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ICT & e-Business in the
Food, Beverages & Tobacco Industry

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European Commission
Enterprise Directorate General
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and Services

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Introduction

European policy is in a number of areas, including economic, innovation and SME policies, increasingly focused on promoting the business techniques and new ways of working which will provide the economic and social foundation of the information society in Europe. To help policy-makers define their programmes, and to monitor the effectiveness of these policies, some indication of progress and of areas requiring active support is essential. At the same time, many areas of European business lack information about the speed of technological update in European markets, which they expect to have a strong impact on their global competitiveness.

Despite the increasing number of studies and market research on electronic business, and especially on electronic commerce, there used to be a lack of reliable empirical information about the extent, scope, nature of and factors affecting the speed of e-business development in Europe at the sectoral level in an internationally comparative framework. This report aims to provide such information for the Food, beverages and tobacco sector.

The *e-Business W@tch*

This report has been published in the framework of the European e-Business Market Watch. This is a market observatory established by the European Commission, DG Enterprise. Laying the groundwork for a continuous facility, the *e-Business W@tch* monitors and assesses the maturity of electronic business in 15 industry sectors across all EU Member States, including seven manufacturing and eight service sectors. At least two reports are to be published on each sector during the 18-month life-time of the *e-Business W@tch* (cf. publication schedule on the following page).

The research presented in these Sector Impact Studies is intended to help to benchmark progress and to assess how electronic business development can be further enhanced at the European level or at Member State level with the objective to strengthen the competitiveness of European businesses. Special attention is paid to the SME dimension of e-business. All reports, as well as an extensive collection of statistics on electronic business, can be downloaded from the website of the market observatory at www.ebusiness-watch.org.

The e-business decision-maker surveys 2002 and 2003

Most of the data presented in this report are based on the recent European e-Business Survey 2003. The fieldwork of this enterprise survey was carried out by INRA Germany GmbH in co-operation with its international partner organisations in March 2003 using computer-aided telephone interview (CATI) technology. In total, 3,515 interviews with decision-makers in European enterprises were conducted. The survey included enterprises from five Member States (Germany, Spain, France, Italy and the UK) and from seven sectors of the economy. On average, about 100 interviews were conducted with enterprises from a sector in each of the five countries (i.e., 500 interviews per sector in total). More detailed information about the survey methodology is provided in the Annex to this report.

This was the second e-business decision-maker survey of the *e-Business W@tch* after the (larger) first survey in June/July 2002 which had a scope of 9,264 interviews and covered businesses from 15 sectors. In 2002, interviews were carried out in all 15 EU Member States, but only in the four largest states (Germany, France, Italy and UK) were all sectors covered. The first survey for the Food, beverages and tobacco industries was carried out in the following countries: Germany, Greece, Spain, France, Italy, the Netherlands and the UK.

Sector Impact Studies of the e-Business W@tch: Publication schedule

No.	Sector	Date
1	**Food, beverages and tobacco industry**	
	• Report I: Economic background / e-business issues	July 2002
	• Report II: The statistical picture (Survey 2002)	Feb. 2003
	• Report III: Recent trends (Survey 2003)	July 2003
2	**Chemical industries**	
	• Report I: Economic background / e-business issues	July 2002
	• Report II: The statistical picture (Survey 2002)	Feb. 2003
	• Report III: Recent trends (Survey 2003)	July 2003
3	**Transport equipment manufacturing**	
	• Report I: Economic background / e-business issues	July 2002
	• Report II: The statistical picture (Survey 2002)	Feb. 2003
	• Report III: Recent trends (Survey 2003)	July 2003
4	**Financial sector**	
	• Report I: Economic background / e-business issues	July 2002
	• Report II: The statistical picture (Survey 2002)	Feb. 2003
5	**Insurance and pension funding services**	
	• Report I: Economic background / e-business issues	July 2002
	• Report II: The statistical picture (Survey 2002)	Feb. 2003
6	**ICT services**	
	• Report I: Economic background / e-business issues	July 2002
	• Report II: The statistical picture (Survey 2002)	Feb. 2003
	• Report III: Recent trends (Survey 2003)	July 2003
7	**Health and social services**	
	• Report I: Economic background / e-business issues	July 2002
	• Report II: The statistical picture (Survey 2002)	Feb. 2003
8	**Media and printing**	
	• Report I: Background, issues and key figures	Oct. 2002
	• Report II: The statistical picture (Survey 2002)	April 2003
9	**Metal products manufacturing**	
	• Report I: Background, issues and key figures	Oct. 2002
	• Report II: The statistical picture (Survey 2002)	April 2003
10	**Machinery and equipment manufacturing**	
	• Report I: Background, issues and key figures	Oct. 2002
	• Report II: The statistical picture (Survey 2002)	April 2003
11	**Electrical machinery and electronics**	
	• Report I: Background, issues and key figures	Oct. 2002
	• Report II: Recent trends (Survey 2003)	July 2003
12	**Retail**	
	• Report I: Background, issues and key figures	Oct. 2002
	• Report II: Recent trends (Survey 2003)	July 2003
13	**Tourism**	
	• Report I: Background, issues and key figures	Oct. 2002
	• Report II: Recent trends (Survey 2003)	July 2003
14	**Real estate sector**	
	• Report I: Background, issues and key figures	Oct. 2002
	• Report II: The statistical picture (Survey 2002)	April 2003
15	**Business services**	
	• Report I: Background, issues and key figures	Oct. 2002
	• Report II: The statistical picture (Survey 2002)	April 2003

Food, Beverages and Tobacco: Sector Profile & e-Business

1 Economic profile

1.1 Definition and focus

The sector consists of two major activities within the NACE Rev. 1 classification, the manufacture of food products and beverages (15) and the manufacture of tobacco products (16). Food and beverages are further subdivided into nine groups covering meat, fish, fruit and vegetables, fats, dairy products, grain mill and starch products and beverages and, lastly, a group for animal feed.

Table 1-1: Classification of activities within the Food Sector

NACE Rev. 1	ACTIVITY
15	Manufacture of food products and beverages
15.1	Production, processing and preserving of meat and meat products
15.2	Processing and preserving of fish and fish products
15.3	Processing and preserving of fruit and vegetables
15.4	Manufacture of vegetable and animal oils and fats
15.5	Manufacture of dairy products
15.6	Manufacture of grain mill products, starches and starch products
15.7	Manufacture of prepared animal feeds
15.8	Manufacture of other food products
15.9	Manufacture of beverages
16.0	Manufacture of tobacco products

In the European Union, the food industry is highly concentrated and considerably fragmented. On the one hand, a few large, vertically integrated multinationals produce a wide range of products and play a significant role in the international performance of the industry. On the other hand, there is a large number of smaller firms responsible for local production and specialising in one or two sub-sectors.

The production share of the four largest countries in Europe is about 65%, which is below their corresponding share in the total manufacturing output (over 70%). This is because the food industry processes fresh products with a relatively low production value that often remain within national markets, and because regional preferences boost local production. This dichotomised structure of the industry was taken into account when developing the research design for this report and other ongoing research of the *e-Business W@tch*.

1.2 Industry statistics

Production value and value added

The EU is the world's largest producer of food and beverages, with combined production (for 2001) estimated at 675 billion Euro. As can be seen from the data in table 1-2, food accounts for more than 80% of the total production value of the sector, whilst beverages represent about 11%. Tobacco represents about 6-7% of total production. Added value, calculated at factor cost, has been estimated at 160 billion Euro for 2001.

Table 1-2: Structure of the Food, beverages and tobacco sector (DA) in the EU 2001

NACE Rev. 1		Production value		Value added at factor cost (est.)	
		EUR (m)*	%	EUR (m)*	%
	Manufacture of food products; beverages and tobacco	675,037.6	100.0	160,045.3	100.0
15.1	Production, processing, preserving of meat, meat products	133,339.7	19.8	26,696.9	16.7
15.3	Processing and preserving of fruit and vegetables	36,732.3	5.4	8,877.7	5.5
15.5	Manufacture of dairy products	94,250.9	14.0	15,411.3	9.6
15.7	Manufacture of prepared animal feeds	38,616.5	5.7	5,890.7	3.7
\15.2, 15.4, 15.6, 15.8, 15.9, 16 together		372,098.2	55.1	103,168.7	64.5
	Reporting:				
15.2	Processing and preserving of fish and fish products 1)	15,801.5	2.3	3,298.8	2.1
15.4	Manufacture of vegetable and animal oils and fats 2)	23,239.1	3.4	3,180.1	2.0
15.6	Manufacture of grain mill products, starches and starch products 2)	20,978.0	3.1	4,232.5	2.6
15.8	Manufacture of other food products 3)	155,676.0	23.1	52,712.6	32.9
15.9	Manufacture of beverages 4)	76,927.9	11.4	21,886.7	13.7
16	Manufacture of tobacco products 5)	43,379.0	6.4	6,171.6	3.9
unassigned (see footnotes 1 to 5)		36,096,7	5.3	11,686.4	7.3

* EU-12 = EU-15 excluding Greece, Luxembourg, and Ireland.

1) EU-11 = EU-12 excluding Austria. 2) EU-11 = EU-12 excluding France. 3) EU-11 = EU-12 excluding Sweden. 4) EU-10 = EU-12 excluding France and Netherlands. 5) EU-9 = EU-12 excluding Netherlands, Austria, and Sweden.

Source: Eurostat New Cronos, estimates by DIW Berlin

Germany and France achieve the highest production value with 142.5 and 124.2 billion Euro (2001) respectively. The UK ranks third in this classification with 111.8 billion Euro, followed by Italy (88.5 billion Euro), Spain (68.7 billion Euro) and the Netherlands (48.1 billion Euro).

The food and beverages sector accounted for 14.2% of the total manufacturing output within the EU in 2001. At higher levels, one finds Denmark (where food and beverage holds 24.6% of the share in national manufacturing production), the Netherlands (22.9%) and Spain (18.0%). Finland showed the lowest share of food and beverage contribution, where the sector accounts for just 7.1% of the total national manufacturing (table 1-3). In almost every country, the production of food, beverages and tobacco has been declining as a proportion of total manufacturing output in recent years.

*Table 1-3: Production of food, beverages, and tobacco in EU countries 2001 **

	Production value		Value added at factor cost		Share in total manufacturing	
	Mill. EUR	%	Mill. EUR	%	Prod. value	Value added
B	28,357.0	4.2	5,705.8	3.6	16.4	12.9
DK	18,489.8	2.7	4,625.7	2.9	24.6	17.8
D	142,528.4	21.1	33,603.3	21.0	11.0	8.1
E	68,731.6	10.2	15,852.7	9.9	18.0	14.9
F	124,197.9	18.4	26,462.7	16.5	14.5	12.5
I	88,568.7	13.1	18,275.2	11.4	11.0	8.7
NL	48,105.4	7.1	10,335.9	6.5	22.9	18.4
A	11,606.8	1.7	3,712.4	2.3	11.4	10.1
P	10,837.4	1.6	2,402.9	1.5	15.9	12.7
FIN	7,878.2	1.2	1,902.0	1.2	7.1	5.3
S	13,937.9	2.1	3,838.9	2.4	9.1	8.2
UK	111,798.5	16.6	33,327.8	20.8	16.3	14.3
EU-12	675,037.6	100.0	160,045.3	100.0	14.2	11.5

* EU-12 = EU-15 excluding Greece, Luxembourg, and Ireland.

Source: Eurostat New Cronos, estimates by DIW Berlin

Employment and number of enterprises

As of 2001, Germany, France, Spain and Italy had the highest number of companies operating in the food and beverage industry. Taking into account only companies with more than 20 employees: in Germany there were over 6,035 companies; in France and Spain 3,604 and 3,040 companies respectively; and in the UK 2,319 companies. Luxembourg had the lowest number of companies of the EU Member States (226).

Germany had the highest number of employees (597,000 estimated in 2001), followed by the United Kingdom (506,000) and France (392,000). The average number of employees per company was 9.4 for the year 2001.

UK and Denmark had the highest average number of employees per company (21.8 and 19.3 respectively), while countries such as Italy, Greece and Portugal had the lowest number of employees per company (3.9, 4.2 and 5.4 respectively). This reflects the important role SMEs play in the economy in these Member States (see table 1-4).

Table 1-4: Food, beverages, and tobacco: Number of employees and enterprises in 2001

	Employees (**)	No. of companies	Number of employees per company
Austria	79 (1)	1,264 (1)	6.3
Belgium	62	723	8.6
Denmark	87 (1)	450	19.3
Finland	34	336	10.1
France	392 (2)	3,604	10.9
Germany	597	6,035	9.9
Greece	43	1,036 (1)	4.2
Ireland	47	687	6.8
Italy	268	6,800 (3)	3.9
Luxembourg	4 (1)	226	1.8
Portugal	104 (1)	1,916 (3)	5.4
Spain	371 (1)	3,040	12.2
Sweden	53	344	15.4
The Netherlands	147 (1)	855	17.2
United Kingdom	506 (1)	2,319	21.8
EU 15	2,796	29,635	9.4

(*) x 1000. Enterprises of more than 20 employees except: (1): more than 1 employee; (2): more than 3 employees; (3): more than 9 employees

Source: Eurostat New Cronos

Industry structure by size-class distribution

The structure of the food and beverages industry shows a relatively small number of multinational companies on the one hand and a large number of small enterprises on the other. In general, over 80% of the enterprises operating in this sector are small companies (with less than 50 employees).

This is particularly accentuated in the Mediterranean area. In Italy and Spain, the percentage of small companies amounts to 87.7% and 81.5%, respectively.

Nevertheless, the number of employees working in these small companies accounts for a relatively small percentage. In Italy, for example, small companies employ only about 40% of the total employees (table 1-6). In the EU, companies with over 50 staff members employ 80-85% of the total employees.

Table 1-5: Food & beverage: distribution of companies according to size (2000)

N° of employees per company in %	Number of companies (%)							
	I	E	P	F	D	B	DK	S
Small companies (10 to 49 employees)	87.7	81.5	80.5	61.6	54.2	76.3	72.3	75.5
Medium-large companies (50 employees and more)	12.3	18.5	19.5	38.4	45.8	23.7	27.7	24.5
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: CIAA, Annual Report 2001

Table 1-6: Food & beverage: distribution of employees according to size of the company (2000)

N° of employees per company in %	Number of employees (%)							
	I	P	F	D	B	DK	S	UK
Small companies (10 to 49 employees)	39.9	34.7	14.4	17.0	30.4	14.6	15.7	9.7
Medium-large companies (50 employees and more)	60.1	65.3	85.6	83.0	69.6	85.4	84.3	90.3
TOTAL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: CIAA, Annual Report 2001

Trade balance

In 2001, the EU food and beverage industry recorded an external trade deficit of 6,646 million Euro. Export of processed agricultural products to non-EU countries increased by 5% compared to 2000 (from 42,862 to 45,015 million Euro), whilst imports rose by 10.2% (table 1-7). The export of processed agricultural products is about five times as big the total exports of agricultural products (Table 1-8).

Table 1-7: Food and beverages: import - export (estimates 2001, Euro million)

	2001	2000	1999	1998	Evolution (%) 2001/2000
Export extra-EU	45,015	42,862	38,102	39,639	5.0
Import intra-EU	38,369	34,821	30,940	30,887	10.2
Balance	6,646	8,041	7,162	8,752	- 17.3

Source: Eurostat

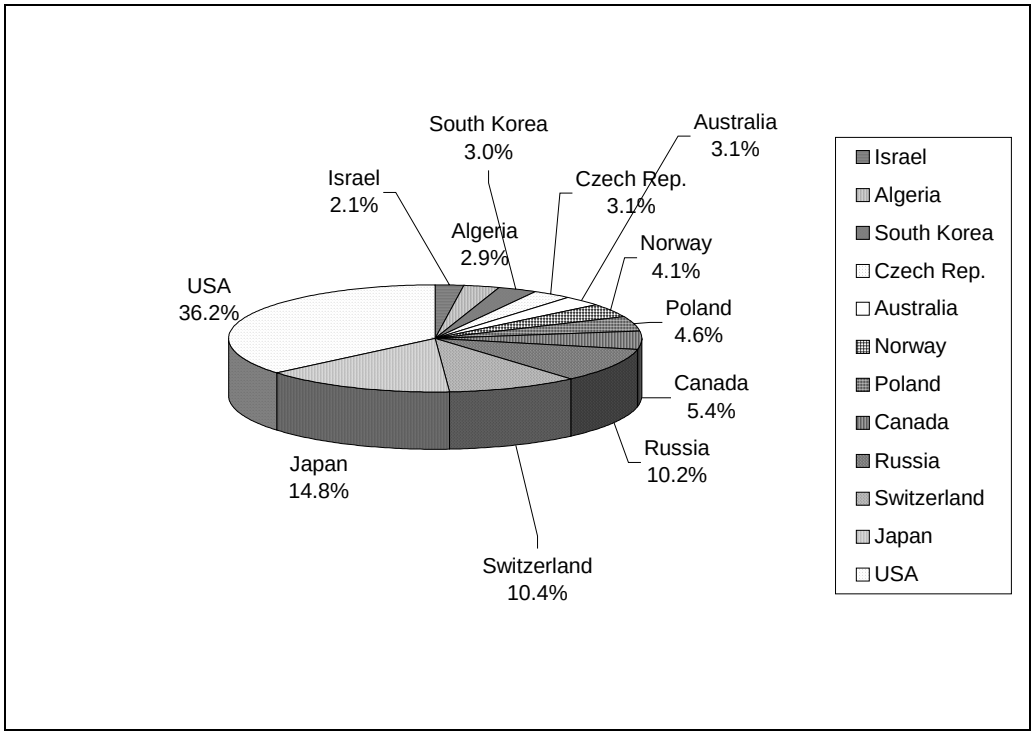
Table 1-8: Key figures for trade in primary and processed agricultural products (estimates 2001, Euro million)

	Exports	Imports	Balance
Primary agricultural products	9,655	28,279	- 18,624
Food and drink industry products	45,015	38,369	6,646
Total agricultural products (primary and F&D industry products)	54,670	66,648	- 11,978

Source: Eurostat New Cronos

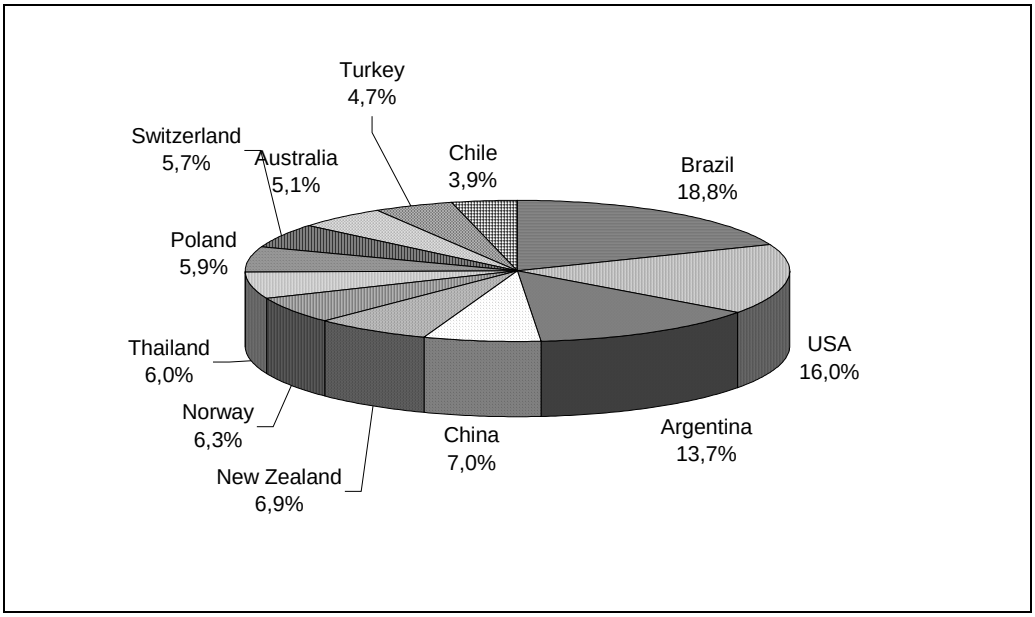
The US is the leading destination country, to which products worth 9,085 million Euro are exported (approximately 20% of the export total). Behind the US is Japan, which takes in 3,716 million Euro worth of products (see figure 1-1). The leading supplier country is Brazil, from which products worth 4,083 million Euro are imported (approximately 10.5% of the total imports). The US and Argentina follow, with 3,438 and 2,936 million Euro respectively (see figure 1-2).

Figure 1-1: Top export destinations of EU food and drink products (estimates 2001 Euro million)



Source: Eurostat

Figure 1-2: Top origin of EU food and drink imports (estimates 2001 Euro million)



Source: Eurostat

1.3 General economic trends and challenges

Competition in the food, beverages and tobacco sector is likely to continue to increase in the next few years. The structure of the market is bipolar: on the one hand a few very large companies – multinationals such as Nestlé (CH) or Unilever (NL/UK) for example – operate transnationally; on the other hand a significant group of small and medium-sized enterprises operate mostly in regional markets, and concentrate on regional preferences for local specialities.

The sector profile varies from country to country. The UK and the Netherlands (where most of the multinationals are registered, including the "giants" British American Tobacco and Unilever) contrast significantly with Italy and Greece, where SMEs still play a major role in production and distribution.

Forecasts suggest that in Italy, and in other fragmented markets (i.e. Greece, Spain and Belgium), large multinationals will progressively dominate, through aggressive acquisition strategies.

Table 1-9: Top 10 EU food and beverages manufacturers, ranked by turnover, in 2002

Name	Country	Sales (billion Euro)	Total Employees (.000)	Food / Drink Sectors
Nestlé	CH	52.6	230	Cereal, Dairy, Beverages, Confectionery
Unilever	NL/UK	32.1	279	Dairy, Beverages, Dressings, Frozen foods, cooking products
Diageo	UK	19.0	72	Alcoholic beverages
Danone	F	14.5	101	Dairy, Beverages, Biscuits, Cereals
Cadbury Schweppes	UK	8.9	38	Beverages, Confectionery
Heineken	NL	8.1	38	Alcoholic beverages
Parmalat	I	7.8	39	Dairy, Biscuits, Beverages
Interbrew	B	7.3	38	Alcoholic Beverages
Associated British Food	UK	7.1	34	Sugar, Starches, Baking products
Tate & Lyle	UK	6.4	9	Sweeteners/starches

Source: CIAA

The competitive pressures are global, despite the global sector dominance of EU Member States and the US (the tobacco sector, where competition is greater in other countries and continents, is an exception).

The operating environment of the sector is characterised by:

- gradual deregulation of the markets;
- reduction in the support prices (food subsidies);
- regulations on improved food hygiene;
- deregulation of the distribution network;
- antitrust limits on a European level;
- European standards on local products (systems for protecting the origin through geographic indication) and biological/ecological production techniques and produce;
- labelling regulations;
- European standards on genetically modified foods.

Emerging market trends in food, beverages and tobacco are summarised as:

- **Increased segmentation of products**, developing *mega*-brands (products available throughout Europe) that stand as clear market choices. The large multinationals will continue to invest in substantial brand development;
- **Widening of the range of products/offers**. Under the global brand products will become increasingly diversified (low fat, low salt, gluten-free, etc.);

- **Intensive use of communication levers**. E-business will complement significant media investment in strengthening and supporting brands;
- **Reduction of "me too" products**, allowing companies to focus more on the core business. The expense of product and brand development in an increasingly competitive market is prohibitive. Products produced by several manufacturers competing on price will inevitably lead to consolidation;
- **Joint venture development through agreements at the European level**. Products are increasingly being produced under licence or in collaboration with regional producers. Competitive advantages are time to market and local focus;
- **Greater integration with raw material suppliers**. Integration is less about e-business & ICT and more about long-term relationships, focused on reducing cost (for the manufacturer) and increasing security of demand (for the producer);
- **Increasing collaboration in distribution**. This activity focuses upstream on distribution and retail chains. Automatic stock replenishment and deliveries are increasingly becoming the responsibility of producers; for example in Wal-Mart (US & UK) & Tesco's (UK) supply chains.

The current and persistent market environment penalises SMEs and mandates a few sophisticated suppliers with the ability to: (a) maintain the life cycle of the product, (b) support it with modern distribution, and (c) source from international suppliers of raw ingredients, which puts increasing pressure on local producers. Currently, the increasing competition puts the least technologically developed companies in a weak position, in most cases SMEs. For example, food safety and quality assurance require the installation of new monitoring mechanisms that SMEs can hardly afford. Moreover, the increased use of computers, the Internet, and web technologies and applications require specific personnel skills and investments in network technologies. A relatively moderate proportion of SMEs is already aware of new developments, but fewer smaller enterprises exhibit a readiness to adopt. Coupled with structural inefficiencies (i.e. islands of operations) found in most EU food industries, which place SM agribusiness enterprises in a rather disadvantaged position, SMEs strive to respond by adopting their product/services, market strategies and partners.

SMEs are likely to respond to such threats by: (a) developing their own brands; (b) positioning their products to niche markets; and (c) meeting market demand for organic produce on traditional farms. ICTs & e-business have provided a channel to support marketing and distribution of niche products. Furthermore, e-business improves communication with consumers, advances business operations, and enhances business relations profoundly.

2 Usage of ICT & e-business

2.1 The role of ICT and e-business

The following section qualitatively analyses the role of ICT and e-business in the food, beverages and tobacco sector.

The role and use of ICT technologies mirrors the structure of the industry: dominance by large multinationals, where the creation of industrial groups (tied to mergers and subsidiaries) has encouraged the installation of interconnected local networks.

In the large multinationals, the role of ICTs is evolving from mere instrumentation for reducing production costs and it is becoming a growing support for strategic decisions and greater e-business interaction/models.

Sophisticated technologies and applications are less pervasive than in other manufacturing sectors, focusing mainly on intra-organisational processes and procedures. The main factors that push companies in the food sector to consider ICT solutions include:

- greater efficiency in internal processes (productive, administrative, delivery of orders, etc.)
- integration of internal processes with external organisations to improve logistics and reduce costs.
- a response to increased competition that uses e-business to gain a competitive advantage.

Core sector business areas are: supply, production, logistics, services, and marketing & sales. Other critical areas now being targeted for improvement are: packaging processes, the control of quality in Hazard Analysis and Control Critical Points (HACCP), the quality of the product, and the reverse supply chain management of returned products.

In the production sector, verifying the quality of the raw material is becoming increasingly important. Vertical integration and control between production processes and their suppliers have been the focal point of many agribusiness ICT initiatives.

However, whilst there is a demand for increased ICT integration, the current diffusion of applications is believed to be low outside of large multinationals and their larger suppliers.

For the most part, suppliers have more traditional relationships and communication techniques, and the operational focus is on quantity, quality, and delivery schedules.

An e-business solution guaranteeing food safety to final consumers and integrating (vertical) business operations across the supply chain is likely to become the “killer application” in the food industry.

Recently there has been a growing trend for larger companies (in nearly all sectors) to concentrate on improving logistics, by upgrading inventory management and storage capacity and trying to improve the flows of input and output in order to avoid stock breaches and guarantee more punctual deliveries. Sophisticated electronic infrastructures have been installed to improve distribution.

Table 2-1: Food, beverages and tobacco: primary activities and support for generating value

INFRASTRUCTURE ACTIVITY				
HUMAN RESOURCE MANAGEMENT				
RECRUITING AND TRAINING				
TECHNOLOGICAL DEVELOPMENT				
Automation and optimisation of incoming flows		**Just in time distribution** **Quality control** **in HACCP** **Food safety**		**Retail assistance and more consumer information**
VARIOUS FUNCTIONS				
Raw Material Flow Management	**Material Handling and Packaging**	**Shipping Order Management**	**Customer Relationships Sales**	**After-sales customer service**
Management and pick up of raw materials **Control of incoming raw materials** **Quality control on outgoing merchandise**	**Selection of raw materials** **Production and packaging** **Finished product warehousing** **Inventory Management**	**Ad hoc palletising per customer** **Deliveries** **Vehicle routing and Scheduling** **Shipment and consignment Tracking**	**Advertising** **Promotion** **Sales force management** **Price and discount policy** **Trade marketing activities** **Agreements with large scale retail & organised distribution** **Assortment and product policies**	**Return policies** **Collection of out-of-date merchan-dise**
INCOMING LOGISTICS	OPERATING ACTIVITIES	OUTGOING LOGISTICS	SALES AND MARKETING	SERVICES

Source: Elaboration by Databank Consulting 2002 from Porter, M. “Competitive Strategy”

Production in food and beverages tends to be characterised by small batch processes that are hard to consolidate and integrate. As in other sectors (for instance in machinery, but also in manufacturing in general), the capital-intensive and incremental developments of food production have created "islands" of activity that have proved difficult and costly to integrate, and consequently will not be directly connected to suppliers or to customers in the short term.

E-business solutions (ICTs & software) focus predominately on the business interface and on integrating activities such as accounting, administration, and stock control. Large software houses have developed flexible ERP systems for many food manufacturers.

It is mostly the larger agribusinesses that deploy this software, though there are examples of bespoke (low-cost, low-complexity friendly interface) applications created by small in-house IT teams (often in medium-sized enterprises).

In the large multinationals, the role of ICTs is evolving from mere instrumentation for reducing production costs and is becoming a growing support for strategic decisions and greater e-business interaction and models. However, the degree of diffusion of ICT within the EU food industry depends heavily upon the adoption behaviour of SMEs which are the predominant institutional type (table 1-4).

Companies are under continuous pressure to optimise internal processes and to integrate them with those of customers and suppliers. Integration is stimulated through the optimisation of partner relationships, especially with partners from the retail and distribution network.

The strategic use of new ICTs is depicted by various Efficient Customer Response (ECR) initiatives that, since the 1990s, have gradually spread throughout North American and EU member states. The objectives of ECR initiatives include reducing operating costs and optimising the principal processes of the food chain, i.e. efficient replenishment of products and store assortment, and developing more efficient promotion and new product introduction.

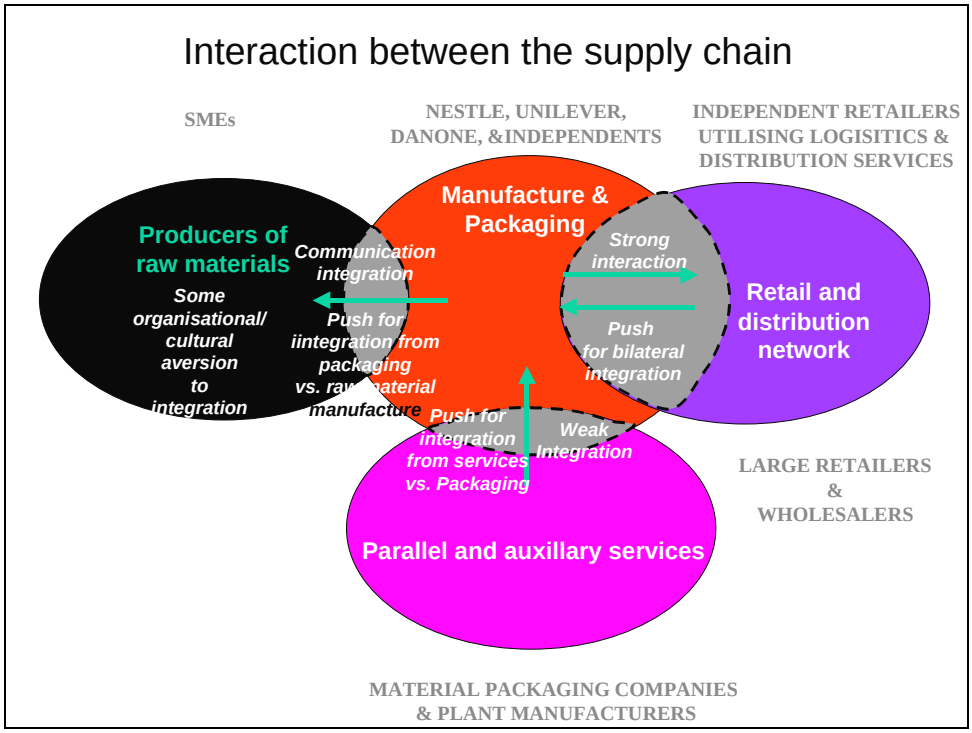
These projects involve the larger distribution companies and a variety of manufacturing companies, most of which operate in the food service sector. For instance, the Efficient Foodservice Response (EFR) initiative aims at saving billions of Euro in the food supply chain through five distinct strategies: (a) equitable alliances, (b) supply chain demand forecasting, (c) electronic commerce, (d) logistics optimisation, and (e) foodservice category management.

Integration of tiers of suppliers to manufacturers and to the retail and distribution network could drive down costs, improve logistics and ultimately improve customer satisfaction. The actual extent of collaboration and integration by means of B2B e-commerce is dependent on many factors. Although collaboration and integration between producers and suppliers of raw materials must be improved, it is evident that the diffusion of network technologies can only build on an average penetration rate of EDI solutions.

Integration of upstream suppliers is inhibited by the dominance of traditional transaction and communication channels, where the "social factor" (personal contact with business partners, "handshake agreements", long-term partnerships) plays a very important role. Even so, there are efforts to achieve better integration by implementing Supply Chain Management (SCM) applications.

The "push" for integration between production, packaging and modern distribution is bilateral, in the sense that the initiatives for e-business are promoted by both parties, and are now supported by greater interaction from the so-called "parallel" sectors, for example, packaging manufacturers and food production process companies.

Figure 2-1: Supply chain interactions in the food and beverage industry



Source: Databank Consulting, 2002

Despite the fact that e-business in the sector mainly involves processes and internal procedures, companies (above all food companies, particularly the larger ones) have shown a continuously growing interest in web applications, and in recent years, they have implemented numerous projects aimed towards creating portals for online selling and applying e-procurement solutions. Online initiatives are predominantly B2B solutions.

Most of them are composed of “showcase” portals, but several significant marketplaces have also been observed.

In the food sector, B2C is facing difficulties in terms of development. Two types of sites drove growth:

- sites that have introduced new e-commerce offers as an extension of existing, more information-based and less interactive facilities,
- sites created specifically to exploit B2C e-commerce.

***www.thebestraffaello.com*: A success story**

www.thebestraffaello.com demonstrates the capacity of the Net to connect a food producer with its culinary audience. This Italian-based site promotes more than just pasta, and has taken regional Italian cuisine and embellished it. The Best Raffaello was founded as a hand-made pasta company in the heart of Italy, the Marche region, with a high quality line of pasta called Di Sanzio. While the business originated as a pasta manufacturer, the company transformed quickly into something much greater: offering the best and most characteristic food products found in Italy. The transition from a strictly regional market base to a national one was swift. The brand Raffaello Sanzio represents enthusiasm, love of beauty and an obsessive interest in detail, a corporate image that has proven popular. The site also includes features dedicated to historical recipes, gastronomic itineraries, classic holiday farms, and much more. Its ultimate objective is to extend its market to other continents, including the US, Japan and South Africa.

The strong performance of many food and beverage sites underscores the importance of offering products online that might not otherwise be accessible to consumers, for instance local products (e.g. specialities, wine, olive oil). Culinary and gastronomic culture has fostered excellent B2C interaction, building virtual communities for food and wine articles.

Research on B2C e-commerce (including studies by the US Department of Commerce and the European Community) suggests that the main factors affecting consumer acceptance are: the variety of the range offered, the wealth of accompanying information, convenience of use (including the ordering process), and the quality of the product and/or the service. In the food and beverage sector the driving force would seem to be the convenience and ease of ordering, in addition to making local specialities available in other regions as well. The utility of this consumer demand suggests convenience/commodity purchases, and not higher value-added products, evinced by the poor emphasis on impulse buying and a lack of promotional marketing. Furthermore, sites tend to pay little attention to quality, service issues or product information, especially as regards bulk fresh products. Payment terms and conditions usually offer credit card payment or bank transfer.

Many sites closed between 1999 and 2002 or decided to eliminate e-commerce from their offer. Most of the failures involved companies that were only present as virtual shops. Companies with a brick-and-mortar outlet to support their web activities were generally more successful, thriving on their existing infrastructure and brands. Pure Internet players failed to convince enough consumers to purchase products online from virtual brands with no visible "brick-and-mortar" foundations.

Webvan.com represents one of the most important cases of company failure.

Webvan was founded in December 1996 under the name Intelligent System for Retail, to sell food and housewares online throughout the US. Through an IPO, the company obtained $405 m in financing and investments. Webvan invested this money in creating super-automatic computerised warehouses.

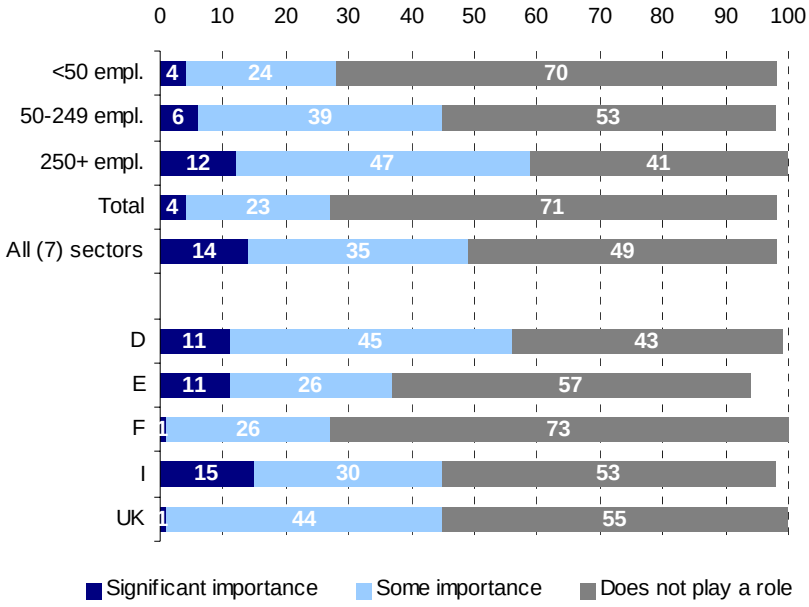
The company intended to achieve online distribution in 26 cities in the shortest possible time. At the start of 2000, Webvan opened operating bases in other states. The quality of its services was excellent. Gomez advisors lauded it as the best company in its sector: In autumn 2000, Webvan acquired Homegrocer, its main online competitor. Growth seemed unstoppable, but at the end of 2000, it registered losses of $453 m; in the first quarter of 2001, it lost another $217m and by July 2001 it had declared bankruptcy. Two thousand workers were laid off and shares in Webvan sank down to 2 cents a piece from its peak of $34 at the end of 1999. Failure was attributed to four factors: 1) poor market acceptance; only 2% of Internet users purchased food online in 2001 in the US; 2) excessive geographic expansion and the necessary investments that this expansion entailed; 3) A lack of alliances within the traditional market; 4) financial markets allowed the company to fail, as they had lost confidence in its future.

The role of ICT in the sector is still rather controversial. Despite the fact that, based on the results of the survey, 71% of the enterprises interviewed feel that e-business does not play a significant role yet for the company, it must be noted that for approximately 50% of larger enterprises and over 20% of small enterprises, e-business already represents a rather significant part (see figure 2-2).

Figure 2-2: Food, beverages and tobacco: Importance of e-business in 2003 as perceived by companies

Base: EU-5 (D, S, F, I, UK), all enterprises (N= 3,515 for all sector, N=502 for Food sector). In % of enterprises. Reporting period: March 2003.

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



2.2 ICT infrastructure and skills development in the sector

The following section discusses the spread of ICT and e-business in the food, beverage and tobacco sector, including information on attitude towards e-business, technical infrastructure, general IT usage and IT skills.

2.2.1 ICT infrastructure

The diffusion and use of ICT infrastructures in enterprises mirrors the structure of the sector. While the big multinationals (most of which lead in their markets) are also the companies with the most highly evolved infrastructures, smaller businesses normally “lag behind” when it comes to ICT. Table 2-2 illustrates how company size corresponds to use of ICT infrastructures.

Computers are used by 82% of companies comprising more than 90% of employment. All enterprises with more than 50 employees interviewed in the 2003 survey reported the use of computers. The most widely used network applications are the Internet (70%) and e-mail (55%). LAN networks (25%), Intranets (13%), EDI systems (8%), WAN networks (6%) and Extranets (3%) are used less often. Here again, however, the percentages rise if we consider larger companies and they drop significantly in the case of smaller ones.

On the whole, the usage of ICT is less widespread in the food and beverage sector than in the other sectors analysed.

IT infrastructures more likely to grow are Extranet, Intranet (15% and 18% of lager enterprise respectively plan to introduce these technologies) and EDI systems which will be adopted by medium-sized companies (table 2-3). In particular, SMEs with 50-249 employees are more keen to adopt EDI systems as they can apparently deal more decisively with the cost and the complexity associated with EDI, which are the two most significant barriers to its implementation, than the smaller agribusinesses (Vlachos, 2003).

Table 2-2: Food, beverages and tobacco: Availability of IT infrastructure (2003)

Available IT infrastructure	All sectors	Food			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
Computer usage	93	92	81	100	100
Internet access	87	82	69	96	94
E-mail usage	83	75	53	93	94
WWW usage	77	69	46	85	87
Intranet usage	49	41	12	37	73
Extranet usage	17	14	2	15	26
LAN usage	61	57	23	70	88
WAN usage	34	32	6	23	64
EDI usage	25	39	7	37	73

Base: EU-5 (D, S, F, I, UK), all enterprises (N= 3,515 for all sector, N=502 for Food sector). Note: figures for "all sectors" / "all enterprises" weighted by employment ("enterprises comprising …% of employment"), figures for size-classes in % of enterprises. Reporting period: March 2003.

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

Table 2-3: Food, beverages and tobacco: Plan to use IT infrastructure (2003)

Plan to use IT infrastructure	All sectors	Food and beverages			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
Planned internet access	5	4	4	1	2
Plans to use e-mail	2	3	3	0	0
Plans to use the WWW	2	2	2	3	0
Plans to implement an intranet	4	2	2	6	8
Plans to implement an extranet	3	3	3	3	15
Plans to implement a LAN	2	2	2	0	0
Plans to implement a WAN	2	1	1	4	4
Plans to use EDI	3	2	2	9	1

Base: EU-5 (D, S, F, I, UK), all enterprises (N= 3,515 for all sector, N=502 for the food sector). In % of enterprises. Reporting period: March 2003.

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

To access the Internet, enterprises mainly use ISDN lines (40% of the total number of companies with Internet access) and/or an analogue modem (35%). ISDN is used above all in Germany (65%), whereas the analogue modem is used most in France (65%) and the United Kingdom (53%). In Italy and Spain, ISDN and the analogue modem are used to more or less the same extent. With regard to the other Internet access methods, 18% of companies use DSL lines; this percentage rises significantly in Spain (38%), where DSL is the most commonly used access among companies. Lastly, 6% of enterprises have stated that they use another fixed connection, and 1.4% of them use other types of connections (table 2-4).

Table 2-4: Food, beverages and tobacco: Type of Internet connection (2003)

Type of Internet connection	D	E	F	I	UK	EU-5
Analogue dial up modem usage	9	26	65	42	53	35
ISDN usage	65	27	16	44	25	40
DSL usage	26	38	2	12	5	18
Other fixed connection usage	3	2	23	2	13	6
Other connection usage	0	4	5	0	0	1

Base: EU-5 (D, E, F, I, UK), enterprises with internet access N=350. In % of enterprises. Reporting period: March 2003.

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

In terms of Internet connection bandwidth (figure 2-3), most of the companies connected to the net (representing 69% of employment with Internet access) use bandwidths with less than 2 megabits per second. Broadband, if defined as internet connection with >2 Mbit/s bandwidth, is used by companies representing 18% of employment, which is less than on sector average. Main users of broadband connectivity are large enterprises. There is hardly a difference between countries with respect to the diffusion of broadband connectivity.

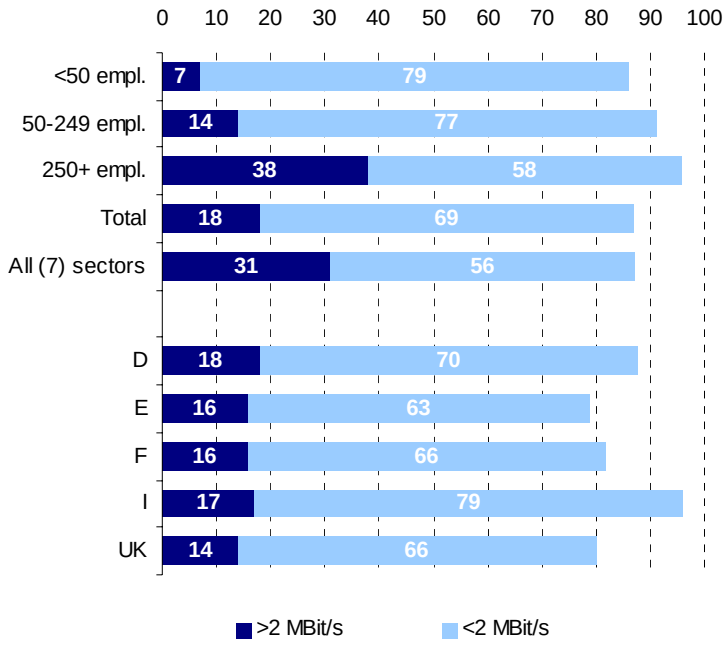
Figure 2-3: Food, beverages and tobacco: Internet connection speed (2003)

Figures for "total", "all sectors" and countries weighted by employment ("enterprises comprising …% of employment), figures for size-classes as % of enterprises.

Base: enterprises with internet access (N=405 for sector).

Figures don't add to 100 because of "don't know" / "no answer".

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



2.2.2 IT skills development

The success of e-business and other types of ICT requires not only the availability of adequate technology within the company, but also the presence of specialised, trained personnel capable of accessing and using these technologies. Through the interviews that were conducted, an attempt was thus made to evaluate the level of training support provided by companies to their employees.

As shown in figure 2-4, 67% of the companies interviewed back their employees in acquiring specialised skills in using a personal computer and network-related information technology.

Companies with more than 250 employees are the most training-oriented (92% of them support their personnel), whereas small companies with less than 50 employees are the ones that feel the problem of ICT training the least.

With regard to the training instruments offered by companies, 52% of enterprises stated that their employees can use some of their working hours for learning, 48% of them use specific training courses offered by outside consultants, and 32% of them rely on computer or IT training courses conducted in-house.

Only about 3% of small companies from the food and beverages sector stated that over the past 12 months period they recruited (or at least tried to recruit) personnel with specialised skills in information technology (see table 2-5), one in seven medium-sized companies and every second large enterprise. About 5% of medium-sized enterprises in the food and beverages industry and 15% of large companies had great or some difficulties in finding personnel. Due to the lower than average demand for specialists, the sector is likely not to suffer from the IT skills gap as much as other sectors.

Figure 2-4: Food, beverages and tobacco: IT training offered to employees (2003)

Figures for "total" and "all sectors" are weighted by employment ("enterprises comprising …% of employment), figures for size-classes should be read as "% of enterprises".

Base: all enterprises (N=502 for sector).

Multiple answers possible.

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

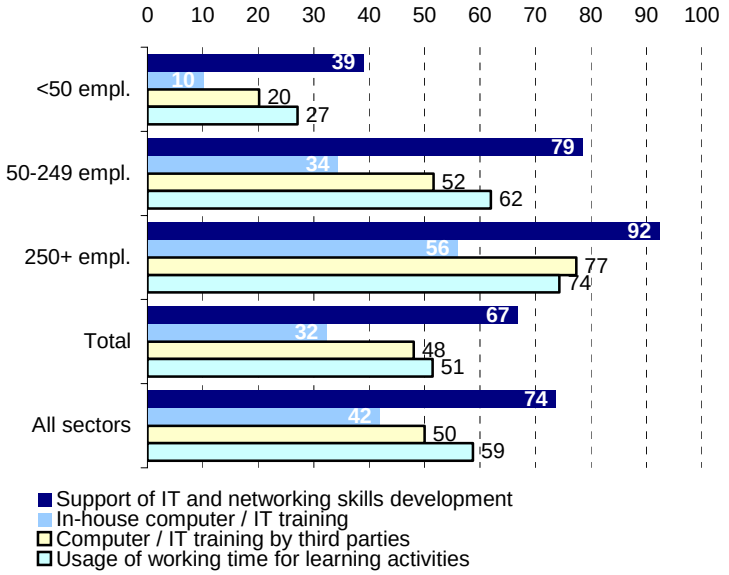


Table 2-5: Food, beverages and tobacco: Recruitment of IT specialists (2003)

Recruitment of IT specialists	All sectors	Food and beverages			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
Recruitment of IT specialists *	9	4	3	14	52
Great difficulty in finding IT specialists	2	<1	<1	<1	10
Some difficulty in finding IT specialists	3	1	1	4	5

* % of companies which have or tried to recruit IT staff within a 12 months period prior to the interview.
Base: EU-5 (D, E, F, I, UK), all enterprises (N=3,515 for all sectors, N=502 for Food sector). In % of enterprises. Reporting period: March 2003.

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

Lastly, an attempt was made to analyse the type of access employees have to various ICT applications. As can be seen in table 2-6, 44% of the interviewed companies stated that their employees can access the system “remotely” from places outside the company (for example from home), whereas 14% stated that their employees access the system remotely through wireless equipment.

A very low percentage (only 4% of the sample) stated that they were planning to install remote access in the next 12 months. This percentage rises slightly (11%) in the case of medium-sized enterprises (between 50-249 employees) (see figure 2-5).

Table 2-6: Food, beverages and tobacco: Remote access to the company's computer system (2003)

Remote Access	All sectors	Food and beverages			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
Remote access to the company's computer system	43	44	12	33	78
Wireless access to the business computer system	14	14	5	8	25

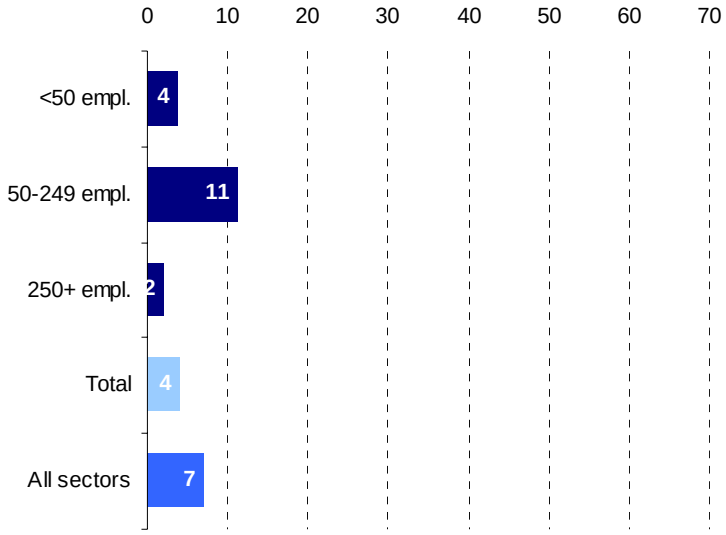
Base: EU-5 (D, E, F, I, UK), enterprises with computers (N= 3,272 for all sectors, N=459 for the food sector). Note: figures for all sectors/enterprises weighted by employment ("enterprises comprising…% of employees"), figures for size-classes in % of enterprises. Reporting period: March 2003.

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

Figure 2-5: Food, beverages and tobacco: Plans to enable remote access

Base: all enterprises. In % of enterprises

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



2.3 E-business activities and impacts

This chapter analyses the e-business activities conducted by companies operating in the food, beverage and tobacco sector, and their impact within the company organisation.

In particular, Sections 2.3.1 and 2.3.2 examine the current status of e-procurement and online marketing and sales within the sector. Sections 2.3.3 and 2.3.4 analyse the specific e-business solutions adopted by the companies.

2.3.1 Marketing and sales

Marketing

Approximately three out of ten companies in the EU Member States examined have a website, and if we consider only large companies, this rate rises considerably (nearly eight out of ten) (see table 2-7).

Italy is the country with the largest percentage of companies with a website (54%); inversely, Germany and France are the countries with the lowest percentage of companies with a website (23% and 13%, respectively).

Of the sample companies, 16% of them plan to create a website over the next 12 months. German and Spanish companies (with 27% and 20% respectively of the total) are the ones that are the most oriented towards setting up a website within the next year.

This table also shows that 12% of the companies with a website use a content management system, which allows the various divisions/offices to access the website and update its contents. This system is used considerably in Spain (36% of companies), but is not applied at all in Germany.

Table 2-7: Food, beverages and tobacco: Enterprises with a website (2003)

Percentage of companies having a website on the Internet	D	E	F	I	UK	EU-5
Website	23	46	13	54	47	34
Plans to have a website	27	20	10	10	16	16
Usage of Content Management Systems	0	36	1	9	4	12

Base: EU-5 (D, E, F, I, UK), all enterprises (N= 502). In % of enterprises. Reporting period: March 2003.

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

Online selling

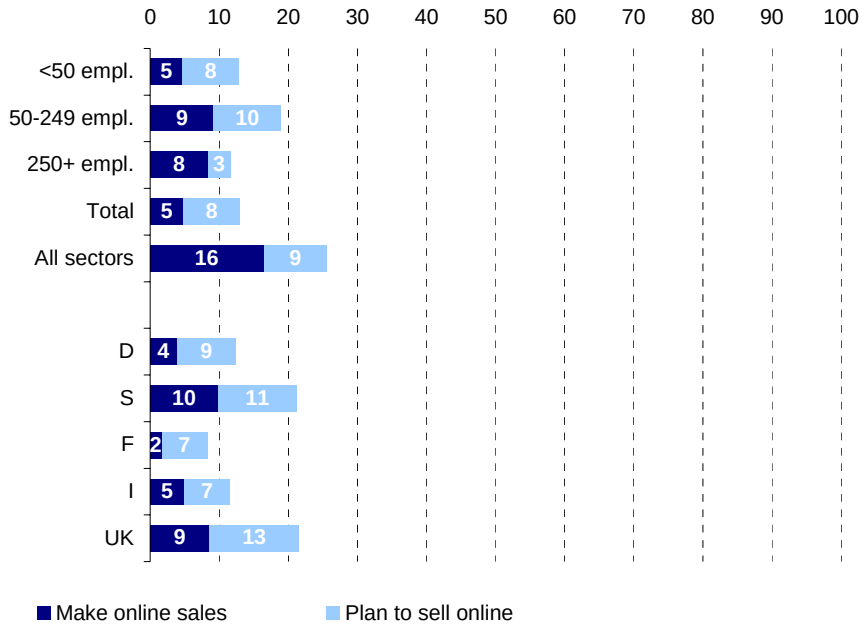
Figure 2-6 shows the status of online selling in the food, beverage and tobacco sector. In particular, it indicates that only 5% of companies use online selling. This percentage is slightly higher in the case of medium-sized enterprises (9%) and large enterprises (8%). Nevertheless, it must be emphasised that in the food industry, online selling is less developed in comparison to the average of other sectors, in which there is a 16% rate of online selling.

Spain and the United Kingdom are the countries that use this sales method the most, with 10% and 9% respectively of companies selling online. France is the least oriented to online selling (only 2% of companies).

Figure 2-6: Food, beverages and tobacco: Companies selling online (2003)

Base: EU-5 (D, E, F, I, UK), all enterprises (N= 502). In % of enterprises. Reporting period: March 2003.

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



While it is true that the percentage of companies conducting online selling is still low overall, it must be noted that 8% of companies interviewed are planning to do this within the next twelve months. The percentage drops for large companies (3%), whereas it rises to nearly 10% if we consider medium-sized companies. The countries revealing the highest percentage of companies that are planning to introduce online selling within the next twelve months are Spain (11%) and the United Kingdom (13%).

Among companies that sell online, 21% declared that they have been doing this for over two years, 15% for over a year but less than two years and 64% for less than a year; 15% stated that they have been selling online for only a few months. Companies in France and Italy have essentially started online sales projects only in the past year.

Table 2-8: Food, beverages and tobacco: Enterprises selling online (2003)

Enterprises selling online	D	E	F	I	UK	EU-5
Sell online	4	10	2	5	9	5
Have been selling online for ... months (on average)	*	*	*	*	*	15

Base: EU-5 (D, E, F, I, UK), all enterprises in 1st row (N=3,515 for all sectors, N=502 for Food and beverages), enterprises selling online, excl. "don't know" / "no answer", for second row. (N=542 for all sectors, N=33 for Food & beverages). * no breakdown possible because number of observations is too small. In % of enterprises. Reporting period: March 2003.

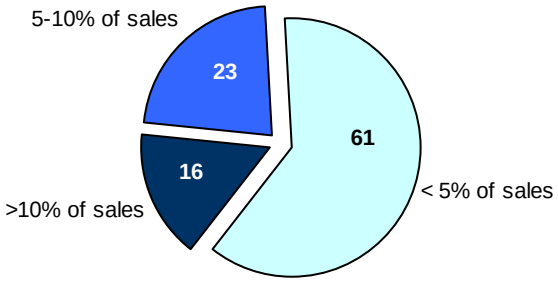
Source: *e-Business W@tch (2003)*

Even if making online sales, the relative importance of e-commerce is very limited in most of the cases. More than 60% of the companies from the food and beverages sector that reported to sell online said that online sales represent less than 5% of their total sales in 2003.

Figure 2-7: Food, beverages and tobacco: Share of online sales on total sales (2003)

Base: EU-5 (D, E, F, I, UK), enterprises selling online, excl. "don't know" / "no answer" (N=542 for all sectors, N=31 for Food & beverages). In % of enterprises. Reporting period: March 2003.

Source: e-Business W@tch (2003)



Business integration of online selling

Most enterprises (and particularly SMEs) that sell online use the company website as a base to expand their distribution platform. In addition, Internet marketplaces are used rather extensively (above all in Spain and Italy), and they have been listed by 31% of companies that sell online. Extranets and EDI are used more marginally, and EDI systems are used mainly by large enterprises. None of the companies in the sample cited mobile commerce, such as WAP or GPRS services (table 2-9).

Table 2-9: Food, beverages and tobacco: E-commerce channels used for online sales (2003)

E-commerce channels used for online sales	All sectors	Food			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
E-commerce through company website	83	89	90	77	8
E-commerce through electronic market places	40	31	32	5	8
E-commerce via extranet	5	0	0	6	0
E-commerce via EDI	3	2	0	18	92
Mobile e-commerce	4	0	0	0	0
IT system integration with customer(s) for receiving orders	24	47	49	13	46

Base: EU-5 (D, E, F, I, UK), enterprises selling online (N= 542 for all sectors, N=33 for the food sector). In % of enterprises selling online. Multiple answers possible. Reporting period: March 2003.

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

Figure 2-8: Food, beverages and tobacco: Geographical scope of online sales (2003)

Base: EU-5 (D, E, F, I, UK), enterprises selling online, excl. "don't know" / "no answer" (N=542 for all sectors, N=33 for Food & beverages). In % of enterprises. Reporting period: March 2003.

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

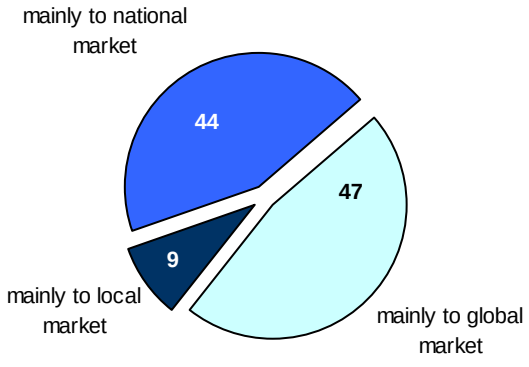


Figure 2-8 shows the distribution of sales by geographic area. 47% of companies (that sell online) reported to target markets abroad, and 44% of the companies stated that they conduct online sales mainly within the country. Only 9% of the companies that sell online said that they were catering mainly for local markets.

The main challenge of e-business is to achieve full integration of company processes and, in this specific case, the process of receiving and managing online orders. In 2003 hardly any of the companies in the food and beverages sector that sell online say that the processing of those sales is integrated with their backend systems. Most companies (77%) are informed about orders by e-mail.

However, 20% of the companies that sell online say that an incoming online order automatically triggers internal business processes that are performed electronically, and 40% of the companies stated that they are equipped with online selling systems that can provide secure transactions through a server, using an SSL protocol (Secure sockets layer).

30% of companies enable their customers to pay online for purchases. About every second company selling online offers customers after-sales services online.

Table 2-10: Food, beverages and tobacco: Integration and sophistication of e-commerce functions (2003)

Integration and sophistication of e-commerce functions	All (7) sectors	Food & beverages
Online orders are fully integrated with the back-end system	8	1
Information about online orders by e-mail	73	77
Information about online orders by fax	8	11
Other forms	8	10
Online orders triggering business processes	30	20
Usage of an online sales system with SSL	43	40
Enabling online payment	36	30
After-Sales-Service provided online	46	50

Base: EU-5 (D, E, F, I, UK), enterprises selling online, excl. "don't know" / "no answer" (N=542 for all sectors, N=33 for Food & beverages).
In % of enterprises. Reporting period: March 2003.

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

Impact of online selling on companies

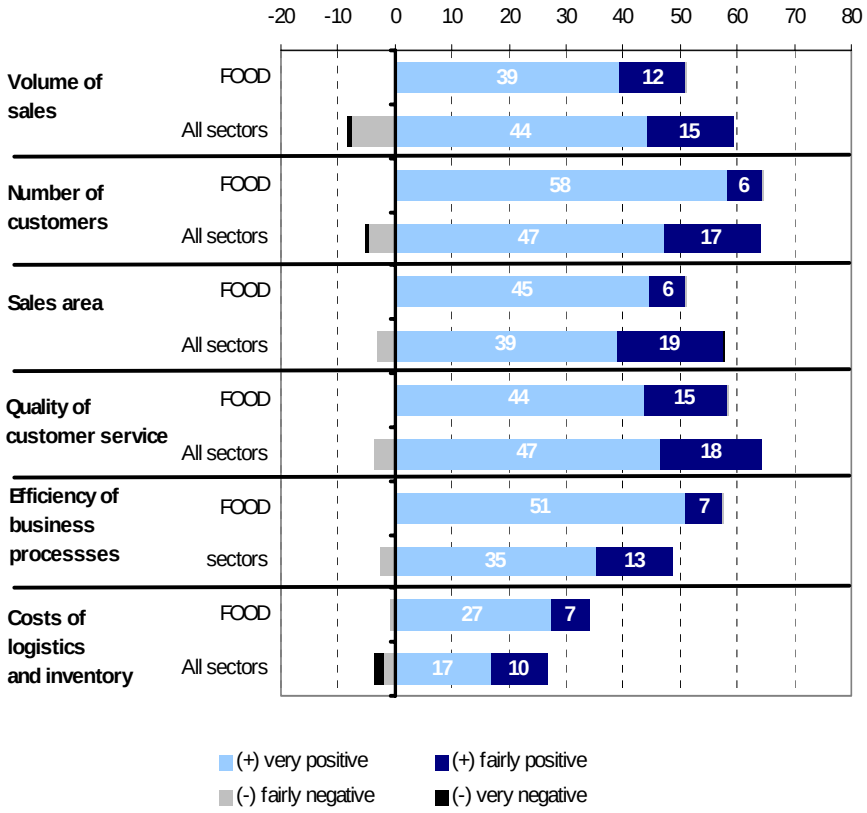
Figure 2-9 illustrates the impact of online selling on companies in this sector. In particular, online selling has proven to have a positive impact above all in terms of the number of customers (an aspect cited by 64% of the companies that sell online). Moreover, although with a slightly lower percentage, its impact on the quality of customer service (58%) and on the efficiency of internal processes (57%) has been indicated as positive. There is also a significant percentage of companies that gave a positive opinion about the impact of online selling on their sales turnover, a factor that 12% of the companies even considered a “very positive impact”.

The impact that online selling exerts on logistics costs and stock management is less positive. For this factor, over 65% of the companies stated that online selling has neither a positive nor a negative impact.

Figure 2-9: Food, beverages and tobacco: Impact of selling online on ... (2003)

Base: EU-5 (D, E, F, I, UK), enterprises selling online, excl. "don't know" / "no answer" (N=542 for all sectors, N=33 for Food & beverages).
In % of enterprises. Reporting period: March 2003.

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



2.3.2 Purchasing

In contrast to online selling which is used by 5% of the interviewed companies, online procuring (as in other sectors) has been developed more rapidly, playing a more important role in the sector. In 2003, 19% of the sample companies representing 36% of employment make online purchases. This is significantly below the average of the seven sectors surveyed (47%, employment-weighted).

Large companies are the ones that mainly adopt online procuring (54% of the sample), but there is also a rather significant percentage of small companies that handle their purchasing online (19%).

On a geographic level, online procuring is more widespread on the average in countries such as Germany (40% of enterprises) and the United Kingdom (30%).

Intentions to start using e-procurement within a twelve months period ahead are stated by only 5% of enterprises which suggests that the initial implementation of e-procurement activities has reached a first degree of saturation. In this respect, e-procurement has penetrated early adopters and seems to lie between early majority and late majority while online selling still rests among early adopters expecting to double its users in the next 12 months.

For 70% of the companies (out of the total number of companies that use e-procurement), online purchases represent less than 5% of total purchases. This leaves a wide window for future online purchases. For 20% of these companies, online procuring represents a share ranging from 5% to 10%, for 9% of the companies online procuring represents a share of 11% to 25%, whereas there are no companies (except UK) for which e-procurement exceeds 26% of total purchases. This means we must expect a two-fold increase in e-procurement: firstly, an increase on the percentage of companies purchasing on line and secondly, an increase on the percentage of e-procurement volume over total purchases.

Figure 2-10: Food, beverages and tobacco: Companies making online purchases (2003)

Base: all enterprises. Note: Figures for "total" and "all sectors" are weighted by employment ("enterprises comprising…% of employees"), while figures for size-classes are to be read as "% of enterprises".

Reporting period: March 2003.

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

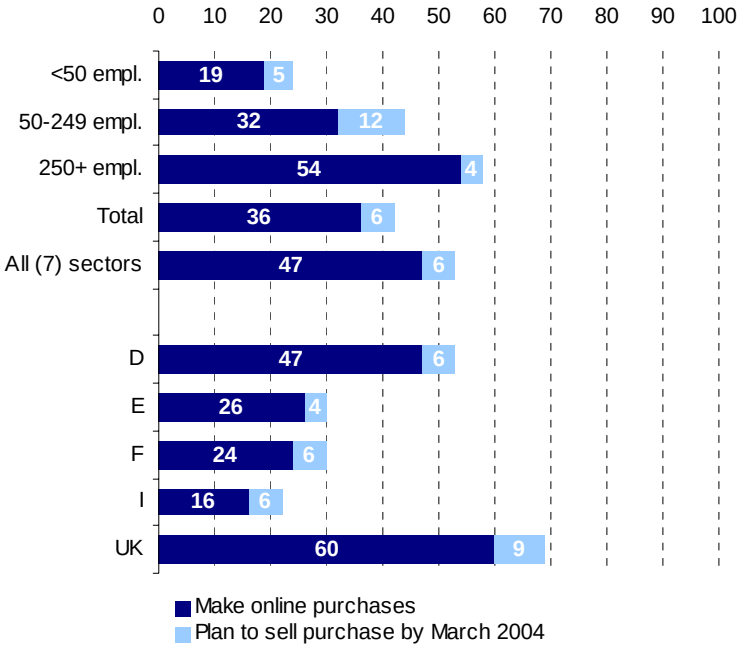


Table 2-11: Food, beverages and tobacco: Share of online purchases in total procurement (2003)

Share of online procurement on total procurement	D	E	F	I	UK	EU-5
Online share of total procurement: > 50%	0	0	0	0	0	0
Online share of total procurement: 26 to 50%	0	0	0	0	1	0
Online share of total procurement: 11 to 25%	4	10	29	12	12	9
Online share of total procurement: 5-10%	22	20	2	25	20	20
Online share of total procurement: < 5%	74	71	69	63	67	70

Base: EU-5 (D, E, F, I, UK), enterprises procuring online (excl. DK/NA) N=135. In % of enterprises. Reporting period: March 2003.

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

Business integration of online purchasing

Most companies use the website of other companies to place their orders (an instrument used by 76% of companies). Moreover, EDI is used rather extensively (21%), above all in Italy (see table 2-12). However, only a few companies place their orders through a marketplace or through access to a supplier's Extranet. This table also reveals that only a very small percentage of enterprises (8%) indicate that they have a system integrated with those of their suppliers for placing their orders. This percentage rises in the case of larger companies (21%).

Table 2-12: Food, beverages and tobacco: Type of e-procurement (2003)

Type of E-procurement	D	E	F	I	UK	EU-5
E-procurement through company website	66	82	36	99	100	76
E-procurement through electronic market places	21	19	33	0	9	16
E-procurement via extranet	9	19	29	0	7	10
E-procurement via EDI	0	18	10	33	8	21
IT system integration with suppliers for placing orders	1	10	2	25	13	8

Base: EU-5 (D, E, F, I, UK), enterprises procuring online N=135. In % of enterprises. Reporting period: March 2003.

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

A total of 48% of companies has been using online procuring for more than two years (with the highest percentages in Germany, a country with a longer tradition in this field); 16% of the enterprises have been using online procuring for more than one year but less than two, 29% of the companies stated that they have been operative for less than a year, and 25% of the companies only started an e-procuring project in the past few months (France, in particular, seems to be the country that was the last to move in the field of e-procuring).

Table 2-13: Food, beverages and tobacco: Starting point for procuring online (2003)

Enterprises procuring online	D	E	F	I	UK	EU-5
Online procurement	40	19	6	13	30	19
Procuring online for more than 2 years	66	37	34	25	37	48
Procuring online for 1-2 years	17	11	4	13	32	16
Procuring online for < 1 year	17	52	62	38	12	29
Procuring Online for ... months	28	23	17	18	30	25
Base: EU-5 (D, E, F, I, UK), enterprises procuring online N=135. In % of enterprises. Reporting period: March 2003.						

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

B2B electronic marketplaces

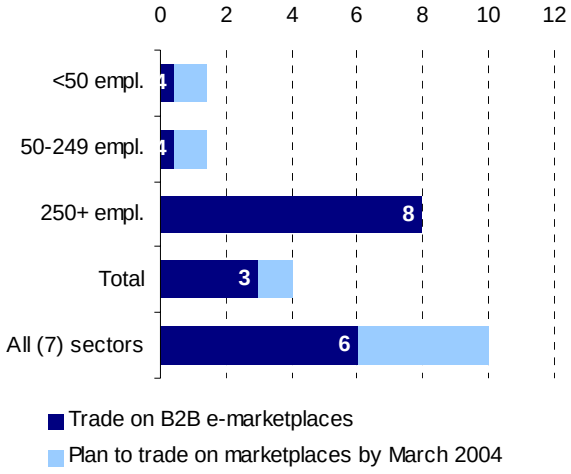
Participation of companies from the food and beverages sector in B2B electronic marketplaces seems to be still marginal at first sight, as only about 1% of all companies (representing 3% of employment in the sector) reported trading on food e-marketplaces in March 2003. The share increases to 8% when looking at large companies only. Intentions to start using e-marketplaces in the future are lower in the food & beverages sector than on average.

Figure 2-11: Food, beverages and tobacco: Participation in B2B e-marketplaces (2003)

Base: all enterprises. Note: Figures for "total" and "all sectors" are weighted by employment ("enterprises comprising…% of employees"), while figures for size-classes are to be read as "% of enterprises".

Reporting period: March 2003.

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

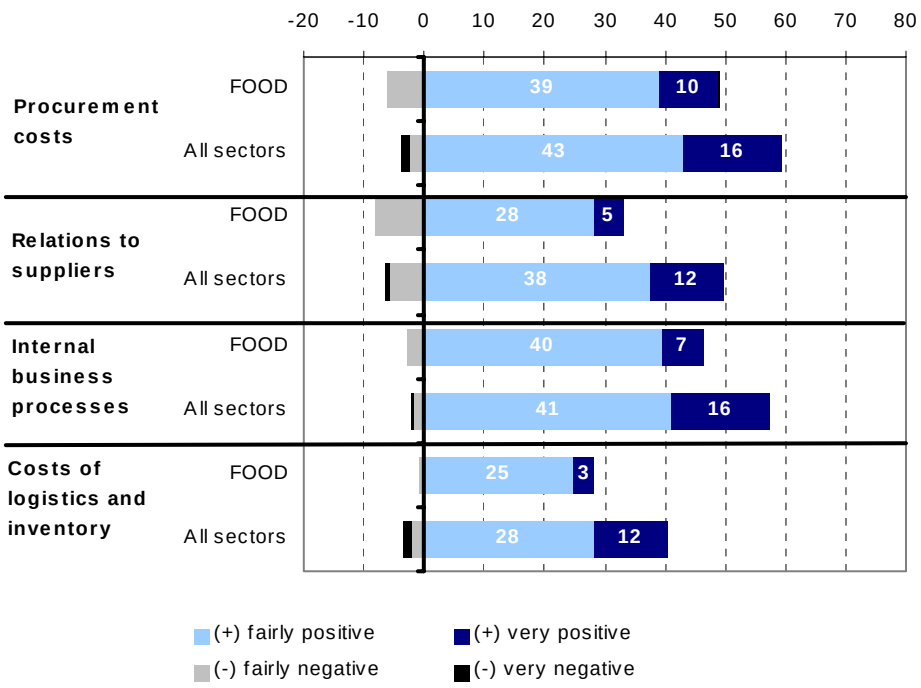


Impact of e-purchasing on the company

Figure 2-12 highlights the impact of e-purchasing on companies in the sector. In particular, online procuring seems to have the most positive impact on procurement costs (a factor indicated by 52% of the enterprises that use e-procurement). 45% of the enterprises stated that the impact of e-procurement is positive in terms of the efficiency of in-house company processes. Also indicated as positive, although with a lower percentage, is the impact on supplier relations (33%) and on the costs of logistics and stock management (27%). Nevertheless, it must be emphasised that with respect to online selling, in the case of online procuring, companies have judged its overall impact as less positive.

Figure 2-12: Food, beverages and tobacco: Impact of procuring online on ... (2003)

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



2.3.3 Internal e-business processes

Diffusion of special e-business software solutions

In 2003, 12% of the companies from the food, beverages and tobacco industry use **Enterprise Resource Planning** (ERP) systems in order to integrate their information system with their customers. Adoption of integrated management systems will emerge as a trend in the coming years as the major ERP suppliers create solutions for small and medium-sized businesses, opening up new prospects for those companies with the available capital to invest. Up to now, this sector has not shown a particular interest in ERP, opting rather for traditional business models better adapted to their size and characteristics. The functionalities of ERP systems are integrated by means of specific sector utilities, for example management of returns, handling recyclable packaging, HACCP quality control, handling with double independent units of measurement or recipe management.

Supply Chain Management (SCM) is in an embryonic phase, but presents significant opportunities. After reengineering internal processes to increase efficiency, large companies (especially in the food and beverage sector) have attempted to increase their competitive advantage by achieving inter-organisational goals, such as decreasing time-to-market and distribution costs. In the process, companies are reshaping relationships with their suppliers, producers, distributors, retail stores and customers. SCM projects move toward integration of these processes throughout the complete supply chain, from receiving the order to procurement and from production to delivery.

An emerging customer-centred approach and the spread of concepts such as "segment by one" and "mass customisation" have encouraged the implementation of **Customer Relationship Management** (CRM) by some of the larger companies. CRM is primarily a strategy and an operating method aimed at improving and expanding the connection with the customer with the aim of generating new business opportunities. CRM system implementations mostly involve customer contact points with the company in: sales, marketing, trade assistance services, order management, distribution and delivery. Typically, the first areas tackled in implementing CRM are automation of the sales force and call centre management. CRM systems offer new specialised applications, but also use or reuse of investments already made in structures such as Helpdesks and websites, redirecting them to meet CRM needs. Thus the service component is still more important than the software application component.

Table 2-14: Food, beverages and tobacco: Usage of special e-business solutions (2003)

Usage of special e-business solutions	All sectors	Food and beverages			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
SCM usage	4	3	3	5	8
Plans to use a SCM-System	2	2	2	4	7
CRM usage	6	4	3	7	20
Planning to implement a CRM-System	4	1	1	4	8
Usage of a Knowledge Management Solution	5	4	4	5	5
Plans to use a Knowledge Management Solution	2	0	0	1	3
Usage of an ASP	7	5	5	8	12
Plans to use the services of an ASP	2	0	0	2	3
Usage of an ERP system	9	12	11	25	30
Plans to use an ERP-System	2	1	1	5	19
Use of online technologies for e-learning	7	2	2	4	9
Plans to use online technologies for e-learning	2	1	1	2	0
Base: EU-5 (D, E, F, I, UK), all enterprises (N= 3,515 for all sector, N= 502 for Food sector). In % of enterprises. Reporting period: March 2003.					

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

Table 2-15: Food, beverages and tobacco: Usage of special e-business solutions (2003)

Usage of special e-business solutions	D	E	F	I	UK	EU-5
SCM usage	5	8	0	2	5	3
Plans to use a SCM-System	2	0	2	3	1	2
CRM usage	7	2	2	3	6	4
Planning to implement a CRM-System	2	5	0	0	2	1
Usage of a Knowledge Management Solution	5	8	0	5	0	4
Plans to use a Knowledge Management Solution	0	0	0	0	2	0
Usage of an ASP	2	13	0	10	3	5
Plans to use the services of an ASP	0	0	0	0	2	0
Usage of an ERP system	14	2	5	23	1	12
Plans to use an ERP-System	2	2	0	2	2	1
Use of online technologies for e-learning	3	5	0	0	5	2
Plans to use online technologies for e-learning	0	2	2	0	2	1
Base: EU-5 (D, E, F, I, UK), all enterprises N= 502. In % of enterprises. Reporting period: March 2003.						

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

One area in which interest is growing is **Knowledge Management** (KM**)**. There is some uncertainty as to how Knowledge Management may be defined; KM is an interdisciplinary area ranging from psychology to organisation theory and specific technologies such as document management, workflow tools and expert systems. Many scholars and practitioners have recognised the importance of KM for learning organisations to gain a competitive edge in recent years. The technologies supporting KM include technological infrastructures for storage and transmission of information and know-how (such as client/server networks, databases, Data Warehouses, etc.) and tools for sharing information (such as e-mail, Document Manager, Document Imaging, Workflow systems and GroupWare). KM is still a relatively small business, but it is growing rapidly, especially in larger corporations (see section 2.3.3).

Another emerging phenomenon is **Application Service Provisioning** (ASP). ASPs are commonly defined as service providers that furnish user businesses with application services over dedicated lines or over the Internet on the basis of a multi-year contract requiring either fixed periodic payments or payment based on actual use.

Another application that, in general, has found interesting room for development over the past two-three years is **e-learning**, and web-based Continuous Vocational Training systems (web–CVT) or the use of the Internet to provide training, for example by furnishing educational material to employees with the Internet or via the Intranet. It must be emphasised, however, that within the sector being examined, this application has not yet become particularly widespread.

With the exception of ERP, these applications are still not very widespread on the whole (generally, the percentage of companies using them is less than 5% of the sample), but it has shown a growth trend. Here again, larger companies are mainly the ones that have adopted a "pioneering" role. For example, ERP is used by 30% of large enterprises (and 19% plan to implement it within the next 12 months). Moreover, there has been a significant spread of CRM and ASP, used respectively by 20% and 12% of large businesses.

The extent of these applications appears essentially uniform across the various countries. However, it should be noted that CRM applications are found above all in Germany (where they are used by 7% of enterprises), whereas ASP applications are used principally in Spain (13%) and Italy (10%). Italy is also the leading ERP user (23%), together with Germany (14%). KM has made inroads above all in Spain, with 5% of enterprises that have already implemented it and 8% of enterprises that stated they are planning to do so in the next 12 months.

Other e-business applications supporting internal processes

It does not necessarily need one of the complex IT systems discussed above for supporting and (at least partly) automating some of the "typical" internal processes. Document-sharing among colleagues for group work has become quite common, above all among large enterprises. The spread of technologies to support other processes is less evolved. Only 7% of the enterprises stated that they use ICT to monitor work schedules and production time (in Germany, the rate is 13%); 4% use these technologies to support human resource management, and 1% of the enterprises use technologies to automate travel reimbursements to employees.

Table 2-16: Food, beverages and tobacco: Use of online technologies (2003)

Use of online technologies	D	E	F	I	UK	EU-5
Use of online technologies to share documents/ to perform collaborative work	7	24	4	12	11	10
Use of online technologies to automate travel reimbursement of employees	2	0	2	0	7	1
Use of online technologies to track working hours and production time	13	8	2	7	5	7
Use of online technologies to support the human resources management	3	7	2	5	9	4
Base: EU-5 (D, E, F, I, UK), all enterprises N=502. In % of enterprises. Reporting period: March 2003.						

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

2.3.4 Processes of the extended enterprises

Enterprises do not use online technologies solely for e-business purposes. The use of online technologies for the electronic exchange of documents with suppliers (order, for example) or with customers is becoming quite important in the sector. There is less latitude for the use of these technologies for collaborating with commercial partners to design new products or forecast product demand. Moreover, only a low percentage of enterprises stated that they use online technologies to negotiate contracts or to manage production capacity and inventory (see table 2-17).

Table 2-17: Food, beverages and tobacco: Usage of online technology within the value chain (2003)

Usage of online technology within the value chain	All sectors	Food and beverages			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
Online collaboration with business partners for designing products	12	7	6	9	14
Online collaborating with business partners to forecast product demands	10	7	6	8	19
Online management of capacity / inventory	10	10	10	10	15
Electronic exchange of documents with suppliers	37	29	28	40	57
Electronic exchange of documents with customers	28	25	25	34	58
Online negotiation of contracts	12	7	7	10	12

Base: EU-5 (D, E, F, I, UK), all enterprises with internet access (N= 2,677 for all sector, N= 350 for Food sector). In % of enterprises. Reporting period: March 2003.

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

2.3.5 Overall satisfaction and outlook

Lastly, an attempt was made to sketch out a forecast of future investments in e-business technologies that the enterprises in this sector will make in the next 12 months and to evaluate the overall satisfaction level of companies in terms of the current status of e-business. As shown in table 2-18, 70% of the enterprises interviewed stated that they would maintain the same level of investments , whereas 26% of the enterprises plan to increase their investments in e-business technologies over the next 12 months. Only 2% of the enterprises think that ICT expenditures may diminish. It is important to note that large enterprises are not the only ones that are oriented towards increasing their ICT expenditures in the next 12 months, but that a very high percentage of SMEs is also planning to increase these expenditures.

As to the general opinion of e-business, 90% of the enterprises (see table 2-19) indicated that they are satisfied with the effect and success of the e-business activities and initiatives that they have undertaken.

Table 2-18: Food, beverages and tobacco: Planned expenditure on e-business (2003)

Plans for expenditure on e-business technologies for 12 months period ahead	All sectors	Food and beverages			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
Increase expenditure	29	26	26	29	36
Decrease expenditure	2	2	2	1	8
Maintain current level	64	70	71	65	56

Base: EU-5 (D, E, F, I, UK), all enterprises (N= 3,515 for all sector, N= 502 for Food sector). In % of enterprises. Reporting period: March 2003.

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

Table 2-19: Food, beverages and tobacco: Satisfaction with e-business in 2003

Expenditure on e-business	All sectors	Food and beverages			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
Very satisfied with e-business	19	11	12	10	8
Fairly satisfied with e-business	70	79	79	87	88
Fairly disappointed with e-business	9	9	10	3	4
Very disappointed with e-business	1	0	0	0	0

Base: EU-5 (D, E, F, I, UK), enterprises expressing that they do e-business, excl. DK (N=1,576 for all sector, N= 125 for Food sector). In % of enterprises. Reporting period: March 2003.

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

2.4 E-business development 2002 – 2003: main trends

Methodological remarks on the survey comparison

The *e-Business W@tch* carried out two enterprise surveys based on similar questionnaires in June 2002 and in March 2003. The data presented in the previous sections of this report are based on the *e-Business W@tch* survey conducted in March 2003. The aim of the following section is to identify whether significant changes from the first survey have occurred, which allow an assessment of some major trends in e-business developments in the Food, Beverages and Tobacco Sector.

However, the comparison of survey results meets some challenges: the time frame between the two surveys, which is too short to provide statistically significant changes in percentage figures for most indicators and the weight of the micro enterprises in the sample which is slightly higher in the 2003 survey (micro enterprises are likely to have lower e-business usage compared to the other size classes). This means that while most of the indicators do not show any relevant change and we cannot reject the hypothesis that differences are merely due to the fact that different companies were interviewed in both survey rounds, although selection was based on the same sampling procedure

Notwithstanding these restrictions in comparability, some trends of e-business use in the can be identified and are presented in the following paragraphs.

ICT infrastructure

A comparison of survey results from 2003 and 2002 on ICT infrastructure diffusion in the food, beverages and tobacco sector seems to suggest that the general level of diffusion has essentially remained stable. This is expressed by the Industry Connectivity Index and the SME Connectivity Index[1] developed in *e-Business W@tch*.

Table 2-20: Food, beverages and tobacco: Industry and SMEs Connectivity Index (2003)

	Industry Connectivity Index		SME Connectivity Index	
	6/2002 (EU-4)	3/2003 (EU-5)	6/2002 (EU-4)	2003 (EU-5)
Food, beverages and tobacco	37	37	28	25 *

The index considers (a) the diffusion of internet access in a sector and (b) the quality of their access in terms of bandwidth. It can take a maximum value of 100.
* decrease is partly due to different sample composition in 2003

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

As for networking applications and infrastructure in particular, more traditional applications such as e-mail, www, etc. are stable while more sophisticated applications are slightly increasing. Major increase are in the usage of Intranet (+ 2% compared with 2002), Extranet (+ 4%) and Wan (+ 4%).

The survey results indicate that companies are upgrading their Internet connections: from 2002 to 2003 DSL by + 13%.

Table 2-21: Food, beverages and tobacco: usage of network applications and infrastructure in 2002 and 2003

	Intranet	Extranet	LAN	WAN
2003 (a)	41	14	57	32
2002 (b)	39	10	60	28
Change	+ 2	+ 4	- 3	+ 4

Base: all enterprises.
a) EU-5 includes D, E, F, I, UK.
b) EU-4 includes D, F, I, UK.

Source: *e-Business W@tch* (2002-2003)

[1] Both indices are pilots. They are presented for the first time in this report to stimulate discussion about innovative, adequate and useful indicators for measuring progress in ICT and e-business adoption.

Table 2-22: Food, beverages and tobacco: Internet access in 2002 and 2003

	Analogue modem	ISDN	DSL	other fixed connect.
2003 (a)	21	38	35	20
2002 (b)	27	51	22	14
Change	- 6	- 13	+ 13	+ 6

Base: all enterprises. a)EU-5 = D, E, F, I, UK. b)EU-4 = D, F, I, UK.

Source: *e-Business W@tch* (2002-2003)

E-business activities: the growth of on line selling

In the past two years, the development of e-business in the food and beverage sector has followed the trend of the entire ICT sector, which is experiencing a phase of reflection. Although the number of companies present online has increased slightly through the creation of websites, e-commerce has not shown enormous development. However, it must be noted that online procuring, which has now become rather widespread in the sector, has recently shown a slowdown (see figure 2-13). Inversely, online selling – which is less widespread – can boast of positive performance (see figure 2-14).

The growth of online selling has been favoured, on the one hand, by the market entry of websites belonging to companies that were already operating on the traditional market (favoured over dot-coms in that they already have infrastructures and an established brand), and on the other hand, by the creation and success of several sites offering typical food products.

Figure 2-13: Food, beverages and tobacco: Adoption process of online procurement

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

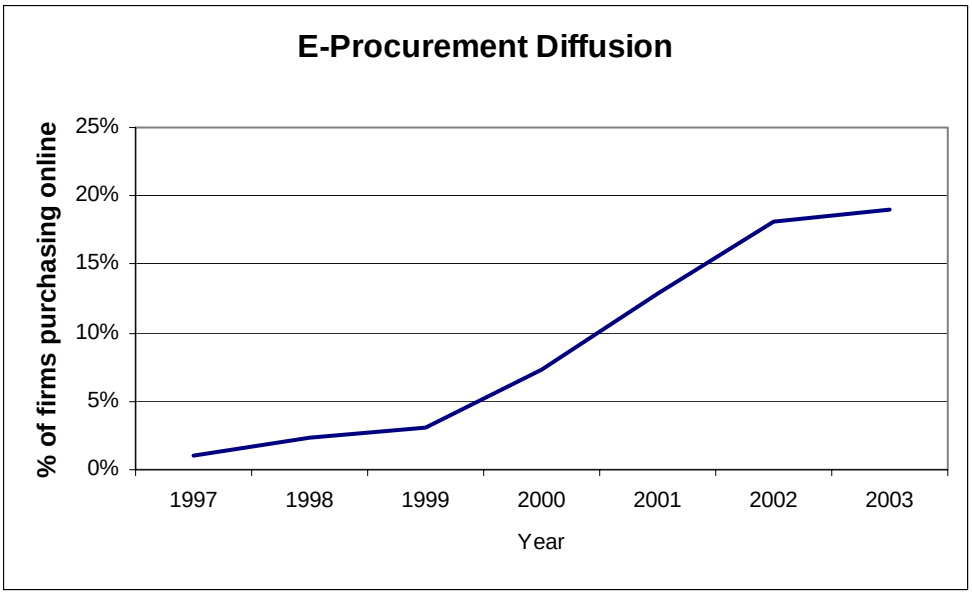
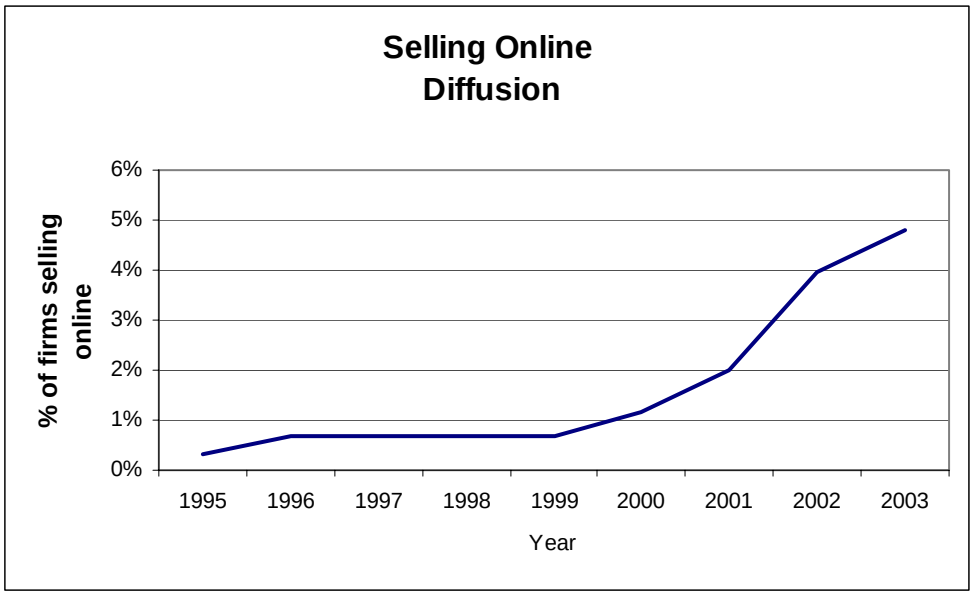


Figure 2-14: Food, beverages and tobacco: Adoption process of selling online

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



Special e-business software solutions

With regard to the use of special e-business solutions, there is a growth trend of ERP. This growth has been driven by requests from larger companies (due to increasingly customised software to meet the specific needs of food businesses), as well as the tendency among ERP suppliers to broaden their target to include SMEs.

SCM and CRM have remained stable, while ASP services and knowledge management projects are slightly increasing.

Table 2-23: Food, beverages and tobacco: usage of special e-business solutions in 2002 and 2003

	SCM	CRM	KM	ASP	ERP
2003 (a)	3	4	4	5	12
2002 (b)	3	4	2	4	8
Change	-	-	+ 2	+ 1	+ 4

Base: all enterprises. a) EU-5 includes D, E, F, I, UK. b) EU-4 includes D, F, I, UK.

Source: *e-Business W@tch* (2002-2003)

Plans for investments and satisfaction with e-business

The attitude towards ICT investments in this Industry sector has slightly decreased in the past two years. The share of companies who state they intend to increase their investments in the next 12 months, in fact, has shifted from 29% in 2002 to 26% in2003. Lager companies are those who reduced more their ICT budget; while the share of medium-sized companies (50-249 employees) planning to increase their ICT investments has been increasing.

Table 2-24: Food, beverages and tobacco: Planned expenditure on e-business in 2002 and 2003

Plans for expenditure on e-business technologies for 12 months period ahead	Food and beverages			
	All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
Increase expenditure (2003) (a)	26	26	29	36
Increase expenditure (2002) (b)	29	29	23	58

Base: all enterprises. a) EU-5 includes D, E, F, I, UK. b) EU-4 includes D, F, I, UK.

Source: *e-Business W@tch* (2002-2003)

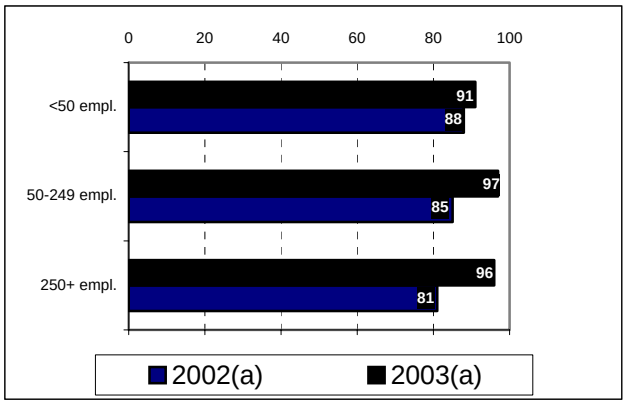
Although the overall attitude towards investments in ICT is lower, the general evaluation about e-business impacts is positive. The share of companies who are satisfied with e-business, which was quite high in 2002, increased further in 2003, first of all among larger enterprises (from 81% in 2002 to 96%).

Notwithstanding players' scepticism and the general economic slow down, the high and increasing share of satisfied companies indicates that companies' efforts in the implementation of ICT solutions brought good results and the return on investment has been positive.

Figure 2-15: Food, beverages and tobacco: Satisfied with e-business in 2002 and 2003

Base: all enterprises. a) EU-5 includes D, E, F, I, UK. b) EU-4 includes D, F, I, UK.

Source: *e-Business W@tch (2002-2003)*



3 Summary and conclusions

3.1 Summary of main findings

The food, beverages and tobacco sector comprises 15% of the total manufacturing production of the European Union. This intensely competitive sector is characterised, on the one hand by a relatively small group of large companies that tend to operate globally and, on the other, by a large number of small and medium-sized business that operate locally, with the balance varying between countries.

The spread of ICT reflects the structure of the food industry. Large multinational companies (usually leaders in their sectors) are the most technologically advanced companies, while smaller companies lag behind in adopting ICT, especially upstream of the various product lines.

The main factors that push companies in the food sector to consider ICT solutions include greater efficiency in internal processes (productive, administrative, delivery of orders, etc.) and integration of internal processes with external organisations to improve logistics and reduce costs. A more integrated view is emerging, with leading companies looking for ways to apply technology strategically to improve business management activities.

In this sector, e-business mainly involves in-house company processes and procedures. The most widespread technologies in both large companies as well as SMEs are e-mail and websites, with ERP and EDI systems trailing far behind. The most state-of-the-art technologies, such as CRM, SCM systems, and Knowledge Management solutions, are still not very widespread and are to be found almost exclusively at larger enterprises.

Despite the fact that e-business in this sector mainly involves internal processes and procedures, e-commerce has grown steadily in recent years. In particular, online procuring has reached a certain level of diffusion, as it is used by nearly 20% of the enterprises in the sample. Instead, online selling has spread to a much more modest extent, and it is used by approximately 5% of the enterprises interviewed. With respect to online procuring, however, online selling presents slightly more favourable prospects. In fact, based on the results of the survey, whereas 5% of companies have planned e-procurement initiatives in the next 12 months, when it comes to online selling this percentage rises to 8%.

For the companies in this sector, online selling has a positive impact not only on external relations (it can increase the number of customers and improve customer service), but also internally, above all by improving the efficiency of company processes. Instead, online procuring seems to have a slightly less positive impact and, in any event, it exercises its benefits above all inside the company by optimising procurement/logistics costs and offering better stock management.

Companies expressed a complicated, rather controversial view about the role of ICT in the sector. In fact, although there is still a large percentage of interviewees who feel that e-business does not yet play a significant role for the company, at the same time there is a very large percentage (over 90%) of interviewees – from large companies as well as SMEs – who affirmed that they were satisfied with the e-business initiatives undertaken to date by their companies. Those polar views reflect the fact that e-business is rather a complex concept which is more viewed as a facilitator of competitiveness (“we are happy with e-business initiatives”) than a source of competitive advantage (“does not contribute significantly to the company”). This indirect role of e-business in creating the backbone of competitive efficiencies is more visible in large companies that rush to invest in e-business applications as well as state-of-the-art technologies such as CRM and KM. SMEs face difficulties in understanding the complex role of how e-business applications today help businesses develop the infrastructure of tomorrow.

Furthermore, this may partially explain the current phase being experienced by e-business in general. Following the large investments of the past years, which were not always rewarded with adequate economic returns, the introduction of ICT within companies now requires more prudent and rational

management. Achieving this goal entails closer collaboration between technology suppliers and customer enterprises, a higher and more widespread level of training among users, and a technological offer that is more rational, targeting the real needs of the company.

3.2 Economic implications

3.2.1 Implications for the individual enterprise

As it has been emphasised a number of times, from a structural standpoint and also in terms of ICT availability and "awareness"; the food, beverage and tobacco sector is "polarised". In other words, on the one hand is operating a relatively limited group of large multinational firms that have acted as "pioneers", introducing within their corporate structures the various technologies present on the market. On the other hand, there is a large group of SMEs operating in this sector (to varying extents, depending on the country), and these firms are relatively "behind" from an ICT standpoint.

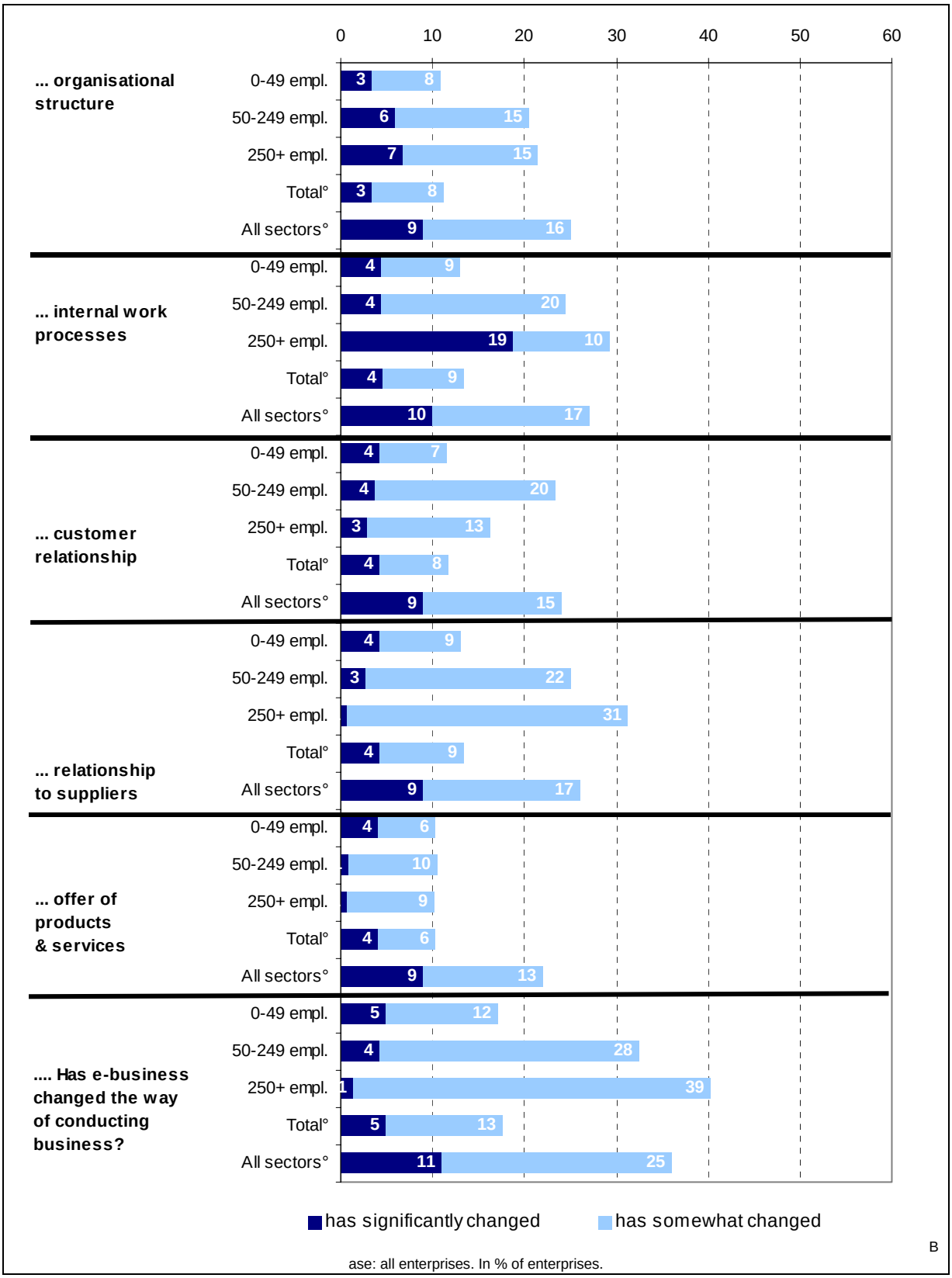
This distinction is important for understanding the economic implications of e-business on companies in this sector.

The first consideration that emerges is the fact that, to date, e-business has had "partial" economic implications specifically because it has significantly involved only a relatively small number of companies, namely the larger ones. For SMEs, the impact of e-business must be gauged above all in relation to the ICT facilities currently at their disposal: websites, the Internet, and e-mail.

The second evaluation to be made is that there are still few companies that feel e-business has significantly changed their corporate organisation (see figure 3-1). However, we must not overlook the percentage of interviewees who feel that there have been changes – some of which are significant – in terms of internal work processes (approximately 30% of large companies) as well as relations with customer and suppliers. The optimisation of corporate processes has been achieved above all in the areas of production, logistics, administration and order management, thanks to the introduction of and ERP systems, the latter being increasingly "tailor-made" to meet the specific requirements of food companies, and to a lesser extent of SCM packages.

Thirdly, although it is true that the impact of e-business has not shown itself to be particularly productive so far, we must nevertheless underscore the fact that a large portion of interviewees (nearly 50%) feels that e-business will benefit large companies in the future, whereas one interviewee out of three thinks that e-business will bring benefits to large companies and SMEs alike. Only a fraction of the sample (equivalent to 2%) feels that there will be no benefits for any type of business.

Figure 3-1: Food, beverages and tobacco: Impact of e-business on companies (2003)



ase: all enterprises. In % of enterprises.

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

Table 3-1: Food, beverages and tobacco: Expected beneficiaries of e-business (2003)

Who will mainly benefit from e-business? Assessment by companies	All sectors	Food and beverages			
		All enterpr.	0-49 empl.	50-249 empl.	250+ empl.
Main beneficiaries will be SMEs	15	12	12	15	19
Main beneficiaries will be large enterprises	40	47	47	44	36
SMEs and large enterprises will equally benefit	36	33	33	36	39
No one will benefit	2	2	2	2	5
Base: EU-5 (D, E, F, I, UK), all enterprises (N= 3,515 for all sector, N=502 for Food sector). In % of enterprises. Reporting period: March 2003.					

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

E-business opportunities

- **"Leading" companies:** in this sector are companies like Barilla (I), Danone (F) and Unilever (NL) that are playing a "pioneering" role in the introduction of ICT and the development of e-business. The satisfactory results achieved by these companies could generate an "imitative" process by smaller companies operating in the respective trade sectors. In many cases, large companies find it effective to upstream their ICT technologies in their smaller suppliers and trading partners in general. A significant proportion of current ICT diffusion has been attributed to this so-called "hub and spokes" phenomenon which is expected to continue with current B2B applications.
- **"Typical" products:** there are numerous SMEs in this sector – above all in countries like France, Italy and Spain – that have gained important shares of online sales on foreign markets with typical products. The trade sectors that are most involved are those of wine, charcuterie products and baked goods. As far as Italy, Greece and Spain are concerned, olive oil may also play an important role.
- **Training:** a significant opportunity for sector companies is tied to bolstering ICT training and education for their employees. Large companies seem more evolved from this standpoint. Here again, more widespread training among SME's would be positive. Web-based Continuous Vocational Training, although in its first steps, provides a promising alternative training for remote SMEs that cannot afford expensive training programmes requiring employee absenteeism.
- **Online selling:** although the percentage of companies that continue to sell online is still limited, based on the results of the survey there are good growth prospects in both B2B and B2C.
- **ICT expenditure:** although it is true that for most companies in the sector the current level of ICT investments will remain unchanged over the next 12 months, it must nevertheless be emphasised that for over 25% of the companies ICT expenditures should increase over the short/medium term. In a generalised context of a lull in technological investments, these results should be interpreted as a good opportunity for the sector.

E-business threats

- The main threat for the sector is represented by general backwardness with regard to ICT awareness, and this is widespread throughout the production chain and above all among SMEs. This is due in part to the relatively low level of training and education conducted inside these companies.
- Another threat is tied to the ongoing difficulty of companies in evaluating and appreciating the economic returns of e-business, often accompanied in the past principally by the steep purchase costs of software and hardware, and by a technological offer that is often not very efficient and that does not always target the specific needs of the sector.
- The sector is also affected by the current negative economic trend and by the stagnation phase being experienced by e-business in general.

E-business barriers

The barriers that prevent the development of e-business in the sector are high and, above all, they are cultural barriers. In particular, as far as e-procuring is concerned the main barriers and factors that can slow down development are represented by the need for personal interaction with suppliers and by the still limited number of suppliers who sell online. In the case of online selling, the main barriers are instead linked to the fact that many of the products offered by companies do not lend themselves to being sold online. Buyers are still accustomed by the "traditional way" of buying and selling and find it hard to shift their behaviour, particularly regarding the way they collect information about the product and the investigation of its physical characteristics. In both procuring and selling online, another significant barrier is the low level of trust among users with regard to the confidentiality and security of their transactions. In e-marketplaces, state-of-the-art technologies raise the level of consumer trust by automatic rating systems that provide consumers with added information about the buying/selling behaviour of their prospective trading partner.

Table 3-2: Strengths and weaknesses of e-business in the food, beverages and tobacco sector

Points of strength	Points of weakness
Presence of multinationals leading in the introduction of ICT and development of e-business	Presence of a large number of SMEs which lag behind when it comes to ICT "awareness"
Presence of many companies capable of offering local speciality products which are also popular abroad	SMEs often cannot budget for ICT expenses
Good level of availability of "basic" ICT infrastructures (PC, website, e-mail)	Lack of availability of certain "advanced" ICT structures (such as LAN, Intranet, WAN, Extranet), especially in SMEs
ICT training and education is quite widespread in larger enterprises	Little education and training in SMEs
Good prospects for growth for selling online	Little use of e-commerce throughout the sector
In a number of countries (including France, Italy, Spain) enterprises have large shares of online sales for export thanks to their offer of local speciality products	Online sales/purchases represent a small percentage of the total
Birth of a number of marketplaces and portals / vortals specialising in specific food sectors	Enterprises rarely participate in B2B initiatives and marketplaces in the sector
Significantly widespread use of banking online. Growing offer of specialised ERP services for food enterprises	Certain specific e-business solutions (SCM, CRM, ASP, KM, etc.) are rare, practically non-existent in SMEs
About 25% of enterprises plan to increase ICT expenditures in the next 12 months	Presence of high barriers (mostly "psychological") to growth in e-commerce

Source: Databank Consulting

3.2.2 Implications for the industry structure

From the standpoint of the industry structure, the implications of e-business have not been highly significant to date. We can say that e-business has not led to structural changes, but it has nevertheless facilitated certain processes: for example, the creation of industrial groups (tied to recent acquisitions) has been facilitated from an operative standpoint by the installation of interconnected local networks. Likewise, the need to achieve greater collaboration and integration between industry and trade has discovered an important tool in network technologies. However, it would be difficult to sustain that – at least so far – e-business has triggered significant structural changes in the sector.

The less-than-positive results achieved so far can be attributed mainly to the following factors: widespread cultural backwardness from an ICT standpoint (above all in SMEs); limited (or often non-existent) budgets to be allocated to ICT expenditures; education and training that are not widespread among SMEs, leading to the consolidation of barriers and obstacles to the development of e-business.

The most significant economic implications that may arise over the next several years can be summarised as follows:

- the growing collaboration among companies, tied to common online initiatives, could lead to the creation of new agreements or strategic alliances, as well as acquisitions and mergers, with an ensuing increase in the level of concentration of the sector;

- increasing competition in terms of costs, accelerated by the introduction of certain labour-saving technologies, could cause companies (particularly SMEs) to leave the sector, as they are no longer able to be competitive on the market;
- the spread of ICT infrastructures and new applications could lead to a more forceful integration within the various production chains, particularly between industry and distribution;
- the optimisation of certain processes/areas/corporate activities could promote the recovery of operating margins and free up financial resources to be allocated to other areas/activities (for example, trade marketing, customer service); the structure of the chain of value is likely to undergo some changes;
- the development of online selling could promote the establishment of new specialised enterprises in the channel (and the growth of existent enterprises), the development of new online operators (online supermarkets, virtual consortia), and the creation of new strategic groups of enterprises.

3.3 Policy issues

Quality assurance, including food safety, is a key issue that most companies in the food industry are facing today: "safety from gate to plate"

EU regulation concerning safety is of utmost importance in this sector, and in the Food sub-sector in particular. Issues involved are quality and safety of materials and the regulation of food typical products (regulated by the EU laws n. 2081/92 and 2082/92, concerning the DOP and IGP productions

Verifying the quality of raw materials and finished products is becoming increasingly important. ICT is important in this respect as it plays a key role in facilitating vertical integration and control between production processes and suppliers. An e-business solution capable of guaranteeing food safety to consumers and vertically integrating business operations across the supply chain would have a good chance of becoming the “killer application” for e-business in the food industry.

E-business can offer traceability of inputs, ingredients, etc., thus making transparent food safety happen from farm gate across the supply chain to consumer plate. In this context, transparency of information and actions aimed at building customers’ trust and loyalty will be key issues in the near future. A number of EU funded-projects such as trace-fish or EUfoodtrace (www.EUfoodtrace.org) have researched the possibility of applying e-business applications in order to achieve food traceability with promising results. The ICT technology is there to enable integration “from gate to plate”. Policy should take into account e-business applications in order to legislation proves itself productive.

Promotion of ICT education, training and “cultural” change

The implementation of e-business requires qualified and continuously vocationally trained personnel. Companies, therefore, have to ensure the necessary tools for improving competences and ICT skills.

The flexibility of organisation is, in electronic environments, dependent to a significant part on the adaptability of their workers. The main difficulty for businesses in this respect is the requirement to train users every time their work routines are changed and new software packages are introduced.

The aim of promoting education and training is not only up to enterprises, but also involves universities, learning institutions and the government. Public institutions should undertake the task of promoting ICT within enterprises in order to dismantle the barriers which still hamper its development. It is still important to raise awareness and recognition of the potential of ICTs on Continuous Vocational Training.

So far only leading companies have progressed from use of ICTs as a mere tool for reducing production costs to a tool supporting strategic decisions and e-business interaction models. The dominant culture, especially among SMEs, is still conservative. They lack confidence in the potential and benefits of new technologies for their business, and instead underline the common concerns about security and the cultural reluctance to any change in established procedure.

Companies of all sizes, however, should be fully aware and recognise the impact which e-business applications will have on their business in the future, for example for achieving and attaining competitive advantages as well as enhancing profitability.

Successful initiatives which have developed forms of collaborative product design, joint marketing and integrated logistics among the various players in the value chain should be promoted and become common knowledge in the sector. To this end, especially among SMEs, there is a need for promoting information activities about the potential of ICT through the dissemination of best practices, enhancing trust and confidence, and developing actions aimed at raising awareness and ensuring that appropriate skills are available. Industry associations will play an important role in taking up these actions and getting their members involved.

Fostering competitiveness in industrial districts through ICT support

In the sector, and particularly in Italy and France, there are several important industrial districts (for example, the charcuterie districts of Parma and San Daniele in Italy, and the champagne district in France) and they are mainly composed of SMEs. The industrial districts of the food and beverage sector enjoy the competitive advantages typical of all industrial districts (exclusive skills, a dense network of relations, etc.) and, as such, they are experiencing a transitional situation, tied not only to the globalisation process underway but also to the impact of new technologies.

The ability to face these challenges in a positive way depends on numerous factors, including the application of new ICT technologies by enterprises in order to enhance their efficiency and collaboration within the production chain, as well as relations with companies working outside the district.

Fostering and encouraging SMEs to use ICT

The food & beverage industry has been a *follower* of e-commerce and e-business development rather than an early adopter. Encouraging the further up-take of e-business by this sector, and especially among SMEs, will therefore be a key issue for policy actions.

This aim can be achieved facilitating and promoting:

- creation of marketplaces and B2B portals capable of drawing SMEs closer to larger enterprises and large-scale distribution. Special initiatives could be implemented in sectors characterised by an important offering of “typical” national speciality products (wine, cheese, ham, etc.). Initiatives of this kind would offer countless benefits for SMEs, but also for larger enterprises and distributors. The benefits for SMEs would include increased visibility (for both the enterprise and its products), improved communication with prospective customers, reduction of the time and expense involved in negotiation (telephone contact, sending of documentation sending of information and clarification on products, productive processes, etc.). Large multinationals and distributors wanting to expand their range by offering speciality products would benefit from the presence of small local suppliers capable of guaranteeing know-how, procurement of quality raw materials locally, the image and guarantee of the genuine speciality product, and flexibility in production.
- facilitating and promoting creation of B2C portals and sites capable of bringing SMEs closer to final consumers Implementation of B2C initiatives capable of enhancing the final consumer’s impression of national speciality products and promoting sales on foreign markets. Almost half of online sales in the sector are destined for export. Countries like Italy, France and Spain with a vast offering of world-renowned speciality products are most export-oriented. Promotion and facilitation of support might take such forms as promotion of the creation of carrier networks for rapid delivery, opening “virtual” shops for online sales of speciality products, etc.
- facilitating the purchase and usage of ICTs and e-business applications specifically aimed at improving SMEs' competitiveness. Specialized software solutions tailored for food companies are already available and could be adapted to the SMEs' specific needs. This initiative can be coupled with “best-practice” examples in order for SMEs to reduce the concept complexity of e-

business applications and make more visible how those applications can practically help their business.

Promotion of implementation of projects and initiatives involving both industry and modern distribution

Following the example of the ECR (Efficient Customer Response) initiative which spread throughout all EU nations from the mid-nineties on, other similar initiatives could be implemented with the aim of improving integration between industry and modern distribution and making it more efficient. The goals of initiatives of this kind should be reduction of operating costs and optimisation of the principal processes in the food chain (product supplies, restocking of individual points of sale, administration of transport, inventory management, etc.).

Projects of this kind should involve both the major distribution groups and the largest possible number of producers in the food industry. Those initiatives can also offer value-added in terms of traceability of products. It is evident that, one way or another, food safely and food quality depends upon the efficient traceability of products and raw materials throughout the food chain. The implementation of effective traceability projects relies upon the usage of modern e-business applications that permit the efficient communication of information, coordination of activities, and integration of processes. Most technological difficulties have already been solved (web interfaces, integration of software systems, data interchanges, mobile technologies etc) and now it is time for the implementation of supply-wide and industry-wide projects and initiatives in order to deliver the desired food quality to the plate of the end-consumer.

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Annex: Methodology of the e-Business Survey 2003

Background

Most of the data presented in this report are derived from the recent European e-Business Survey 2003, which constitutes – together with the previous survey carried out in June/July 2002 – a cornerstone of the monitoring activities of the *e-Business W@tch.* In total, 3515 telephone interviews with decision-makers in European enterprises in all EU Member States were conducted between 24th February and 20th March 2003. The questionnaire was largely based on the questionnaire used in the 2002 e-Business Survey.

Field-work

The field-work of the survey was carried out by INRA Germany in co-operation with its partner organisations on behalf of the *e-Business W@tch*:

Country	Organisation
Germany	INRA Deutschland GmbH, Papenkamp 2-6, 23879 Mölln
Spain	INRA España, Grupo IPSOS ECO Consulting, Avda. de Burgos, 12.-8°, 28036 Madrid
France	CSA TMO, 22 rue du 4 Septembre, 75065 Paris Cedex 02
Italy	INRA Demoskopea S.p.A.,Via Rubicone 41, 00199 Roma
UK	Continental Research, 132-140 Goswell Road, EC1V 7DY London

Interview method

The field work was carried out in June and July 2002 using computer-aided telephone interview (CATI) technology. The decision-maker in the enterprise targeted by the survey was normally the person responsible for ICT within the company, typically the IT manager. Alternatively, particularly in small enterprises without a separate IT unit, the managing director or owner was interviewed.

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 EU Member States and which have their primary business activity in one of the 7 sectors specified by NACE Rev. 1 codes. 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 focuses 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 included enterprises from 15 sectors of the economy, defined by NACE Rev. 1 business activities (see table next page). The composition of sectors took into account their economic importance, homogeneity with respect to the analysis of e-business, and the relevance of e-business activities.

The sample drawn was a random sample of companies from the respective sector population in each Member State where the respective sector was to be surveyed with the objective of fulfilling quota with respect to company size class. Target quota were to include a share of at least 10% of large companies (250+ employees) per country-sector cell and at least 30% of medium sized enterprises (50-249 employees).

Samples were drawn locally by the INRA partner organisations based on the acknowledged business directories and databases (cf. table next page). In total, 3,515 interviews were carried out.

Population coverage of the e-Business Survey (2003)

No.	NACE Rev. 1 Codes (Section – Division/Group)		Sector Name
01	D	15, 16	Manufacture of food products, beverages and tobacco
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	G	52.11, 52.12, 52.4	Retail
06	H / I / O	55.1, 55.2, 62.1, 63.3, 92.33, 92.52, 92.53	Tourism
07	I / K	64.2, 72	Telecommunications and computer-related services

Country	Directory / Database	No. of interviews	Average length
Germany	Heins und Partner Business Pool	701	12.1 min.
Spain	Schober	700	11.1 min.
France	IDATA, based on "INSEE Siren file" (the National Institute of Statistics) and other directories	701	12.4 min.
Italy	Dun & Bradstreet	709	15.3 min.
UK	Dun & Bradstreet	704	13.0 min.
TOTAL		**3,515**	**12.8 min.**

Problems encountered

No major problems were reported by the fieldwork organisations with respect to interviewing (e.g. comprehensibility of the questionnaire, logical structure). A statement from the institute that carried out the survey in Germany summarises this general assessment very well: "In total fieldwork ran smoothly and the questionnaire was easy to understand for most of respondents."

- Most problems stemmed from the difficulties of conducting research projects among ICT decision-makers in general rather than from any specific flaws in design of this project itself. 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 not possible to accomplish the objective of including a share of 10% of large companies in a specific sector. These were then replaced by interviews with SMEs.
- The Italian institute remarked that it was difficult to carry out the interviews within businesses/retailers not using or with a basic use of computers, because of the number of questions on related issues. Furthermore, it was reported that few respondents seemed to be aware of the existence of e-marketplaces and/or the meaning of this term.
- An issue – which was known in advance but is unavoidable in telephone interviews – is that it is not always easy to find the right target person. Field work 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 implementation status and technical consequences.

Tabulations

Within the coverage specified above, and in line with the special task of the *e-Business W@tch*, results were compiled for mainly two sets of data:

1. An activity breakdown of the population of enterprises into 7 sectors. This breakdown is based on the aggregate of five countries (D, E, F, I, UK). In order to facilitate comparisons to the 2002 survey, an additional breakdown by activity based on the EU-4 aggregate of D, F, I and the UK was computed. The reason is that in 2002 Spain was not covered in all of the 7 sectors.
2. A size-class breakdown of the population of enterprises into three categories: small enterprises (including micro-enterprises, i.e. enterprises with 0-49 employees), medium sized enterprises (50-249 employees) and large enterprises (250+ employees).
3. A breakdown of the population by EU Member States (D, E, F, I, UK).

In addition, the activity breakdown was cross-tabulated with the country as well as with the size-class breakdown. These cross-tabulations are offered in special sector databases. However, depending on the indicator and the filter questions, the number of observations can become very small in many cells of this cross-tabulation. It is therefore recommended to limit the breakdown of data to one dimension (in the case of pre-filtered questions) or two dimensions (if all enterprises were asked).

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 figures 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 and allowing 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 three 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 can be structured into four main modules:

- Module A: ICT infrastructure and e-skills development in the company
- Module B: E-commerce and e-business usage
- Module C: Impact of selling and procuring online
- Module D: Impact of and satisfaction with electronic business

The choice of indicators is largely based on those used in the previous survey in 2002. It includes a basic set of widely accepted measures for e-commerce and e-business (as used in related surveys on e-commerce and e-business, e.g. by Eurostat), but also introduces a few 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 questionnaire can be downloaded (as a spreadsheet) from the *e-Business W@tch* website at its "database" section (http://www.ebusiness-watch.org/marketwatch/database/survey_info.htm.