.2	25,086	70.3
new EU-MS ¹⁾	141,064 ²⁾	4.9	6,134 ²⁾	59.8	5,099 ³⁾	76.3
NACE 18						
former EU-15	887,411	3.1	25,478	49.8	19,044	53.4
new EU-MS ¹⁾	196,585 ²⁾	6.8	4,288 ²⁾	41.8	3,999 ³⁾	59.8
NACE 19						
former EU-15	452,309	1.6	28,007	54.7	19,358	54.2
new EU-MS ¹⁾	44,700 ⁴⁾	2.0	4,689 ⁴⁾	41.9	4,397 ⁵⁾	64.8

1) Year 2000; 2) CY, CZ, EE, HU, LV, MT, SK only; 3) CY, EE, HU, LV, MT, PL, SI, SK only

Source: Eurostat New Cronos 2003, estimates and calculation by DIW Berlin (2003)

Production and regional distribution

The former EU-15 accounted for 29% of world textile production and 26% of world clothing production in 1999 (source OETH, 2000), lying well behind Asia which accounted for 39% and 45% respectively. Based on the analysis of indicators related to production and value added – plus employment – Italy is by far the most important country in the combined textile, clothing and leather (NACE 19 as a whole) industries Italy accounts for more than one third of production and value added in textile and clothing and about 50% in the leather industry of the EU.

Exhibit 1-5: Production value and value added in the textile, clothing and leather industries in European countries

	Production value Euro (million)		Value added Euro (million)	
	2000	2001	2000	2001
NACE 17				
former EU-15	114,661.5	115,173.4	36,332.0	35,317.6
new EU-MS ¹⁾	5,669.5	n.a.	1,828.9	n.a.
NACE 18				
former EU-15	77,048.0	77,480.8	23,192.0	22,609.7
new EU-MS ¹⁾	4,360.0	n.a.	2,037.1	n.a.
NACE 19				
former EU-15	46,036.8	46,566.2	12,337.3	12,667.7
new EU-MS ¹⁾	1,385.2	n.a.	486.2	n.a.

1) new EU Member States include CY, CZ, EE, HU, LV, MT, PL, SI, SK

Source: Eurostat New Cronos 2003, estimates and calculation by DIW Berlin (2003)

In the footwear sector, the EU accounted for 7.3% in volume of world production in 2002. The negative cycle in consumption, increasing competition from Asian countries and the use

of decentralised production processes have resulted in an overall output of 802 million pairs which corresponds to a sharp downturn in production levels: -9% with respect to 2001. This negative trend involved all the main manufacturing countries. Italy remained the leading country within the EU with a share of about 41%. Spain was second in terms of production, followed by Portugal and France (Source ANCI – Italian National Association of shoe manufacturers, CEC – European Confederation of Footwear industry – SATRA Shoe & Allied Trades Research Association, 2004).

External trade

The textile, clothing and footwear industry is very global and trade flows have been constantly increasing over the past decades. According to Euratex (the European Apparel and Textile Organisation), the EU is the largest trader in textile and clothing: the world's biggest exporter of textile products and the second largest exporter of clothing products. The overall trade balance was constantly negative in the period 2000-2003, accounting for -27bn Euro in 2003. The overall deficit is mainly due to the clothing sector, while the balance of textile trade has remained positive. When looking at these trade flows and their increase, it must be borne in mind that a large share of export has to be considered temporary: it consists of intermediary products that will be re-imported for final production and distribution. The increase of international trade in recent year is, first of all, a signal of the process of production internationalisation which is under way in this sector.

Competitive factors

The competitive scenario of the textile industries has undergone profound changes in the past year. The main macro trends which have been and still are affecting this evolution are: liberalisation of trade and globalisation of production and markets, strong competitive pressure related to price-competition, concentration in manufacturing and distribution, pressure on innovation and differentiation. Competitiveness increasingly depends on the – rapidly changing – consumer side and the requirements of distribution. Successful companies in this sector are increasingly paying attention to strategic issues such as: further control on fixed costs; optimisation of production processes with the aim of reducing time to market and lead time; IT systems able to integrate the whole supply chain: from the point of sale (POS, bar code) to order management and logistics; selection of suppliers in the framework of long-term strategies. The point is no longer (or not only) the minimisation of direct production costs but more and more the minimisation of the overall supply chain cost, including standardised and agreed mechanisms able to evaluate quality and timing performances.

Exhibit 1-6: Strategic challenges for the textile, clothing and footwear sector

Strategic Challenges			
International scenario	Market and consumer	HR and management	Technology
<ul style="list-style-type: none"> • Globalisation • Removal of import quotas by 2005 • Price competition • Environmental pressure 	<ul style="list-style-type: none"> • Quicker response to the market • Quality, innovation & differentiation of products • Concentration in distribution 	<ul style="list-style-type: none"> • Management factor in SMEs • Education and training • Creativity, protection of copyright, counterfeit products • Supply chain management 	<ul style="list-style-type: none"> • New material and innovation of products • Higher efficiency in product development, manufacturing and distribution • IT integration • Environment: health and safety at workplace

Source: Databank Consulting

2 The role of electronic business in the textile industries – analysis of selected issues

2.1 Key application areas of electronic business in the sector

The role of ICT and e-business in the sector

The production and distribution cycle in the textile, clothing and footwear sector is quite complex and not at all straightforward. It is based on backward and forward¹ interchanges involving various players, among which are numerous micro and small enterprises.

All phases are characterised by high information intensity, although the physical process remains central. The fragmentation along the value chain has determined the development of IT tools for the management of the various production processes. This has resulted in the so-called “islands of activity” which have seen very little degree of integration so far.

To gain competitive advantage at value chain level, it is necessary to integrate, forward and backward, different technologies and applications in order to accelerate and optimise information flow. Advantages expected by the introduction of e-business and the related acceleration of information flows include the following effects:

- Shortening the development cycle by co-ordinating all information on marketing forecasts, design, production scheduling, dispatch and delivery, eliminating “hand-over” time between each stage of the process and, eventually, stocks
- Improving links with all existing manufacturing operations – especially if outsourced – in order to shorten lead times and to save on administration and management costs. These manufacturing operations will increasingly be small batch ones requiring efficient and rapid management
- Capturing and analysing information about distribution channels and final customers in order to adjust marketing and production strategies
- Enhancing the bargaining power vis-à-vis larger customers for those small firms which are able to integrate or interface the respective information systems, thus challenging the asymmetric structure of the market

The textile, clothing and footwear sector shows a set of features which have been delaying a full exploitation of e-business potential. These features are related to the companies’ size and the cultural attitude, lack of trust and knowledge, as well as problems related to ICT competences.

Main results of the e-Business Survey 2003

Exhibit 2.1 illustrates the breakdown of the *e-Business W@tch* survey sample, by sub-sector and by size class in the combined textile sector.

¹ The cycle is initiated by design and production of samples, followed by sales, purchasing of raw materials production and distribution

Exhibit 2-1 Breakdown of the survey sample by size class
in the textile, clothing and footwear sector

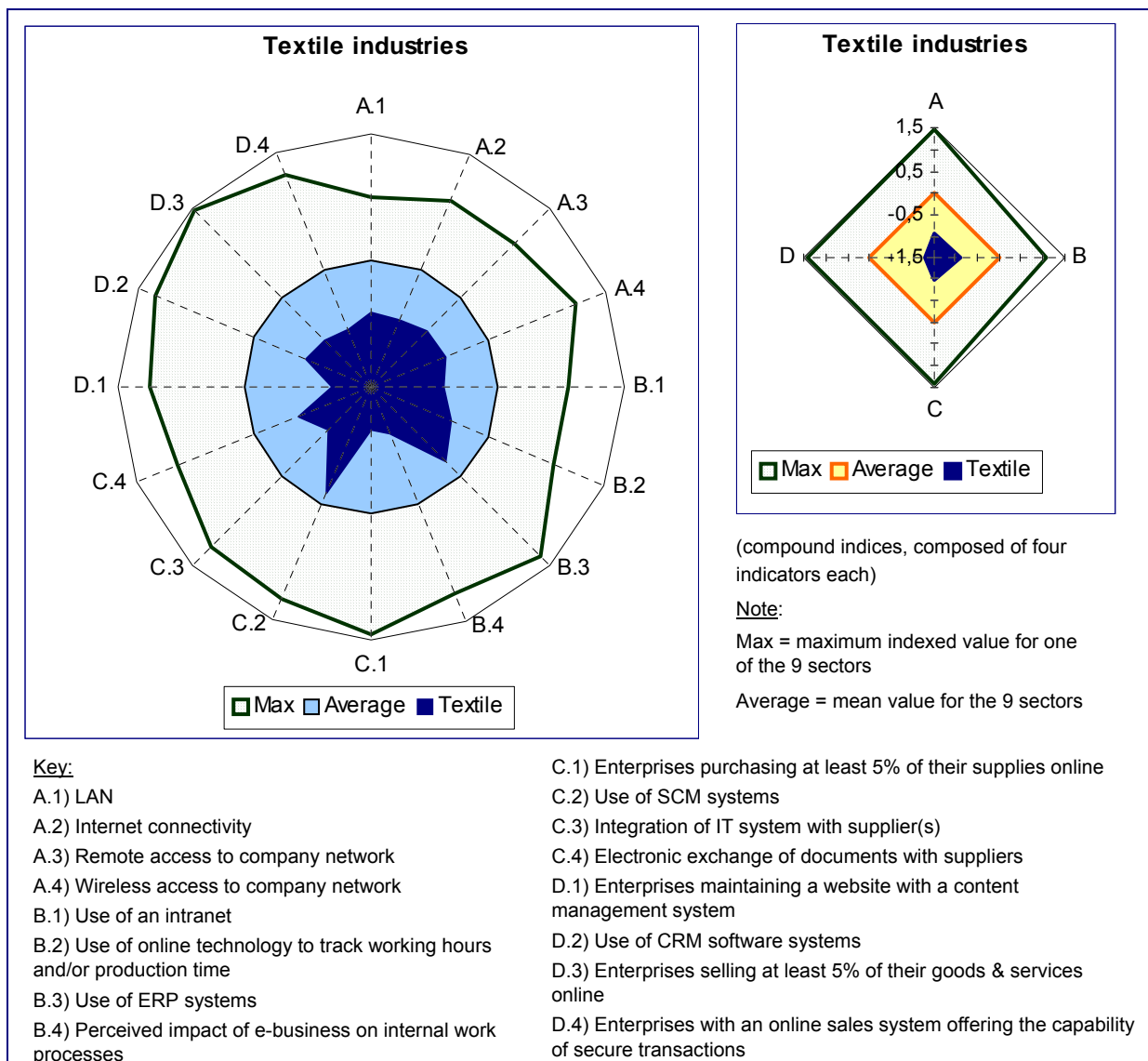
NACE code	N° of enterprises	Out of which (%)			
		Micro	Small	Medium	Large
17	212	77%	18%	5%	1%
18/19	289	79%	18%	2%	0%
Total sector	501	78%	18%	3%	0%

Base: all enterprises, N = 212 (textile industries), N = 289 (clothing and footwear), Reporting period: November 2003.

Source: e-Business W@tch (2003/04)

Survey data indicate that adoption rates of technologies and applications are lower than in other sectors. There is clearly a divide between these industries and the rest of manufacturing and service sector. This divide is comparatively larger than the divide between larger and smaller companies within the sector itself.

Exhibit 2-2: The E-Business Scoreboard for the textile, clothing and footwear industries



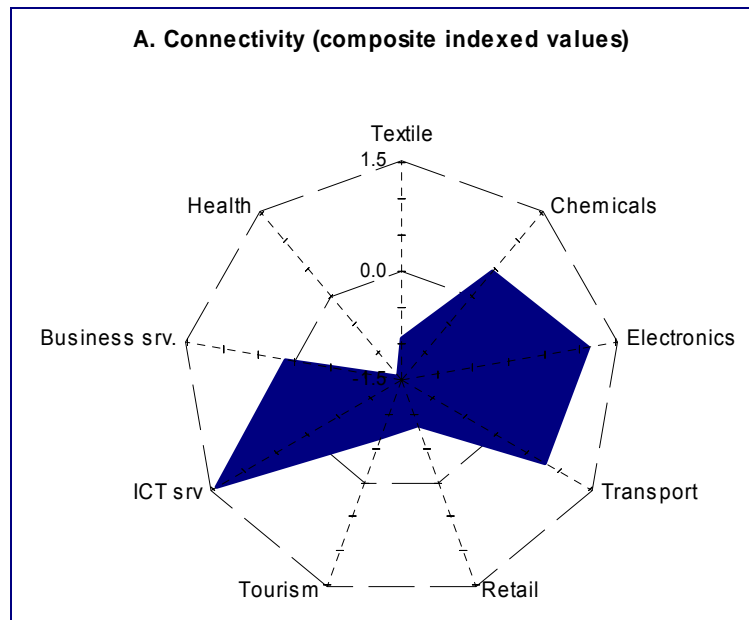
The previous report² (May 2004) introduced the newly developed E-Business Scoreboard (see Exhibit 2-2). This scoreboard compares the importance of ICT and e-business across 9 sectors of the European economy, based on a system of 16 key indicators that have been aggregated into four compound indices (composed of four indicators each):

- (A) The connectivity of the enterprise (ICT infrastructure index)
- (B) Internal business process automation
- (C) Procurement and supply chain integration
- (D) Electronic marketing and sales.

The main assessment for the textile industries as presented in the previous Sector Study (May 2004) was that there is a substantial divide between the textile industries and the rest of the manufacturing sectors in the use of e-business. This divide is comparatively larger than the divide between larger and smaller companies within the sector itself. Nevertheless, ICT and e-business are essential to speed up information flows along the value chain, even if adoption rates are lower than in other sectors.

A. ICT infrastructure of firms

In general, companies from manufacturing sectors tend to be equipped with more powerful IT architectures than business from service sectors). The textile, clothing and footwear sector is an exception to this rule. The Internet is far from being a standard among micro and small companies. E-mail and the WWW are not part of everyday practice for many firms in this sector, and broadband is limited to a minority of larger firms.



This picture clearly mirrors the composition of the sector and in particular the large share of micro and small enterprises, many of which have the characteristics of handcraft workshops rather than companies active in the market. Being production-oriented, often for very few, if not single, customers, providing them with input sources and determining production timing and flows, these companies have little investment capacity and also limited needs. A stand-alone basic system is enough to suit their requirements.

B. Internal business process automation. Data about the diffusion of e-business solutions and ICT to support internal processes indicate a limited horizontal integration of ICT within companies. The fragmentation of the sector, in terms of number of different players along the value chain, has determined the development of IT tools for the management of the various production processes. This has resulted in “islands of activity” which prove to be difficult and costly to integrate and, consequently, are not likely to be connected in the short term, at least

² The report is available at the publications section of www.ebusiness-watch.org.

among the smallest firms. Most of these operation processes require a significant amount of personnel and labour to operate, thus imposing a significant barrier to greater ICT diffusion.

The use of e-business solutions might significantly enhance the efficiency of internal processes in a sector where the production process is complex and organised in a number of different activities. Studies on this topic³ show that information flows are relevant and critical in all phases. Most of the companies, however, are concentrated on single apportioned phases rather than being integrated. The need (and the capacity) for integration is, therefore, shifted more at value chain level than inside single businesses. Wherever internal information flows are relevant, they are currently carried out using traditional instruments such as telephone and fax, while e-mail has only recently been introduced as a more sophisticated means of information. Only larger enterprises are comparatively advanced in the use of online technologies to support internal processes.

C. Procurement and supply chain integration. Efficient management of procurement is a fundamental activity along a sector value chain which is very complex and fragmented. Online procurement can be carried out regardless of real integration without suppliers. It is often the first step towards the use of the ICT in support of external processes. E-procurement activities in the textile industries seem to be at a surprisingly low level for a manufacturing sector where managing the supply chain is a core business function. Even larger companies rely on online procurement in only 33% of the cases.

D. Electronic marketing and sales. Textile, clothing and footwear companies are less present on the web than companies from other sectors: Only 22% of enterprises (about 80% of the large ones) have a website, and only a minority of those make online sales. Even for firms successfully pursuing the strategy of selling through their website, the share of online sales on total ones is less than 5% for most of the companies. This channel is clearly a complementary one and relies upon brand and services shared with the traditional selling organisation.

In this context, however, the typical buyer-supplier relation of this sector must be considered. For a large share of enterprises from the sector, customers are not commercial intermediaries or distributors that buy finished products, but other (individual) businesses for which they perform a part of the production activity. The relationships and transactions among these players are still mainly carried out in a traditional way. Although companies may recognise the potential of networking, the migration towards web-based sales activities has not really taken place. In addition, in all phases of the textile, clothing and footwear value chain, the physical characteristics of the products are of utmost importance. This has clear implications concerning the quality control of the features of the exchanged goods (such as yarn, fabric or finished goods). This aspect is especially relevant whenever the buyer is a final customer with no access to tools currently used to control quality in B2B relations.

Exhibit 2-3 summarises the key objectives and relative importance of electronic business in the textile, clothing and footwear industries.

³ see OECD, EBIP project textile-Clothing sector in Italy, 2001

Exhibit 2-3: Summary overview: Importance of e-business applications in the textile, clothing and footwear industries

E-business area	Importance	Remark / example
Diffusion and quality of access to ICT	●●●●	A large share of companies lack basic conditions for e-business implementation. Quality of access also needs to be enhanced
Use of e-business standards for exchanging structured data	●●●●	Textile companies could largely benefit from standardisation to favour the flow of information along the value chain
Web services and XML based standards	●●●○	It is important to foster migration to tools and standards which offer data access flexibility, openness, ease of use and low cost
Supply chain process integration	●●●	The winners in the changing environment are those companies that are embracing ICT in cooperation with their business partners
Extended enterprise: collaborative (online) e-product design	●●●	In this area, companies from the textile sector are close to the average of other manufacturing sector in terms of use and diffusion
Automate internal business processes	●●	E-business might significantly enhance the efficiency of internal processes in a sector where the production process is complex, fragmented and organised in a number of different activities.
Improve ERP-to-ERP connectivity	●●●	Availability of sector-specific applications is a condition for the spread of ERP in the sector
Electronic customer management	●●○	Mass customisation, shortening of lead times and rapid reaction to market changes will increase the importance of these applications
B2B marketplaces on the internet	●●○	Marketplaces have increased in number although their potential has not been fully exploited
● = little relevance; ●● = average relevance; ●●● = very relevant; ●●●● = high relevance for sector ○ = mixed results, depending on the sub-sector within the combined textile industries		

Source: e-Business W@tch (2003/04)

Based on these findings, a number of specific issues are analysed in more detail and illustrated by case studies in the following chapters:

- whether the sector's usage and access to infrastructure rolls out differently in the main sub-sectors (textile versus clothing and footwear). In particular, whether there are significant differences between the textile sector (where the average size of firms is slightly larger and B2B activities within the sector value chain prevail), and the clothing and footwear sectors, the main feature of which is the prevalence of micro and small enterprises with relevant links with the distribution systems.
- the attitude to technological innovation of firms from the textile industries; verifying to what extent this innovation is enabled by the internet.
- the joint occurrence of innovation, increasing turnover and profitability. One particularly interesting question is what specific kind of innovation is most frequently used by the successful companies
- to what degree sector companies are integrated along their value chain and whether there are significant differences between the textile and the clothing & footwear sectors.

2.2 Comparison in e-business usage between the textile industry and the clothing & footwear industry

The previous Sector Study (of May 2004) presented statistics on the use of electronic business for the combined textile industries which consist of three sectors in the sense of the NACE Rev. 1 classification of business activities: the manufacture of textile products (NACE Divisions 17), the manufacture of wearing apparel, dressing and dyeing of fur (NACE 18), and the manufacturing of leather products (NACE 19) out of which this study covers the manufacturing of footwear only.

Data from the survey showed that a large share of companies from this sector have not yet met the conditions for a full exploitation of the opportunities related to e-business. However, the study presented only the aggregated results for these sectors. It was not possible in the context of that analysis to break down the survey data on e-business for each sector.

This chapter will analyse whether the sector's weakness in terms of use and access to infrastructure rolls out differently in the main sub-sectors. In particular, the aim is to verify whether there are significant differences between the textile sector, where the average size of firms is slightly larger and B2B activities within the sector value chain prevail, and the clothing and footwear sectors, the main feature of which is the prevalence of micro and small enterprises with relevant links with the distribution systems.

Sector differences

A full and detailed economic and competitive profile is provided in the first Sector Study (May 2004). However, in order to carry out the comparative analysis between the textile and the clothing/footwear sector, it is important to remember some structural features of the two sub-sectors.

Although small companies prevail in the whole sector, textile companies tend to be larger, employing high tech machinery. Clothing manufacturing is more labour-intensive and is carried out in smaller firms. The footwear industry is also organised in small firms, while the actual number of employees in each location varies significantly across countries.

While textile produces mainly intermediate materials, clothing and footwear produce consumer goods. About one quarter of the production of textile consists of so-called technical textiles which include special fibres and materials suiting industrial and technical applications. Besides technical garments, these textiles are largely and increasingly applied in sectors such as transportation, health care and environmental protection. The demand for such products is represented by other industrial sectors: Automobile, furniture, building, electronic industries. The textile industry delivers about half of its production to the clothing industry, while the manufacture of footwear is in the same position towards the leather industry as a whole.

Exhibit 2-4 illustrates the breakdown of enterprise from the sample of *e-Business W@tch* by type of customers. Data reflect the differences in business relationships: companies from clothing and footwear manufacturing have a more significant number of relations with consumers.

Exhibit 2-4: Breakdown of enterprises by type of customer in the textile, clothing and footwear industries

Sector	Primary customers: other businesses	Primary customers: consumers	Primary customers: the public sector
Combined textile industries	60	31	3
NACE 17 (textiles)	74	22	1
NACE 18/19 (clothing/footwear)	53	36	4

Base: all enterprises, N = 212 (textile industries), N = 289 (clothing and footwear). Weighting: in % of enterprises. Reporting period: November 2003.

Source: e-Business W@tch (2003/04)

All these sectors now face the competitive challenges related to increasing international competition, abolition of import quotas⁴ compliance with environmental regulations⁵ and advances in technology.

ICT and e-business use

The following analysis is based on data from the e-Business Survey 2003. For reasons of comparability with other sectors, aggregate data from the EU-5 (DE, ES, FR, IT, UK) are used. On this level of aggregation, data are available for all sectors monitored by the e-Business W@tch in 2003/04. The two sub-sectors of the combined textile industries are compared to each other, and to the “all sectors” average.

Data about physical infrastructure in the analysed sub-sectors illustrate that:

- the use of a computer is common practice among employees from the textile sector (97%, in line with the all-sector average) while the clothing & footwear sectors lag behind (68%). In these latter sectors, around one third of the companies, mainly micro ones, do not have any access to computers;
- for companies equipped with basic infrastructure, the usage of LAN and Intranet is quite similar

Many micro and small firms have the characteristics of handcraft workshops rather than companies playing on the market. Being production-oriented, often for very few – if not single – customers, providing them with input sources and determining production timing and flows, these companies have little investment capacity and also limited needs. Most business exchanges are carried out by traditional means (telephone and fax).

⁴ Textiles and clothing trade among World Trade Organisation (WTO) members is governed by the Agreement on Textiles and Clothing (ATC), which came into force with the WTO Agreement on 1 January 1995. This agreement means that alongside progressive application of General Agreement on Tariffs and Trade (GATT) rules, there will be progressive phasing out of quotas in the EU, US and Canada. These quotas were inherited from the Multifibre Arrangements (MFA). After a 10-year period ending on January 1 2005, the ATC will expire and all quotas will be abolished. So, in 2005, all WTO members will have unrestricted access to the European, American and Canadian markets.

⁵ The pressure on the EU textile industries to comply with environmental regulations has intensified in recent years. Firms face a major challenge regarding compliance with legislation and competition from countries operating in less strict conditions.

Exhibit 2-5: Use of physical infrastructure in the textile and clothing & footwear sector

	Use computers		Local Area Network		Intranet usage	
	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.
Combined textile industries	74	91	17	50	10	32
<i>Textiles</i>	86	97	21	56	11	32
<i>Clothing & footwear</i>	68	86	14	46	10	32
All (9) sectors	89	95	32	61	21	45

Base: all enterprises, EU-5 (DE, ES, FR, IT, UK). N = 212 (textile industries), N = 289 (clothing and footwear), N ~ 500 for other sectors. "% of empl." means that data are weighted by employment ("enterprises comprising ...% of employees in the sector"). Reporting period: November 2003.

Source: *e-Business W@tch* (2003/04)

Similarly, Internet access and use of basic internet applications are slightly more diffused in textile, while clothing and footwear are well below the sector average. For the reasons explained above, smaller companies have also very limited needs for external communication and do not pursue visibility on the net.

The diffusion of broadband, quite low in general, is similar among firms from the two sectors. Such a quality of Internet connections seems to indicate that they are used mainly for accessing the web while not being suitable for data transmission and exchange.

Exhibit 2-6: Internet access and use of basic internet applications in the textile and clothing & footwear sectors

	Have access to the internet		Use e-mail		Use the www		Have a website	
	% of firms	% of empl.	% of firms	% of empl.	% of empl.	% of empl.	% of firms	% of empl.
Combined textile industries	58	82	48	77	40	68	22	47
<i>Textiles</i>	70	88	55	82	49	74	25	55
<i>Clothing & footwear</i>	52	78	44	72	35	63	21	41
All (9) sectors	76	88	68	84	58	77	35	66

Base: all enterprises, EU-5 (DE, ES, FR, IT, UK). N = 212 (textile industries), N = 289 (clothing and footwear), N ~ 500 for other sectors. "% of empl." means that data are weighted by employment ("enterprises comprising ...% of employees in the sector"). Reporting period: November 2003.

Source: *e-Business W@tch* (2003/04)

Exhibit 2-7: Quality on internet connection in the textile and clothing & footwear sectors

	Analogue dial-up modem		Are connected with <2Mbit/s		Are connected with >=2Mbit/s	
	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.
Combined textile industries	41	23	69	62	7	22
<i>Textiles</i>	41	25	71	59	7	27
<i>Clothing & footwear</i>	40	22	68	64	7	17
All (9) sectors	27	16	64	54	15	31

Base: all enterprises, EU-5 (DE, ES, FR, IT, UK). N = 212 (textile industries), N = 289 (clothing and footwear), N ~ 500 for other sectors. "% of empl." means that data are weighted by employment ("enterprises comprising ...% of employees in the sector"). Reporting period: November 2003.

Source: *e-Business W@tch* (2003/04)

Exhibit 2-8 Companies using an ERP system

	Use ERP system	
	% of firms	% of empl.
Combined textile industries	2	18
<i>Textiles</i>	2	21
<i>Clothing & footwear</i>	3	16
All (9) sectors	5	19

Base: all enterprises, EU-5 (DE, ES, FR, IT, UK). N = 212 (textile industries), N = 289 (clothing and footwear), N ~ 500 for other sectors. "% of empl." means that data are weighted by employment ("enterprises comprising ...% of employees in the sector"). Reporting period: November 2003.

Source: e-Business W@tch (2003/04)

Very few companies have implemented ERP systems both in textile and in clothing & footwear. Information is generally still received on traditional, mostly paper-based documents and inserted manually into the system. The low percentage of companies currently using ERP is due, not only to their size and limited investment capacity, but also to the scarce availability of solutions specifically developed for small enterprises.

Conclusions

The comparative analysis of the two sub-sectors of the combined textile industries reflect some differences, related to size and structure of companies and to the type of customers addressed. Such differences, however, are not very pronounced and, as a general conclusion, it is possible to say that the selected aggregate of the combined textile, clothing and footwear industries is fully justified and provides a sound overall sector profile.

The exercise carried out is nevertheless interesting as it provides some useful insight:

- The most relevant difference between the two sub-sectors concerns the basic infrastructure, i.e. the usage of computers and access to the internet. This difference regards mainly micro enterprises which, in the clothing and footwear sector, lag considerably behind.
- When it comes to more sophisticated technologies, the gap between the two sub-sectors is far less pronounced.

Even in the absence of detailed data on the activities performed by these companies, it can be hypothesised that in the clothing and footwear sub-sectors, a large percentage of workshops and micro/small companies will be able to continue operating relatively successfully on the market or find their own niche in the industry even without the support of technologies, let alone e-business. These "technology refuters" remain such because these islands of activity – concentrated on single apportioned phases, with one or only a few customers – do not justify and most likely will not justify any investment in the near future. (This phenomenon is less pronounced in the textiles industry, due to the way production is organised and the more complex technologies involved in the productive process.) However, for those companies aiming at broadening their offer or extending their market reach, the lack of basic general-purpose infrastructures is likely to be a high risk factor as it does not allow integration along the value chain and quick response to the market.

2.3 E-business activities and product/process innovation

Role and features of technological innovation in the sector

The aim of this exercise is to highlight the attitude to technological innovation of firms from the textile industries and to verify to which extent this innovation is enabled by the internet.

As outlined under “Competitive Factors” in Chapter 1, technological innovation is a critical challenge as it allows European companies to face global competition and to keep positioning in the higher market segments, relying on differentiation and quality. It is largely recognised that automation, innovation and flexible re-organisation are the main instruments to support this strategy. This can only be achieved by a large-scale deployment of leading-edge research results, a highly efficient process organisation and supply chain management, and a highly qualified work-force.

The competitive scenario pushes towards the usage of technologies to innovate products, to enhance quality and to broaden the applicability of materials. Research-based innovation may include:

- Fibres that respond in a *smart way* to external influences (temperature changes, humidity, chemicals, light and radiation, mechanical use etc.);
- Fibres and textiles with improved characteristics in strength, weight, chemical resistance, fire resistance, isolation, and noise filtering;
- Textiles with medical and hygienic properties.

Process innovation is centred on production processes, such as automated and computer-based manufacturing systems, or processes aimed at manufacturing products that can combine costs of mass production with differentiation of customised production, optimisation of the value chain. Environmental concerns push towards the adoption of new processes aimed at ensuring labour force and consumer protection, at managing disposal and recycling.

For the textile industries, non-technological innovation in the form of creativity, fashion, and new designs and models is crucial for retaining competitiveness, but these activities are not covered by this report.

Firms' attitude to innovation

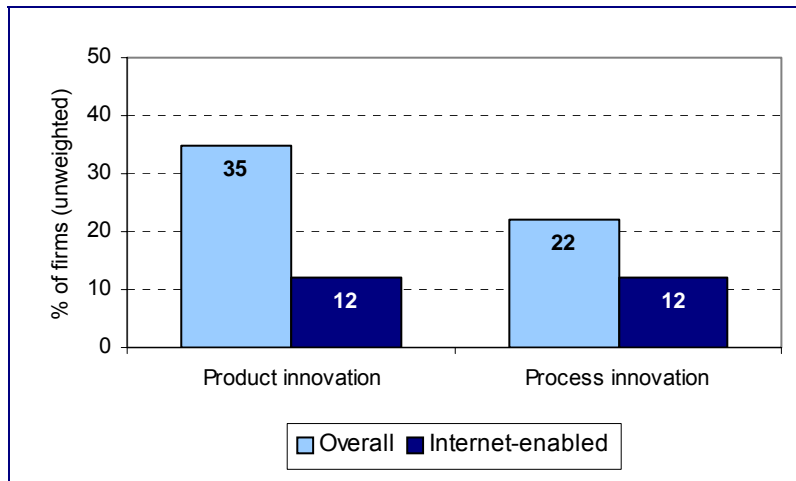
The *e-Business W@tch* survey conducted in November 2003 contained for the first time questions regarding innovative activities of firms. Companies were asked whether they had introduced substantially improved products or services to their customers during the 12 months prior to the survey. It was also asked if the companies had introduced new internal processes in the same period of time. These introductory questions were adopted from the Community Innovation Survey (CIS - <http://www.cordis.lu/eims/src/cis.htm>) to determine the share of companies in the sector that recently introduced product or process innovations. The advantage of adopting the questions from CIS is that it enables us to use a well accepted and matured survey instrument.

Companies that indicated in the introductory questions that they have conducted innovations in the previous 12 months were asked follow-up questions. The results for the textile industries are shown in Exhibit 2-9. 35% of enterprises in the sample introduced substantially improved products or services to their customers in 2003. One third of these product innovations had been directly related to or enabled by Internet-based technology. This

corresponds to 12% of enterprises in the sample that have introduced Internet-based product innovations in 2003.

The importance of the Internet is even more pronounced for process innovations: 22% of enterprises introduced new internal processes in 2003. Around half of these process innovations were directly related to or enabled by Internet-based technology.

Exhibit 2-9: Innovation in the textile, clothing and footwear sector 2003



Base: all enterprises, unweighted. Reporting period: November 2003.

Source: *e-Business W@tch* (2003/04)

Conclusions

These data are particularly interesting if put in the context of the relatively low diffusion of ICT technologies and applications in this sector. Considering that textile, clothing and footwear products cannot be digitised, and that online sales of these products are the rare exception, the main lines of innovation for which the Internet can be a driving factor will probably be in other business areas. These could include the following applications:

- **New and improved materials.** A point of strength for European firms is the capability to incorporate research based innovation. This clearly requires sharing of information and technology-supported knowledge which benefits from the usage of the net.
- **"Mass customised products".** These are products which, thanks to the efficient usage of information on markets and consumers, have features and production costs which are typical of industrial products, while addressing tailored needs and requirements.
- **Creativity as a major asset in fashion-related industries.** Traditionally creativity has been considered an intangible asset relying on tacit knowledge, with very little technological support. However, most innovative companies are increasingly trying to approach creativity in a more structured way, picking up latest trends (using inspiration trips, street trends, exhibition, films, magazines, etc). The nature and features of the internet can be very supportive in gathering information and establishing links with the customer community
- **Process innovation.** Innovation along the value chain can be triggered by new tools and concepts through Internet based platforms.

The information collected and analysed in the present survey is not detailed enough to allow for understanding which kind of internet-based innovation companies in the sample have adopted, whether breakthrough or incremental. This could be an indication for a deeper

insight in this sector. What is relevant and worth attention, however, is the role that companies start assigning to the internet, in a sector characterised by a rather conservative culture and low technological attitude.

What the survey data clearly show, however, is the gap between the EU's innovation capability and sector-specific know-how, with respect to ICT deployment and use in the sector. This has two main implications. On one side, firms find it difficult to make visible and accessible to the external world their competences and capabilities. This penalises their competitiveness in the global context. Moreover, innovation in this sector is currently increasingly demand driven. It is, therefore, increasingly important for companies to work closely with their customers in order to rapidly exploit opportunities for innovation. Only adequate ICT infrastructure and e-business solutions can support this process.

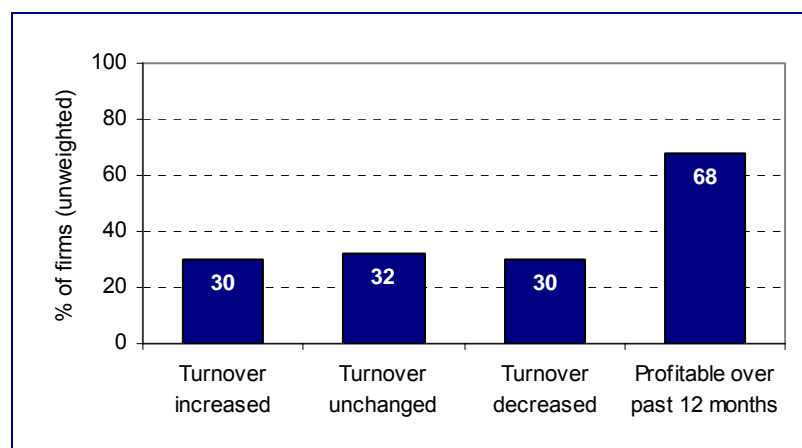
2.4 Adoption of e-business and business success

Impact of e-business on innovation and financial performance

The aim of this exercise is to test the joint occurrence of innovation, increasing turnover and profitability using data from the *e-Business W@tch* survey. One particularly interesting question is what specific kind of innovation is most frequently used by the successful companies in the different sectors studied by the *e-Business W@tch*.

Exhibit 2-10 shows the financial performance of enterprises in the textile industries in 2002/2003. The sample of the interviewed companies is equally shared as for turnover results: 30% of firms in the sample experienced increasing turnover in this period. 32% report unchanged turnover in 2003 compared to 2002, and 30% report decreasing revenues. A very high share of companies (68%) stated that they had been profitable over the last 12 months prior to the survey.

Exhibit 2-10: Financial performance of enterprises in the textile, clothing, footwear sector 2002/2003: Change of turnover in past year



Base: all enterprises, unweighted. Reporting period: November 2003.

Source: *e-Business W@tch* (2003/04)

Exhibit 2.11 shows how these financial performance parameters correspond to the types of innovative activities that were captured by the *e-Business W@tch* survey in November 2003:

- Product or service innovations – general (not Internet related)
- Product or service innovations – Internet-enabled
- Internal process innovations – general (not Internet related)
- Internal process innovations – Internet-enabled

The variables in the dataset were recoded as dummies and Kendall-Tau-b correlation⁶ coefficients were calculated using un-weighted individual level. Analysis of data highlights the main following results:

- Profitability and increase in turnover are quite strongly correlated.
- Product and process innovation (both internet related and not) are positively correlated with turnover increase.
- Product and process innovation are also correlated to profitability.
- There is a very strong correlation between internet-related product and process innovation.
- There is also a – weaker but relevant – correlation between general product and process innovation.
- There is a negative correlation between general and internet enabled innovation, both for product and process.

Exhibit 2-11: Correlation of innovative activities and financial performance

	Turnover increased last year	Turnover same last year	Turnover decreased last year	Profit in last 12 months	Product innovations (general)	Product innovations (Internet related)
Profit in last 12 months	0,303**	0,044	-0,302 **			
Product innovations – general	0,075 *	-0,086 **	0,011	0,085 **		
Product innovations – Internet related	0,047	0,013	-0,076 *	0,071 *		
Internal innovation – general	0,092 **	-0,016	-0,058	0,061	0,286 **	-0,089 **
Internal innovation – Internet related	0,117 **	-0,046	-0,100 **	0,033	-0,158 **	0,513 **

Correlation coefficients ; * significant at 95%, ** significant at 99% N = 1021

Base: all enterprises (unweighted) EU-5 (DE, ES, FR, IT, UK). Reporting period: November 2003

Source: *e-Business W@tch* (2003/04)

⁶ Kendall's Tau is a measure of correlation between two variables. It can take values between -1 and 1. If two variables are totally independent, Kendall's Tau takes a value of 0. If two variables are identical (always occur together), Kendall's Tau takes a value of 1 and a value of -1, if they always occur together but with reversed signs.

Conclusions

The small number of observations affects the significance of these results. They are nevertheless interesting as they show the expected sign for most of the correlations. Before drawing any conclusion it is important to remember that:

- It is not possible, on the basis of survey data, to establish any causality relation between correlated data. In other words, it is not possible to say, for instance, whether companies have increased turnover due to innovation or whether innovation has allowed them to increase turnover. What can be said is that companies with increasing turnover are, in general, more innovative than others with poorer economic performances.
- The time gap between the implementation of innovation and the measuring of effects cannot be taken into account in this exercise. The questions about innovation and economic performance refer to the same period, while obviously, innovation requires some time to deploy its effects

Despite these caveats, however, a quite interesting result is the strong correlation between internet enabled product and process innovations and, conversely, the – not so strong – correlation between non-internet enabled innovation of products with non-internet enabled innovation of process. This suggests that there are two alternative patterns for innovation and that they are pursued alternatively. Another interesting result is that general innovation is more strongly correlated with profitability than internet enabled innovation.

CASE STUDY: GEOX

Abstract

This story is about a footwear manufacturer whose differentiating factor is technology. Thanks to an innovative product solution, this company went from being a micro enterprise in 1992 (5 employees) to the current turnover of 254.1 million euro with production of over 6.6 million pairs of shoes and a workforce of more than 5,000 directly or indirectly employed worldwide. This case study highlights the main features of European competitive strength in the global scenario: creativity, innovation, quality. On the other hand it demonstrates how a business idea can lead to business and economic success if supported by an innovative management of organisation and production. The de-localisation strategy is also representative for the sector.

Case characteristics	
• Sector focus	Footwear
• Business focus	Large company
• Geographical focus	International
Case objectives	
• Supply chain integration	***
• Product innovation	****
• Internal processes integration	****

* = some relevance for case; **** = high relevance

Background and objectives

The story of the Italian company GEOX is the story of its system (patented less than 10 years ago) whereby rubber soles are perforated and contain a special micro-porous membrane that recreates an ideal microclimate inside the shoe, keeping the feet dry and at the right temperature. On this breakthrough product technology, the company built its developments in world business, with turnover growth rates of 40% per year, reaching a 2003 production level of over 6 million pairs of shoes and operating at present in 68 countries. Product innovation has constantly been supported by innovative organisation solutions and increasing investments in ICT.

Activities

Key figures

The consolidated turnover passed from 180 million Euro in 2002 to 254 million Euro in 2003 (compared to 92 million Euro in 2000). The EBITDA (earnings before interest, taxes, depreciation and amortization) rose to 19.8% of the turnover and increased from 31 million Euro in 2002 to 50.3 million in 2003, while the net margin rose in the same period from 19,4 Euro to 30.7 million Euro. Investments went from 15.5 million Euro in 2001 to 29 in 2003.

Research and innovation account for an increasing share of investments, as the life cycle of patents forces the company to continuously innovate. Patents involve products, processes and manufacturing equipment. R&D is carried out in close partnership with research centres and universities, while an internal laboratory for R&D was also established.

In 2002, licences granting accounted for around 201 million Euro; production has in fact been de-localised and Geox buys back products which have been manufactured under licence. The company has also invested in ICT solutions (1 Million Euro in 2002 for the upgrading of the Information System) with the aim of fully integrating the various units and the different production and distribution phases.

Organisation and de-localisation policy

The company's strategy follows three main lines of development:

- focus on product innovation and development. This is increasingly leading to diversification into other complementary markets
- flexibility and reduction of time to market
- development of the distribution network
- expansion in the main international markets.

Although Geox is marketed as an Italian brand, it is in fact manufactured in two main units: one in Romania (with 1,750 employees) and one in Slovakia (with 400 employees). In addition to this, the company owns two units in Italy where R&D, product design activities and prototyping are carried out.

The way production processes are de-localised and centrally managed is a key success factor. De-localisation traditionally poses problems related to know-how transfer. Romania, and particularly the district of Timisoara where Geox has out-sourced production, had a long-standing tradition of footwear production. For this reason, the company could rely on skilled local staff.

The integration with headquarters is very close and includes: purchasing of raw materials (both leather and rubber), accessories, as well as plant equipment, while technical specifications are managed centrally. The strict control of production has the twofold objective of monitoring quality and reducing the risk of counterfeit. This kind of integration and the centrally managed flow of information allow for significant savings in internal work processes. Relations (information, consultancy, exchange of materials) with external business partners (such as suppliers and technical consultants) are all managed centrally.

Logistics play a crucial role both for the complex production organisation and seasonal peaks in production and selling. Integration of information systems between the headquarters (where R&D and design are carried out), production sites and the distribution network are supported by a Virtual Private Network (VPN⁷). The company information system is managed by internal IT staff and has been developed in-house using standard technologies. Communication, both internal and external, is managed mainly through the company's websites.

⁷ A VPN is a private data network that makes use of the public telecommunication infrastructure, maintaining privacy through the use of a tunnelling protocol and security procedures

Lessons learned

The success of Geox in the competitive scenario is related to creativity and innovation, but also to efficient management of these intangible assets through the support of technologies and organisation.

Sources and references

- Company's annual financial reports
 - Company website and articles
 - Information from the company management (May / June 2004)
-

2.5 Integration along the value chain

This chapter will analyse to which degree sector companies are integrated along their value chain. In particular, the aim is to verify whether there are significant differences between the textile and the clothing and footwear sectors. The instrument used to conduct this test is based on the e-business scoreboard, which was introduced in the first Sector Study (May 2004)

Sector differences

Survey data presented in Exhibit 2-12 indicate that sector companies are integrated with their suppliers in only a minority of cases. Supply Chain Management (SCM - i.e. a software application that helps businesses to match supply and demand through integrated and collaborative planning tools) is hardly ever practised. Data about the integration with customers (see Exhibit 2-13) mirror those about the integration with suppliers.

The share of textile, clothing and footwear companies collaborating online with their partners is not far from the all sectors average. The exchange of data related to product design has a long tradition in this sector – the introduction of CAD/CAM dates back some decades – and is diffused even among micro and small companies, without relevant differences among countries. Other applications related to demand forecast and capacity inventory management are comparatively rather diffused; these applications, however, are applied mainly among larger companies (see Exhibit 2-14).

Exhibit 2-12: IT integration with suppliers in the textile, clothing & footwear sectors

	Use of online technologies to exchange documents with suppliers		IT system integrated with that of a supplier for placing orders		Use a SCM (Supply Chain Management System)	
	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.
Combined textile, clothing and footwear	23	37	23	37	1	7
<i>Textiles</i>	16	31	16	31	0	6
<i>Clothing and Footwear</i>	27	43	27	43	1	8
All (9) Sectors (EU-5)	32	42	32	42	2	6

Base: enterprises with internet access, EU-5 (DE, ES, FR, IT, UK). N = 190 (textile industries), N = 223 (clothing and footwear), N ~ 500 for other sectors. "% of empl." means that data are weighted by employment ("enterprises comprising ...% of employees in the sector"). Reporting period: November 2003.

Source: e-Business W@tch (2003/04)

Exhibit 2-13: IT integration with customers in the textile, clothing & footwear sectors

	Use of online technologies to exchange documents with customers		IT system integrated with that of a customer for receiving orders		Use of an electronic invoicing system	
	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.
Combined textile, clothing and footwear	17	38	27	32	9	22
<i>Textiles</i>	17	35	34	26	5	22
<i>Clothing and Footwear</i>	18	40	24	39	11	22
All (9) Sectors (EU-5)	30	38	27	31	N/A	N/A

Base: enterprises with internet access, EU-5 (DE, ES, FR, IT, UK). N = 190 (textile industries), N = 223 (clothing and footwear), N ~ 500 for other sectors. "% of empl." means that data are weighted by employment ("enterprises comprising ...% of employees in the sector"). Reporting period: November 2003

Source: e-Business W@tch (2003/04)

Exhibit 2-14: Use of online technologies for business processes between companies in the textile, clothing & footwear sectors

	Collaborative product design		Collaborative demand forecast		Capacity/inventory management		Contract negotiation	
	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.	% of firms	% of empl.
Combined textile, clothing and footwear	10	13	5	9	5	10	3	9
<i>Textiles</i>	5	12	4	11	3	9	3	6
<i>Clothing and Footwear</i>	14	14	7	7	6	10	3	12
All (9) Sectors (EU-5)	12	17	8	12	6	14	11	13

Base: enterprises with internet access, EU-5 (DE, ES, FR, IT, UK). N = 190 (textile industries), N = 223 (clothing and footwear), N ~ 500 for other sectors. "% of empl." means that data are weighted by employment ("enterprises comprising ...% of employees in the sector"). Reporting period: November 2003..

Source: e-Business W@tch (2003/04)

Conclusions

As described in detail in the first Sector Report (May 2004), the sector supply chain is complex and very fragmented. It involves a network of long standing relations among suppliers, third parties and customers. As a general rule, the performance of these relations (response time, quality and price) is not measured with a view to enhance overall efficiency. This attitude, combined with the still widespread use of traditional means of communications (telephone, fax), limits the “visibility” of exchanges along the value chain and does not allow a substantial improvement of efficiency.

Analysis of the sector value chain as a whole indicates the need for further vertical integration. Survey data, however, show that only a limited share of companies in this sector is integrated in their supply chain. Main findings are:

- The online exchange of documents and production orders is surprisingly low in a sector where there are many and diverse operational phases. The analysis on the use of standards in chapter 2.6 will provide some insight to this point;
- digitalization and integration of commercial activities is – even more surprisingly – low, considering the number and frequency of supplying operations, the relevance of pricing and discount policies and the issue of stocks;
- collaboration in product development is the only area where companies have traditionally worked in an integrated way.

Even the larger companies have not yet taken a leading role towards supply chain integration. The lack of commitment of larger players in guiding innovation at the supply chain level is certainly one of the most important factors in explaining the delay of this sector in adopting e-business. Among smaller players, the very limited degree of computerisation and related know-how, cultural barriers and the diversity of technological equipment are accompanied by a lack of trust and knowledge about the potential benefits of e-business. With regard to this latter point, awareness should be raised not only about efficiency and savings but also about the competitive and commercial benefits, i.e. the enhancement of bargaining power vis-à-vis larger customers for those firms which are able to integrate or interface the respective information systems.

CASE STUDY: HENNES & MAURITZ

Abstract

H&M is a very successful and expansive Swedish fashion group. H&M's strategy has been developing along:

- *expansion, through the set up of a proprietary distribution network of centrally controlled stores*
- *price-competitiveness and profitability, through very efficient management of production and logistics*
- *very short lead times which ensure quick response to market trends and reduction of stocks*

H&M was a pioneer in pursuing a strategy of vertical integration with the distribution network. This strategy has allowed the company to directly collect and fully exploit information about sales and consumers in order to improve and accelerate response to the market

Case characteristics	
• Sector focus	Clothing
• Business focus	Large company
• Geographical focus	Worldwide
Case objectives	
• Supply chain integration	****
• Integration of internal processes	***
• Integration of extended enterprise	****

* = some relevance for case; **** = high relevance

Background and objectives

H&M is well known for being a successful and expansive company, both in terms of market and of financial performance. The company's strategy is carried out along the lines of continuous expansion and search for most promising markets, cost-efficient production of goods, and reduction of lead times. H&M is also an example of competitive advantages brought by integrated e-business solutions. Procurement and logistics can track sales and stock status as, owning the stores, they share a common IT platform. This allows the company both to react quickly whenever new trends are identified and to avoid procurement of goods which are not appreciated by the market.

H&M also relies on efficient and integrated systems for inventory management which have been able to reduce lead times while ensuring adequate stock management.

Activities

H&M sells clothes and cosmetics in about 950 stores in 19 countries. The group has more than 40,000 employees and the turnover was SEK 56,550 million (6.1 Million Euro) in 2003. Central functions are based in Sweden, but there is a national office in most of the sales countries.

Buying and production

H&M does not have any factories of its own, relying on a network of external suppliers managed through two departments: Buying and Production. The buying function focuses on customers, fashion and composition of the range. The company's clothing collections are created in Sweden by around 100 internal designers, 50 pattern designers and around 100 buyers. H&M's method of production is customer-driven. The company puts a lot of effort into research and prediction of emerging trends, both through traditional research means and innovative ones such as street trends. This activity is carried out by central staff and by national offices which are responsible for detecting new trends.

The production function consists of 21 production offices. H&M purchases garments from around 750 suppliers: 60% of production takes place in Asia and the remainder mainly in Europe. The production offices have a mediating function between the internal buying department and external suppliers, ensuring that:

- buyers' orders are placed with the right supplier,
- the goods are produced at the right price and quality
- the suppliers conform to the company's code of conduct as for working conditions.

Production offices also deal with sample garments and other checking and testing, which is a major factor in reducing lead times. The decision of which supplier is the right one, is not only a matter of cost-efficiency but also depends on other factors such as transport times, import quotas and quality aspects. To minimise risk, buying is carried out on an ongoing basis throughout the year.

In recent years, H&M has reduced the average lead time by 15-20% through developments in the buying process. Flexibility and short lead times diminish the risk of buying the wrong items and allow stores to restock quickly with the best selling products.

In technical terms, H&M operates with two main collections per year, one in spring and one in autumn. Within each season, however, there are a number of sub-collections so that customers can always find new goods in stores. The aim of the company is to find the optimal time (and supplier) to order each item. In this context, quick is not always the best – while trendier garments require very short lead times, many fashion basics or children's wear may be ordered well in advance. For goods which are selling well, the company is able, on average, to get supplementary orders in a few weeks.

Logistics

Every stage in the logistic chain is controlled by H&M, acting as importer and wholesaler, as well as a retailer. Continuous IT development provides support to H&M logistics. While the stock management is primarily handled within the H&M organisation, transport is contracted to third parties. A large part of the flow of goods is routed from production sites via a transit terminal in Germany. In every country there is a distribution centre. Upon arrival, goods are inspected and allocated either in a store or in the centralised stock room, referred to as "Call off warehouse". The role of the warehouse is to replenish item levels in stores according to selling trends.

Distribution

Proprietary stores (948 in June 2004) are the main distribution channel. In Nordic countries, H&M has been selling by mail order. In 1998, H&M began its "shopping

online” service which has since been continuously improved. Stores continue, however, to be the main distribution channel. The strategy behind the owning of a proprietary network is that H&M can maintain control of the expansion strategy and of business locations.

IT

IT is a crucial tool along the entire value chain. Individual stores are connected with the logistics and procurement departments and the central warehouse. From central departments, it is possible to follow sales of individual items, thus feeding an intelligent procuring system. The company relies on IT integration between the central office and the production offices. Communication between departments takes place electronically, including design and product development.

Lessons learned

Reasons behind the success of H&M are:

- organisation of production and integration of the supply chain;
- vertical integration with the distribution network allowing direct control of market and customers;
- continuous and efficient collection of information on demand which allows cost-efficiency and shortening of lead times.

Sources and references

- Articles and Annual Reports from H&M
- Company’s website: www.hm.com

2.6 Role of standards in B2B communication

The prerequisite for online collaboration with external partners is the digitalization of information to be exchanged. To allow for automatic processing, information has to be digitized in structured, consistent and standardised formats. This prerequisite is particularly critical in a sector where the supply chain is fragmented and production is carried out through complex relations among suppliers, sub-contractors and customers.

Electronic business can be really useful only where there is the right degree of consensus between companies and industries on issues such as product description or the order/payment process. Without this, there is the risk of a company’s information system not understanding data sent by the systems of the trading partners

So far, the widespread use of ICT solutions in the sector has been limited by the scarce availability and use of specific description and messaging standards for data exchange, for supplier and product certification, for measuring the various players’ performance. The widespread adoption of CAD as well as of code-based labelling systems has not been accompanied by the adequate development of recognised standards in the sector. Moreover, the limited presence of leading companies (imposing their standards) and the high diversity of technological equipment within companies have led to a situation where most companies

have developed their own systems in house, therefore making difficult any integration with other players.

The aim of this chapter is to have a closer look at the use of standards in the sector and to verify how this impacts on e-business practices.

Differences across sector and size classes

Looking at how standardised data are exchanged among companies in the *e-Business W@tch* sample, it appears that sector-specific and proprietary standards are more diffused than common ones (see Exhibit 2-15). Fragmentation of the supply chain accounts for the low diffusion of EDI-based standards which are more suitable for larger companies. EDI-XML replacement trends are worth noticing as they can allow previously developed EDI systems to extend to smaller players. There are no remarkable differences across sub-sectors, but significant ones are observed between different size-classes (see Exhibits 2-15 and 2-16).

Exhibit 2-15: Exchange of standardised data between companies by sub-sector

	Any standards	of those (multiple answers possible):					EDI-XML replacement plans
		EDI based*	XML based*	STEP*	Proprietary standards*	Other*	
Combined textile, clothing and footwear industries (EU-5)							
% of firms	13	2	0	1	5	3	6
% of employment	35	15	4	2	14	6	9
Textiles							
% of firms	10	2	0	1	3	0	2
% of employment	29	12	5	2	11	6	13
Clothing & footwear							
% of firms	15	2	0	1	6	4	8
% of employment	40	17	4	2	16	6	7
All (9) Sectors							
% of firms	N/A	5	N/A	N/A	N/A	N/A	N/A
% of employment	N/A	18	N/A	N/A	N/A	N/A	N/A

Base: all enterprises. EU-5 = DE, ES, FR, IT, UK. N=501 for EU-5 sector total N = 215 (textile industries), N =286 (clothing and footwear). N ~ 500 for other sectors. "% of empl." means that data are weighted by employment ("enterprises comprising ...% of employees in the sector"). Reporting period: November 2003.

Source: *e-Business W@tch* (2003/04)

Exhibit 2-16: Exchange of standardised data between companies by size class (2003)

	Any standards	of those (multiple answers possible):				
		EDI based*	XML based*	STEP*	Proprietary standards*	Other*
Sector total (EU-5)						
0-9 employees	9	1	0	0	4	2
10-49 employees	24	3	1	2	5	4
50-249 employees	47	21	7	4	20	5
250+ employees	65	38	10	0	30	13

Base: all enterprises / * enterprises exchanging standardised data. EU-5 = DE, ES, FR, IT, UK. N=501 for EU-5 sector total and 50-100 per country. Weighting: Figures for size-bands in % of enterprises. Figures for countries are weighted by employment ("enterprises comprising ...% of employees"). Reporting period: March/November 2003.

Source: e-Business W@tch (2003/04)

Critical issues and conclusions

According to the e-Business W@tch survey data (see Exhibit 2-17), security and data protection appear to be critical standardisation issues for the majority of clothing and footwear companies. These companies seem to be very sensitive to the risk of mis-use of information on the net. For textile firms, the difficulty of sharing a common business messaging and transaction processing system seems to constitute the major hurdle in this field.

Exhibit 2-17: Exchange of standardised data between companies: critical issues

	Critical standardisation issues				
	Lack of technical standards as obstacle to e-business	Security as a critical standardisation issue	Data protection / privacy as a critical standardisation issue	Cataloguing / classification as critical standardisation issues	Business messaging / transaction processing as critical standardisation issues
Combined Textile, clothing and footwear (EU-5)					
% of firms	9	41	47	14	36
% of employment	22	50	44	37	27
Textiles					
% of firms	9	24	26	16	59
% of employment	21	38	39	36	28
Clothing & footwear					
% of firms	8	54	63	13	19
% of employment	22	60	48	37	27
All (9) Sectors					
% of firms	N/A	N/A	N/A	N/A	25
% of employment	N/A	N/A	N/A	N/A	N/A

Base: enterprises using computers/enterprises observing lack of standards as obstacle. EU-5 = DE, ES, FR, IT, UK. N=455 for EU-5 sector total N = 208 (textile industries), N =247 (clothing and footwear). N ~ 500 for other sectors. "% of empl." means that data are weighted by employment ("enterprises comprising ...% of employees in the sector").

Reporting period: November 2003.

Source: e-Business W@tch (2003/04)

It is commonly acknowledged that standardisation is a key issue in this sector. Although interesting initiatives have been taking place for standardisation via Internet based platforms, like TEX-SPIN (Textile Supply Chain Integrated Network (www.atc.gr/texspin) or MODA-ML (www.moda.ml.org), diffusion of standards is still limited, especially among SMEs. Survey data call for the development of new and the upgrading of existing sector-specific standards for the uninterrupted flow of information. It is particularly important to foster migration to emerging tools and standards (e.g. XML/EDI) which offer data access flexibility, openness, ease of use and low cost. In particular, it will be necessary to ensure micro and SME's awareness of availability and functionality.

CASE STUDY: TEXTILEBUSINESS.IT

Abstract

This case study features an example of electronic integration of the supply chain, allowing participants to take advantage of an advanced e-business solution at low cost. It illustrates how critical the standardisation issue is in B2B integration. It also shows that SMEs migration towards e-business may be a long term process even under favourable conditions and despite the support of external funding.

Case characteristics	
• Sector focus	Textile
• Business focus	Small companies
• Geographical focus	Como, Italy
Case objectives	
• Supply chain integration	****
• E-standards usage in B2B communication	***
• E-business and process innovation	**

* = some relevance for case; **** = high relevance

Background and objectives

This case study describes an experience in an important Italian textiles district in the Como area (Northern Italy). The supply chain in the sector, also in this particular district, is governed by a consolidated network of relationships between suppliers, contractors and customers. It is a highly fragmented industry in which relations between various players are handled primarily in traditional ways (by telephone and fax).

The district produces textiles for high end apparel and for the home, primarily upholstery fabrics. Companies in the area are increasingly subject to fierce price competition from enterprises in the Far East. It is difficult for them to bear the competitive challenge represented by price. But positioning or repositioning at the high end of the market (based on product and service differentiation, quality and technological innovation) is a choice which is difficult to sustain over time, as innovation can easily be copied in this sector. For these reasons, rapidity of response to the market, flexibility in dealing with particular and customised needs, and the ability to guarantee reduced

cycle times (taking advantage of location close to customers) and produce very small lots are becoming increasingly important success factors.

Textilebusiness.it (www.textilebusiness.it) is an initiative supported by the Chamber of Commerce of Como, the Industrial Association of Como and the Politecnico of Milan and the Lombardy Region. The aim of Textilebusiness.it is not only to improve visibility, (as in first generation marketplaces), but mainly to digitise the entire process of relations among various players in the industry in order to fully exploit the benefits of online integration.

Activities

The solution offered

The solution is based on a peer to peer (“P2P”) architectural paradigm in which communication among participating firms is totally symmetric. With respect to traditional marketplaces where a central server manages the system (where problems related to privacy and data security may arise), in Textilebusiness.it, the central platform acts as a directory which localises the counterpart. Once the identification has taken place, direct communication is established between the two parties. Participants need to simply use an interface bridging XML standardised messages from other knots with their own information system.

The real challenge, however, has been the standardisation of the communication protocol (in practical terms, the definition of a commonly shared “vocabulary”) that describes documents to be exchanged, e.g.: orders and sub-contractors specifications, confirmation or modification of orders, transport documents and packing lists, fabric technical sheets. The initiative got underway in 2002, and operations were due to start up in February 2003, although in actual fact standardisation and fine tuning of the system required another year.

The experience of two businesses participating in the initiative

To understand how and to what extent an initiative such as Textilebusiness.it can effectively change the way participating enterprises do business, the *e-Business W@tch* interviewed one medium-sized and one small supplier company that participate in this initiative.

Fiorete is a company that covers the complete textiles cycle, from warping and weaving to the finished product. Some of these activities are partially contracted out, in particular dyeing. The company has about 50 suppliers of raw materials and intermediate products and 245 employees, and had a turnover of 31 million Euro in 2003. The company already had its own integrated management system and was planning to integrate the purchasing function and relations with its principal suppliers and customers. The introduction of Textilebusiness.it therefore offered an ideal opportunity, in line with the company’s strategy. It was preferable to starting up its own system, as the company was able to benefit from the technical support of the consortium that took care of the translation and standardisation of language, the training of human resources and the promotion of the initiative among various interested parties.

The investment required of the company was very limited: about 20 man/days for one employee, the investment for upgrading the connection with migration to DSL, plus the annual participation charge and a fee for every document transacted. The technological centre supporting the initiative took care of standardisation of the vocabulary.

So far, the company has involved suppliers of dyeing activities and about 80% of this type of supply is now managed online. The activities handled by the system are processing instructions, including handling of goods.

The main benefit reported by the company is integration with the company's management system, which has in turn led to:

- saving time,
- drastic reduction of error margins, as well as
- tracing and control of productive phases handled by the system.

According to company's evaluation, time saving in operation can be estimated at about 15-20%. The company's initial goal was to extend its on-line orders system to all suppliers. But Fiorete did not push other suppliers as the system had not yet been completed in full.

Having completed the start-up phase, Fiorete now intends to encourage all its partners to adopt the system. Standardisation of vocabulary, the most difficult and most expensive phase, must be performed separately for each type of supplier, just as was done with dyeing plants. This is why the company aims to involve as many suppliers as possible, to divide up the investment required and to maximise benefits.

There are two major hurdles to overcome:

- The types of information system present in the partner enterprises (some of which have no management systems) and
- the level of the investment they would be required to bear which, though limited (the estimate is around 10,000 –12,000 Euro), still represents a major hurdle.

In the company's opinion, these hurdles will make expansion difficult. Even with clear benefits to be gained, the highly conservative attitude of the textiles industry and the unfavourable market trends make enterprises extremely cautious.

Being aware of these difficulties, the consortium decided to broaden its base of potential participants by creating a platform accessible via the web. Lack of integration with the company system means that this experiment offers fewer benefits to its participants. The primary goal of the experiment, however, is overcoming the cultural barrier.

Tintoria Sala, the other company interviewed in the context of this case study, is a small local firm active in industrial dyeing. The company brings in about 10 million Euro in turnover, with customers located within the same district. It is strongly oriented toward quality and product innovation and is one of Fiorete's selected suppliers.

Tintoria Sala joined Textilebusiness.it in response to pressure from Fiorete, which piloted the initiative as its primary customer. Tintoria Sala is therefore participating in the initiative as a Fiorete supplier and solely for transactions with this customer.

Its participation in the initiative enabled Tintoria Sala to participate in a training course in which the staff member in charge of business relations with Fiorete could obtain the technical know-how required. The investment in training had public support, and the cost to the company was less than 15,000 Euro, including adaptation of the information system. Creation of the basic common vocabulary was the most complex phase, but was supported by Textilebusiness.it

At present, only trade with this particular customer is organised through the platform, and it represents less than 10% of total orders. While the experience is quantitatively

limited, the company has noted considerable benefits in terms of saving time, data quality, response speed and improved customer service quality.

Lessons learned

The experience and the competitive advantages from participation in Textilebusiness.it are definitely viewed as highly positive by both companies interviewed. Economic savings, response speed, reduced frequency of error, customer satisfaction and the possibility of freeing up resources for greater added value activities, are all essential to SMEs. The principal benefit, however, is that independent SMEs had the opportunity to implement methods of trade which are not normally open to them. The absence of a large hub company usually limits the possibility of implementing complex trade systems, due to the level of investment required and to cultural barriers. In this case, independent SMEs undertook an integration process even without the leadership of a parent company.

The limit to the initiative is the very small number of transactions conducted and, consequently, the small overall impact on the companies' operation. Such an impact can, obviously, be significant for the company only when its full network of partners, customers and suppliers are covered by the system.

One important lesson to be learned from this experience is the amount of time required to implement an initiative of this kind. In technological terms, the complexity is relatively limited, but translation and standardisation of communication vocabulary is very time-consuming, even for companies from the same district that have always worked together. For companies that could potentially be involved, there are still some inhibitors:

- The presence of partners who do not have a minimum infrastructure sufficient for participation in a process such as this one. As demonstrated by the figures on access and use of the infrastructure (see Exhibit 2-5), this is a common problem in the textiles industry.
- The need to adapt the information system, with the investment and commitment of resources this requires. The companies interviewed attempted to promote participation by their other customers and suppliers once they realised the benefits offered by the initiative. However, they found that this was the biggest hurdle and that this hurdle is aggravated by the need to turn to external suppliers of technology to adapt the system.
- The cultural issue, relating to limited perception of the benefits and mistrust of information-sharing. This is still a major hurdle for the smallest businesses, even though clear and well-documented advantages can be demonstrated.

Sources and references

- Interviews with Professor Noci, Politecnico of Milano (May 2004) , Fiorete (Ms. Roncoroni Responsible for ICT department, June 2004), Tintoria Sala (Mr. Sala, Owner, May 2004)
 - Information available at www.textilebusiness.it
-

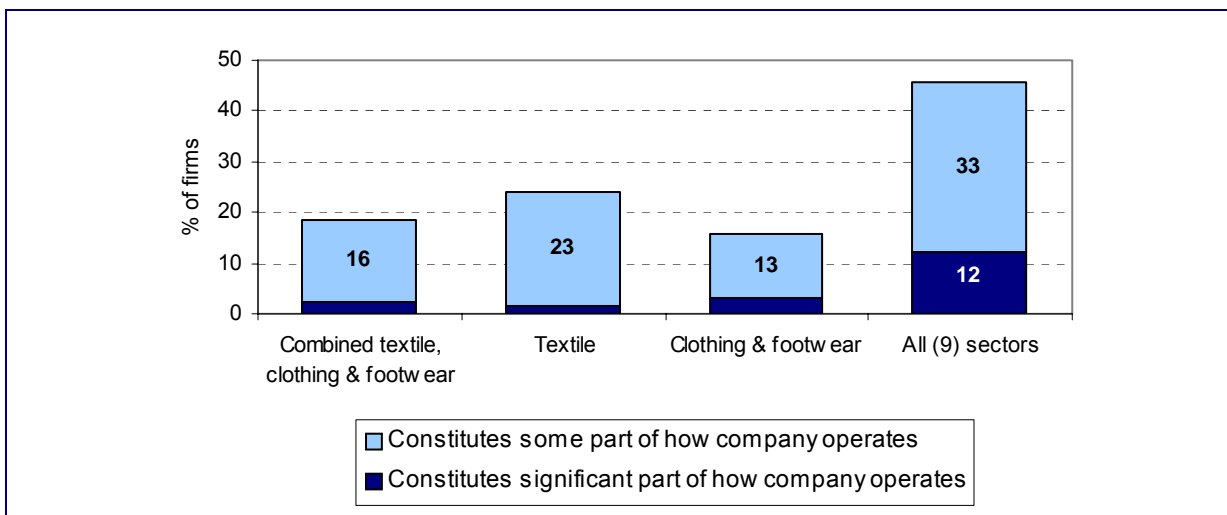
3 Conclusions: Opportunities and challenges, drivers and barriers

The state of e-business in the combined textile, clothing and footwear sector is below the all sector average. The pace of change is also slow, according to firms' expectations and expenditure plans.

Gaps identified in the diffusion and usage of ICT and e-business are relevant in both sub-sectors, particularly for more sophisticated applications. Only a few specific and "isolated" activities are commonly on-line, foremost the collaborative design of products.

The importance that firms from the survey sample attribute to e-business is shown in Exhibit 3-1. It highlights that, for the majority of firms in the sector and in particular for those from the clothing and footwear sub-sectors, e-business does not play any role in their current activities.

Exhibit 3-1: Overall significance of e-business for companies in 2003

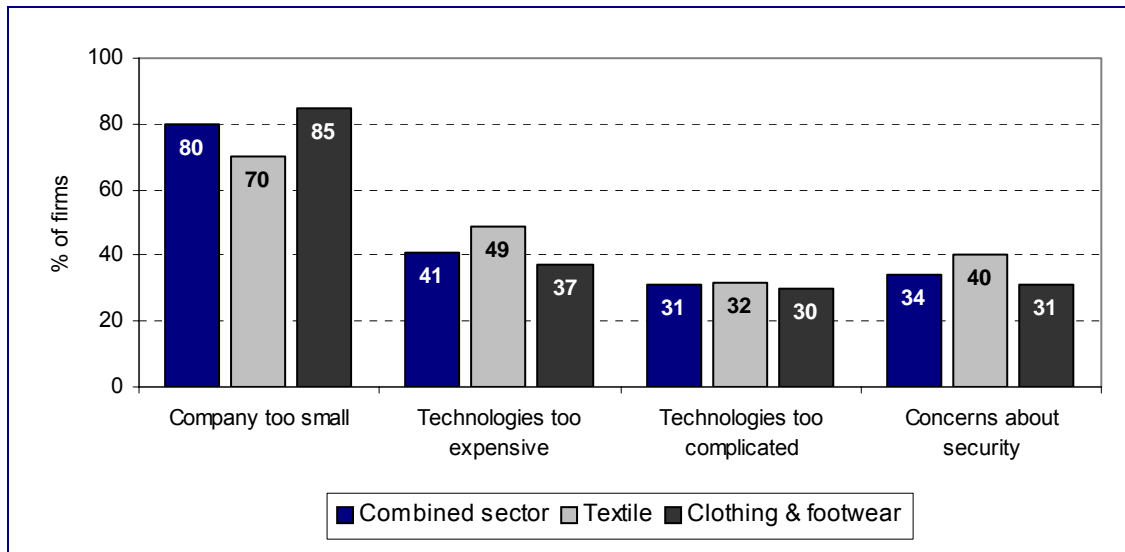


Base: all enterprises, EU-5 (DE, ES, FR, IT, UK). N = 212 (textile industries), N = 289 (clothing and footwear), N ~ 500 for other sectors. In % of firms. Reporting period: November 2003/04.

Source: e-Business W@tch (2004)

Company size is the main reason reported by companies themselves why e-business does not play a role in their operation. Other reasons are related to the fact that technology is expensive and complicated (see Exhibit 3-2). Moreover, some sector-specific features are also relevant, the most important among them being the fragmentation of the value chain and the fact that competition has traditionally relied more on intangible assets (such as creativity) rather than on technological ones.

Exhibit 3-2: Reasons why e-business does not play a role in companies



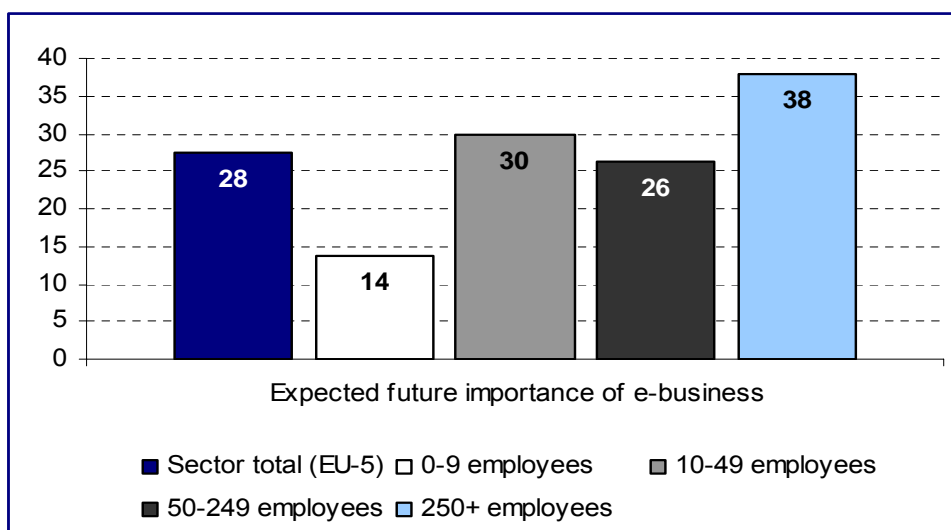
Base: enterprises saying that e-business is not yet part of their operations, EU-5 (DE, ES, FR, IT, UK). N = 124 (textile industries), N = 172 (clothing and footwear), N ~ 500 for other sectors. In % of firms. Reporting period: November 2003/04.

Source: e-Business W@tch (2004)

Investment climate for e-business technologies

Exhibit 3-3 illustrates the evaluation of future e-business importance, independently of the distinction between adopters and non-adopters. The results are quite interesting since they support a view of e-business as a complementary element rather than a predominant asset within the everyday activity of firms. Less than one third of firms state that e-business is likely to constitute a significant part of their operations within the next two years. E-business sceptics prevail in the sector and this situation does not seem likely to change in the near future.

Exhibit 3-3: Assessment by companies: The expected future importance of e-business



Base: all enterprises. EU-5 = DE, ES, FR, IT, UK. N=501 for EU-5 sector total.

Weighting: Figures for size-bands in % of enterprises. Figure for "Sector total" is weighted by employment ("enterprises comprising ...% of employees"). Reporting period: March/November 2003.

Source: e-Business W@tch (2003/04)

The impacts of the internet and of e-business technologies are nevertheless perceived as quite positive by firms in the sector. According to the 2003 e-Business Survey, about 25% of firms record positive effects on collaboration and knowledge exchange between employees, availability of information for management and controlling, internal processing of commercial transactions, and product innovation. A share of firms close to 90% state that they are very or fairly satisfied with the overall effects and success of e-business activities. However, 75% of the interviewed companies stated that they would maintain the same level of investments, whereas only 16% plan to increase their expenditures. In other words, the positive attitude towards e-business has not yet translated into an increase of e-business budgets.

3.1 Opportunities and challenges

Exhibit 3-4: Overview of e-business opportunities and challenges in the textile, clothing and footwear sector

Opportunities	Challenges
<ul style="list-style-type: none"> • Speed up information flows • Decrease supply chain management costs • Extend market reach and improve visibility via marketplaces • Reduction of stocks through online selling • Enhance collaboration with business partners • Efficiency gains in internal processes 	<ul style="list-style-type: none"> • General backwardness and large share of Internet refuters • Sophisticated technologies and applications less diffused than in other manufacturing sectors • Need to develop new skills • Standardisation

Source: e-Business W@tch (2004)

Opportunities

Speed up information flows is crucial in a sector where mass individualisation requires small batch production, short lead times and proximity to the final customer.

Decrease of supply chain management costs. Using e-business to decrease cost and error rates in commercial transactions could be a driver for e-business. Due to the large number of transactions and exchanges along the value chain, even limited improvements can turn into significant savings. Benefits can be documented and good practices shared, although experiences witnessed in our interviews indicate that there are still relevant cultural barriers.

Extend market reach. The internet offers smaller companies the opportunity to make their offer known to a larger target. The number of firms actively using electronic marketplaces is very limited in this sector (1% of the firms) and the number of operating e-marketplaces⁸ is, in turn, very low if compared to the importance of the sector in the overall economy. It is worth noting, however, that this number has been increasing in the past two years.

Another opportunity offered by the Internet is the possibility to **sell stocks** at reduced prices through an alternative channel and different selling modality. This, for example, allows

⁸ According to "E-marketplaces in the Textile and Leather Sector", issued by ICE (Italian Institute for External Trade), the – worldwide – number of electronic marketplaces operating in the textile, clothing and leather industries was 45 in October 2003 (see <http://www.emarketservices.com>).

companies operating in the higher and/or highly seasonal market segments, to maintain or even increase sales without damaging their image.

Major advantages can be gained from a better **collaboration with business partners**. Globally dispersed partners can be connected and integrated efficiently.

One of the most important and under-exploited opportunities of e-business is to **improve the efficiency of internal working processes** and achieve productivity gains. Currently only around 20% of firms in this sector record significant impacts in this area, leaving ample room for improved exploitation in this area.

Challenges

A major threat for the sector is represented by a **general backwardness** with regard to ICT usage and awareness. This is widespread throughout the whole value chain and especially among SMEs. Several factors affect this situation, among which the relatively low level of specific training and education conducted inside companies are the most important.

Companies that begin getting involved in e-business need to reorganise their business attitudes and culture. They may also face the need for personnel training to adapt to new roles or to the evolution of previous ones. Technical concerns and **insufficient e-business skills** emerge as the main risk factors in this respect.

Lack of data standards affects the possibility of implementing online data exchange. It is particularly important to foster migration to open standards and to raise SME's awareness on the availability and functionality of such standards.

3.2 E-business drivers and barriers

Exhibit 3-5: Overview of e-business enablers and barriers in the textile, clothing and footwear sector

Enablers	Barriers
<ul style="list-style-type: none"> • Distribution and market pressure to increase efficiency • International competition and resulting pressure on profit margins drive companies to search for new cost saving opportunities • Search for improved tools to counteract unfair competition in the form of counterfeit products • Awareness about e-business benefits 	<ul style="list-style-type: none"> • Cultural barriers • Negative market trends • Limited degree of computerisation and diversity of information systems; lack of ICT integration • Concerns about security

Source: *e-Business W@tch* (2004)

Enablers: factors that could drive e-business adoption

Strong competition and pressure from the market and from the distribution system may, in the medium run, force companies to adopt e-business in order to achieve any possible efficiency gain.

It is well known that the higher market segments are strongly affected by the problem of **unfair competition by counterfeit products**. E-business provides a set of new, powerful

tools for monitoring production processes and tracking the distribution of products from the factory to the point of sale.

Barriers: factors that may inhibit e-business diffusion

Barriers preventing the development of e-business are high and above all are **cultural barriers** related to the very conservative sector culture.

The sector is also affected by **stagnating demand** which leads to fierce price competition and profit margin reduction.

Among smaller players, the very **limited degree of computerisation** and related know-how, cultural barriers and the **diversity of technological equipment** are accompanied by a lack of trust and knowledge about the potential benefits of e-business.

Security appears to be a critical issue when the exchange of sensitive data along the value chain is concerned. Part of the problem is probably related to lack of awareness or misperceptions, while the already available security standards can probably fulfil the requirements of this sector's companies.

4 Policy challenges

4.1 General considerations on electronic business as a policy challenge

Independent from this particular sector report, there are a number of areas where electronic business developments could coincide with European or national policies. These are in particular the following areas:

1. The regulatory environment for telecommunication services
2. Innovation and technology policy
3. Education and labour market policy
4. The role model of the public sector
5. Other policy areas which have possibly some overlap with electronic business developments (e.g. patenting law, trade regulations)

This section discusses on a general level how these policy areas relate to ICT use by enterprises and for electronic business development. It points out some concrete policy challenges as well as some caveats with respect to possible policy actions, based on evidence delivered by the *e-Business W@tch*. The focus is on the first four issues mentioned above, which are the most obvious and direct ones, placed at the intersection of technological development, policy and regulatory environment.

4.1.1 Regulation of telecommunication services

The regulatory environment for telecommunication services and goods provides an important basis for the provision of ICT access in the European Union, both for enterprises and private households. A highly developed telecommunication infrastructure with a high quality of service, easy access for anyone and anywhere, and affordable prices are preconditions for a

fast take-off of Internet usage and – at least at this stage of the development – for e-business technologies.

A good example to support this argument is the diffusion of internet access in European households. It became evident as early as the mid 1990s that Internet access would eventually become a standard in most households. However, it was only after the massive tariff reductions for online connections (compared to voice telephony), which were introduced mostly after the liberalisation of the EU telecommunication markets in 1998, that the Internet access boom started in most countries. The situation is now similar with regard to broadband deployment. While many households have connected to the Internet, the diffusion of broadband connections differs considerably between regions and depending on socio-economic configurations of households. While basic Internet access has become affordable for a vast majority of citizens in Europe, the costs for broadband Internet access remain rather high and constitute a main barrier for adoption.

The European Commission is currently working on the timely and effective transition to the new EU framework for electronic communications networks and services, which was adopted by the Parliament and the Council in March 2002. The new framework is designed to ensure that ex ante regulation is applied only where the level of competition in defined markets is considered to be insufficient on the basis of an analysis consistent with competition law methodology. Newly emerging markets also should in principle be free from regulation. Other key aspects of the framework are designed to support this approach to regulation and promotion of consumers' interests. The new framework is an important initiative that will support the continued growth and development of the electronic communications sector in Europe.⁹

A favourable regulatory environment is not in itself a sufficient condition for a high usage of the Internet and associated technologies and services within a region, but it is definitely an enabler and an important requirement. Positive examples of such framework conditions within Europe are the Nordic countries, Ireland, Italy, Austria, Estonia, and the UK. Empirically, these examples show that countries with a modern, competitive telecommunication infrastructure are usually among the early adopters of ICT. This facilitates the development of internationally competitive enterprises in the provision of ICT products and services, along with competitive advantages for enterprises using these products and services.

However, not all countries in the European Union have yet realised a regulatory environment that enables them to develop a modern, competitive telecommunication infrastructure. In some of the new Member States, the regulatory environment of telecommunication markets as well as the de facto market structure is still underdeveloped in terms of competition and offer compared to the markets in the former Member States of 2003.¹⁰ Also, six of the former Member States currently face Court action for failing to put in place the new rules on electronic communications. Thus, regulatory challenges are not unique to the new Member States.

It will certainly constitute an important challenge and objective for policy – both on the European level as well as in the concerned Member States – to ensure that the take-up

⁹ http://europa.eu.int/information_society/topics/ecommm/all_about/implementation_enforcement/index_en.htm;
Further information on the current initiatives of the European Commission can be found at
http://europa.eu.int/information_society/topics/ecommm/index_en.htm

¹⁰ This assessment was confirmed by speakers from the new Member States at the e-Business W@tch Workshop on "e-Business in Acceding Countries", Brussels, 10 December 2003.

process in these markets occurs as rapidly as possible and that the new regulatory framework will be fully implemented soon. This requires constant monitoring of market developments and, possibly, further improvements in the regulation of telecommunication services in the respective Member States.

4.1.2 Innovation and technology policy

Technology adoption at the firm level

The adoption of e-business technologies at the firm level is essentially an investment decision which carries risk for the business owners and is subject to a multitude of relevant framework conditions. These include the sector and type of business, the market structure, endowment and resources of the firm, the behaviour of competitors, suppliers and customers, and the availability of alternative technologies to carry out a specific task. Risk means in this context that the payoff of the investment into technology adoption is uncertain at the time of the investment decision. However, it is also possible that individually optimal investment decisions lead to sub-optimal outcomes on the aggregate level (market failure).

According to normative economic theory, policy intervention would be desirable in both circumstances: in the case of market failure and in the case of sub-optimal investment decisions by firms due to unequal access to information. Such an asymmetric situation could occur, for example, if a lot of complex information has to be gathered and evaluated, which is very time consuming and therefore costly. In such a case, it could be argued that large enterprises with strong economies of scale have an incentive to gather this information, while small companies do not. This could result in sub-optimal investment decisions in SMEs because of a lack of relevant information. The objective of policy action in such a case could be to improve the availability of objective and reliable information about the technologies for all market players.

Another possible source of market failure is the company-external network effects of a new technology. For example, if the value of a new technology to the user strongly depends on the number of other users, the individual decision to adopt will be largely influenced by expectations about the behaviour of others. In such a situation, market failure can theoretically occur as a result of either of two equilibriums: one in which everyone adopts, or one in which nobody adopts. It could be that one of the two equilibriums dominates the other in terms of social welfare (for example, everyone could be better off with the adoption scenario), but that the less favourable one develops in the market. This would also indicate a need for policy action.

A good example of such a situation is general purpose ICT, such as Internet access (and preferably via broadband connections). In this case, there is broad agreement that every country would be better off with a high connectivity of private households and enterprises. In countries where the development of infrastructures and user access is still in its infancy, government support or subsidies to build up infrastructures could be worthwhile policy actions. On the other hand, in countries with highly developed infrastructures, such policy action to "steer the market towards the better equilibrium" will no longer be needed.

However, due to the complexity of the investment decision framework of each enterprise, it is extremely difficult (if not impossible) to identify actual over- or under-investments in many technologies. This applies in particular to technologies that are highly specific in their purpose and do not exhibit strong firm-external network effects. For example, the lower diffusion of some e-business technologies among SMEs (such as ERP or SCM systems)

compared to large enterprises does not necessarily imply that SME under-invest in these tools. There can be many good reasons for these adoption patterns, as pointed out in many of the sector studies. A small company, for example, which is a supplier of specific parts to a small number of other firms, will hardly gain significant advantages from a CRM system.

Eventually, it is barely possible to determine precisely why certain firms do not adopt some of these technologies, while others do. One possible reason for non-adoption of a specific e-business technology is that firms may have a more efficient way to carry out specific tasks, or that more profitable investment opportunities exist (for instance investments in new products or services which are not based on Internet-technology, or hiring a new employee instead of investing in technology).

Consequently, there are good reasons to argue that policy should be cautious about promoting the adoption of non-general purpose technologies in enterprises, especially if there is no unambiguous indication of a market failure.

Economic consequences of technology adoption

ICT based applications for doing business electronically, if successfully implemented and used, can be viewed as a change in the production technology of a firm. From an economic perspective, this constitutes a change in the cost-function of the firm or the creation of a new supply function, if the technology is used to create a new product or service. Hence, e-business technology adoption coincides with innovation.

Evidence from the *e-Business W@tch* suggests that Internet-based technologies are currently an important enabler of innovation in the European economy. However, many firms also improve their internal processes or create new products or services for their customers without making use of Internet-technologies, or by using online technologies only peripherally. Innovation research shows that all sorts of innovations, whether based on the Internet or not, are in the majority of cases positively associated with business success. Thus, it is not yet proven that investments in Internet-based innovations yield superior returns to other kinds of innovation.

This means that policy should focus on stimulating a climate that is generally favourable to investments in innovation, and not exclusively on Internet-based technology investments. An important aspect of such a policy is to reduce the ambiguity and risk that face potential investors. This involves the entire environment in which enterprises operate, not only the uncertainty about specific investment opportunities such as the adoption of e-business technologies.

As a means of conducting innovation, technology adoption has the potential to influence other important economic measures, such as the optimal size of the firm, the optimal market structure (degree of industry concentration, large vs. small firms), the optimal degree of vertical integration, productivity, competitiveness, and changes in the demand for different types of skilled labour. The degree to which technologies actually influence these measures is hard to estimate a priori. Even empirical ex-post analysis whether and to what degree e-business has exercised an "impact" on these parameters is extremely difficult, since it is hardly possible to filter the impact of ICT and e-business from other factors and externalities.

However, it is acknowledged that the impact of electronic business implementation can be substantial. Policy-makers are therefore well advised to closely observe these technology-induced changes in order to identify areas which may require policy action. For example, if certain technologies tend to reinforce the development toward monopolistic market structures in an industry, policy should consider interventions. In this context, the sectoral analysis of

the *e-Business W@tch* and the resulting empirical evidence has already revealed important insights and provides a sound basis for further analysis of specific aspects.

4.1.3 Education and labour market policy

Information and communication technologies need complementary inputs in the form of specialised human capital in order to function properly and to generate economic value. Consequently, an economy that lacks a high level of general education, computer and Internet literacy, and an adequate supply of highly skilled specialists will not be able to realise the full potential of ICT. In addition, the rapid technological progress in computer, network and software technologies leads to a fast depreciation of ICT skills and hence requires a constant updating of skills, which eventually leads to the “life-long learning” paradigm.

Since basic schooling and higher education systems are to a large extent public responsibilities in the European Union, this could be a starting point for policy-makers to develop and induce the implementation of educational schemes that are favourable for an economy that is “tech-savvy” and innovative. In addition, the realisation of life-long learning in the Member States could probably be supported by a further deployment of public-private partnerships. A substantial involvement of the private sector will be necessary to create sufficient opportunities for employees to participate in specific training and in a general continuing education, irrespectively of their age and work experience.

The surveys of the *e-Business W@tch* confirm that firm-size and training offers for employees are interrelated. Large enterprises are able to provide more and better training opportunities for their employees than SMEs.¹¹ Economies of scale in large enterprises play an important role in this context. A company with many employees can more easily delegate responsibilities to other workers. Temporary replacement of employees participating in training by co-workers, which severely inhibits formalised training programmes in SMEs (possibly more than the mere direct costs for training programmes), is therefore less complicated in large than in small firms. Public-private partnerships might eventually help to narrow this gap between SMEs and large enterprises. Such initiatives concern, for example, training initiatives carried out in cooperation with e-business technology providers, training organisations and the public sector, or SME networks that cooperate in offering training to their members.

4.1.4 Role model of the public sector

The active use of ICT, the Internet, and e-business applications in the public sector can spur an active use of these technologies in the private sector, for example via the creation of positive network externalities.

An excellent example is the case of Estonia. The Estonian government played a very active role in promoting the development and usage of Internet infrastructures. For example, the Estonian Parliament approved a proposal in February 2000 to guarantee Internet access to each of its citizens¹² and immediately began to take action. The Government kick-started a

¹¹ cf. CVTS2; Statistisches Bundesamt, 2002

¹² ebusinessforum, 2001

high-tech drive by setting up 500 public computer centres across the country. The centres were established in cities, but also in tiny Baltic Sea islands and converted barns in desolate forests.¹³ The government also makes very active use of Internet technologies itself, playing the role of an “e-champion” in Estonia. For example, public agencies use the Internet for procurement purposes and parliamentary meetings are often organized as virtual conferences, saving substantial time and travel costs. Today, Estonia is the ICT leader amongst Eastern European countries, ranking 25th out of 102 countries (ahead of Italy, Spain, Portugal, and Greece) in the Global Information Technology Report by the World Economic Forum (2002/03 edition). The active use of ICT in the public sector helped Estonia to leapfrog other countries that are still wedded to older technologies, and has also helped to make the public sector in Estonia efficient and slim.

Similarly, the public sector in the European Union and its Member States can help to support the development and usage of ICT in the private sector by making intensive use of the new technologies itself. This includes active use in providing services to its “customers” (citizens and businesses), but also the internal use for improving and optimising their own routines (Government-to-Government).

Government institutions with their experience in handling public calls can also serve as a role model by increasingly using public electronic tendering procedures, provided that the main objective of this technology can be achieved: realising cost advantages for all parties involved. For governments, cost advantages can stem from cheaper procurement prices or from more efficient procurement processes. A cost advantage for companies that participate in public tendering procedures via the Internet will mainly result from reduced efforts, both for getting access to calls and for submitting tenders.

However, a caveat in this context is that the technical development and implementation of electronic tendering procedures in the public sector could – to some extent – compete with already existing, functioning solutions and services from the private sector. This requires an assessment on a case-by-case basis, carefully weighing the gains and losses of either way from an aggregate economic perspective.

4.2 Policy challenges at the sectoral level

Following these considerations (and caveats) on the policy relevance of electronic business developments in general, the question is which instruments policy could use to intervene in this development, in order to counteract undesirable outcomes on the aggregate level. This chapter presents a synthesis of policy challenges which have been identified in the first series of Sector Impact Studies (published in May 2004) on 10 sectors. As this analysis bears close links to ongoing policy initiatives of the Commission’s DG Enterprise, the introduction offers a brief summary of the current approach to e-business policies. The analysis attempts to map the challenges identified by the *e-Business W@tch* into the policy framework that was proposed in the Communication from the European Commission “Adapting e-business policies in a changing environment: The lessons of the Go Digital initiative and the challenges ahead”.¹⁴

¹³ Wired News, 21. April 2003

¹⁴ COM(2003) 148 final

4.2.1 Taking stock of existing policies – a record of recent EU initiatives

In this context, the Enterprise Directorate General has already undertaken a substantial effort to systematize "e-business policies" with respect to their objectives, targets and contents. The "Go Digital" campaign can be regarded as the starting point and initial background of this activity, and in particular the Communication "Helping SMEs to Go Digital",¹⁵ in which the Commission identified benchmarking as a major step to further promote the use of ICT and the Internet by SMEs.

The Communication defined a policy-oriented objective for this benchmarking activity, namely "to describe and benchmark national and regional policies and instruments for the promotion of e-business for SMEs". The objective was to help Member States and regions to assess their policies and identify best policy practices. This policy benchmarking initiative received widespread political support and attention from all relevant stakeholders.

In February 2002, the first Synthesis Report "Benchmarking National and Regional E-Business Policies" was issued. It summarised the process, which was envisaged at that time, in five steps:

1. Getting a clear picture about the adoption of ICT and e-business by SMEs
2. Benchmarking policy initiatives in favour of helping SMEs
3. Presenting the results of this benchmarking initiative, including examples of good practices in policy-making, to a broader audience of policy-makers in a high-level conference
4. Identifying a number of quantitative targets to be achieved by national and/or European policies
5. Monitoring the implementation of the policy targets

Since the publication of this report, the first four steps of this process have been addressed and mostly successfully accomplished. The e-Business Surveys carried out by the *e-Business W@tch* and Eurostat since 2002, and the analysis of issues in the Sector Studies of the *e-Business W@tch*, have largely contributed to a substantial improvement of the picture about the adoption of ICT and e-business by SMEs.

Step 2 has been addressed in special reports, including the above-mentioned Synthesis Report and, in particular, the Final Report of the e-Business Policy Group on Benchmarking national and regional e-business policies for SMEs from June 2002. This report provides an impressive documentation of different types of policies that have been applied in the Member States of the European Union. The report structures the policies into four categories (see Exhibit 4-1).

The collection and case-study like description of these policies in the quoted report can be regarded as a breakthrough in systematizing European e-business policies. In parallel to this initiative of gathering evidence on e-business policies, and as a vehicle for doing so, DG Enterprise had started to develop a network of stakeholders and policy intermediaries to advance the processes of policy-making and policy co-ordination across Member States. This led to the founding of the e-BSN (e-Business Support Network), which had its first European workshop in January 2003 in Athens, in the context of the Greek EU presidency.

¹⁵ COM(2001) 136 final

Exhibit 4-1: E-business policy objectives and categories identified in the EU in 2002

Main policy objective / category	Examples of good practice
Framework policies	<ul style="list-style-type: none"> • UK: UK online for business • Greece: the e-business forum • Norway: the VerDI programme • NL: The Netherlands Go Digital Programme • Spain: Catalunya on the Net
E-business awareness raising and training	<ul style="list-style-type: none"> • Finland: eAskel • UK/Scotland: First Steps Workshop Series • Austria: EC Austria ("Let's e-biz") • Sweden: SVEA • Germany: the B-on-line project
Promoting SME support networks	<ul style="list-style-type: none"> • Ireland – The PRISM II initiative • Germany – Network of e-business centres • The Netherlands – 'Digikringen' • UK – Opportunity Wales
Promotion of Internet platforms for SMEs	<ul style="list-style-type: none"> • Denmark - Rakat in Roskilde • Ireland – Empower • Spain – The ARTEPYME II • France – project Achat-ville • UK - Local Shops On Line

Source: European Commission, DG Enterprise: Final report on benchmarking national and regional e-business policies for SMEs by the e-Business Policy Group (June 2002)

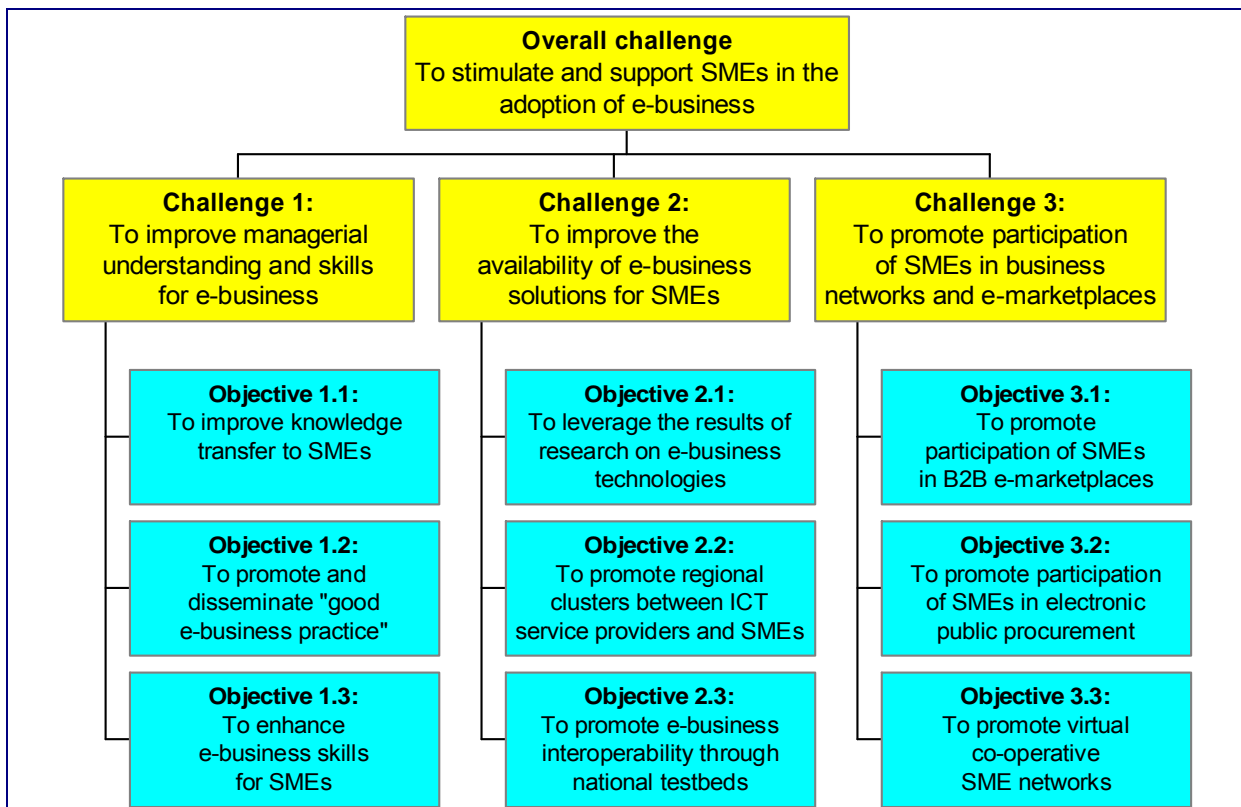
This e-BSN Workshop was the kick-off event for the fourth step of the master plan, as the title of the event already indicates: "Workshop on quantitative targets for e-business policies". From the beginning, it was a courageous move by DG Enterprise to promote target oriented policy-making processes, considering the substantial amount of debate and scepticism whether and to what extent policy objectives can be translated into concrete (measurable) targets or not. This debate has not yet ebbed away, but has rather increased, in particular in the context of the eEurope benchmarking which shows all the difficulties and challenges that are inevitably connected with this approach. The first challenge is that the stakeholders involved have to agree on targets and on adequate indicators to measure the achievement of a target. The second challenge is whether the required data can be collected in a comparable and reliable way, and – an important aspect with all data collection activities – with a reasonable economic effort.

In this context, it must be considered that most e-business policies are implemented on a regional or national level. Therefore, when it comes to setting targets for these policies, the European Commission can only act as a promoter and catalyst, but cannot enforce any targets for regional or national governments. To stimulate the debate in this area, and as "food for thought", the Commission issued in March 2003 the Communication "Adapting e-business policies in a changing environment: The lessons of the Go Digital initiative and the challenges ahead" (COM(2003) 148 final). This Communication, which proposed a further elaborated framework for e-business policies, attracted considerable attention and was praised for its clarity and practical applicability. The European Economic and Social

Committee, for example, believes that "the European Commission has produced an excellent proposal document on the need for Member States and regions to re-orient e-business policies" and welcomed "the highly practical approach".¹⁶

The Communication outlines a framework for SME specific e-business policies that consists of three main challenges and nine objectives related to them (three each, see Exhibit 4.2-2). Continuing from this framework, the latest workshops of the e-Business Support Network at Paris (October 2003), Budapest (February 2004) and Barcelona (May 2004) have advanced the debate on appropriate targets for each of these objectives. Moreover, DG Enterprise has recently launched an evaluation study that will benchmark 10 selected e-business policies with respect to measurable targets and criteria.

Exhibit 4-2: A framework for SME specific e-business policies



Source: European Commission [COM(2003) 148 final]

Based on these achievements, the Commission has now gradually moved to start the fifth step of the process according to the "Road Map" outlined above: monitoring the implementation of the policy targets. In this context, the recently established European e-business policies portal on the Internet (www.e-bsn.org) will play an important role. The portal already provides a valuable overview of e-business policies and best practices across the European Union, with links to related resources.

¹⁶ Opinion of the European Economic and Social Committee on [COM(2003) 148 final], published in the Official Journal of the European Union, 2004 / C 108 / 02, 30 April 2004, p. 23-28

4.2.2 Synthesis of policy challenges identified by the *e-Business W@tch*

The policy challenges which the *e-Business W@tch* has identified and outlined in the previous series of Sector Impact Studies (May 2004) on a sector-by-sector bases can – to a large extent – be mapped into the framework developed by the EC Communication [COM(2003) 148 final] as shown above. This can be expected, as the framework covers a broad range of policies. In this chapter, an effort is undertaken to synthesize the various sectoral policy challenges by integrating similar issues under one heading, and to provide an overview of the relative importance of various policy areas by sector.

As a first overview, Exhibit 4-3 indicates the relevance of the three main e-business policy challenges identified in the EC Communication on adapting e-business policies. The mapping has been made from the perspective of small and medium-sized enterprises, and not from the large firms' point of view. This appears to be consistent as the EU framework for e-business policies has been developed specifically for SME policies, and as the conclusions on policy challenges drawn by the *e-Business W@tch* in its Sector Studies also concentrate on the SME aspect.

Exhibit 4-3: Relevance of SME e-business policy objectives by sector

	To improve managerial understanding and skills for e-business among SMEs	To improve the availability of e-business solutions for SMEs	To promote participation of SMEs in business networks and e-marketplaces	Other measures (sector specific)
Textile industries	●●	●●●	●●	●
Chemical industries	●●	●●	●	○
Electronics	●●	●●●	●●	●
Transport equipment	●●●	●	●	●
Craft and trade	●●●	●●	●●●	●●●
Retail	●●●	●●	●●	●●
Tourism	●●●	●●	●●●	●
ICT services	●	●●	●●	●●
Business services	●●●	●●	●	●
Health services	●●●	●●	●●	●●●

○ = not relevant; ● = some relevance; ●● = rather relevant; ●●● = highly relevant

Source: *e-Business W@tch* (2004)

In summary, the following conclusions can be drawn from this overview, backed up by the analysis and recommendations from the various Sector Studies presented by the *e-Business W@tch*:

- The policy objective "to improve the availability of e-business solutions for SMEs" has certainly some relevance for all sectors. It holds true for all sectors that the major (positive) impacts of e-business stem from rather powerful applications that are mainly adapted to the needs of large enterprises. However, the objective to stimulate the development of useful applications for small business is even more relevant for manufacturing than for service sectors, as handling the supply chain of physical materials is a major application area for systems under consideration.
- The policy objective "to improve managerial understanding and skills for e-business among SMEs", which includes awareness raising activities, appears to be most important for those sectors which are dominated by a huge number of micro (and very

small) enterprises, for example the textile industries and in the craft and trade sectors. There are two main arguments in support of this position. Firstly, small enterprises cannot employ specialised staff in the way larger enterprises do. A company of five people cannot afford a (full time) "IT manager", but needs to assign related tasks to one of the five. Therefore, some public support mechanisms can be justified. Secondly, it has frequently been experienced that the adherence to traditional, established business cultures can be very strong among small firms, particularly in craft and trade sectors. This can be an impediment to introducing new, IT based processes.

- A certain reluctance among many small firms to abandon traditional business cultures and models, even if for the benefit of doing things more efficiently, can also be an obstacle to cooperation among themselves. In some sectors, however, new ways of cooperation among SMEs have already proved to be successful and necessary, for example in the furniture and in the textile industries.¹⁷ Policy measures to stimulate the participation of SMEs in business networks are therefore particularly relevant in sectors where such cooperation appears to have the highest potential.

The grouping of policy challenges identified in the *e-Business W@tch* Sector Studies into the three objectives of the EC framework is a useful but rather crude simplification. Furthermore, the framework does not indicate whether the challenges must or should rather be dealt with at a European, national or regional level. Some policy approaches require a co-ordination of the different governmental levels, for example RTD oriented policies, while others need to be implemented predominantly on a specific geographical level. The support of standardisation developments, for example, which has been recommended in several of the reports, can best be addressed by the European Commission or EU industry groups, if at all (considering that standardisation is mostly a voluntary process). Awareness-raising targeted at SMEs, on the other hand, can only be effectively achieved through intermediaries on the regional level.

Exhibit 4-4 groups suggestions for possible policy initiatives that were raised in the Sector Studies according to the underlying objective and the policy level (from regional to European) on which the suggested action should probably be addressed, although many of the policies could of course be addressed at different levels. Thus, it can be considered as an extension of the SME e-business policy framework proposed by the EC.

It is not possible in the context of the *e-Business W@tch* to develop blueprints for how to implement these policies. Clearly, the methods and instruments used will depend on the local situation, the administrative structures, and the sectors to which activities are mainly targeted. However, such blueprints are available, as it must be assumed that most of the policy measures proposed have already been implemented in some place in the EU, whether successfully or not. It is the main objective of the e-Business Support Network (www.e-bsn.org) that these blueprints are communicated and exchanged across the EU, together with the lessons learned. Replication of successful policies, while avoiding making the same mistakes again, is the goal of this exercise.

¹⁷ There are many examples for ICT supported SME collaboration; see, for example, case study on Textilebusiness.it in this report.

Exhibit 4-4: Suggestions for policy actions mapped by objectives and level

Objective	Level	EU	National	Regional
To improve managerial understanding and skills for e-business among SMEs		Make it easier for small firms to participate in European RTD programmes	Public administration as a role model in using electronic procurement	Encourage ICT training, especially among micro and small enterprises and in the new Member States
		Monitor the demand for ICT skills among enterprises, possibly at sectoral level (at least on the levels of manufacturing and services), develop profiles of skills required and assess the supply situation for those skills	Promote IT and e-business training opportunities, for instance by providing incentives for participation	Improve access of SMEs to information about e-business
			Develop high-quality ICT education programmes (at university level)	Improve the knowledge transfer between competence centres, business development agencies and SMEs
			Collect good e-business practice examples to overcome mental or cultural reservations among SMEs	Educate SMEs about opportunities of using simple Internet applications Encourage links between small firms and schools & universities to give them access to young skilled people Change the investment attitude of SMEs from saving costs by not investing to building value by investing in ICT
To improve the availability of e-business solutions for SMEs		Encourage the adoption of e-standards	Provide financial incentives for innovation through e-business adoption	Stimulate cooperative projects involving software providers and regional SMEs
		In particular: promote the standardisation of computer languages used for more advanced forms of supply chain management	Develop web-based resources and interactive modules for e-business support in craft and trade Stimulate the customisation of e-business tools as part of innovation policies	
To promote participation of SMEs in business networks and e-marketplaces		Monitor the evolution of marketplaces / internet trading platforms and the related business practices	Monitor the participation of SMEs on electronic marketplaces	Support the establishment of local e-commerce platforms for SMEs, particularly in retail
				Emphasis on and support for the development of network relations among SMEs and customers
Other measures		Monitor market concentration in online retail markets	Reduce legal barriers to craft business market entry (e.g. in DE, LU), particularly in ICT-related crafts	Educate SMEs about regulatory changes and consequences of the EU enlargement
			Create the regulatory environment for a competitive telecommunication market, so that companies have access to services at low prices	

Source: e-Business W@tch (2004)

4.3 Sector specific challenges

The general considerations presented in chapters 4.1 and 4.2 are relevant and applicable for the textile, clothing and footwear industry. A number of e-business related issues that could be addressed by policy were introduced in the previous report (of May 2004). By and large, these issues are covered by the policy challenges described in the previous chapters of the report at hand.

A key challenge from the perspective of the textile, clothing and footwear sectors is certainly to increase the efficiency of product development. A focus of SME support policies should therefore be to encourage and support concepts and technologies in this application area. The successful development of products and services involves many factors that are difficult to keep under control, especially for micro and small enterprises. This could be supported, for example, by appropriate and standardised e-business solutions that have been developed specifically for the requirements of this sector and with expertise from the sector.

In addition, starting from the recommendations made in the previous report, the following issues are particularly relevant for this sector and could be considered for sector specific policy actions.

Encourage micro and small enterprises to adopt basic infrastructure and technology: Survey data highlight a large share of “technology refuters” in these industries. These firms remain such because their activity focuses on single apportioned phases, with one or only a few customers - this apparently does not justify and most likely will not justify in the near future any investment in ICT. However, for those companies aiming at broadening their offer or extending their market reach, the lack of basic general-purpose infrastructures is likely to be a high risk factor as it does not allow integration along the value chain and rapid response to the market

Encourage standardisation and the development of sector-specific solutions, focusing on SMEs’ needs: The variety of players and the amount of information exchanged along the sector value chain require coherent and efficient solutions for supply chain management. Survey data on the exchange of standardised data among sector companies call for the development of new and the upgrading of existing sector-specific standards for the uninterrupted flow of information. It is particularly important to foster migration to emerging tools and standards which offer data access flexibility, openness, ease of use and low cost (XML/EDI). In particular, it will be necessary to ensure micro- and SMEs’ awareness on the availability and functionality of such standards and tools.

Encourage ICT training, especially among micro and small enterprises and in the new Member States: There is a strong case for supporting training in this sector. Current investments in ICT are limited and poorly directed. It will be important to encourage companies, especially smaller ones to regard training as a key investment. On the other side, it will be important to make available tailored training programmes. In the new EU Member States and the Candidate Countries, firms will have to be encouraged to fully exploit the e-business potential in the process of integration and modernisation. They will have to face a more demanding business environment than the one to which they were used. In this context, ICT will play a key role in improving methods of production and distribution, as well as of access to information on markets and consumers.

References

e-Business W@tch (2003). The European e-Business Report 2003 edition. A portrait of e-business in 15 sectors of the economy. Second Synthesis Report of the e-Business W@tch. Luxembourg: Office for Official Publications of the European Communities.

DTI (UK Department for Trade and Industry), E-commerce Impact Study of the Footwear sector, 2002

Euratex. European Research in the Textile and Clothing sector. Common Strategy Paper. March 2002

Report on the promotion of competitiveness and employment in the European footwear industry (2001). Commission of the European Communities.

The textile and clothing industry in the EU. A survey. Enterprise papers N°2 , 2001. DG Enterprise. Available at <http://europa.eu.int/comm/enterprise/library/enterprise-papers/paper2>

Impact of electronic commerce on the textile industry. CELTTA, 2000

OECD, EBIP project. Textile-clothing sector in Italy. Future Centre Telecom Italia Lab, 2001. Available at <http://www.oecd.org/dataoecd/41/11/2675551.pdf>

Textile and Clothing Strategy Group, A National Strategy for the UK Textile & Clothing Industry, 2002

Web sources

European Confederation of Footwear industry, <http://www.cecshoe.be>

Euratex (European association of Textile Industries) <http://www.euratex.org/>

SATRA, (Shoe & Allied Trades Research association), <http://www.satrap.co.uk>

Annex I: Glossary of technical terms

Term	Definition
Access	The ability to retrieve information and to communicate online through the use of digital information and communication technologies.
B2B	Business to Business. Electronic transactions between companies.
B2B e-marketplace	Electronic trading platforms on the Internet where companies can sell and/or buy goods or services to/from other companies. They can be operated by a single buyer or seller or by a third party. Many marketplaces are industry-specific. Some marketplaces require registration and membership fees from companies that want to conduct trade on them.
B2C	Business to Consumer. Electronic business processes between companies and consumers.
Bandwidth	The physical characteristic of a telecommunications system that indicates the speed at which information can be transferred. In analogue systems, it is measured in cycles per second (Hertz), and in digital systems in binary bits per second. (Bit/s).
Broadband	High bandwidth internet access. In this report, broadband is defined as the capacity to transfer data at rates of 2Mbit/s (megabits per second) or greater.
Channel	In communications, a physical or logical path allowing the transmission of information; the path connecting a data source and a receiver.
CRM	Customer Relationship Management. Software systems that promise the ability to synthesize data on customers' behaviour and needs and thus to provide a universal view of the customer.
Dial-up	The process of establishing a temporary connection (to the Internet) via the switched telephone network.
DSL	Digital Subscriber Line. A family of technologies generically referred to as DSL, or xDSL, capable of transforming ordinary phone lines (also known as "twisted copper pairs") into high-speed digital lines, capable of supporting advanced services. ADSL (Asymmetric Digital Subscriber Line), HDSL (High data rate Digital Subscriber Line) and VDSL (Very high data rate Digital Subscriber Line) are all variants of xDSL.
E-business	Electronic business. The <i>e-Business W@tch</i> uses the term "e-business" in the broad sense, relating both to external and to company internal processes. This includes external communication and transaction functions, but also ICT supported flows of information within the company, for example, between departments, subsidiaries and branches.
E-commerce	Electronic commerce. As distinct from the broader concept of e-business, e-commerce refers to external transactions in goods and services between companies (B2B), between companies and consumers (B2C), or between companies and governments (B2G) and may therefore be seen as a subgroup or component of e-business activities.
EDI	Electronic Data Interchange. A way for unaffiliated companies to use networks to link their businesses by using a common technical standard for exchanging business data. While electronic mail between companies is common, electronic data interchange passes bigger bundles that replace large paper documents such as bills and contracts. Besides saving paper, computers could save time by taking over transactions such as regular purchase orders that now require human intervention.
E-readiness	Readiness for e-business is defined as the capability to engage in electronic transactions. This comprises appropriate network access (including sufficient bandwidth), internal hardware and software solutions as well as the procedural and managerial readiness to deal with online transactions from simple web presence through to fulfilment of customer orders and related after sales services.

ERP	Enterprise Resource Planning. A software system that helps to integrate and cover all major business activities within a company, including product planning, parts purchasing, inventory management, order tracking, human resources, projects management, and finance.
Extranet	A network using Internet protocols that allows external organisations (for example customers or suppliers) access to selected internal data. Essentially it is an Intranet which gives external users restricted access (often password protected) to information through the firewall.
ICT	Information and communication technology. ICT includes networks, computers, other data processing and transmitting equipment, and software. The application of ICT in business processes leads to e-business, if non-proprietary networks are used.
Information security	Measures taken to protect information systems against unauthorised use and attacks
Internet	The world's largest computer communication system, with an estimated 700 million users worldwide. ¹⁸ The Internet is a loose confederation of principally academic and research computer networks. It is not a network but rather the interconnection of thousands of separate networks using a common language.
Interoperability	The technical features of a group of interconnected systems (includes equipment owned and operated by the customer which is attached to the public telecommunication network) which ensure end-to-end provision of a given service in a consistent and predictable way.
Intranet	An internal Internet, that is an internal network running using TCP/IP, which makes information available within the company. Most intranets are connected to the Internet, and use firewalls to prevent unauthorised access.
ISDN	Integrated Services Digital Network. An international telecommunications standard for transmission of voice and data over dial-up lines running at 64 Kbit/s (kilobits per second). It allows sharing of multiple devices on a single line (for example, phone, computer, fax).
LAN	Local Area Network. The most common way of connecting computers in a small area (typically inside a building or organisation) for sharing databases and communication facilities. The two most common versions are Ethernet and Token Ring. Implementation is based on coaxial cables or plain wires. Speed achieved ranges from 10 to 100 Mbps.
Leased line	A private communication channel leased from the common carrier. It is usually a dedicated fixed-route link (e.g. point-to-point frame relay).
M-commerce	Mobile commerce. E-commerce that takes place using mobile connection devices and through data transmission via technical standards for mobile communication.
Micro enterprise	A company with less than 10 employees.
Modem	Modulator/Demodulator. A device that modulates outgoing digital signals from a computer or other digital device to analogue signals suitable to be transmitted through a conventional telephone line (copper twisted pair telephone). The reverse procedure takes place for incoming signals.
MRO goods	Maintenance, repair and operating goods. Supplies which companies need to maintain their operations, for example office supplies, in contrast to "direct production goods" which are components of the goods and services the company produces.
Processes	Business processes are operations that transform the state of an object or a person. This can, for example, be an order placed via the internet. Ordering an object or a service creates a liability for the supplier to deliver, and initiates the transfer of property rights from one entity to another. The electronic handling of processes is likely to speed them up and to introduce new processes in the realisation of the same transaction.

¹⁸ Cf. Global Internet Statistics by Global Reach, www.gltreach.com

Remote access	The ability of a company computer network's transmission points to gain access to a computer at a different location.
SCM	Supply Chain Management. Software that helps businesses to match supply and demand through integrated and collaborative planning tools.
Sector	Sectors of the economy with comparable business activities. These constitute the main research unit of the <i>e-Business W@tch</i> . Aggregated information at the industry level is used to document the diffusion of activities within the industries as well as the overall importance of the observed phenomena for changes in the economy as a whole. The definition of sectors follows NACE Rev.1 classifications.
SME	Small and medium-sized enterprises with 0-249 employees. To be classed as an SME, an enterprise has to satisfy the criteria for the number of employees and one of the two financial criteria, i.e. either the turnover total or the balance sheet total. In addition, it must be independent, which means less than 25% owned by one enterprise (or jointly by several enterprises) falling outside the definition of an SME or a micro-enterprise, whichever may apply. The thresholds for the turnover and the balance sheet total will be adjusted regularly, to take account of changing economic circumstances in Europe.
Transaction	Electronic transactions can be subdivided into several steps, each of which initiates a process. There are pre-sale (or -purchase) phases, sale and after-sale phases. Typically a transaction starts with information gathering, price and quality comparisons and possibly pre-sale negotiations. During the sale phase contracting and delivery are the core processes, and payment is the final stage of this phase. After-purchase transaction stages comprise customer service, the administration of credit payments and the handling of returns as well as marketing activities preparing for the next purchase.
Value added	Gross output minus intermediate inputs. It is valued at producers' prices and includes all indirect taxes but excludes VAT and subsidies.
WAN	Wide Area Network. A network allowing the interconnection and intercommunication of a group of computers over a long distance.
WAP	Wireless Application Protocol. A communication protocol for delivering data over mobile telephone systems, allowing cellular phone sets and other mobile hand-set systems to access WWW pages and other wireless services.
Website	A related collection of World Wide Web files that includes a beginning file called a home page.
Wi-Fi	Short for "wireless fidelity", popular term for a high-frequency wireless local area network (W-LAN). Wi-Fi technology is rapidly gaining acceptance as an alternative or complementary infrastructure to a wired LAN.
W-LAN	Wireless Local Area Network. An implementation of a LAN with no physical wires, using wireless transmitters and receivers. It allows a mobile user to connect to a LAN or WAN through a wireless (radio) connection. A standard, IEEE 802.11, specifies the technologies for wireless LANs.
WWW	World Wide Web. The collection of pages in html format which reside on web-servers. Although WWW and the internet are different, the terms are increasingly becoming interchangeably used.

Annex II: Methodological Notes on the e-Business Survey 2003

Background

Most of the data presented in this report are results of a decision-maker survey about e-business in European enterprises in 2003. This is an annual survey carried out by the *e-Business W@tch* – the first one took place in 2002 –, constituting a cornerstones of its monitoring activities. For organisational and contractual reasons, the e-Business Survey 2003 was split into two parts. The first consisted of 3,515 telephone interviews which were conducted in March 2003 with decision-makers in enterprises from five EU countries. The second part had a scope of 4,570 interviews in the EU, 100 interviews in Norway and 2,632 interviews in the 10 new EU Member States (NMS) and was conducted in November 2003. The questionnaires used in the two parts of the survey were largely the same. A few new questions were added in the second part in order to cover issues of special topical interest for policy.

Fieldwork

The fieldwork of the surveys in the EU-15 and in Norway was carried out by Ipsos Germany in co-operation with its partner organisations on behalf of the *e-Business W@tch*. Fieldwork in the 10 new Member States was carried out by NFO Aisa (Czech Republic) and its network.

Country	Organisation	Country	Organisation
Belgium	INRA Belgium, Avenue de la Couronne 159-165, 1050 Brussels	UK	Continental Research, 132-140 Goswell Road, EC1V 7DY London
Denmark	Gallup TNS Denmark, Masnedogade 22-26, 2100 Copenhagen	Norway	Norfakta Markedsanalyse, Kjøpmannsgt. 5, 7013 Trondheim
Germany	INRA Deutschland GmbH, Papenkamp 2-6, 23879 Mölln	Cyprus	Synovate (member of the Aegis Group plc), Nicosia
Greece	Synovate, 24 Ippodamou St., 11635 Athens	Czech Republik	NFO AISA s.r.o., Slezská 113, 130 00 Praha 3, Česká republika
Spain	IPSOS ECO Consulting, Avda. de Burgos, 12-8a, 28036 Madrid	Estonia	Saar Poll, Veetorni 4, 10119 Tallinn, Estonia
France	Ipsos Insight Marketing, 99, rue de l'Abbé Groult, 75739 Paris Cedex 15	Hungary	MEDIAN, Opinion and Market Research, POB 551, BUDAPEST, H-1539
Ireland	TNS mrbi, Blackrock, Co. Dublin 2	Lithuania	BALTIC SURVEYS, 6A Šermukšnių str., Vilnius LT-2001, Lithuania
Italy	Ipsos-Explorer, Via Mauro Macchi 61, 20124 Milano	Latvia	TNS – baltic data house, Kronvalda Blvd. 3 – 2, Riga LV-1010, Latvia
Netherlands	INRA in Belgium, Avenue de la Couronne 159-165, 1050 Brussels	Malta	MISCO – Market Intelligence Services Co. Ltd., Valetta
Austria	Spectra Marktforschung: Brucknerstr. 3-5/4, 4020 Linz	Poland	CASE Consumer Attitudes & Social Enquiry, ul. Nowy Świat 64, PL 00-357 Warsaw
Portugal	Ipsos Portugal, Rua Joaquim António de Alguiar 43-5.º, 1070-15 Lisbon	Slovenia	CATI – Marketing, Media and Social Research & Consulting, Tržaška 2, 1000 Ljubljana
Finland	Taloustutkimus Oy, Lemuntie 9, 00510 Helsinki	Slovakia	NFO AISA s.r.o., Slezská 113, 130 00 Praha 3, Česká republika
Sweden	GfK Sverige, Box 401, 221 00 Lund		

Interview method

The fieldwork was carried out using mostly computer-aided telephone interview (CATI) technology. Face-to-face interviews were used in Lithuania, and a mixed approach in Malta. The decision-maker in the enterprise targeted by the survey was normally the person responsible for ICT within the company, typically the IT manager. Alternatively, particularly in small enterprises without a separate IT unit, the managing director or owner was interviewed.

Population coverage and sampling

The highest level of the population for the e-Business Survey was the set of all enterprises which are active at the national territory of one of the respective countries and which have their primary business activity in one of the sectors specified by NACE Rev. 1 categories (see table). The selection and composition of sectors took into account their economic importance and the relevance of e-business activities.

The most important viewpoints used for breakdown of the population in the survey were (i) the economic activity, (ii) the national territory of the enterprise and (iii) the size in terms of employees. The survey was carried out as an enterprise survey, i.e. data collection and reporting focus on the enterprise (rather than on the establishment), defined as a business organisation of one or more establishments comprised as one legal unit.

The sample drawn was a random sample of companies from the respective sector population in each country where the respective sector was to be surveyed with the objective of fulfilling strata with respect to company size class. Strata were to include a share of at least 10% of large companies (250+ employees) per country-sector cell, 30% of medium sized enterprises (50-249 employees) and 25% of small enterprises (10-49 employees). Micro enterprises with less than 10 employees were also included in the survey. Samples were drawn locally by fieldwork organisations based on acknowledged business directories and databases (see table).

Population coverage of the e-Business Survey (2003)			
No.	NACE Rev. 1		Sector Name
	Section	Division/Group	
01	D	17, 18, 19	Manufacture of textiles and textile products, leather and leather products
02	D	24, 25	Manufacture of chemicals and chemical products
03	D	30, 31 (except 31.3 - 31.6), 32	Manufacture of Electrical machinery and electronics
04	D	34, 35	Manufacture of transport equipment
05	D	Parts of (17-19), 20, (30-32), (34-35), 36, 45	Crafts And Trade: In addition to companies from sub-sections covered by other sectors: Manufacture of wood products; manufacture of furniture; construction and site preparation. Only enterprises with 0-49 employees.
06	G	52.11, 52.12, 52.4	Retail
07	H / I / O	55.1, 55.2, 62.1, 63.3, 92.33, 92.52, 92.53	Tourism
08	K	74	Business services
09	I / K	64.2, 72	Telecommunications and computer-related services
10	N	85.11, 85.12, 85.3	Health and social services

Country	Directory / Database	Country	Directory / Database
Austria	Herold BUSINESS MARKETING database	UK	Dun & Bradstreet
Belgium	Dun & Bradstreet	Norway	Dun & Bradstreet
Denmark	KOB (Købmandsstændens Oplysnings Bureau)	Cyprus	Census of economic activity
Germany	Heins und Partner Business Pool	Czech Republic	Merit – CDF, Meritum Software, Enterprises database 2003
Finland	Blue Book - TDC Hakernistot OY	Estonia	Estonian statistical bureau + Kredinfo (register of taxpayers)
France	IDATA, based on INSEE Siren file (the National Institute of Statistics) and other directories	Hungary	Company Information Data Store, provided by Hungarian Central Statistical office
Greece	ICAP directory (the major database for Greece)	Lithuania	Department of Statistics and National Register at Ministry of Economics
Ireland	Bill Moss	Latvia	Business Register of Republic of Latvia
Italy	Dun & Bradstreet	Malta	National Statistics Office, Employment and training corporation
Netherlands	Dun & Bradstreet	Poland	REGON (GUS) data (National register of business)
Portugal	MOPE database	Slovenia	IPIS directory, published by Noviforum (list of active Slovenian enterprises)
Spain	Dun & Bradstreet	Slovakia	Albertina, Albertina Data, Enterprises database 2003
Sweden	Swedish Post Address Register (PAR)		

Scope of the e-Business Survey 2003: No. of interviews per country and sector

Scope	Part I (March 2003)	Part II (Nov/Dec 2003)
No. of sectors covered	7 sectors	10 sectors
No. of EU Member States involved	5 countries	25 countries
No. of sector-country-cells	35	98
No. of interviews	3515	4670 (EU+NO) + 2632 (NMS) = 7302

	Food, beverages and tobacco	Textile industries	Chemical industries	Electronics	Transport equipment	Crafts & trade (Construction ; Wood & furniture)	Retail	Tourism	ICT services	Health & social services	Business services	Total int.
Belgium			101				100				100	301
Denmark							67	67		66		200
Germany	100*	100	100*	100*	100*	100	100*	101*	100*	100	100	1101
Greece		84		76	89	75		75				399
Spain	100*	101	100*	100*	100*	108	100*	100*	100*	101	100	1110
France	100*	100	100*	100*	101*	101	101*	99*	100*	100	100	1102
Ireland			70					70	71			211
Italy	102*	100	101*	101*	100*	100	102*	102*	101*	100	101	1110
Luxembourg **												0
Netherlands		100							101	102		303
Austria					68			132		100		300
Portugal					104		100				100	304
Finland		75		75					76			226
Sweden			80	75	79						80	314
United Kingdom	100*	100	101*	101*	100*	100	101*	100*	101*	100	100	1104
Cyprus							64					64
Czech Republic			60		60			60	60	60		300
Estonia		50	50	50	21	65	50	50	50	50	50	486
Hungary				80	80						80	240
Lithuania							57					57
Latvia		51	49				51					151
Malta								51				51
Poland		80	80	80	80	80	80	80	80	80	80	800
Slovenia				56				51	53	55	58	273
Slovakia		50		50			50				60	210
Norway		30					70					100
TOTAL	502	1021	992	1044	1082	729	1193	1138	993	1014	1109	10817

* interviews carried out in March 2003 ** was covered in the e-Business Survey 2002

Problems encountered

No major problems were reported by the fieldwork organisations with respect to interviewing (e.g. comprehensibility of the questionnaire, logical structure). The overall feed-back from the survey organisations was that fieldwork ran smoothly and that they had the impression that the questionnaire was well understood by most respondents. Some difficulties occurred, though, mainly with respect to the following issues:

- The main challenge was the fulfilment of quotas regarding company size-bands. In many countries, it was not possible to accomplish the objective of including a minimum share of large or even medium-sized enterprises in specific sectors. In such a case, these were replaced by interviews with smaller companies or from other sectors.
- Another well known issue in this type of survey stems from the difficulties of conducting research projects among ICT decision-makers in general. Dedicated ICT professionals are heavily researched and therefore securing their participation can be difficult. This is a particular problem in larger companies.
- In some countries it was difficult to carry out interviews within businesses and retailers not using or with a very basic use of computers, because of the number of questions on related issues. The French fieldwork

organisation, for instance, reported that the questionnaire was too specific for some organisations, for example for small companies in the health & social services sector. These are mostly doctor's surgeries, where it was felt that the e-business related questions were not applicable to them. Also, small companies from the crafts' & trade sector, which often have just a computer but no network at all felt that the questionnaire was not sufficiently adapted to their activities.

- A related issue is that there are some compromises to be made if the same questionnaire should be used for micro-enterprises as well as for large companies. Some of the questions, while only scratching the surface of e-business activities in large companies, are hardly relevant for micro-enterprises with less than 10 employees. The Hungarian survey company, for instance, reported that some questions seemed to have little relevance for companies with only one or a few employees.
- Finally, an issue which was known in advance but is unavoidable in telephone interviews is that there is no "ideal target person" to be interviewed. Fieldwork organisations reported that sometimes a data processing manager is not very aware of the consequences of e-business on the whole of the company, on the personnel level and on the financial level. On the other hand, the general manager may not always be aware of the technical implementation status. The Irish fieldwork organisation, for instance, reported that some of the smaller companies were not familiar with technical terms such as used for standards ("EDI" or "EDIFACT").

Weighting principles

Two weighting schemes have been applied: weighting by employment and by the number of enterprises. Data are presented in either way depending on the kind of the analysis to be made.

- Values that are reported as weighted by employment should be read as "enterprises comprising x% of employees". To give an example: The indicator "percentage of companies selling online" – if weighted by employment – is defined as "companies comprising x% of employees sell online". The reason for using employment weighting is that there are very many more micro enterprises than non-micro enterprises. The unweighted figure would effectively represent mainly the smallest sizes of firm.
- Values that are reported as enterprise-weighted figures are to be read as "x% of enterprises", reflecting the number of enterprises as legal entities but not their relative economic importance in terms of employment.

Weighting was based on the latest available universe figures by Eurostat. Missing or undisclosed universe data had to be imputed. The imputation procedures depended on auxiliary or proxy data availability, taking into account where available information about higher industry aggregations, nearest neighbour data, turnover-employment correlation and secondary sources other than Eurostat. It also allows for the constraint of predetermined ranges such that imputed data had to be contingent with published sectoral, national and European universe totals as well as for final plausibility checks for every single imputed data item. The weighting cells correspond to the data reporting pattern used as regards industries and employment size-classes. Uniform expansion factors are applied to enterprises within one of the four size-classes per industry per country. As for data that refer to a base other than the universe of all enterprises (e.g. indicators appropriately reported for online selling enterprises only), expansion factors are adjusted to the different shares of observations per cell that build the computation base.

Variables - indicators

The set of ICT and e-business indicators for which data were collected in this survey was organised into the following modules:

- Background information (basic company data, innovation activities)
- ICT infrastructure and e-skills development in the company
- E-commerce and e-business activities (internal business process automation, procurement and supply chain integration, exchange of standardised data between trading partners, marketing and sales activities, use of e-business software)
- Impact of e-business (impact of selling and procuring online, perceived effects on work processes, satisfaction with outcome)
- Assessment of future importance of various e-business technologies

The choice of indicators considers relevant statistical work by the OECD and Eurostat and includes a basic set of widely accepted measures for e-commerce and e-business, but also tries to introduce innovative indicators which have a pilot character and are not yet widely tested.

The full list of variables which was the basis for preparing the questionnaires can be downloaded (as a spreadsheet) from the *e-Business W@tch* website (<http://www.ebusiness-watch.org>).

Annex III: Sector Impact Studies of the *e-Business Watch* in 2003/04

No.	Sector	Date
1	Textile, clothing and footwear industries <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004
2	Chemical industries <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004
3	Electrical machinery and electronics <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004
4	Transport equipment manufacturing <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004
5	Crafts' and trade sectors <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004
6	Retail <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004
7	Tourism <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004
8	ICT services <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004
9	Business services <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004
10	Health and social services <ul style="list-style-type: none"> • Report I: The Quantitative Picture: Diffusion of ICT and e-business in Europe • Report II: Key Issues, Case Studies, Conclusions 	May 2004 August 2004