Special Report (July 2005)

# An International Outlook on Electronic Business Developments

## Monitoring activities and key results

e-business w@tch

European Commission
Enterprise & Industry Directorate General

## The e-Business W@tch

The European Commission, Enterprise & Industry Directorate General, launched the *e-Business W@tch* to monitor the growing maturity of electronic business across different sectors of the economy in the enlarged European Union, EEA and Accession countries. Since January 2002 the *e-Business W@tch* has analysed e-business developments and impacts in manufacturing, financial and service sectors. Results are continuously being published on the Internet and can be accessed or ordered via the Europa server or directly at the *e Business W@tch* website (www.europa.eu.int/comm/enterprise/ict/policy/watch/index.htm or www.ebusiness-watch.org).

This special report is a pilot to assess comparability of statistics about ICT use by enterprises that are collected through different mechanisms and from different sources.

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## Contact

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

**empirica**
Gesellschaft für Kommunikations- und Technologieforschung mbH
Oxfordstr. 2, D-53111 Bonn
Germany

Fax: (49-228) 98530-12
info@empirica.com

***e-Business W@tch***
c/o empirica GmbH
Oxfordstr. 2
D-53111 Bonn
Germany

Fax: (49-228) 98530-12
info@ebusiness-watch.org

**European Commission**
Enterprise & Industry Directorate-General
Technology for Innovation / ICT Industries and e-Business

Fax: (32-2) 2967019
entr-innov-ict-ebiz@cec.eu.int

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# Introduction to the *e-Business W@tch*

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

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

It is against this background that the European Commission, Enterprise Directorate General, launched the *e-Business W@tch* in late 2001. The objective of this initiative is to provide sectoral analysis based on empirical research, including representative enterprise surveys in countries of the European Union, the EEA and Accession States, with special emphasis on the implications for small and medium-sized enterprises (SMEs).

Since its launch, the *e-Business W@tch* has published more than 60 e-Business Sector Studies on 17 different sectors of the European economy, three comprehensive synthesis reports about the status of electronic business in the European Union, three statistical pocketbooks and various other resources (newsletters, special issue reports, etc). These are all available on the website at www.ebusiness-watch.org ('resources').

The quantitative analysis about the diffusion of ICT and e-business is based to a large extent on regular representative surveys among decision-makers in European enterprises. The e-Business Survey 2005 covers more than 5000 enterprises from 10 different sectors across 7 EU member states. In addition, more than 70 case studies on e-business activity in enterprises from all EU, EEA and Accession countries are carried out, to complement the statistical picture by a more detailed analysis of current e-business practices.

Survey results of the previous years have confirmed the initial assumption and rationale of the *e-Business W@tch* that the sector in which a firm operates and the size of a company, rather than its location, are the main determinants of its e-business activity. The large demand for the various publications and statistics provided by the *e-Business W@tch*, and their exploitation by other research institutions (for example, in the EITO Yearbook 2003 and in the OECD Information Technology Outlook 2004), document the demand for sectoral e-business analysis. Facilitated by positive responses and the growing interest in its analysis, the *e-Business W@tch* is increasingly developing from an observatory into a think-tank and intermediary, stimulating the debate about the economic and policy implications of e-business among stakeholders at an international level.

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

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

Over the past 10 years, "*electronic business*" has increased from a very specific to a very broad topic to be studied. The OECD proposes a definition of e-business as "*automated business processes (both intra-and inter-firm) over computer mediated networks*". This definition is useful as it makes clear that

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

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

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

## The role of economic analysis in the Sector Reports

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

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

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

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

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

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

Economic sectors constitute the main level of analysis for *e-Business W@tch*. In 2005, the sample consists of ten sectors. Their configuration and definition are based on the NACE Rev. 1.1 classification of business activities.

The rather broad aggregation of different business activities into sectors in 2002-2004 made it possible to cover a broad spectrum of the economy, but also caused some challenges for the analysis of e-business developments. For instance, it was hardly possible to focus on individual sub-sectors in much detail within a single sector report. The selection and definition of sectors proposed for 2005

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

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

- The current dynamics of electronic business in the sector and the impact of ICT and electronic business, as derived from earlier *e-Business W@tch* sector studies.
- Interest articulated by the industry in previous years on studies of this type.
- Policy relevance of the sector from the perspective of DG Enterprise & Industry.
- Roll-out strategy of 2003: New sectors (not covered in 2002/03 and/or 2003/04) have been added, as well as specific industries which have only been covered as part of a larger sector in the past

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

## The 10 sectors and 4 topics analysed in 2005

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

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

| | Sector Studies | NACE Rev. 1 | Publication date(s) * | |
|---|---|---|---|---|
| 1 | Food and beverages | 15 | July 2005 | Sep. 2005 |
| 2 | Textile industry | 17, 18 | July 2005 | |
| 3 | Publishing and printing | 22 | July 2005 | Sep. 2005 |
| 4 | Pharmaceutical industry | 24.4 | July 2005 | Sep. 2005 |
| 5 | Machinery and equipment | 29 | July 2005 | Sep. 2005 |
| 6 | Automotive industry | 34 | July 2005 | |
| 7 | Aerospace | 35.3 | Sep. 2005 | |
| 8 | Construction | 45 | July 2005 | Sep. 2005 |
| 9 | Tourism | 55, 62.1+3, 92.3+5 | Sep. 2005 | |
| 10 | IT services | 72 | July 2005 | Sep. 2005 |
| | | | | |
| | **Special Topic Reports** | | | |
| A | A User's Guide to ICT Indicators: Definitions, sources, data collection | | July 2005 | |
| B | Overview of International e-Business Developments | | July 2005 | |
| C | e-Business Standards and Interoperability Issues | | Sep. 2005 | |
| D | ICT Security and Electronic Payments | | Sep. 2005 | |

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

# Executive Summary

## Objectives of this study

This report is one of four special studies published by *e-Business W@tch* in 2005, in addition to its sector studies. While sector studies present electronic business (e-business) developments from a specific industry's perspective, special studies focus on a particular information and communication technologies (ICT) related topic, across sectors.

The objective of this special study is to present a comparative analysis of current e-business monitoring activities in major economies of the world, to summarise the main findings, and compare these initiatives with equivalent activities in the European Union (EU). Five countries outside Europe have been selected for this purpose: Australia, Canada, Japan, Korea and the USA. The selection considers the economic importance of these countries in the global economy, access to sources on e-business development, and the objective to include economies from different continents. The study identifies the major national monitoring initiatives and their institutional set-up, and features the main results as far as they have been accessible. The study concludes with some policy recommendations for international e-business monitoring in the future.

## National e-business monitoring activities: similarities and differences

- In all countries and in the EU, a form of **regular monitoring** of electronic business activity by enterprises has been established. In all cases, the **national statistical offices** are involved. Some of the enterprise surveys that are conducted in this context are mandated by national law. The surveys in all countries follow the purpose of collecting data on business adoption and use of ICT, and e-business.
- Although the OECD definition of e-commerce – either broad or narrow[1] – is reflected in the set-up of all national monitoring activities, the **approaches used differ widely** in terms of focus, methodology, and metrics applied. Any comparison of results must therefore be taken very cautiously.
- An important specification to be considered in this context is whether **networks other than the internet** (e.g. **EDI**) are included or excluded in the definition of e-business transactions and its measurement. Some surveys are rather internet-focused (for example in Australia), while others differentiate between protocols used, for example the Eurostat survey. In the case of Japan, settlement and commercial trade among establishments within the same incorporated enterprise is specifically excluded.
- National specifications differ regarding size and type of enterprises surveyed. In particular, company **size thresholds** in terms of minimum number of full-time employees (to be included in a survey) differ between countries and hamper direct comparability.
- Regarding the method of data collection, **postal questionnaires** is the prevailing data collection method in Australia, Canada, Japan and the USA. Korea applies direct interview methods and self-enumeration techniques[2] through e-mail and internet. Australia used computer-assisted telephone interviews (CATI). User participation to surveys is mandatory in most countries.

[1] See chapter 1.2.1

[2] Survey methods in which the electronic survey form is available online and a respondent can access and key in the form electronically. CASI (computer-assisted self interviewing) is such a method.

## Main monitoring results: e-business adoption

The findings of these monitoring activities confirm the high level of e-business activities in all five countries under study and in Europe. Main results for the international benchmarking countries are summarised in the following table.

**Exhibit: Overview of e-business monitoring initiatives in 5 countries and snapshots of key results**

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

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

## e-Business performance of EU enterprises in comparison

- On average, EU enterprises are **head-to-head** with their counterparts in other advanced economies in terms of electronic business activity. However, **gaps in e-business adoption within the EU** (i.e. between Member States) are clearly more pronounced than on aggregate level in international benchmarks, i.e. between firms from the EU-25 and the USA, Australia, Japan or other countries.
- Firms from those EU Member States which are most advanced in their information society development (the Nordic countries in particular) are not only 'e-leaders' within the EU, but constitute **international benchmarks** of ICT infrastructure adoption and e-business activity. Many of the other EU countries are well aligned with the international state-of-play in e-business. This holds true for some of the major economies in the EU, for example the UK, Germany and the Netherlands.
- ICT and e-business adoption is **comparatively low** among firms from EU Member States which constitute the least advanced group in information society development ('third tier'). This group includes some of the new EU Member States, Greece and Portugal.

## Suggestions for policy

- Information society statistics is one of the most **challenging areas** for the statistical community, especially at the enterprise level of analysis. Research carried out for this report shows that e-business monitoring activities in Australia, Canada, Japan, Korea and the USA differ considerably in their structure and focus. Therefore, the international comparability of results is limited and problematic.
- Considering the importance of ICT as a driver and enabler of globalisation processes, further initiatives to **facilitate the international comparison of e-business developments** and their impacts should be encouraged. There are several possibilities how this goal can be addressed. Three approaches are briefly presented and discussed in this report in terms of their requirements, strengths and weaknesses:
  - Approach 1: Coordination of methodology development
  - Approach 2: Coordination of decentralised data collection
  - Approach 3: The "International *e-Business W@tch"*
- As electronic business has a growing impact on international (cross-border) trade, and considering implications for SMEs, impacts on growth, productivity and employment, some form of international coordination and cooperation in monitoring related developments is certainly relevant. Models how to go about this task are available on a national or European level. The task is to raise them to the international level.

# Overview of International e-Business Developments

## 1 Introduction

This is one of the four special studies published by *e-Business W@tch* in 2005, in addition to its sector studies. While sector studies present e-business developments from a specific industry's perspective, special studies focus on a particular ICT related topic, across sectors.[3]

This study features a comparative analysis of the adoption of ICT and e-business (in manufacturing and services) in Europe and some of its major competitors among the industrialised economies, focusing on Australia, Canada, Japan, Korea and the USA. The study is organised in four main chapters and has three annexes:

**Exhibit 1-1: Study structure of present report**

| | |
|---|---|
| **Chapter 1** | • **Objectives** and scope of the study<br>• Major **international frameworks** that are important for e-business measurement, including classification systems |
| **Chapter 2** | • Measurement **frameworks** for e-business adoption (e.g. sources of national official statistics, e-business definition)<br>• Country-specific **measurement programmes** (i.e. survey designs and methods applied) of ICT adoption and e-business practice in official business statistics |
| **Chapter 3** | • Main **results** of e-business surveys in Europe and the five selected countries on a country-by-country basis |
| **Chapter 4** | • Synthesis of findings regarding e-business **measurement methods** in the countries studied.<br>• Synthesis of main **results** on ICT adoption and e-business activity. |
| **Chapter 5** | • **Conclusions** from chapters 3 and 4 regarding the performance of European enterprises in e-business compared to their international counterparts<br>• Implications and **recommendations for policy** to improve the availability of internationally comparable data on ICT adoption and e-business |
| **Annex I** | • **Glossary** of abbreviations and technical terms referred to in this report |
| **Annex II** | • **Currency exchange rates** for AUD, CAD, JPY, KRW and USD to the Euro |
| **Annex III** | • Available survey **questionnaires** of the respective countries under study |

[3] The other three special studies of 2005 are: "A User's Guide to ICT Indicators: Definitions, sources, data collection"; "ICT Security and E-Invoicing"; and "e-Business Standards and Interoperability Issues". Reports are available at www.ebusiness-watch.org ('resources')

### Background to this report

Since 2002, the European Commission's *e-Business W@tch* has been monitoring the development and implications of e-business across different sectors and countries in the EU. The statistical basis for this analysis are annual e-Business Surveys (2002, 2003 and 2005). International comparisons of the results, however, were restricted to special chapters in the E-Business Reports 2003 and 2004. Starting from this basis, it was decided in 2004 to pilot a special report, complementary to the regular *e-Business W@tch* sector studies, which should feature a more detailed comparison of:

- the activities carried out in other countries to monitor e-business developments and
- the statistical results of these activities, with an effort to compare findings as far as possible in light of the differences in methodology and definitions.

The research method is a secondary analysis of existing, publicly available empirical data with the objective to establish a comparative perspective. Resources were mainly taken from national statistical offices (NSOs). Other secondary material includes research papers from renowned experts.

The study should be regarded as a **pilot**. It explores to what extent it is possible to compare statistics about ICT use by enterprises ex-post, i.e. data that have been collected through different mechanisms and from different sources. It is evident that this task poses many challenges, which are summarised in the conclusions to this report. However, even the comparison of the different methods used to monitor e-business developments, and the different types of results that are gained from this exercise, offers interesting insights and a broad perspective on the dynamic development of e-business even after the burst of the new economy. Comparing measurement methods, metrics and results across different countries and continents offers a holistic view on e-business developments, on possible implications for global business and the resulting policy requirements that are widely debated these days at international fora.

## 1.1 Objectives and scope

The main objective of this study is to present comparatively the methodologies used for monitoring developments of ICT and e-business adoption in major economies of the world, to analyse their main features and summarise the main findings, and to compare these initiatives with their counterparts in the European Union. This main objective encompasses the following secondary objectives:

- to foster discussion on existing and developing measures, methods and instruments for monitoring ICT usage and e-business activity in the EU against other benchmarked countries;
- to illustrate critical methodological issues on measuring ICT and e-business adoption and usage in the EU and abroad;
- to enhance the understanding of differences in the monitoring methodologies applied in the EU and abroad;
- to assist knowledge production and transfer for developing further standards for measurement of e-business in Europe.

Ultimately, this study could be considered as contributing, as much as allowed by the *e-Business W@tch* scope and size, to addressing the need for international harmonisation work of ICT statistics and analysis.

## 1.2 International frameworks for monitoring e-business

It is quite safe to assume that governments in all developed economies have engaged in e-business monitoring activities, mostly with support of the national statistical offices. This is evidenced by the countries studied for this report and by work of the United Nations (see chapter 1.2.2). However, as the definitions and methods used to collect data vary considerably across countries (see chapter 2), it is extremely difficult to compare the results of these activities on an international basis.

In essence, the **findings are not comparable**, unless a substantial research effort would be made (which widely exceeds the potentialities of this report) to make them somewhat comparable. This could involve re-computing raw data, for example to adjust them to a different base, or estimating the impact of differences in definitions and survey questions.

Against this background, international organisations have an important role in coordinating initiatives to develop international frameworks for ICT and e-business related surveys and research. In fact, they have already taken up this task since the late 1990s, for example by proposing definitions and model questionnaires. Some of the relevant activities by the OECD and the UN are introduced in this chapter. Although it cannot be expected that this work will lead to the use of fully harmonised instruments in all countries, it is already evident that this work has had an impact on many national and international monitoring activities.

### 1.2.1 Work by the OECD

The OECD has acted as a **coordinator and forum** for the development of internationally comparable information society statistics for more than 20 years. Methodological work covers issues such as the definition and classification of the ICT sector, definitions of e-commerce and e-business, the development of model questionnaires on ICT usage, and general guidance for the measurement of indicators of ICT. Within the OECD, the Working Party on Indicators for the Information Society (**WPIIS**) is one of the main units to carry out work in this area.

Recent work of the OECD has been very influential in defining and measuring the information economy, particularly regarding efforts to harmonise international statistics. The OECD has been active in all areas of ICT statistics, including the measurement of ICT investment and of e-business activity. In the area of ICT investments, harmonisation of statistics from different countries involves considerable challenges: "*Data availability and measurement of ICT investment based on national accounts (SNA93) vary considerably across OECD countries, especially as regards measurement of investment in software, deflators applied, breakdown by institutional sector and temporal coverage*." (OECD 2002)

#### A model questionnaire on the use of ICT

In the field of measuring e-business activity, the challenge is to harmonise statistical efforts *ex-ante*, mainly by promoting the agreement on common definitions and survey instruments (e.g. by developing model questionnaires).

WPIIS has worked since 1999 with the Voorburg Group[4] and individual OECD member countries to develop a model questionnaire on the use of ICT by enterprises. The underlying

[4] The Voorburg Group on Services Statistics was created in 1986, in response to a request from the United Nations Statistical Office (UNSO), for assistance in developing services statistics. It was set up at the initiative of Statistics Canada. It works as an informal forum for the exchange of views on service statistics. The Bureau consists of a core group of members elected each year, the chairperson of the last meeting and the chairperson of the next meeting (see: http://www.stat.fi/voorburg2005/voorburg_group_presentation.html).

idea behind the elaboration of a **model questionnaire** is to guide the collection of internationally comparable statistics of ICT usage and electronic commerce in enterprises across OECD member countries. A first proposal for a model questionnaire on ICT usage in enterprises was adopted by WPIIS at its meeting in 2001 (OECD, 2001c). In 2004, WPIIS commenced a revision of the model questionnaire which is planned to be completed by the end of 2005.

## Definitions of e-business and e-commerce transactions

In 1999, WPIIS established an Expert Group on Defining and Measuring Electronic Commerce to compile definitions of electronic commerce which are policy relevant and statistically feasible. By 2000, work of the Group had resulted in **definitions for electronic commerce** transactions. At that time, the research and policy community still focused mainly on e-commerce in the sense of conducting transactions online. Accordingly WPIIS had proposed a "broad" and a "narrow" definition of electronic commerce for statistical activities (OECD, 2001b) which were then endorsed by the OECD member countries:

| e-Commerce transaction | OECD definition | Guidelines for Interpretation |
|---|---|---|
| **Broad definition** | An **electronic transaction** is the sale or purchase of goods or services, whether between businesses, house-holds, indiv-iduals, governments, and other public or private organisations, conducted over **computer-mediated** networks.<br>The goods and services are ordered over those networks, but the **payment** and the ultimate delivery of the good or service may be conducted **on- or offline**. | **Include**: orders received or placed on any online application used in automated transactions, such as internet applications, EDI, Minitel or interactive telephone syst-ems. |
| **Narrow definition** | An **internet transaction** is the sale or purchase of goods or services, whether between businesses, households, indiv-iduals, governments, and other public or private organisations, conducted over the **internet**.<br>The goods and services are ordered over the internet, but the **payment** and the ultimate delivery of the good or ser-vice may be conducted **on- or offline**. | **Include**: orders received or placed on any internet application used in automated transactions such as Web pages, extra-nets and other applications that run over the internet, such as EDI over the internet, Minitel over the internet, or over any other Web enabled application regardless of how the Web is accessed (e.g. through a mobile or a TV set, etc).<br>**Exclude**: orders received or placed by telephone, fax or conventional e-mail. |

Source: Roberts, Sheridan: OECD work on measuring the Information Society (OECD 2004a, p.9)

Since 2002/03, it has been increasingly acknowledged among the policy and research communities that this focus on e-commerce transactions may be too narrow to capture the full implications of e-business. A wider, business process oriented focus (including internal processes) has been adopted in many studies and surveys. This development has been reflected by work of the OECD Expert Group, which proposed a (broader) **definition of e-business processes** based on functionality rather than technology in 2003: Electronic business is here defined as

> *"(automated) business processes (both intra- and inter-firm) over computer mediated networks*" (OECD, 2004a, p. 6).

In addition, the Group proposed that e-business processes should integrate tasks and extend beyond a stand-alone or individual application. Nine broad business functions were identified and described in terms of e-business processes, e.g. customer acquisition and retention; e-commerce; finance, budget and account management; logistics (inbound & outbound); and inventory control (OECD, 2004a, p. 6).

A new module on e-business for the model questionnaire was drafted in 2004. As it is assumed that the benefits of e-business will increase along with the degree of (digital) business process integration, the draft module focuses on integration. It has two types of questions: The first asks about links associated with e-commerce, e.g. whether systems used to receive or place orders are linked with customers' or suppliers' systems. The second is a general integration question where respondents report those business functions which are linked (with any others) via computer networks.

### 1.2.2 Activities of the United Nations

#### Work on classifications

United Nations statistical classifications are used in some way by virtually every country. An integral part of the work of **international cooperation in classifications** is to ensure harmonisation and standardisation, so that changes in statistical classifications at the international level, consistently reverberate through multi-national / regional levels to the national level.

For the classification of economic activities, **ISIC** (International Standard Industrial Classification of All Economic Activities)[5] is the major international reference system. The groups and divisions, the successively broader levels of classification, combine the statistical units according to the character, technology, organization and financing of production. Wide use has been made of ISIC, both nationally and internationally, in classifying data according to kind of economic activity in the fields of population, production, employment, gross domestic product and other economic activities.

In order to link their **national industry classification schemes** to ISIC, most countries provide correspondence tables between ISIC and their national system. Exhibit 1-2 introduces the industrial classifications used in the countries whose e-business monitoring activities are presented in this report.

[5] See http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=17&Lg=1 for the detailed structure of ISIC Rev. 3.1 and explanatory notes.

**Exhibit 1-2: Major industrial classifications in Europe and other parts of the world**

| Country | National classifications | Background and correspondences[6] |
|---|---|---|
| **EU** | ***NACE*** | The "General Industrial Classification of Economic Activities within the European Communities" is a 4-digit activity classification which was originally published by Eurostat in 1970. The current version is NACE Rev. 1.1.<br>While NACE is used at the European level, most European countries use their own national systems for national statistics. France, for example, uses the "Nomenclature d'activités Française" (NAF); in Italy, the "Classificazione delle attività economiche" (ATECO 2002) is used; and in the UK, the UK Standard Industrial Classification of Economic Activities 2003 (UK SIC) is in use. However, most of these systems have close links to NACE. |
| **Australia** | ***ANZSIC*** | The "Australian and New Zealand Standard Industrial Classification 1993" is structured in divisions, subdivisions, groups and classes, comparable with, or convertible to, the sections, divisions, groups and classes of ISIC.<br>ANZSIC was developed by the Australian Bureau of Statistics (ABS) and Statistics New Zealand (StatsNZ) and implemented in 1993. |
| **Canada, USA** | ***NAICS*** | The "North American Industry Classification System", developed jointly by the U.S., Mexico and Canada, was adopted in 1997.<br>It links to ISIC (Rev 3) at 2-digit level in many cases, but there are some differences – cf. correspondence tables between NAICS 2002 (US) and ISIC Rev.3.1. |
| **Japan** | ***JSIC*** | The Standard Industrial Classification for Japan is not directly linked to ISIC. Thus, detailed correspondence tables are needed for most classes to 'translate' categories from JSIC into ISIC nomenclature.<br>JSIC was first adopted in 1949 and was revised 11 times since, the latest revision dating from 2002 (current version). |
| **Korea** | ***KSIC*** | The Korean Standard Industrial Classification is basically in line with ISIC Rev 3. It has 5 levels for meeting national needs. It was revised to reflect new emerging high-tech and science industries.<br>KSIC Rev.6, which was based on ISIC Rev.3, was implemented in 1991. The latest version, KSIC Rev.8, was revised and introduced in 2000. |

Source: UN Department of Economic and Social Affairs

[6] See http://unstats.un.org/unsd/cr/registry/regot.asp?Lg=1 for correspondence tables between the different classification systems.

## Measuring the information society

The **UN Information and Communication Technologies Task Force** is the main body for the formulation of a comprehensive UN strategy in the field of ICT. Through its activities, working groups and regional nodes, the task force aims at stimulating a multi-stakeholder discussion on implications of ICT for economic development. This includes an objective to achieve progress in measuring, monitoring and analysing the impact of ICT on the achievement of the internationally agreed development goals. The latest meetings of the task force took place in April 2005 in Dublin and in November 2004 in Berlin.[7]

The UN Conference on Trade and Development (**UNCTAD**) has established an Electronic Commerce Branch (**ECB**) which carries out policy-oriented analytical work on the implications for developing countries of the adoption of e-commerce and internet technologies. ECB organises international conferences and workshops with the objective to raise awareness and promote the exchange of experience among e-commerce practitioners and policy makers in developing countries.[8]

An important initiative in this context is the "**Partnership on Measuring ICT for Development**". Recognising the need for improved data and indicators on information society developments, UNCTAD launched in 2004[9] a global initiative that brings together key stakeholders involved in the statistical measurement of ICT use (by citizens, businesses and government). The objective is to create a partnership that will contribute to closing the data gap at the international level and, in particular, in developing countries. Committed partners include the ITU[10], OECD, UNCTAD, the UNESCO Institute for Statistics, the UN Regional Commissions, the UN ICT Task Force and the World Bank[11]. This partnership will work towards defining and collecting a set of common ICT indicators and assisting developing countries in their efforts to produce information society statistics. This is regarded as crucial to assess the socio-economic impacts of ICT.

A concrete output of the UN activities in this field, in connection with the Partnership, is the publication of an annual "**E-Commerce and Development Report**". The report synthesises available results on ICT adoption in developed and developing countries, but is confronted with the same "comparability challenge" as this study.[12]

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7 More information is available at the website of the task force at http://www.unicttaskforce.org.

8 A notable example was the UNCTAD Expert Meeting "Measuring Electronic Commerce as an Instrument for the Development of the Digital Economy" from 8-10 September 2003 in Geneva.

9 The Partnership was officially launched during UNCTAD XI, held in São Paulo, Brazil, from 13 to 18 June 2004.

10 ITU: International Telecommunications Union (http://www.itu.int/home).

11 See UNCTAD 2004, p. 14

12 ibid

# 2 E-Business Monitoring: Overview of Worldwide Activities

This chapter presents the main e-business monitoring activities in major economies of the world. Starting with the EU, the following sections present the institutional context and the main surveys which are conducted in Australia, Canada, Japan, Korea and the USA to measure ICT usage and e-business activities by enterprises. The selection of these five countries considers their economic importance in the global economy, access to sources on e-business development (in English language), and the objective to include economies from different continents.[13]

## 2.1 E-business monitoring in Europe

***In brief***

The main vehicle in European statistics to collect EU wide indicators on ICT use and e-business activity in European companies is the Eurostat Survey on ICT Use in Enterprises, which was piloted in 2001 and has been carried out annually since. Eurostat coordinates this survey which is then carried out by the national statistical offices in the Member States. The survey has a large scope, including close to 100,000 enterprises in the participating Member States.

In addition, since 2002, the *e-Business W@tch* of the European Commission, DG Enterprise and Industry, conducts an e-Business Survey every 1-2 years. This survey has a scope of about 5,000 – 10,000 enterprises and focuses on sectoral e-business activity. It explores new trends in e-business and pilots related questions. As such, it can be considered as a forward-looking activity, which complements and delivers input to the regular surveys of Eurostat.

### 2.1.1 Institutional framework

The main vehicle in European statistics to collect EU wide indicators on ICT use and e-business activity in European companies is the **Eurostat** Survey on ICT Use in Enterprises, which was piloted in 2001 and has been carried out annually since. Eurostat coordinates this survey which is carried out by the national statistical offices in the Member States. In addition, since 2002, the ***e-Business W@tch*** of the European Commission, DG Enterprise and Industry, conducts an e-Business Survey every 1-2 years.

#### Eurostat

Eurostat is the main official statistical body of the European Union, with the mission to provide the European Union with a high-quality statistical information service. The **European Statistical System** (ESS) was built up gradually with the objective of providing comparable statistics at EU level. The ESS comprises Eurostat and the statistical offices, ministries,

[13] It is acknowledged that other country selections would have been possible; however, the resources of available for the study did not allow to extend the coverage in terms of the number of countries covered.

agencies and central banks that collect official statistics in EU Member States, Iceland, Norway and Liechtenstein.

Member States collect data and compile statistics for national and EU purposes. The ESS functions as a network in which Eurostat's role is to lead the way in the harmonisation of statistics in close cooperation with the national statistical authorities. ESS work concentrates mainly on EU policy areas. However, with the extension of EU policies, harmonisation has been extended to nearly all statistical fields. The ESS also coordinates its work with international organisations such as OECD, the UN, the International Monetary Fund and the World Bank. At the heart of the ESS is the Statistical Programme Committee (SPC), which is chaired by Eurostat and brings together the heads of Member States' national statistical offices.

The Statistical Programme 2003-2007, which specifies the priorities and main aims of the European Statistical System for the given period, includes as one of four main aims the improvement in the collection of "structural indicators" for EU Member States. This target is directly related to further consolidation of work as requested by the Lisbon summit. In this context, ICT and e-business indicators are relevant.

#### *e-Business W@tch*

The European Commission, Enterprise Directorate General, launched *e-Business W@tch* as an observatory for monitoring the growing maturity of electronic business across different sectors in the European Union. Since January 2002, *e-Business W@tch* has analysed e-business developments and impacts in about 20 industries including manufacturing sectors, financial services, construction, retail and other service sectors. As a result, more than 60 e-Business Sector Studies have been published since, three comprehensive synthesis reports about the status of electronic business in the European Union, statistical pocketbooks and various other resources (newsletters, special issue reports).

The quantitative analysis about the diffusion of ICT and e-business is based to a large extent on regular representative surveys among decision-makers in European enterprises. In addition, about 40 case studies on e-business activity in enterprises from all EU, EEA and Accession countries were carried out in 2004 and more than 70 in 2005, to complement the statistical picture by a more detailed analysis of current e-business practices.[14]

The mission of *e-Business W@tch* is to present a 'wide-angle' perspective on e-business developments and practices in the sectors covered. Survey results and their analysis have confirmed the initial assumption and rationale of the *e-Business W@tch* that the sector in which a firm operates and the size of a company, rather than its location, are the main determinants of its e-business activity.

### 2.1.2 Main surveys

#### Eurostat Survey on ICT Use in Enterprises

The Eurostat "Survey on ICT Use in Enterprises" was launched as a pilot in 2001. Since then it has been carried out annually. The survey is – together with the survey on ICT Use in Households – one of the main vehicles in European statistics to collect information society indicators on a European scale.

[14] All the data, reports, case studies and other publications produced by the *e-Business W@tch* since its start are available at www.ebusiness-watch.org ('resources').

In 2001, a pilot survey was carried out, jointly coordinated by Eurostat and Statistics Denmark. 13 EU Member States participated in the pilot which focused mainly on e-business readiness (e.g. questions relating to factors and barriers for ICT adoption and e-commerce) and usage (e.g. questions about making sales and purchases via the internet or EDI). Based on this pilot exercise, with the support of the Enterprise Directorate General, Eurostat started the preparation of a regular (annual) survey on ICT usage in enterprises. The objective was to improve coverage of this issue within the European Statistical System.[15]

Both, the 2002 ICT usage survey and the 2001 pilot survey were carried out on the basis of voluntary agreements between the European Commission and the National Statistical Institutes (NSIs). The European Commission contributed financial support in the form of grants to the Member States to partly cover the survey costs. Member States oblige themselves to provide harmonised data and meta-data, while retaining some flexibility in adapting their national surveys, e.g. by adding questions. Some countries have not implemented optional questions, others have widened enterprise size class coverage.

The Eurostat surveys have a large scope. In the latest survey for which results are available (2004)[16], close to 100,000 enterprises were surveyed in the participating EU Member States (cf. Exhibit 2-1), up from about 66,200 enterprises in 2003 (prior to the EU enlargement).

**Exhibit 2-1: Eurostat – Survey on ICT Usage in Enterprises (2004)**

| | |
|---|---|
| **Name** | **EUROSTAT** – Survey on ICT usage in enterprises |
| **Purpose** | Measuring ICT usage by enterprise; Monitoring Community activities and developments. |
| **Coverage** | NACE Rev. 1.1 divisions covered:[17]<br>D - manufacturing,<br>F - construction,<br>G - distributive trades,<br>H - (groups 55.1 and 55.2 only) hotels and camping sites and other provision of short-stay accommodation<br>I - transport and communication,<br>K - real estate, renting and business activities.<br>O - groups 92.1-2 only: motion picture and video activities, radio and television activities. |
| **Measures** | Internet usage by enterprises, sales and purchases, purchasing/ordering goods and services; selling goods and services |
| **Sample size** | 99 332 enterprises were surveyed in all respondent countries (2004) |
| **Unit** | Enterprises with 10 persons employed or more |
| **Size class breakdown** | Small enterprises (10-49 persons employed), medium-size enterprises (50-249 persons employed), large enterprises (250 and more persons employed). |
| **Periodicity** | Annually |
| **Reference period** | January 2004 and/or the year 2003. E-commerce questions relate to 2003 |
| **Method of data collection** | Paper-based mail questionnaire |
| **More information** | http://eurostat.cec.eu.int<br>(> Themes > Industry, trade and services > Information society statistics) |

[15] For more information about the background, see *e-Business W@tch* Special Report "A User's Guide to ICT Indicators: Definitions, sources, data collection" (July 2005), available at www.ebusiness-watch.org ('resources')

[16] http://epp.eurostat.cec.eu.int/portal/page?_pageid=0,1136195,0_45572097&_dad=portal&_schema=PORTAL (accessed in June 2005)

[17] see chapter 1.2.2 for information about NACE

## e-Business Surveys by *e-Business W@tch*

*e-Business W@tch* collects data on ICT and e-business by means of a representative survey among decision-makers from European enterprises in different sectors. The e-Business Survey 2005, which was the third survey after those of 2002 and 2003, had a scope of 5,218 telephone interviews with decision-makers in enterprises from seven EU countries (the **EU-7**, including the Czech Republic, France, Germany, Italy, Poland, Spain and the UK). Interviews were carried out in January and February 2005 using computer-aided telephone interview (CATI) technology.[18]

The highest level of the population for the e-Business Survey was the set of all computer-using enterprises which are active within the national territory of one of the respective countries, and which have their primary business activity in one of the ten sectors specified by NACE Rev. 1.1 categories.

In contrast to many other ICT surveys, no cut-off was made in terms of minimum size of firms. A random sample of companies was drawn from the respective sector in each country. The respective sectors were to be represented according to company size class strata per country. Strata were to include a share of at least 10% of large companies (250+ employees) per country-sector cell (i.e. any combination of a country and a sector covered), 30% of medium sized enterprises (50-249 employees) and 25% of small enterprises (10-49 employees). Micro enterprises with less than 10 employees were also included in the survey. Samples were drawn locally by fieldwork organisations based on acknowledged business directories and databases.

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. with a data collection and reporting focus on the enterprise, defined as a business organisation (of one or more establishments) comprised of one legal unit.

**Exhibit 2-2: e-Business Survey 2005 by *e-Business W@tch***

| **Name** | **e-Business Survey 2005** |
|---|---|
| **Purpose** | Measuring ICT adoption and e-business activity among enterprises, mainly from a sectoral perspective |
| **Coverage** | 10 sectors, specified on the basis of NACE Rev. 1.1 divisions and groups. An overview is included in the "Introduction to *e-Business W@tch*" in this report. |
| Measures | The survey consists of the following modules: A: Background information about the company; B: Innovation activity of the company; C: Adoption of basic ICT infrastructure; D: Investing in ICT and security; E: Internal and external collaboration; F: Supplier-facing e-business activity and cooperation with business partners; G: Customer-facing e-business: marketing and sales activities; H: Standards and interoperability issues; I: Implications, drivers and inhibitors |
| **Sample size** | 5218 enterprises surveyed in 7 EU countries (2005) |
| **Unit** | Enterprises using computers (no cut-off in terms of enterprise size) |
| **Size class breakdown** | Micro enterprises (up to 9 persons employed), small enterprises (10-49), medium-size enterprises (50-249), large enterprises (250 and more). |
| **Periodicity** | 2002, 2003, 2005; possibly another survey in 2006 |
| **Reference period** | January 2005 and/or the year 2004, depending on the question |
| **Method of data collection** | CATI (Computer-assisted telephone interviews) |
| **More information** | www.ebusiness-watch.org ('About' **à** 'Methodology') |

[18] More detailed information on the methodology and the results of the survey is available on the website of *e-Business W@tch* (www.ebusiness-watch.org)

## 2.2 E-business monitoring in Australia

***In brief***

The Australian Bureau of Statistics (ABS) collects e-commerce related data by one dedicated survey measuring the business use of information technology (BUIT). The survey uses the narrow OECD definition of an internet commerce transaction and focuses on income (revenues) resulting from internet orders for goods and services. Further information is collected on barriers to internet sales.

Measuring units are enterprises of any size covered by the Australian and New Zealand Standard Industrial Classification. Australia applies synchronised sampling[19] since 1983 to control sample rotation within surveys and overlap between surveys.

### 2.2.1 Institutional framework

The Australian Bureau of Statistics (**ABS**) is Australia's official statistical organisation. The ABS collects a range of information technology data as part of its innovation and technology statistics program of work (www.abs.gov.au). The topical website *Information Technology* offers information on latest IT statistics and other electronic publications on ICT issues such as the discussion paper *Measuring a Knowledge-Based Economy and Society – An Australian Framework* to present indicators for core dimensions of the knowledge-based economy and society. Importantly, the ABS also provides information and data on the business use of information technology.

**Important other data sources:** The National Office for the Information Economy (**NOIE**)[20] commissioned the international consulting company Ernst & Young to undertake a series of case studies on the adoption of electronic commerce by small and medium enterprises (SMEs) in Australia. The study, titled *Advancing with E-commerce*, involved interviews with 34 SMEs from different industry groups. The participants were chosen from all areas of Australia including rural and regional areas. NOIE also commissioned the study *B2B E-Commerce: Capturing Value Online* to offer an independent assessment of developments in business-to-business e-commerce and a description of the Australian government's role and achievements in its development.

**E-business definition:** The ABS uses the narrow OECD definition of an internet commerce transaction and therefore measures the income resulting from internet orders for goods and services. Some definition refinements have been initiated to only include orders where the commitment to purchase is made via the internet or web, thus obviously excluding EDI transactions (ABS, doc. 8129.0). The ABS defines internet commerce as placing or receiving orders for goods and services via the internet or web, with or without associated on-line payments.

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[19] Cf. glossary in Annex I or ABS "Statistical Clearing House" (http://www.sch.abs.gov.au/).

[20] NOIE (http://www.noie.gov.au/) was the Executive Agency advising Australian government on information economy issues, acting therefore as the prime agency for high level government policy, projects and research on major e-commerce, online or ICT issues with national or strategic significance. On 8 April 2004, the Australian Government Information Management Office (**AGIMO -** http://www.agimo.gov.au/) was established in the Department of Finance and Administration, replacing the NOIE.

### 2.2.2 Main survey

The **Business Use of Information Technology** survey (**BUIT**) measures the use of ICT and of associated functions, such as the conduct of e-business, by Australian enterprises. BUIT has been conducted annually since 1999-2000, while before 1999 it was conducted biennially. It collects data on use of computers, the internet and the web by Australian businesses.

The central **data** requirements of the BUIT Survey are for statistics detailing the extent and nature of business use of the internet including the range of business activities being conducted via the internet and a measure of the value of internet commerce in Australia. A range of other data requirements related to contemporary business usage of ICT is also included, for example, modes of internet access and web presence. Data relating to benefits and barriers of web/internet commerce are also collected.

Data on type of internet connection, functionality of business websites, placing and receiving of orders (by businesses) via the internet for goods or services, as well as on supporting IT systems are also collected. Statistics are classified by state/territory, business size (based upon both employment and income), and by Australian and New Zealand Standard Industry Classification (ANZSIC)[21] at the division level.

The **scope** for the BUIT survey includes all business units in the Australian economy from a vast majority of economic activities (see Exhibit 2-3 for exceptions). The **frame** for the BUIT survey, like most ABS economic collections, is taken from the ABS Business Register.

**Survey methodology**: The 2003-04 BUIT survey was conducted by mail. It was based on a random sample of approximately 9,000 businesses which was stratified by industry, state or territory and number of employees. All manufacturing businesses with 500 or more employees and all other businesses with 200 or more employees were included in the sample.

The main topics covered by the 2003/4 BUIT survey include:

- Use of IT specialists;
- Internet access and connection type;
- Barriers to not having broadband;
- Web presence;
- Business systems linkages and internet commerce;
- Receiving and placing orders via the internet or web;
- Internet commerce activity and values (in AUD), and
- Barriers to receiving orders via the internet or web.

More specifically, ICT-related data items include:

- Source of IT support,
- Method of internet access and broadband type,
- Extent, nature and benefits of internet commerce,
- How customers are able to place or receive internet or web orders,
- Value (in AUD) of orders received via the internet or web,
- Whether systems for receiving internet or web orders are linked automatically with other systems and, if so, what types of systems, and,
- Barriers to receiving internet or web orders.

[21] See chapter 1.2.2

**Exhibit 2-3: BUIT survey overview**

| Name | BUIT - Business Use of Information Technology survey |
|---|---|
| **Purpose** | To collect data on use of computers, the internet and the web by Australian businesses. Data on type of internet connection, functionality of business websites, placing and receiving orders (by businesses) via the internet for goods or services and supporting IT systems are also collected. |
| **Coverage** | The scope for the BUIT survey includes all business units in the Australian economy except the following activities: Agriculture, Forestry and Fishing; Government Administration and Defence; Education; Private Households Employing Staff; the Central Bank and the Reserve Bank of Australia; and Religious organisations. |
| **Measures** | The survey includes questions on different aspects of e-commerce:<br>• Online procurement activity and volumes traded online<br>• Online selling activity and volumes traded online<br>• Perceived benefits of conducing e-commerce<br>• Barriers<br>The questionnaire is available in Annex III of this report. |
| **Unit** | Enterprises according to ABS Business Register |
| **Data** | The broad data requirements are the penetration of various technologies, internet use and web presence and the range of activities being conducted online, as well as the size of e-commerce in Australia. |
| **Frequency** | Frequency: 5 surveys between 1993 and 2000; annually since 2000 |
| **Method of data collection** | Mail out (back questionnaires) |
| **More information** | http://www.abs.gov.au/ |

Source: empirica, 2005 (based on information by ABS)

## 2.3 E-business monitoring in Canada

***In brief***

The main survey dedicated to the collection of e-commerce related data in Canada is SECT (Survey of Electronic Commerce and Technology). SECT measures the use of ICT by businesses by means of total gross sales over the internet with or without online payment. Businesses are stratified by type of activity.

Statistics Canada uses the narrow OECD definition of internet commerce transactions and measures the income resulting from internet orders for goods and services, with or without online payment. Included is the value of orders received over the internet. Sales using electronic data interchange over proprietary networks and transactions conducted on automatic teller machines are excluded.

### 2.3.1 Institutional framework

**National Statistical Office (NSO)**: Statistics Canada (www.statcan.ca) has been active in monitoring developments in ICT-induced transformations and e-business adoption and usage by Canadian enterprises. Its research in several aspects of ICT-related phenomena include the size, growth and significance of the ICT sector, the penetration and use of ICT by households and individuals, business and government connectivity and engagement in e-commerce. In this context, Statistics Canada produced *Networked Canada: Beyond the Information Highway* in 2001. Much of Statistics Canada's work in this area is shared internationally, in a quest for common knowledge and learning.

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

**Important other data sources**: In 2003, Statistics Canada published the volume *Canada's Journey to the Information Society*. This work represents a comprehensive compilation of measurements and analyses from diverse areas across the agency. Efforts in measuring transformations in the Information Society are prominently made evident with the technical paper *Measuring the Networked Economy*, published by Statistics Canada in March 2002.

The need to understand the ICT-induced transformations underpinned the case for reliable measurements. Early efforts in this area by statistical offices were guided by the framework implied by the **S-curve**[22] (see, OECD 2000). Statistics Canada proposed the now widely acknowledged "readiness-intensity-impact" scheme:

- The primary focus was on **e-readiness**, which includes penetration of ICT, employee access and perceived barriers.
- Interest subsequently shifted to **intensity**-of-use. Issues here relate to the type, purpose and volume of usage, including the nature, volume and value of transactions. Indicators include the extent of computer use, the uses of websites, the proportion or

[22] Diffusion of innovation among enterprises or among consumers, measured as a percentage of the total population that has adopted the innovation, normally occurs in the form of an 'S-curve'. First, only the 'early adopters' chose to adopt; then the majority follows and growth accelerates; finally, a technology or innovation is common, with only little or no growth in diffusion anymore.

value of sales and purchases made online, types of goods sold or purchased over these networks.

- Once basic measures exist, benchmarking by sector of activity, firm size and other characteristics becomes possible. That permits the identification of business leaders or laggards, and the emphasis then shifts to **impacts**. These are diverse and relate to productivity, profitability, competitiveness and the creation of wealth. They are best examined analytically, as opposed to being directly measurable – although the latter cannot be precluded.

To respond to policy needs in the area, Statistics Canada conducted the first economy-wide survey on the use of ICT and e-commerce, in collaboration with Industry Canada under the Connectedness project (Statistics Canada, 2000). The large-scale survey (21,000 enterprises) continues annually as the Survey of Electronic Commerce and Technology (SECT). Findings reported in the subsequent chapter of this report come from that source, and they feed into work on international comparisons, such as that undertaken by the OECD (2002) and studies of impacts (OECD, 2004). Moreover, measurement and analytical work on the business side is coordinated with an e-commerce module in the Household Internet Use Survey (HIUS), which is also conducted by Statistics Canada annually as a subsample of the Labour Force Survey.

**E-business definition**: Statistics Canada uses the narrow OECD definition of an internet commerce transaction and therefore measures the income resulting from internet orders for goods and services, with or without online payment. **Included** is the value of orders received over the internet. Sales using electronic data interchange (EDI) over proprietary networks and transactions conducted on automatic teller machines are **excluded**. The value of financial instruments transacted on the internet such as loans and stocks are **not** considered e-commerce sales, but the service **charges** received for conducting these transactions over the internet are included.

### 2.3.2 Main survey

The main e-business related survey in Canada is **SECT**, the "Survey of Electronic Commerce and Technology".[23] SECT includes more than 20,000 enterprises and continues annually. The survey questionnaire is comparable to the one used by Eurostat for its "Survey on ICT Use by Enterprises"; however, results are not directly comparable, since SECT also includes very small firms: "*Depending on the industry, the threshold may be CAD 150.000 or CAD 250.000. This is the main reason why these data are not directly comparable to Eurostat's survey which generally includes firms employing 10 or more people (Eurostat 2003).*"[24]

Statistics Canada has conducted annual surveys to measure ICT use by business since 1999. At the inception of the first survey (not yet named SECT) in 1999, a very detailed questionnaire covering the uses of various ICT and electronic commerce (sales and purchases) was designed. Until that time, no comprehensive estimates existed on the use of ICT by Canadian businesses and closing this gap was a prerequisite to measuring e-commerce (cf. Davis, 2003).

The 1999 survey was administered at the **establishment level**, with the intent to use appropriate methodology and produce estimates at the enterprise level. This survey provided important baseline measures of the use of computers, e-mail and the internet by Canadian business and public enterprises. It captured the extent to which public and private sectors

[23] SECT is catalogued as the survey no. 4225 within Statistics Canada.

[24] Sciadas, 2004, p. 205, footnote 89

had developed websites and engaged in electronic commerce, including measures of the value of sales. Certain barriers to the introduction of electronic commerce were also identified.

The survey was then redesigned, simplified and renamed the "Survey of Electronic Commerce and Technology" (SECT) for the year 2000. It has been administered annually since at the **enterprise level**. Content was reduced and topics were limited to those that could be answered by a single individual for the enterprise. For example, while tracking sales over the internet, it excludes the value of purchases, which are generally decentralised throughout an enterprise. Nevertheless, SECT 2000 yielded a richer dataset on electronic commerce. Sales made to households (B2C) were distinguished from sales to business (B2B) and export sales were also measured. Results were released in *The Daily* on April 3, 2001.

Form then on, annual surveys were undertaken to measure electronic commerce from a variety of perspectives such as private and public sector sales over the internet, overall e-commerce sales, market concentration for e-commerce sales, general trends of the e-commerce market (e.g. market volatility), and e-commerce sales per industry sector.

**Exhibit 2-4: SECT survey overview**

| **Name** | **SECT - Survey of Electronic Commerce and Technology** |
|---|---|
| **Purpose** | To measure the use of various ICT and the extent to which the internet is used to buy and sell goods and services by Canadian businesses. The survey also measures the barriers to buying and selling over the internet. |
| **Coverage** | Most industrial sectors with the exception of local governments. The collection entity for the survey is the enterprise, i.e. the organisational unit of a business that directs and controls the resources relating to its domestic organisation and for which consolidated financial and balance sheet accounts are maintained. The implication is that the survey collects data on transactions that occur between enterprises, while it specifically **excludes intra-firm transactions**, i.e. internet transactions that may occur between two establishments or companies within the same enterprise.<br>2004 coverage: 17,000 enterprises |
| **Measures** | The survey consists of 4 modules:<br>• General information<br>• Internet use<br>• Barriers to internet commerce<br>• Use of management practices |
| **Unit** | Enterprise, no size limit |
| **Data** | Total gross sales conducted over the internet with or without online payment. This includes all orders that were placed over the internet and paid for using the internet, telephone, fax or other technology. |
| **Frequency** | Annually, since 1999 |
| **Method of data collection** | Postal survey |
| **More information** | http://e-com.ic.gc.ca/epic/internet/inecic-ceac.nsf/en/gv00314e.html |

Source: empirica, 2005 (based on information by Statistics Canada)

## 2.4 E-business monitoring in Japan

***In brief***

In Japan, several surveys are conducted by the Japanese Statistics Bureau that address issues related to electronic business development. Topics include the engagement of companies in e-commerce, the ratio of e-commerce by industry, by networks used, by partners for trade, and by size of enterprise. Surveys cover business units under the Japan Standard Industrial Classification Systems (JSIC). The Statistics Bureau uses a broad definition of e-commerce, similar to the one proposed by the OECD. However, commercial trade among firms of the same incorporated enterprise is not included.

### 2.4.1 Institutional framework

**Legal framework**: The Basic Law on the Formation of an Advanced Information and Telecommunications Network Society was enforced on January 6, 2001, obliging the government to work out a basic strategy to promote the formation of advanced IT network society. This 'E-Japan-Strategy' was established by the Japanese Government in January 2001 and adopted in 2003 ('E-Japan-Strategy II'). Article 14 of the law also obliges the government to compile statistics and other documents concerning an advanced IT network society and to publish them on the internet and by using other appropriate means. In Japan, a decentralised statistical system is adopted. Basic and common statistical surveys, for instance the Population Census are conducted by the Statistical Survey Department of the Statistics Bureau, Ministry of Public Management, Home Affairs, Posts and Telecommunications (MPHPT), while other statistical surveys necessary for the policy making of the ministries and agencies are conducted within their respective jurisdiction.

The **Japanese Statistics Bureau** (www.stat.go.jp/) plays a key role in the Japanese statistical system. The Bureau is responsible for coordinating the statistical activities of different ministries, and for producing basic statistics on the state of the nation by carrying out major censuses and sample surveys, such as the Population Census and the Establishment and Enterprise Census. The Bureau is part of the Ministry of Internal Affairs and Communications (MIC).

**Important other data sources**: ECOM (Electronic Commerce Promotion Council of Japan), the Ministry of Economy, Trade and Industry (METI), and NTT Data Institute of Management Consulting conducted a joint-survey to collect data on e-commerce in order to create a reliable database (ECOM, 2002). The objective was to measure the market size of Japan's B2B and B2C e-commerce (trading value). The market size for the year 2001 was to be estimated, and a projection for 2002 to 2006 to be made. Further, CRITO (Center for Research on Information Technology and Organization, University of California, Irvine) has published a seminal work on *Diffusion and Impacts of the Internet and E-commerce in Japan* in 2004.

**E-commerce definition**: Statistics Japan chose to adopt a broad definition of electronic commerce, similar to the one proposed by the OECD, encompassing "*commercial transactions through computer networks like the internet*". It excludes settlement and commercial trade among establishments within the same incorporated enterprise.

However, Japan has introduced a different definition within the framework of its ECOM / METI / NTT survey. There, e-commerce represents the "*conduct of commerce through computer network systems using the internet technology, the transactional values of which*

*can be identified*" (ECOM, 2002, p. 6). In this context, internet technology "represents those suing TCP/IP protocol. Network lines include the internet, extranet, internet VPN, and dedicated IP lines. "'*Conduct of commerce' represents the exchange of goods, services, information and money between suppliers and buyers, associated with the commercial transfer of assets between economic units*" (ibid.). Identification of transactional values means that "*giving quotations, providing information and other pre-order conducts are included as 'conduct of commerce', as long as it is clearly identified that the conduct has led to purchase/sales orders*" (ibid.).

According to Kitada (2002), between 1998 and 2002, at least 41 kinds of official statistical surveys containing questions related to ICT have been conducted in Japan. The main purpose, survey items, coverage, survey unit and other survey methods of these 41 statistical surveys vary from each other.

Of these, 26 surveys were targeted at enterprises and/or establishments, 13 targeted at households and/or individual and nine were targeted at government, university, school, and other public institutions. The following types of enterprise or establishment surveys can be differentiated (MPHPT, 2002):

- Statistical surveys on the **state of specific ICT-related industries** such as electronic communications businesses or information service businesses.
- Statistical surveys on **production of ICT facilities/equipment** such as the Manufacturing Census.
- Statistical surveys on **investment in plant and equipment related to ICT** or possession of ICT, facilities / equipments by various enterprises / establishments.
- Statistical surveys on the **use of ICT facilities/equipment** in various enterprises / establishments.
- Statistical surveys on the **introduction of e-commerce** in various enterprises / establishments.
- Statistical surveys on the **situation of information processing in various business processes and effects of introduction of ICT/e-commerce** in various enterprises / establishments.

### 2.4.2 Main surveys

The following surveys refer to enterprises and contain ICT-related questions (cf. Kitada 2002; Ito, 2001):

- *Communications Usage Trend Survey (CUTS Offices-Establishments)*: The Information and Communications Policy Bureau of MPHPT carries out this survey annually as a nation wide sample survey to 5,600 establishments, with more than 5 regular employees, belonging to the industries 'Agriculture', 'Forestry', 'Fisheries', 'Mining', 'Construction', 'Manufacturing', 'Electricity, Gas, Heat Supply and Water', 'Transport', 'Wholesales and Retail Trade', 'Eating and Drinking Places', 'Finance and Insurance', 'Real Estate', 'Services' and 'Public Services' of JSIC (Japan Standard Industrial Classification). The establishments belonging to 'Communications' of JSIC are excluded. Main survey items are the state of possession of ICT facilities/equipments, the use of the internet and charges paid for use of communications services (questionnaire and survey results released at http://www.johotsusintokei.soumu.go.jp).
- *Communications Usage Trend Survey (CUTS Enterprises)*: The Information and Communications Policy Bureau of MPHPT carries out this survey annually as a nation wide sample survey to 3,000 enterprises, with more than 100 regular employees,

belonging to the industries 'Construction', 'Manufacturing', 'Electricity, Gas, Heat Supply and Water', 'Transport and Communications', 'Wholesale and Retail Trade, Eating and Drinking places', 'Finance and Insurance', 'Real Estate', 'Services' of the Standard Industrial Classification of Japan (JSIC). Main survey items are the state of establishment of telecommunication network, the use of the internet, security, measures, and cost for communication network (questionnaire and survey results released on the web at www.johotsusintokei.soumu.go.jp).

- *Survey on ICT Workplaces* (ICT WP): The Ministry of Economy, Trade and Industry (METI) annually carried out this survey of 9,500 enterprises using computers. Main survey items are cost for ICT work and its prospect, ICT operators, possession of computer, PC and ICT network, operation of LAN and its application for business, self-development of software, and state of outsourcing.
- *Questionnaire concerning Corporate Activities*: The Economic and Social Research Institute (ESRI) of the Cabinet Office (http://www.esri.cao.go.jp/index-e.html) carries out this survey annually to 2,270 enterprises listed in the three big stock exchanges in Japan (i.e. Tokyo, Osaka and Nagoya) excluding banking and insurance business. Main survey items in the survey are questions on business environment and on fundamental management policies, including the results of investment in plant and equipment in the past three years and prospect in the coming three years, prospect of exchange rate, overseas production etc. Other questions related to enterprise's action are selected every year in accordance with a selected supplementary theme. In the survey conducted in January 2001, also the corporate activities related to ICT were included. Survey results were published in May 2001 in Japanese. Main survey items in January 2001 were as follows:
  - ICT investment (investments made, plans, areas and business processes, purpose, contents, effects, barriers and measures to them).
  - The new management techniques brought into enterprise's management by ICT (results and plans of the introduction of information clearing house system using ICT for the inside use and for the joint use with the outside, results and plans for introducing e-commerce (B2B/B2C), effects of its introduction).
  - Effects on enterprise organisation by introducing ICT (necessity of organisation reform, establishment of specified sections for ICT strategy, practical use of e-mail, results and plans of organisation reform, results and plans on the change of employment).

Other surveys including ICT related questions conducted from financial year 2001 onward are as follows:

- *EEC – Establishment and Enterprise Census*: The Census is conducted by the Statistical Survey Department of the Statistics Bureau, MPHPT with the aim to clarify the industrial structure of the country as well as to provide the basic statistical framework for sample surveys on establishments and enterprises. It has been conducted since 1947 and has been conducted every three years since 1951 until 1981 and every five years since 1981 until 1996 and every three years since. It covers all establishments with the exception of on-incorporated establishments belonging to agriculture, forestry and fisheries, etc. (of JSIC). The Census held in October 2001 asked enterprises about use of e-commerce, its type (B2B/B2C), its five contents (sending orders, receiving orders, delivery of goods and service). The Census provides data that users can analyse by region, industry and size of establishment. Its provisional results about use of e-commerce were released in April 2002. More information on the 2001 census is available at http://www.stat.go.jp/english/data/jigyou/15d2.htm. Contents of the 2004 census have not been available, yet.

- *Report of Incorporated Enterprises Statistics*: The Ministry of Finance carries out this survey quarterly as a nationwide sample survey to about 26,000 enterprises with an aim to gather financial data and other related data. From April 2001 on, the sum of purchased software as assets has been asked as a survey item. More information available at http://www.stat.go.jp/english/index/official/212.htm.
- *Census of Commerce*: METI carries out the Census every five years with the aim to clarify the actual condition of domestic trade. Its coverage is all establishments running wholesale and retail trade. A supplementary census is conducted two years after the Census. The latest Census, investigated e-commerce including annual merchandise sales and purchases over electronic networks, the internet, etc. More information and latest available results (of 2004) are available at http://www.stat.go.jp/english/data/handbook/c10cont.htm.
- *Survey on Private Enterprise Economy*: The Statistical Survey Department carries out the Survey quarterly as a sample survey to 4,000 private enterprises running manufacturing, wholesale, retail trade, restaurant and services, in order to gather data about their management. From the Survey in April 2002, usage of PC, internet connection, etc. has been added as new questions. More information available at http://www.stat.go.jp/english/index/official/208.htm.
- *Basic survey of Commercial and Manufacturing Structure and Activity*: METI carries out the Survey every five years as a nation wide sample survey to 30,000 small and medium size enterprises with establishments belonging to manufacturing, wholesale, retail trade and restaurant in order to gather data for their structure and activity. The survey in June 2002 investigated usage of PC, computer and network. More information available at http://www.stat.go.jp/english/index/official/211.htm.
- *Survey on Service Industries*: The Statistical Bureau Japan has undertaken a survey on service industries in 2004. Results that refer to ICT are not yet available. More information and latest available results are available at http://www.stat.go.jp/english/data/service/.
- *Market Survey of E-commerce 2001* in Japan, jointly undertaken by METI (Ministry of Economy, Trade, and Industry), ECOM (Electronic Commerce Promotion Council of Japan), and NTT DATA Institute of Management Consulting Inc.

## Survey details

The following tables introduce in some more detail the three most important and relevant surveys with regarding ICT use and e-commerce from the ones listed above. These are EEC Establishment and Enterprise Census, CUTS Communications Usage Trend Survey, and ECOM survey 2001.

**Exhibit 2-5: Establishment and Enterprise Census**

| Name | **EEC - Establishment and Enterprise Census** |
|---|---|
| **Purpose** | • To clarify the basic structure of establishments and enterprises at national and regional levels by type of industry and employment size<br>• To provide a sampling frame for various statistical surveys concerning establishments and enterprises |
| **Coverage** | All enterprises (full list of the classification used is available at http://www.stat.go.jp/english/data/jigyou/2004/bunrui.htm) |
| **Measure** | Use of e-commerce, type (B2B, B2C), nature (sending orders, receiving orders, delivery of goods and services after sales) |

| | |
|---|---|
| **Unit** | Establishments and enterprises (i.e. capital companies) |
| **Data** | Establishments provide data on use of e-commerce, type (B2B, B2C), nature (sending orders, receiving orders, delivery of goods and services after sales). |
| **Frequency** | Every three to five years since 1947. The most recent ones were carried out in 1991, 1996, 1999, 2001, 2004. |
| **Method of data collection** | Postal survey. Enumerator survey (self-entry) |
| **More information** | http://www.stat.go.jp/english/data/jigyou/index.htm |

Source: empirica 2005 (based on Liaison, 2003), Statistics Bureau Japan.

**Exhibit 2-6: Current Survey of Commerce**

| **Name** | **CUTS - Communications Usage Trend Survey – Enterprises and Establishments** |
|---|---|
| **Purpose** | • To clarify the actual status and trends in the use of mail, telecommunications and broadcasting services as well as the relationships among different kinds of media for formulating postal and telecommunications policies.<br>• To identify trends in business activities by establishments and companies which conduct commerce across Japan. |
| **Coverage** | Establishments with more than 5 regular employees, excluding the industries of postal services and telecommunications<br>Enterprises with more than 100 regular employees, excluding the industries of "Agriculture," "Forestry," "Fisheries" and "Mining" as defined in JSIC. |
| **Measures** | The survey includes questions on different aspects of ICT use and e-business:<br>• ICT infrastructure adoption<br>• Network connectivity of the enterprise (e.g. remote access)<br>• Use of websites<br>• Use of the internet for procurement and sales<br>• Problems and barriers to the use of ICT<br>• Demand for ICT skills, ICT training activities<br>• ICT security measures<br>The questionnaire is available in Annex III of the report. |
| **Data** | Establishments provide data on the above mentioned items |
| **Unit** | Establishments (Large-size wholesalers: wholesale shops for each product with 100 or more employees and wholesale shops with 200 or more employees; large-size retail shops: department stores and supermarkets with 50 or more employees; general shops: general shops not classified under large-size wholesale or retail shops);<br>Corporations (convenience stores: corporate headquarters of companies which run chain convenience stores with 500 or more shops, regardless of type of shops, including company-owned outlets, franchise stores and venture capital shops). |
| **Frequency** | CUTS, composed of the following 3 sections: "Households/household members", "Offices (establishments)" and "Companies (enterprises)", has been conducted annually since 1990 as a statistical survey authorized by MPHPT in accordance with the Statistical Report Coordination Law. |
| **Method of data collection** | Postal survey |
| **More information** | http://www.johotsusintokei.soumu.go.jp/tsusin_riyou/data/eng_tsusin_riyou02_2003.pdf |

Source: empirica 2005 (based on Liaison, 2003), Statistics Bureau Japan.

**Exhibit 2-7: ECOM survey 2001**

| | |
|---|---|
| **Name** | **ECOM / METI / NTT-survey - Market Survey of E-Commerce 2001 (Current Situation and Future Outlook through to 2006)** |
| **Purpose** | To measure the market size of Japan's B2B and B2C e-commerce (trading value) and to estimate the market size from January to December 2001, and a projection for 2002 to 2006. |
| **Coverage** | Establishments (no size limit) |
| **Measure** | B2B and B2C trading value |
| **Unit** | Establishment |
| **Data** | No detailed information about items |
| **Frequency** | Annually (fourth survey in series) |
| **Method of data collection** | Questionnaire survey:<br>• Mail survey on electronic commerce in FY2001; subject e-commerce operators, e-commerce support businesses and other enterprises from various industry segments; survey body: ECOM, NTT; No. of effective responses: 375.<br>• Results of other related surveys: FY 2001 Survey of Information and Communication Technology and Electronic Commerce (METI)<br>Interviews: 49 face-to-face; approx. 50 other telephone / email interviews.<br>Estimation / projection methods: estimation based on results of the above question-naire survey, interviews, and other publicly available documented surveys, as well as the contents of associated data; projection of future market size: B2B = results of newly prepared projection model, using the latest survey data; B2C = 2000 projections, adjusted based on data from 2001. |
| **More information** | http://www.ecom.jp/ecom_e/ |

Source: empirica 2005 (based on CRITO, 2004), Statistics Bureau Japan.

## 2.5 E-business monitoring in Korea

***In brief***

The Korean National Statistical Office's (KNSO) uses the broader OECD definition. E-commerce data are collected by two dedicated surveys to measure the transaction value of e-commerce and the value of contracts by electronic bidding of listed companies:

- The Cyber Shopping Mall Survey, which covers all establishments whose main business is internet B2C, and
- The E-Commerce Survey on Enterprise (B2B) and Government (B2G), which measures e-commerce adoption in enterprises and governments.

The KNSO data collection methods involve direct interviewing and self-enumeration through e-mail and internet (CASI method – Computer Assisted Self Interviewing).

### 2.5.1 Institutional framework

#### Legal framework

Korean industrial policy included considerations on e-commerce developments since the second half of the 1990s. In 1999, the Korean government established the **Basic Act on e-commerce**. In accordance with global legislation related to e-commerce, Korea established and enforced various laws and regulations, such as consumer protection and electronic payments. Since enacting the "Comprehensive Policies for e-Commerce Development" in 2000 and the "e-Business Initiative in Korea" in 2001, Korea has been promoting various projects, such as creating infrastructure by establishing and standardising B2B networks in industries, developing technology, and fostering human capital. Projects on international cooperation for the global B2B market and the expansion of e-commerce are also being encouraged.

The Korean National Statistical Office (KNSO) collects, monitors and disseminates data and information on ICT adoption. However, it is not the only relevant source for information on e-commerce and e-business. Various organisations are involved in promoting e-commerce through research and project implementations in co-operation with the Korean government.

#### The Korean National Statistical Office (KNSO)

The *Korean National Statistical Office* (**KNSO** – http://www.nso.go.kr/english) has developed a set of indicators measuring changes of the knowledge and information society and is monitoring and measuring changes in e-business at a national scale.

KNSO defines electronic commerce as a way of commercial transaction in which goods and services are traded via electronic media, that is, computers and networks. KNSO's definition of e-commerce coincides with that of the broad OECD definition.

KNSO classifies results of its different surveys also **by type of customer**, so that

- Results from the e-commerce survey on enterprise are classified as B2B.
- Results from the e-commerce survey on government are classified as B2G.
- Results from the Cyber Shopping Mall Survey are classified as B2C, B2B and others according to the destination of sales.

A classification by **attribute of transaction** is applied by KNSO, complementing the definition of OECD. Transactions are classified as **'open type'** if they are concluded via bidding or on open (internet) markets, whereas they are classified as **'closed type'** when concluded between large corporations and their suppliers as part of long-term agreements and ongoing trade relationships. This is an interesting approach, as it takes into account the different objectives that are normally pursued with 'open' and 'closed' transactions. While open transactions are conducted with the aim of selecting the supplier offering the best value, in closed transactions the key objective is to increase the efficiency of inter-firm business processes.

Based on the market power of supply and demand side in an e-commerce market, **B2B** is classified into three types:

- buyer-oriented (i.e. e-commerce driven by the buyer via the e-commerce sites run by the buyer for procurement),
- supplier-oriented (i.e. e-commerce driven by the supplier via the e-commerce sites run by the supplier) and
- intermediary-oriented type (i.e. e-commerce driven by an intermediary via the public e-marketplace).

## Other important institutions for e-business development

Apart from the National Statistical Office, other institutions that a play an important role in promoting and coordinating e-business developments in Korea include the following:

*Ministry of Commerce, Industry and Energy* (**MOCIE** – www.ecommerce.go.kr): The government ministry responsible for overseeing e-commerce, is responsible for Korean e-commerce and e-business policies and promotion. It is involved in e-commerce standard-isation, e-commerce related technology and human capital development. MOCIE also deals with policies concerning international e-commerce activities, consumer protection in e-commerce (including dispute resolution), development of B2B networks, and IT implement-ation for SMEs. The MOCIE is running a survey of the e-commerce market size and has under its auspices a number of institutions which are also dealing with e-commerce issues:

- The *Korean Agency for Technology and Standards* (ATS – http://www.ats.go.kr/english/home/home.asp) is responsible for e-commerce technology and standardisation including: electronic transactions related communication messages, e-document standards, e-data exchange technology, e-payment systems and financial trading, classification and development of search technology for e-catalogues, encryption for electronic transaction, security and certification technology, electronic transaction software, and internet application technology.
- The *Korean Institute for Electronic Commerce* (**KIEC** – www.kiec.or.kr) is a special legal entity established pursuant to the Basic Act on e-Commerce as a private organisation to foster e-commerce. It is responsible for: the standardisation and dissemination of electronic transaction standards such as e-documents, the management of the eTrust mark, the management of the E-Commerce Mediation Committee and the operation of the Electronic Commerce Resource Centres.
- The *Electronic Commerce Resource Centres* (**ECRC** – www.ecrc-korea.or.kr) initiative was launched in September 1997, under the Basic Law of Electronic Commerce, to foster the Korean competitive edge in the digital economy. Each ECRC operation is sponsored by MOCIE and is supervised by KIEC. By April 2005, 26 ECRCs had been set up and are providing various services to promote the use of IT and e-commerce activities. These services can be divided into 4 categories

(Education; Consultancy and Technical Support; Technology Transfer and Regional Specific Activities; Public Relations and International Cooperation) and are mostly addressing the needs of small and medium-sized companies (SMEs).

*Ministry of Information and Communication* (**MIC** – www.mic.go.kr): This ministry is responsible for information communications, radio, broadcasting, postal service and postal finance matters in Korea. MIC is focused on promoting e-commerce by creating the necessary infrastructure including: the streamlining of e-commerce laws and regulations including the Electronic Signature Act, establishment of the information superhighway, standardisation, and human resources development. It also has under its auspices certain e-commerce related institutions, including:

- The *National Computerisation Agency* (**NCA** - www.nca.or.kr), which first opened as a government-invested organisation in 1987. It is engaged in activities to support information society development, including projects for broadband convergence and advancement of e-government.
- The *Korea Information Security Agency* (**KISA** – www.kisa.or.kr/english), which was established as a government owned organisation to formulate policies and technology measures for information protection to enable the safe distribution of information while fostering business practices for the information and communication industries. KISA is also working on development and standardisation of information protection technology. The Agency is also operating the "*e-signature certification management centre*" and raising public awareness of information security. It also operates the "*118*" consulting service (hacking/virus consulting support centre), where people can call to receive information on hacking and virus attacks (also available on their website).
- The *Korea Information Society Development Institute* (**KISDI** – www.kisdi.re.kr), which is a government-invested research centre exploring ways to realise a true Information Society and overcome related obstacles inherent in different sectors of the society. KISDI's research results are used as input in designing the national plan for creating the Information Society and economic policies in the area of information and communication.

*Korean Electronic Trade and Technical Association* (**KCALS** – www.kcals.or.kr): KCALS aims to improve the competitive strength of e-commerce technology. It also acts as a bridge between the private sector and the government to reinforce Korea's industrial competitive edge. KCALS combines the Korea Electronic Trade Association (under MOCIE), which promotes e-business from the demand side as a user of e-commerce, and the Korea Electronic Trade Technical Association (under MIC), whose mission is to cultivate a favourable business environment and supply relevant technologies through e-commerce from the supplier side.

*Korea Chamber of Commerce & Industry* (**KorCham** – www.korcham.net): KorCham offers a wide range of services to promote Korean commerce and industry. As a representative of the industrial sector, KorCham lobbies to protect the rights and interests of Korean business. A network, linking chambers of commerce around the world via KorCham, has been set up to support the overseas activities of Korean companies by offering B2B services.

*Korea Consumer Protection Board* (**KCPB** – www.cpb.or.kr): The Board is a special public entity created under the Ministry of Finance and Economy. It was established on July 1, 1987 pursuant to the Consumer Protection Act to protect the basic rights of consumers and to promote efficient and healthy consumption. To respond quickly and effectively to newly emerging consumer issues related to the advent of the digital economy, the Board is engaged in:

- research on the regulatory framework needed to protect consumers engaging in online transactions and to offer policy alternatives;
- monitoring e-commerce activities and investigating cases of unfair trade practices;
- providing comprehensive consumer information on e-commerce and consumer protection; and
- consumer education.

*Ministry of Culture & Tourism* (**MCT** – www.mct.go.kr): MCT supports the digital content industry and promotes e-commerce by assuring the protection of intellectual property rights (IPR), through the IPR Act, as well as by a variety of other activities.

*Integrated Forum on Electronic Commerce* (**ECIF** – www.ecif.or.kr): ECIF is a non-profit private organisation which was established to promote e-commerce through consultations and coordination in e-commerce standardisation as well as by organising promotional efforts led by the private sector. It is also responsible for:

- development of an e-commerce standardisation roadmap;
- making policy recommendations;
- representing Korea in international standardisation activities;
- participation in international standardisation efforts and developing joint response mechanisms; and
- leading Korea's largest private sector market-oriented standardisation effort.

### 2.5.2 Main surveys

The Korean National Statistical Office (KNSO) monitors the adoption of e-business in Korea by means of two dedicated surveys:

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

Findings from these surveys are published in regular reports by the KNSO. The objective of both surveys is to *"capture the size, growth and nature of e-commerce, thereby to serve as a useful reference for policy-making, business management, and research activities"*. The B2C, B2B and B2G sectors constitute separate surveys, as they require different scopes of survey coverage and content and show different development stages in e-commerce. Each survey measures the type of e-commerce, the amount of e-commerce sales/purchases, and the number of business establishments involved.

The monthly 'Cyber Shopping Mall Survey' (B2C) was first released in August 2000. The quarterly 'E-commerce Survey on Enterprise' (B2B) was first released in June 2001. The quarterly 'E-Commerce Survey on Government' (B2G), being incorporated into the B2B survey, was first released in September 2001. These two surveys were approved as designated statistics in February 2004. Both surveys are approved by the Korean Statistics law.

The strategy of monitoring e-business development by focusing on cyber shopping malls has some advantages and disadvantages, as UNCTAD (United Nations Conference in Trade and Development) points out: "*The advantage of this kind of survey is that it is relatively easy to implement and that it captures all businesses that have opened internet-based cyber shopping malls for either B2B or B2C e-commerce. On the other hand, it may be difficult to identify the malls, and the survey can capture only the e-commerce conducted through the malls, thus omitting any other e-commerce*" (UNCTAD, 2001, p. 13).

**Exhibit 2-8: Cyber Shopping Mall Survey**

| Name | Cyber Shopping Mall Survey |
|---|---|
| **Purpose** | To capture the size, growth and nature of e-commerce, and thus to serve as a reference for policy-making, business management, and research activities |
| **Coverage** | About 2,500 establishments |
| **Measures** | • Sales by type and product category<br>• Operating costs by type<br>• Price competition<br>• Type of purchaser<br>• Support systems for e-commerce<br>• Plans to facilitate e-commerce |
| **Unit** | Internet cyber malls whose main business is B2C transaction. The term 'Cyber mall' refers to a virtual business site using computer and other ICT equipment by which products and services are traded (Article 2, subparagraph 6 of the Basic Act on Electronic Commerce). The clients of cyber malls may be individual consumers, companies or the government.<br>In the case of "home shopping companies", only internet business is included, meaning that home-shopping and catalogue-shopping businesses are excluded.<br>In the case of so called "on/offline hybrid malls", only online scope is included.<br>**Out of survey coverage** are:<br>• Internet cyber malls whose main business is B2B transaction;<br>• Cyber malls whose main businesses are internet contents or internet service. |
| **Data** | Transaction values, composition by purchaser, composition by means of paying, type of operation |
| **Frequency** | monthly (1st and 22nd of following month) |
| **Method of data collection** | Direct interview and self-enumeration through e-mail and internet (CASI – Computer Assisted Self Interviewing) |
| **More information** | http://www.nso.go.kr/eng/surveys/surveys.html?num=45&category=8 |

Source: empirica, 2005 (based on KSNO, 2004; UNCTAD, 2001).

The **e-Commerce Survey on Enterprise (B2B) and Government (B2G)** is a quarterly survey on B2B and B2G e-commerce and has been conducted since the 1st quarter of 2000. The survey is based on the KSE-listed[25] enterprises (both large enterprises and SMEs), KOSDAQ-listed enterprises (venture firms) and public corporations. The survey questionnaire consists of the following modules and items:

- *General and summary forms (14 items)*, covering information about the overall business activity of an establishment and its use of e-commerce systems.
- The *purchasing system form (10 items)*, covering information about online purchasing activity of the establishment.
- The *sales system form (9 items)*, covering information about the online selling activity of the establishment.
- The *e-market form (17 items)*, with questions for operators of e-marketplaces (e.g. classification by operator and by business scope, transaction value by industrial sector; authentication, security and payment modes).

[25] Korea Stock Exchange

**Exhibit 2-9: E-commerce survey on Enterprise (B2B) [and government B2G]***

| Name | E-commerce survey on Enterprise (B2B) |
|---|---|
| **Purpose** | To capture the size, growth and nature of e-commerce, and thus to serve as a reference for policy-making, business management, and research activities |
| **Coverage** | About 2,500 establishments |
| **Measures** | • Use of e-commerce systems<br>• Electronic transactions accomplished via a company's own system (internet, non-internet, purchase, sale)<br>• Electronic transactions via other companies' systems<br>• Use of purchasing systems |
| **Unit** | • Corporations listed in Korea Stock Exchange<br>• Corporations listed in KOSDAQ (Korea Securities Dealers Automated Quotations) public enterprise)<br>• Leading e-marketplaces<br>• Government agencies |
| **Frequency** | Quarterly |
| **Method of data collection** | Direct interviews. Surveys are conducted by staff members of the local statistical office under KSNO. |
| **More information** | http://www.nso.go.kr/eng/surveys/surveys.html?num=44&category=8 |

**Note**: * B2G data are excluded in this report.

Source: empirica, 2005 (based on KNSO, 2004).

## 2.6 E-business monitoring in the United States of America

***In brief***

E-business measurement in the US focuses in the economic value of e-business transactions. The US follow the OECD definition on e-commerce. E-commerce data are collected in five separate Census Bureau surveys, each focusing on specific industry segments (e.g. wholesale, retail, manufacturing). These surveys use different measures of economic activity such as value of shipments for manufacturing, sales for wholesale and retail trade, and revenues for service industries. Consequently, measures of total economic and e-commerce activity differ in concept and definition among these sectors, and the total should be interpreted with caution.

The Census Bureau's e-commerce measures include the value of goods and services sold online whether over open networks such as the internet, or over proprietary networks running systems such as Electronic Data Interchange (EDI).

Surveys cover North American Industry Classification System (NAICS) industries that accounted for approximately 77% of the U.S. economic activity measured in the 2002 Economic Census. The report does not cover agriculture, mining, utilities, construction, agents, brokers, and electronic markets in wholesale trade, and approximately one-third of service-related industries.

### 2.6.1 Institutional framework

The most important authority for measuring e-business in the United States of America is the U.S. Census Bureau of the Department of Commerce (DoC, www.census.gov/eos), pre-eminent collector and disseminator of timely, relevant, and quality data about the people and the economy of the United States.

The **Census Bureau** conducts a population and housing census every 10 years, an economic census every five years, and more than 100 demographic and economic surveys every year, all of them evolving from the first census in 1790. ***E-Stats*** (www.census.gov/estats) is the U.S. Census Bureau's internet project site devoted exclusively to *Measuring the Electronic Economy.* It features recent and upcoming releases, information on methods, classification systems, and background papers. It covers four industry sectors: manufacturing, merchant wholesale trade, retail trade, and selected service industries. Sectors and industries not covered include agriculture, mining, construction, and utilities as well as non-merchant wholesalers and parts of the service sector.

**Important other data sources**: Another relevant source is the U.S. Economics and Statistics Administration (ESA) which has published the *Digital Economy 2003* (DE2003) report. This report is the Department's fifth annual report on conditions in U.S. information technology (IT) industries and the effects of IT on national economic performance.

**E-business definition**: The U.S. Census Bureau initiated an aggressive programme in 2000 to recognise, define and measure the growth, integration, and sophistication of information technology and communications within the U.S. society and economy. However, the fact that e-business is in its infancy, yet growing and changing rapidly, has first posed special problems of definition. Consensus was found in offering the following intentionally broad definition to provide an inclusive framework for planning statistical measures, and to allow

flexibility to incorporate continuing changes in the digital economy (see, Mesenbourg, 2001; Atrostic et al., 2000):

- E-business infrastructure is the share of total economic infrastructure used to support e-business processes and conduct electronic commerce. It includes hardware, software, telecommunication networks, support services, and human capital used in e-business and e-commerce.
- E-business is any process that a business organisation conducts over computer-mediated networks. Business organisations include any for-profit, governmental or nonprofit entity. Examples of major e-business process categories include: online purchasing, selling, production management, logistics, as well as internal communication and support services. Within each of these major category one can identify more specific processes.
- Electronic commerce (e-commerce) is the value of goods and services sold over computer mediated networks. An e-commerce transaction is 'completed' when agreement is reached between the buyer and seller online to transfer the ownership or rights to use goods or services. This online agreement is the trigger for determining an e-commerce transaction, not the payment. Only priced transactions will be measured. Not included are, for example, downloads of free software. While transactions involve buyers and sellers, the US census will generally measure e-commerce from the seller's perspective. Examples of e-commerce transactions include the sale of a book or CD over the internet, an electronic marketplace selling parts to another business, a manufacturing plant selling electronic components to another plant within the company using the company's intranet, and a manufacturer selling to a retailer over an EDI network.
- Computer-mediated networks are electronically linked devices that communicate interactively over networks. A variety of electronic devices can be linked, including computers, internet-enabled cellular phones, personal digital assistants, WebTV, and telephones linked through interactive telephone systems. Networks include the internet, intranet (internal network within an enterprises' or organisation's firewall), extranets (networks using internet/intranet technology that permit businesses to securely share information with selected suppliers, paying customers, or other businesses), Electronic Data Exchange (EDI - a proprietary electronic system used for exchanging business data over networks) networks, and telecommunication networks. Networks can be either open or closed.

Based on these considerations, the Census Bureau's e-commerce measures include the value of goods and services sold online whether over open networks such as the internet, or over proprietary networks running systems such as Electronic Data Interchange (EDI).

### 2.6.2 Main surveys

The U.S. Census Bureau produces the *E-Stats* report to provide national estimates of e-commerce activity by business sector for establishments engaged in manufacturing, merchant wholesale trade, retail trade, and selected service industries. ICT and e-business-related data are collected in five separate Census Bureau surveys: the Annual Survey of **Manufacturers** (**ASM**), the Annual **Trade** Survey (**ATS**), the **Service** Annual Survey (**SAS**), the Annual **Retail** Trade Survey (**ARTS**), and the **Economic Census**.[26]

Consequently, measures of total economic and e-business activity differ in concept and definition among these sectors, and the total should be interpreted with caution. The Census Bureau's e-commerce measures include the value of goods and services sold online whether over open networks such as the internet, or over proprietary networks running systems such as Electronic Data Interchange (EDI). Overall, measures of total economic and e-commerce activity vary by economic sector, and differ by concept and definition; they are, thus, not additive.

The e-commerce estimates for 2002 were derived from the ASM while the estimates for total value of shipments were derived from the manufacturing component of the 2002 Economic Census. The manufacturing universe is comprised of approximately 345,000 plants. The ASM collects data annually from a probability sample of more than 55,000 manufacturing plants with five or more employees. In the census, data are collected from all plants with five employees or more. For both surveys, data for plants with less than five employees are estimated using information obtained from administrative sources.

**Exhibit 2-10: ASM survey overview**

| | |
|---|---|
| **Name** | **ASM - Annual Survey of Manufacturers – Computer Network Use Supplement** |
| **Purpose** | To provide detailed industry measures of 'value of shipments', i.e. the market of all commodities shipped from a manufacturing plant. Value of shipments includes shipments to outside customers as well as affiliated plants. |
| **Coverage** | NAICS 311-339 Manufacturing (approximately corresponding to NACE D – manufacturing) |
| **Measure** | E-commerce value of shipments |
| **Unit** | Manufacturing plants; universe: ca. 345,000 plants; no enterprise size class limit. |
| **Data** | Plants provide data on dollar value of annual sales, end-of-year inventories and methods of inventory valuation, purchases, and gross margins. |
| **Frequency** | Collects data annually from a probability sample of more than 55,000 manufacturing plants with 5 or more employees. |
| **Method of data collection** | Mail questionnaire for larger single-location manufacturing companies and all manufacturing establishments of multi-unit companies (companies that operate at more than one physical location). Non-sampling estimation for smaller, single-establishment companies based on data obtained from administrative records. |
| **More information** | http://www.census.gov/eos/www/papers/asmmultisector.pdf |

Source: empirica 2005 (based on Census Bureau)

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

**Exhibit 2-11: ATS survey overview**

| | |
|---|---|
| **Name** | **ATS - Annual Trade Survey** |
| **Purpose** | To provide detailed industry measures of sales and inventories for wholesale trade activities. The United States Code, Title 13, authorises this survey and provides for mandatory responses. |
| **Coverage** | Wholesale, NAICS 42 (roughly equivalent to NACE rev. 1 51.2 – 51.7). Companies with employment that are primarily engaged in wholesale trade in the U.S. These include wholesalers that take title of the goods they sell such as jobbers, industrial distributors, exporters, importers, and manufacturers' sales branches and offices (MSBOs).<br>In 2007, the US Census will also provide information on companies that do not take title of the goods they sell such as agents, merchandise or commodity brokers, commission merchants; and e-business to business markets. |
| **Measures** | • Merchant wholesale e-commerce sales and components<br>• EDI sales and internet / extranet sales |
| **Unit** | Manufacturing companies with five or more paid employees. Data collected annually from approximately 6,700 firms (sample size) that represent the universe of approximately 300,000 merchant wholesale firms with paid employees. |
| **Data** | Merchant wholesale trade estimates of e-commerce sales use data from the Annual Trade Survey (ATS) and administrative records. |
| **Frequency** | Data for merchant wholesalers, excluding manufacturer sales branches and offices (MSBO's); collected annually since 1978. Data collection for MSBO's was begun in 2003 and included data for 2002 and 2003; data collection for agents, brokers, and electronic markets will begin in 2006 and will cover data for 2004 and 2005.<br>Data collected are for activity taking place throughout the calendar year. New samples are chosen approximately every 5 years and are updated quarterly.<br>Use of the latest sample began in the 1999 survey year. |
| **Method of data collection** | A mail-out/mail-back survey of about 8,000 wholesale businesses. The sample is drawn from the Business Register, which contains all Employer Identification Numbers (EINs) and listed establishment locations.<br>Firms are first stratified by major kind of business and estimated sales. All firms with sales above applicable size cutoffs are selected into the survey and report for all their wholesale industry EINs. In a second stage, unselected EINs are stratified by major kinds of business and sales, and randomly selected from each strata.<br>The sample is updated quarterly to reflect employer business "births" and "deaths"; adding new employer businesses identified in the Business and Professional Classification Survey and deleting firms and EINs when it is determined they are no longer active. There is about a 9 month delay before new firms can be represented in the sample. To account for births during this interim period, data are imputed for all EINs that go out of business but are still active on the IRS mailing list. |
| **More information** | http://www.census.gov/eos/www/papers/asm.pdf. |

Source: empirica 2005 (based on Census Bureau)

**Exhibit 2-12: SAS survey overview**

| | |
|---|---|
| **Name** | **SAS - Service Annual Survey** |
| **Purpose** | Measures activity of employer firms classified in nine service-related sectors. |
| **Coverage** | NAICS 484/492/493 Truck Transportation, Messenger Services & Warehousing<br>NAICS 51 Information Sector Services, containing Publishing Industries (NAICS 511): Motion Picture and Sound Recording Industries (NAICS 512): Broadcasting and Telecommunications (NAICS 513): Information Services and Data Processing Services (NAICS 514)[27]<br>NAICS 52 Securities, Commodities, and Other Financial Investments (roughly equivalent to NACE 67 Activities auxiliary to financial intermediation)<br>NAICS 532 Rental and Leasing Services, roughly equivalent to NACE 71 "Renting of machinery and equipment without operator and of personal and household goods"<br>NAICS 54 Professional, Scientific, and Technical Services, roughly equivalent to NACE 72-74,<br>NAICS 56 Administrative & Support and Waste Management & Remediation Services<br>NAICS 62 Health Care and Social Assistance<br>NAICS 71 Arts, Entertainment, and Recreation Services<br>NAICS 81 Other Services |
| **Measure** | E-commerce revenue for selected service industries |
| **Unit** | Service companies; data are tabulated annually from more than 58,000 firms representing the universe of approximately 3 million establishments with paid employees. |
| **Data** | Service sector estimates of e-commerce revenue use data from the Service Annual Survey (SAS) and administrative records. |
| **Frequency** | Collected annually; quarterly reports |
| **Method of data collection** | SAS questionnaires are mailed to a probability sample that is periodically reselected from a universe of firms operating in the United States and having paid employees. The sample includes firms of all sizes and covers both taxable firms and firms exempt from Federal income taxes; stratification according to size and estimated receipts or revenue. |
| **More information** | http://www.census.gov/econ/www/servmenu.html#service |

Source: empirica 2005 (based on Census Bureau)

[27] The Information sector according to NAICS 51 is not corresponding to single divisions of NACE rev.1 but is spread over several subsections and divisions.

**Exhibit 2-13: ARTS survey overview**

| Name | ARTS - Annual Retail Trade Survey |
|---|---|
| Purpose | To provide detailed industry measures of retail company activities. The United States Code, Title 13, authorises this survey and provides for mandatory responses. |
| Coverage | Retail companies with one or more establishments that sell merchandise (NAICS 44, 45, 72; roughly equivalent to NACE 52 retail trade). 1999 was the first year the ARTS was collected on a NAICS basis. No size class limit. |
| Measure | E-commerce sales of merchandise and other operating receipts |
| Unit | Retail companies |
| Data | Companies provide data on dollar value of retail sales, sales taxes collected, inventories, method-of-inventory valuation, cost of purchases, and account receivables balances. |
| Frequency | Annually since 1951 (except 1954); reported data are for activity taking place over the prior calendar year. Data collection begins in January following the end of the survey year. New samples are chosen approximately every 5 years and are updated quarterly. Use of the latest sample began in the 1999 survey year |
| Method of data collection | A mail-out/mail-back survey of about 22,000 retail businesses with paid employees, supplemented by administrative data to account for non-employer businesses. The employer sample is drawn from the Business Register, which contains all Employer Identification Numbers (EINs) and listed establishment locations. Firms are first stratified by major kind of business and estimated sales. All firms with sales above applicable size cut-offs are selected into the survey and report for all their retail industry EINs. In a second stage, unselected EINs are stratified by major kind of business and sales, and randomly selected from each strata.<br>The sample is updated quarterly to reflect employer business "births" and "deaths"; adding new employer businesses identified in the Business and Professional Classification Survey and deleting firms and EINs when it is determined they are no longer active. There is about a 9 month delay before new firms can be represented in the sample. To account for births during this interim period, data are imputed for all EINs that go out of business but are still active on the IRS mailing list. |
| More information | http://www.census.gov/eos/www/papers/arts.pdf |

Source: empirica 2005 (based on Census Bureau)

**Exhibit 2-14: Economic Census**

| Name | Economic Census |
|---|---|
| Purpose | The Economic Census profiles American business every 5 years, from the national to the local level. |
| Coverage | Covers all sectors except agriculture, forestry, fishing and hunting; schools and colleges; labour; political and religious organisations; public administration and private households. |
| Measure | E-commerce sales, shipments, receipts or revenue |
| Unit | Establishments (business establishments, organisations) |
| Data | Broad coverage of economic and business issues. Several key statistics are tabulated for all industries (e.g. number of employees and establishments), other items vary by sector. |
| Frequency | Every 5 years. The latest survey was the 2002 Economic Census |
| Method of data collection | The 2002 Economic Census measured activity during the calendar year 2002. Census forms were mailed to more than 5 million companies in Dec. 2002, with a due date to send them back by February 12, 2003. There were over 600 versions of the census form, each customised to particular industries. Some micro companies did not receive a form. |
| More information | http://www.census.gov/econ/census02/ |

Source: empirica 2005 (based on Census Bureau)

The five surveys described above use the following different measures of economic activity:

**Exhibit 2-15: Definition of Economic Activity**

| | |
|---|---|
| **ARTS** | The Economic Census profiles American business every 5 years, from the national to the local level.-commerce sales of merchandise and other operating receipts |
| **ASM** | E-commerce value of shipments (a) |
| **ATS** | Merchant wholesale e-commerce sales and components; EDI sales and internet / extranet sales (b) |
| **SAS** | E-commerce revenue for selected service industries (c) |
| **Economic Census** | E-commerce sales, shipments, receipts or revenue. |

Notes:

(a) ASM and the Manufacturing Sector of the 2002 Economic Census: 'Value of Shipments' is the measure used in both the ASM and Economic Census. It is the market value of all commodities shipped from a plant. Value of shipments includes shipments to outside customers as well as to affiliated plants.

(b) ATS and ARTS: 'Sales' is the measure used in the ATS and the ARTS. Sales are the dollar value of transactions between the reporting firm and its customers. Sales include transactions to foreign affiliates, but exclude transactions among domestic affiliates.

(c) SAS: 'Revenue' is the measure used in the SAS: Revenues are the dollar value of transactions and contracts between the reporting firm and its customers. These values include services performed for foreign affiliates, but exclude transactions among domestic affiliates. Revenue includes the total value of service contracts, the market value of compensation received in lieu of cash, amounts received for work subcontracted to others and other industry-specific items.

Source: empirica, 2005 (based on Census Bureau).

# 3 e-Business Deployment: Worldwide Trends

## 3.1 Main results for Europe

### *Snapshot of key findings*

Results of the Eurostat survey 2004 show that there are still significant geographic differences in ICT adoption and e-business activity within the European Union. Eurostat reports that electronic commerce accounted for about 9% of European firms' total turnover in 2004. While it was more than 10% in the technologically most advanced economies (e.g. in the Nordic countries, the UK, the Netherlands and in Germany), the share was only about 2-3% in Southern European countries and in most of the new EU Member States. 13% of EU companies received online orders from customers, and 27% placed online orders with suppliers in 2004.

*e-Business W@tch,* which focuses on sectors rather than countries, presented results which demonstrate that the nature, intensity and impact of e-business activity differs widely between sectors, particularly between manufacturing and service industries, as well as between large, medium and small enterprises. E-business activity has reached a high level of intensity, for example, in the IT services sector, the automotive, aeronautics and pharmaceutical industries. B2B-dominated sectors are more active in electronic procurement and supply chain management dominate, while online marketing and sales play a more important role in B2C oriented sectors (e.g. tourism, publishing).

### Geographic differences in firms' ICT use: results reported by Eurostat

Results of the Eurostat survey on ICT use by enterprises (2004) show that there are still significant geographic differences in ICT adoption and e-business activity within the European Union. Broadband adoption by companies, for example, differs considerably between Member States. Similarly, there are remarkable differences in the deployment of electronic commerce activity (e.g. with regard to the share of firms making online purchases and sales) among firms from different countries (see Exhibit 3-1). In total, Eurostat reports that electronic commerce accounts for about 9% of European firms' total turnover in 2004.

**Exhibit 3-1: Geographic differences in e-business activity in the EU (2004)**

| | EU-25 | DE | EL | ES | IT | HU | NL | PL | SE | UK |
|---|---|---|---|---|---|---|---|---|---|---|
| | in % | | | | | | | | | |
| Firms with internet access | **89** | 94 | 87 | 87 | 87 | 78 | 88 | 85 | 96 | 97 |
| Firms with broadband access | **52** | 54 | 21 | 72 | 51 | ** | 54 | 28 | 75 | 44 |
| Firms having purchased online | **27** | 47 | 14 | 3 | 4* | 14 | 22 | 9 | 38 | 50 |
| Firms having received orders online | **13** | 18 | 6 | 2 | 5 | 6 | 17 | 4 | 20 | 27 |
| Firms having received online payments for internet sales | **3** | 3 | 2 | 1 | 1 | 1 | 3 | 1 | 4 | 5 |
| % of firms' total turnover stemming from e-commerce | **9** | 11 | 2 | 3 | 3 | ** | ** | 3 | 11 | 14 |

* data from 2003; ** no data available

Source: Eurostat (http://epp.eurostat.cec.eu.int; 'Themes' > 'Industry, trade and services')

The results shown in Exhibit 3-1 are selected from those indicators that have been published on the Eurostat website. As Eurostat has only published data for some indicators, there is no full picture of the survey results available yet. Still, from these results, it can be concluded that gaps in e-business adoption within the European Union (between Member States) are clearly more pronounced than on aggregate level in international benchmarks, that is between firms from the EU-25 and those from Australia, Canada, the USA, etc.

It appears that the digital divide within the EU concerns mostly the 'third tier' in information society development within the European Union: ICT and e-business adoption is comparatively low in most of the new EU Member States, but also in Greece and Portugal.

On the other hand, the technologically most advanced Member States (including, in particular, the Nordic countries), can be regarded as international benchmarks in ICT adoption and e-business activity. Many EU countries are well aligned with the international state-of-play in e-business. This holds true for some of the major economies in the EU, for example the UK, Germany, the Netherlands and Spain. For France and Italy, results are mixed: some indicators point at a lower adoption of e-business activity and some at a rather developed one.

## The sector dimension: results reported by *e-Business W@tch*

Sector studies by *e-Business W@tch* show that the nature, intensity and impact of e-business activity differs widely between sectors, particularly between manufacturing and service sectors. For example, the share of firms that has placed orders for supplies online is only 20-30% of firms in the food and textile industries, about 50% in publishing and tourism, and more than 80% in the IT services sector (see Exhibit 3-2).

Interestingly, the total figure reported by *e-Business W@tch* for the 10 sectors monitored (in the EU-7 in 2005) is considerably higher (44%) than the figure reported by Eurostat for the EU-25 (27%). Data for online sales are more aligned between the two surveys: *e-Business W@tch* reports that 15% of firms "sell online on the internet or through other computer-mediated networks", Eurostat reports that 13% of firms "have received orders online".

**Exhibit 3-2: Sectoral differences in e-business activity (2005)**

| | All sectors (EU-7)* | Food & beverages | Textile | Publishing & Printing | Pharma-ceutical | Machinery & equipment | Automotive | Construction | Tourism | IT services |
|---|---|---|---|---|---|---|---|---|---|---|
| | in % of firms (base: firms using computers) | | | | | | | | | |
| Firms with internet access | **91** | 83 | 93 | 98 | 96 | 95 | 92 | 91 | 90 | 100 |
| Firms with broadband access (= at least 2 Mbit/s) | **9** | 4 | 4 | 13 | 11 | 6 | 11 | 7 | 8 | 20 |
| Firms having purchased online | **44** | 22 | 30 | 48 | 38 | 36 | 41 | 36 | 49 | 81 |
| Firms using special ICT systems for e-procurement | **11** | 5 | 8 | 8 | 14 | 10 | 13 | 9 | 14 | 19 |
| Firms making sales online | **15** | 8 | 10 | 18 | 13 | 5 | 11 | 3 | 31 | 25 |
| Firms using special ICT systems for e-marketing / sales | **8** | 6 | 7 | 9 | 12 | 8 | 9 | 3 | 12 | 23 |

The survey covered 10 sectors and 7 EU countries (CZ, DE, ES, FR, IT, PL, UK), in total 5218 interviews.

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

Among the 7 **manufacturing sectors** surveyed in 2005, electronic business activity has reached the highest level of intensity in the automotive, aeronautics and pharmaceutical

industries, according to *e-Business W@tch*. The rapid development in these sectors is mostly driven by the large international companies. Supply-chain integration and the streamlining of procurement processes are common objectives in these industries for which e-business solutions are attractive. ICT was also found to have considerable impacts on production and internal work processes in some of these sectors, for example in publishing and printing.

The food and beverages sector, and the textile and clothing industry, were found to be late adopters of ICT compared to the other manufacturing sectors studied. However, in the food and beverages industry, there are signs of increasing e-business activity, mainly in response to structural changes and new requirements.

In the **construction** industry, ICT adoption and e-business activity appears to be very limited yet. The structure of the industry, which includes many small craft companies, cannot fully explain this gap. An industry with a multitude of standards, technical specifications, labels, and certification marks is not an optimal forum for drawing benefits from electronic business. However, e-business tools have the potential to benefit complex construction projects where there is a need to coordinate a large number of sub-contractors.

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

The IT services sector shares a common feature with **tourism**: in both industries, online channels have become key tools for marketing, communication and interaction with customers. In tourism, online booking and reservation services have been widely accepted among consumers and business travellers, and "e-tourism" has truly taken off.

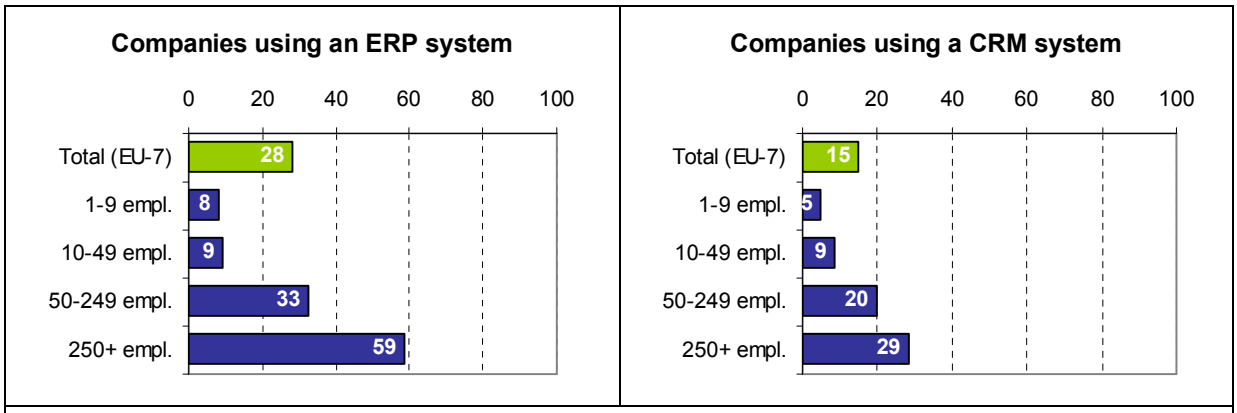
### Differences in ICT adoption by size-band

In consistency with any other survey on ICT adoption and e-business, *e-Business W@tch* reports that the adoption of (advanced) e-business applications increases by firm size. For example, ERP systems are hardly used by micro and small enterprises (less than 10%, see Exhibit 3-3), while about one in three medium-sized firms and about six out of ten large companies from the 10 sectors surveyed by *e-Business W@tch* in 2005 have an ERP system. Similarly, CRM systems are mainly diffused among medium-sized companies (20%) and large firms (29%).

E-commerce activity, at first sight, appears to be less dependant on firm-size. The share of firms that make online purchases and online sales only increases slightly by firm-size (see Exhibit 3-4). In online purchasing in particular, if the minimum threshold of online purchasing is set at 5% of the total volume of supply goods, firms of all size-bands behave very similar (not shown in Exhibit).

However, when it comes to using specific ICT systems for e-procurement and online selling, differences by size-band become evident. This indicates that larger firms are more likely to use integrated solutions where procurement and sales processes are linked to other company information systems such as logistics and accounting. Smaller firms, on the other hand, use e-commerce in a simpler way, such as making online orders from a supplier's websites, or accepting orders by e-mail (without any further digital integration of incoming orders).

**Exhibit 3-3: Diffusion of ERP and CRM systems among European enterprises (2005)**




Base: All enterprises using computers, EU-7 (CZ, DE, ES, FR, IT, PL, UK). N = 5218 (in total).

Data for total and for sectors weighted by employment, data for size-bands In % of firms.

ERP = Enterprise Resources Planning; CRM = Customer Relationship Management

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

**Exhibit 3-4: E-commerce activity among EU enterprises by size band (2005)**

| | Make online purchases | | Use specific ICT solutions for e-procurement | | Make online sales | | Use specific ICT solutions for online marketing / sales | |
|---|---|---|---|---|---|---|---|---|
| Weighting: | % of empl. | % of firms | % of empl. | % of firms | % of empl. | % of firms | % of empl. | % of firms |
| **Total (10 sectors, EU-7)** | **51** | **44** | **19** | **11** | **17** | **15** | **17** | **8** |
| 1-9 empl. | | 43 | | 11 | | 15 | | 8 |
| 10-49 empl. | | 46 | | 10 | | 14 | | 11 |
| 50-249 empl. | | 54 | | 22 | | 16 | | 20 |
| 250+ empl. | | 58 | | 30 | | 21 | | 28 |

"All" = companies using computers. N = 5218 (Total).

"% of employment" = firms representing …% of employment in the sector(s) / country

"% of firms" = % of firms as legal units, irrespective of their size

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

## 3.2 Main results for Australia

***Snapshot of key findings***

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

### Business use of ICT

Between 2002/3 and 2003/4, there have been small increases in the proportion of businesses using a computer, accessing the internet and having a web presence. While the proportion of businesses using a computer has remained around the same level for the last four years to 2003/4, the proportion of businesses with internet use and web presence has continued to grow steadily. Exhibit 3-5 shows trends over time for the proportions of businesses using a computer, the internet or having a web presence.

**Exhibit 3-5: Business use of selected information technologies – 30 June 2004**

| | | 1998/99 | 1999/2000 | 2000/01 | 2001/02 | 2002/03 | 2003/04 |
|---|---|---|---|---|---|---|---|
| Businesses using a computer | % | 63 | 76 | 84 | 84 | 83 | 85 |
| Businesses using the internet | % | 29 | 56 | 69 | 72 | 71 | 74 |
| Businesses with a web presence | % | 6 | 16 | 22 | 24 | 23 | 25 |

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

In mid 2004, a higher share of businesses using the internet were still using non-broadband connection types (58%) compared to broadband connection types (41%). Broadband is defined by the Australian Bureau of Statistics as an "*always on' Internet connection with an access speed equal to or greater than 256Kbps*". Non-broadband connection types consist of dial-up (analogue) and both dial-up and non dial-up ISDN (Integrated Services Digital Network) connections. Broadband connections were the most prevalent as the main type of Internet connection for businesses which employed 100 or more persons (78%) and 20-99 persons (54%).

### Businesses placing and receiving orders via the internet

The 2003/4 BUIT survey measured the number of Australian businesses using the internet or web to place and/or receive orders, with or without online payments, and the value of internet or web orders received by businesses (internet income).

There are both conceptual and measurement issues which mean that the estimate of income for orders placed over the internet or web should be treated with caution. Internet income

earned by Australian businesses increased by AUD 23.6 billion (€ 14.9 billion) from AUD 9.4b (€ 5.4b) in 2000-01 to AUD 33b (€ 19b) in 2003/4.[28]

The proportion of businesses which reported placing orders via the internet or web was 31% for 2003/4, an increase of 3 percentage points from the previous year (see Exhibit 3-6). This growth is a continuation of the trend seen over recent cycles for this business practice. While the number of Australian businesses using IT has continued to increase, so has the use being made of the technologies. For example, during the year 2000/1, the proportion which purchased goods or services via the internet doubled, increasing from 10% to 20% of all businesses. Over the same period, the proportion selling via the internet increased from 6% to 9% of all businesses.

**Exhibit 3-6: Orders for goods and services via the internet or web**

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

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

Estimates for proportions of businesses which received orders via the internet or web have demonstrated volatility over time. These data have been impacted by changes in question wording and processing procedures to better align with the evolving conceptual definition. The reporting of this item is also influenced by the availability of business management information and the relative rareness of this business event.

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

## 'Simple' online selling mechanisms dominate over integrated systems

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

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

[28] All exchange rates used to convert AUD values into EUR are annual average exchange rates (at Interbank rate) for a given year, based on the daily averages from the respective year. Source: OANDA.com currency converter (www.oanda.com/convert/fxhistory). See Annex II. Figures are rounded.

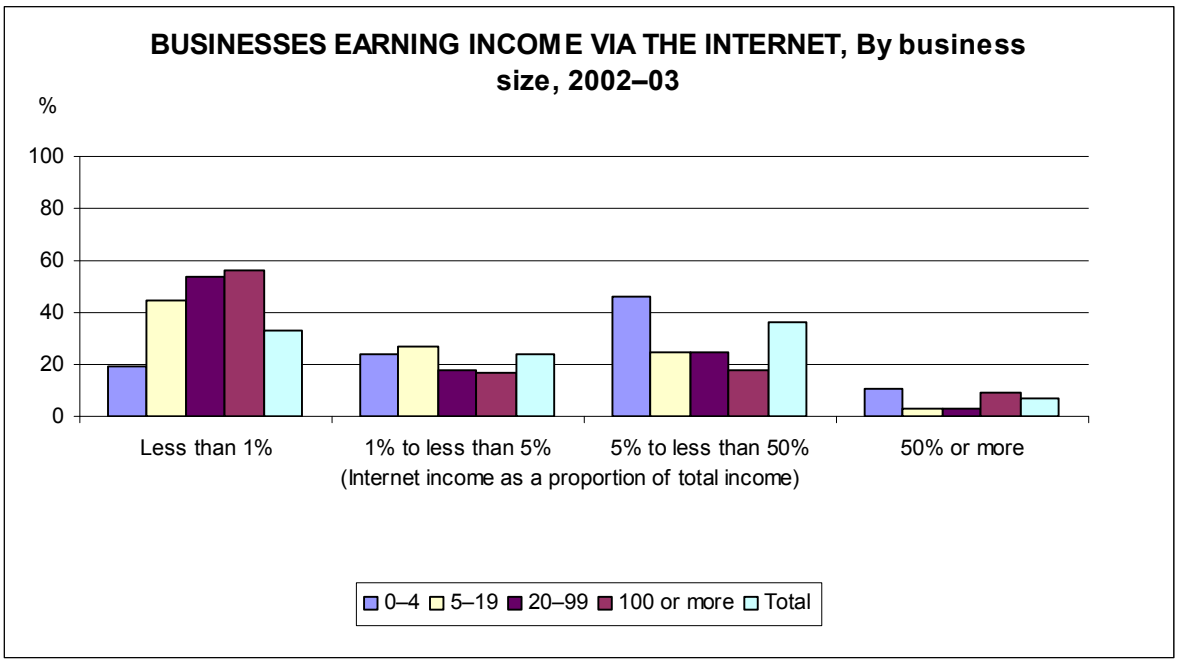
**Exhibit 3-7: Method of receiving orders via Internet or web**

| Method | 2003/04 |
|---|---|
| Email not linked to web site | 81 % |
| Website with linked e-mail facility | 30 % |
| Website with online order form | 15 % |
| Website with shopping cart | 6 % |
| Businesses could identify more than one method. | |

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

As shown in the following graph, there were an estimated 91,000 businesses earning income from orders received via the Internet or web in 2002/3. Of those, 33% generated less than 1% of their total income in this manner. A further 24% generated between 1% and 5% of their total income via the Internet or web, while 36% of businesses generated between 5% and 50% of their income via the Internet or web. Only 7% of businesses generated 50% or more of their total income via the Internet or web.

**Exhibit 3-8: Australian companies using e-commerce (2002-03)**




Source: ABS Business Use of Information Technology, Australia, 2002/3 (cat. no. 8129.0).

## 3.3 Main results for Canada[29]

### *Snapshot of key findings*

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

Sales from B2B amounted to CAD 19.8 (€ 12.3) billion, which represented about 75% of total e-commerce by private firms, up from only 68% the year before. The value of business-to-consumer (B2C) sales in 2004 amounted to CAD 6.6 (€ 4.1) billion. Findings confirm the importance of firm size in conjunction with the sector of activity: Sales from one business to another are still concentrated in large, private sector companies.

In 2004, these large firms accounted for 63% of business-to-business sales. Smaller retailers were more likely to sell to households. Sales to households accounted for less than 24% of the value of online sales by large firms. Small firms, those with fewer than 20 employees, reported that 41% of the value of their online sales was to households. Overall, e-business adoption by SMEs grows only slowly.

### Substantial growth in e-commerce, but still at low level

The 2004 SECT (Statistics Canada's 2004 Survey of Electronic Commerce and Technology) data show that online sales by Canadian companies and government departments grew substantially for the fifth consecutive year in 2004, but e-commerce still accounted for less than 1% of total operating revenues for private businesses.[30] Combined private and public sector online sales increased by 50% to CAD 28.3 (€ 17.6)[31] billion – see Exhibit 3-9. Online sales by private firms increased by about 45% to CAD 26.4 (€ 16.4) billion, while those by the public sector more than doubled to CAD 1.9 (€ 1.2) billion.

The value of business-to-business (B2B) sales in 2004 amounted CAD 19.8 (€ 12.3) billion, while business-to-consumer (B2C) sales in 2004 amounted to CAD 6.6 (€ 4.1) billion. Private sector firms accounted for 93 cents of every dollar of goods and services sold online, while the public sector accounted for only 7 cents.

E-business is still concentrated in large firms. Only 7% of private companies engaged in e-commerce in 2004, unchanged from 2003. These firms represented 27% of gross business income in Canada.

Almost three-quarters of Canadian firms were using high-speed (broadband) internet in 2004, up from just under one-half in 2001.

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[29] In the following, data on monitoring e-business results are mainly taken from several issues of *The Daily*, Statistics Canada's official release bulletin. Some additional data are taken from reports of the Canadian Business Initiative's (CEBI) *Net Impact Study IV* of 2004.

[30] Quoted from The Daily, 20 April 2005

[31] All exchange rates used to convert CAD values into EUR are annual average exchange rates (at Interbank rate) for a given year, based on the daily averages from the respective year. Source: OANDA.com currency converter (www.oanda.com/convert/fxhistory). See Annex II. Figures are rounded.

**Exhibit 3-9: Value of internet sales**

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

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

## B2B sales drive growth

SECT data shows that a large proportion of the gains in e-commerce resulted from increased sales from one business to another, rather than sales to households. B2B sales (CAD 19.8 billion as reported above) represented about 75% of total e-commerce by private firms, up from 68% the year before.

For many firms, e-commerce is one of many steps involved in fully integrating business practices using the internet. The majority of online purchases occur between businesses because the potential economic gain is the greatest for them.

Sales from one business to another are still concentrated in large, private sector companies. In 2004, these large firms accounted for 63% of B2B sales. Smaller retailers were more likely to sell to households.

Sales to households accounted for less than 24% of the value of online sales by large firms. Small firms, i.e. those with fewer than 20 employees, reported that 41% of the value of their online sales was to households.

## Wholesale trade sector still leads e-commerce

Four sectors alone (wholesale, transportation and warehousing, manufacturing and retail trade) accounted for two-thirds (68%) of online sales by private companies in 2004, virtually unchanged from the year before.

For the fourth consecutive year, the wholesale trade sector accounted for the largest value of e-commerce sales. **Wholesalers** sold just over CAD 6 (€3.7) billion worth of goods online in 2004, nearly one-quarter of total private sector e-commerce. Firms in the **transportation** and warehousing sector were second with about CAD 4.6 (€2.8) billion in sales, or 17% of the total.

Firms in manufacturing and wholesale trade were most likely to engage in online sales between enterprises. In 2004, 95% of online sales made by the **manufacturing** sector were between businesses, as were 86% of online sales made by firms in wholesale trade.

Firms in wholesale trade had online sales of just over CAD 5 (€3.1) billion to other firms, an increase of just over CAD 2 billion (€1.25) from 2003.

Even with the increased focus on the danger of viruses and other attacks linked to the internet, the number of firms citing it as a reason not to get involved in e-commerce did not increase over the previous year. Less than one in five firms that used the internet, but did not sell, listed it as a barrier in this respect.

## Use of the internet and of websites

The use of websites and their complexity continues to increase among Canadian companies. In 2004, 37% of Canadian firms had a website, this percentage steadily growing from 34% in 2003 and 32% in 2002. These websites have developed in capability also, as firms now offer more features than ever. Nearly 8 out of every 10 large firms had a website in 2004. These firms were more likely to have incorporated advanced features, such as secure portals to collect information, interactivity and digital products for the user.

For the second year in a row, the sector with the highest proportion of enterprises with a website (78%) was (private) educational services. Among utilities and firms from the information and cultural industries also more than 70% had a website. Just over one-half (51%) of firms in the wholesale trade sector had a website, up from 45% a year earlier.

**Exhibit 3-10: Internet use and presence of websites**

| | Percentage of enterprises that use the internet | | Percentage of enterprises with a website | |
|---|---|---|---|---|
| | **2003** | **2004** | **2003** | **2004** |
| Forestry, logging and support activities | 72 | 78 | 14 | 16 |
| Mining and oil and gas extraction | 90 | 87 | 25 | 32 |
| Utilities | 95 | 100 | 64 | 72 |
| Construction | 74 | 77 | 29 | 25 |
| Manufacturing | 90 | 91 | 57 | 58 |
| Wholesale trade | 89 | 91 | 45 | 51 |
| Retail trade | 75 | 81 | 37 | 38 |
| Transportation and warehousing | 65 | 70 | 17 | 19 |
| Information and cultural industries | 94 | 94 | 62 | 71 |
| Finance and insurance | 81 | 90 | 53 | 60 |
| Real estate and rental and leasing | 67 | 73 | 26 | 28 |
| Professional, scientific and technical services | 95 | 94 | 35 | 39 |
| Management of companies and enterprises | 68 | 63 | 20 | 23 |
| Administration and support, waste management and remediation services | 80 | 83 | 35 | 40 |
| Educational services (private sector) | 93 | 94 | 72 | 78 |
| Health care and social assistance (private sector) | 78 | 83 | 22 | 26 |
| Arts, entertainment and recreation | 87 | 89 | 52 | 53 |
| Accommodation and food services | 60 | 64 | 26 | 29 |
| Other services (except public administration) | 68 | 74 | 33 | 35 |
| **All private sector** | **78** | **82** | **34** | **37** |
| **All public sector** | **100** | **100** | **93** | **92** |

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

## Broadband use and online purchasing

The proportion of Canadian firms using broadband internet keeps rising. In 2004, 72% used high-speed internet, up from 66% in 2003, and a large jump from less than half (48%) in 2001. Firms using broadband technology are more likely to adopt other advanced ICT such as websites, intranets, extranets and online sales.

Companies are also moving towards making more purchases online. In 2004, 42% of firms made purchases online, up from 37% in 2003. The proportion of businesses over the internet was highest in the 'Information and cultural industries' for the first time in 2004, followed by 'professional services'. Further, large firms were most likely to do so.

**Exhibit 3-11: Purchasing over the internet**

| | Percentage of enterprises that use the internet to buy goods or services | | |
|---|---|---|---|
| | **2002** | **2003** | **2004** |
| Forestry, logging and support activities | 20 | 21 | 31 |
| Mining and oil and gas extraction | 26 | 31 | 37 |
| Utilities | 42 | 51 | 56 |
| Construction | 27 | 26 | 31 |
| Manufacturing | 41 | 48 | 53 |
| Wholesale trade | 37 | 46 | 51 |
| Retail trade | 29 | 35 | 43 |
| Transportation and warehousing | 19 | 27 | 30 |
| Information and cultural industries | 61 | 57 | 68 |
| Finance and insurance | 37 | 38 | 52 |
| Real estate and rental and leasing | 20 | 23 | 27 |
| Professional, scientific and technical services | 51 | 60 | 61 |
| Management of companies and enterprises | 21 | 24 | 25 |
| Administration and support, waste management and remediation services | 28 | 37 | 41 |
| Educational services (private sector) | 47 | 45 | 65 |
| Health care and social assistance (private sector) | 29 | 32 | 40 |
| Arts, entertainment and recreation | 35 | 44 | 59 |
| Accommodation and food services | 19 | 22 | 27 |
| Other services (except public administration) | 23 | 28 | 34 |
| **All private sector** | **32** | **37** | **43** |
| **All public sector** | **65** | **69** | **77** |

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

## Comparatively slow growth of e-business among SMEs

Canadian Business Initiative's (CEBI) latest report *Fast Forward 5.0. Making Connectivity Work for Canada* of 2004 found that e-business adoption among Canadian SMEs grew slowly and unevenly across business size and sectors. While more SMEs than in 2003 used customer-focused internet business solutions, e-business adoption of advanced solutions by SMEs, especially smaller firms, has not dramatically increased in 2004. Barriers, including cost and supply issues, continue to be important obstacles in the minds of many small-business owners (CEBI, 2004).

## 3.4 Main results for Japan

***Snapshot of key findings***

In 2003, 30% of corporations responded that they had implemented B2B (business-to-business) e-commerce, while 11.5% said they practised B2C (business-to-consumer) e-commerce.

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

While the percentage of companies that used B2B e-commerce increased in most sectors from 2002 to 2003 (with the exception of financial services), the share of firms that engaged in B2C had stagnated or even slightly decreased.

In spite of the regular surveys that are conducted in Japan with relevant modules on e-commerce development, there are hardly any recent reports or data on e-business activity publicly available in English language.[32] For example, only selected results of the 2004 EEC (Establishment and Enterprise Census, see chapter 2.3), which includes a questionnaire on e-commerce activity, are available in English as of mid 2005. Thus, in the absence of recent evidence, data reported in this chapter are mostly projections stemming from earlier surveys, such as Communications Usage Trend Survey (CUTS) 2003 and EEC 2001.[33]

### E-commerce development: growth mainly in the B2B market

According to the CUTS 2003[34], nearly 80% of corporations surveyed had established a **website** in 2003. Positive responses were comparatively higher in the service industries, including financial and insurance services.

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

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

Reasons for **non-adoption** of e-commerce: The most common reason given why a company would not adopt e-commerce was the lack of specialised knowledge required for system

[32] Research for this special report by *e-Business W@tch* had to be restricted to sources that are available in English (or another major European) language. A translation of documents or reports that might be available in Japanese language was, unfortunately, not possible.

[33] Cf. http://www.stat.go.jp/english/data/jigyou/index.htm (accessed in July 2005)

[34] The Communications Usage Trend Survey (CUTS) 2003 covered enterprises with more than 100 regular employees. Out of a sample of 3000 companies, 2273 effective replies were achieved.

implementation (35% of non-adopters), pointing at a lack of specialised personnel. The second most common answer was security concerns (33% of non-adopters), followed by insufficient ICT capabilities of trading partners (25%). 24% of firms said they simply would not need e-commerce.

## Projections for 2005

The projected size of the e-commerce market (see Exhibit 3-12) in Japan for 2005 was nearly 142 trillion JPY (approx. €1,300 billion[35]). If this projection proves to correspond to actual measurable developments, this would be a more than fifteen-fold increase over the amount of e-commerce transactions in 1998, when the ECOM survey was conducted for the first time. While B2B is projected to account for an estimated 88.5% of total e-commerce sales in 2005, down from 99.3% in 1998, B2C is projected to account for 11.5% (up from a 0.7% in 1998). Further, the B2B market should account for 14.1% of total revenues, and the B2C market for 4.5% of total revenues in this segment.

**Exhibit 3-12: Market size of e-commerce 1998 – 2005**

| Market size of E-commerce 1998-2005 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1998[b]** | **1999** | **2000** | **2001[c]** | **2002[c]** | **2003[c]** | **2004[c]** | **2005[c]** |
| Total (million JPY) | 8,685 | 12,656 | 22,414 | 35,511 | 46,781 | 66,304 | 90,925 | **141,727** |
| **B2B** | 8,620 | 12,320 | 21,590 | 34,027 | 43,950 | 61,270 | 78,430 | 125,430 |
| *B2B ratio (%)[d]* | ***99.3*** | *97.3* | *96.3* | *95.8* | *93.9* | *92.4* | *86.3* | ***88.5*** |
| *e-Commerce ratio (% of total B2B)* | *n.a.* | *n.a.* | *4.1* | *5.0* | *6.6* | *9.2* | *11.5* | ***14.1*** |
| **B2C** | 65 | 336 | 824 | 1,484 | 2,831 | 5,034 | 12,495 | 16,297 |
| *B2C ratio (%)[d]* | ***0.7*** | *2.7* | *3.7* | *4.2* | *6.1* | *7.6* | *13.7* | ***11.5*** |
| *e-Commerce ratio (% of total B2C)* | *n.a.* | *n.a.* | *0.3* | *0.6* | *1.1* | *1.9* | *3.1* | ***4.5*** |

[a] e-Commerce represents the conduct of commerce through computer network systems using the internet technology, the transactional values of which can be identified (ECOM, 2002, p. 6).

[b] First year of survey

[c] Projected figure

[d] B2B or B2C share of total e-commerce.

Source: ECOM, 2002.

## Review of earlier surveys

More comprehensive information is available from earlier surveys. Some of the main results of the Establishment and Enterprise Census of October 2001, which included data about the e-commerce adoption, are reviewed in the following. According to the Census, 10.5% of Japan's incorporated enterprises[36] had introduced **e-commerce activity** in 2001 (Kitada, 2002). The ratio was highest in the financial services industry (banking, insurance) with 14% of enterprises. In the wholesale and retail trade 13% of enterprises conducted e-commerce, while in services the share was about 12% (Statistics Japan, 2004).

[35] All exchange rates used to convert JPY values into EUR are annual average exchange rates (at Interbank rate) for a given year, based on the daily averages from the respective year. Source: OANDA.com currency converter (www.oanda.com/convert/fxhistory). See Annex II. Figures are rounded.

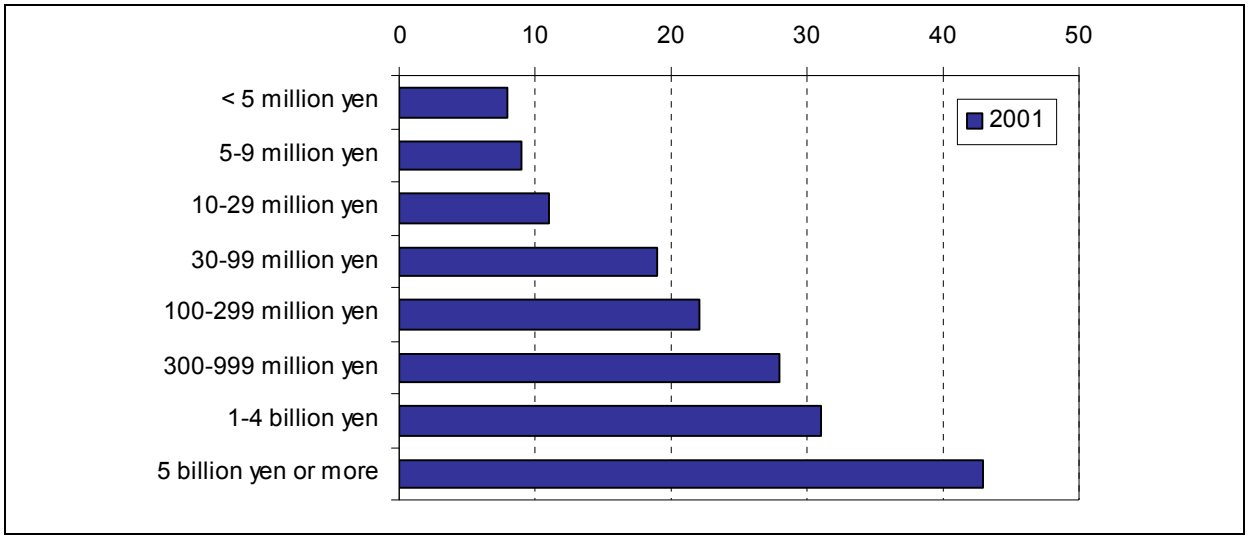
[36] As of 1st October 2001, there were a total of 1,617,250 incorporated enterprises, including stock companies, limited companies, limited or unlimited liability partnerships, and mutual insurance companies.

Classified by the networks used for e-commerce, the share of firms that used the **internet** for e-commerce purposes was very similar across industries. In financial services and in other services, about 11% of firms used the internet for e-commerce, in manufacturing about 10%. **Networks other than internet** were used by about 3-4% of firms in all industries.

**B2B** e-commerce had the highest importance in manufacturing (10% of firms), followed by wholesale and retail trade (9%) and services (9%). B2C activity was led by banks and insurance companies (8%). In retail, 5% of firms were using **B2C** e-commerce, and in real estate and services 5% respectively (Statistics Japan, 2004; Statistics Japan, 2001; Kitada, 2002).

In 2001, e-commerce was concentrated mainly among the larger enterprises. As shown in Exhibit 3-13, 42% of Japanese enterprises with more than 5 billion JPY (approx. € 46 million) total capital used electronic commerce.

**Exhibit 3-13: Enterprises using Electronic Commerce (2001)**




Source: Statistics Bureau, MIC

## Broadband adoption among Japanese enterprises

At the end of 2004, about 74% of companies (with 100 or more full-time employees) that used the internet had introduced Cable TV lines, DSL lines, optical lines or wireless access. The maximum bandwidth exceeded 1.5 Mbps in 61% of companies.[37]

[37] Ministry of Internal Affairs and Communications (2005). Information and Communications in Japan. Stirrings of u-Japan. White Paper 2005.

## 3.5 Main results for Korea

***Snapshot of key findings***

Still behind Japan in terms of size of e-commerce value, Korea has gained much ground in e-commerce. In 2003, the total e-commerce volume (B2B, B2G and B2C transactions) was about KRW 235,000 billion (€176 billion), growing by 32% from 2002. Data for the 1st quarter of 2004 indicated further growth.

By type of transaction, B2B is by far the biggest contributor to e-commerce with close to 90%. Closed transactions (i.e. transactions between large corporations and their long-term suppliers, rather than 'open market' transactions), accounted for about two thirds of the total e-commerce volume.

### Korea as e-tiger – steady growth in e-commerce transaction volume

The Republic of Korea has an advanced internet **infrastructure** (NCA, 2003; MIC, 2003) and has seen a sustained growth in internet users. Broadband access was already widespread in 2002 with about 70% of households having access (NCA, 2003). In fact, Korea was a frontrunner and one of the most advanced countries in terms of building broadband networks (OECD, 2001). Mobile and fixed network communications infrastructures have been largely integrated. The government and private sector have launched actions to build a foundation for the next-generation internet in order to overcome the technical limitations posed by the current networks (NCA, 2003).

As the number of internet users increases, **e-commerce** is expanding in parallel. Generally, as stated by both the National Computerisation Agency and the Ministry of Information and Communication in its *Korea Internet White Paper*, the Korean e-commerce market size had already surpassed KRW 57 trillion (€ 55billion[38]) in 2000. Through the first three quarters of 2001, the total e-commerce market size was KRW 83 trillion (€ 79 billion), demonstrating a steady growth between each quarter.

The Ministry of Commerce, Industry and Energy projected in 2003 that the size of the e-commerce market after 2003 would be worth over KRW 150 trillion (€ 107 billion), and that some KRW 4.2 trillion (0.87% of GDP) added value would be created every year by e-commerce. As a result, it was expected that Korea would "*take off as an advanced country in the digital era in which both traditional and new industries will develop in harmony*" (MOCIE, 2003).

### B2B accounts for close to 90% of transactions

It appears that this projection for 2003 has even been surpassed. According to the Korea National Statistical Office's "Report on the E-Commerce Survey" (2004), the **total e-commerce transaction volume** was KRW 235,025 billion (€ 176 billion) in 2003 (see Exhibit 3-14).

Data for the 1st quarter of 2004 – KRW 69,397 billion (€ 49 billion) indicate further growth, if linearly projected over the year. The 1st quarter figure represents an increase of 31% as compared to the 1st quarter of 2003.

[38] All exchange rates used to convert KRW values into EUR are annual average exchange rates (at Interbank rate) for a given year, based on the daily averages from the respective year. Source: OANDA.com currency converter (www.oanda.com/convert/fxhistory). See Annex II. Figures are rounded.

**Exhibit 3-14: E-business by type of customer (B2C, B2G, B2B) (in billion KRW, %)**

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

Notes:

(a) KRW 206,854 billion for B2B is the sum of KRW 206,336 billion estimated by the E-commerce survey on Enterprise and KRW 518 billion by the Cyber Shopping Mall Survey.

(b) KRW 6,095 billion for B2C and 21,634 billion KRW for B2G were estimated from the results of the Cyber Shopping Mall Survey & E-commerce Survey and Government respectively.

Source: KNSO, 2004

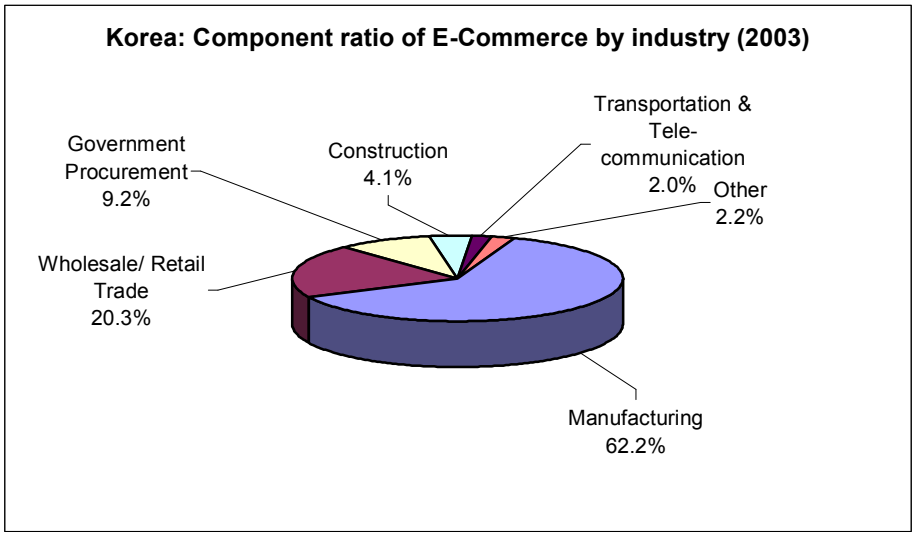
**B2B** has emerged as the major type of e-commerce, accounting for close to 90% of the transaction volume in 2003 (see Exhibit 3-14). B2B has also shown the highest growth rates over the past few years. In 2003, the e-commerce transaction volume in inter-firm trade increased by more than 30%.

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

**Closed transactions** (i.e. transactions between large corporations and their long-term suppliers, see chapter 2.4) accounted for about two thirds of the total e-commerce transaction volume in 2003. Open transactions (i.e. transactions via bidding or open markets) accounted for about one third.

The value of e-commerce sales **by industry** was distributed as follows: Transactions in manufacturing accounted for about 62% of total transactions in 2003, followed by wholesale and retail trade (20%), government procurement (9%), construction (4%) and transportation & telecommunication (2%) – see Exhibit 3-15.

**Exhibit 3-15: Component ratio of E-Commerce by Industry (2003)**




Source; KNSO, 2004.

## 3.6 Main results for the USA

***Snapshot of key findings***

The US Bureau of Census has reported the following results:

(a) E-commerce, on a percent change basis, outperformed total economic activity in all four major economic sectors measured between 2002 and 2003;

(b) Business-to-Business activity, which depends critically on Electronic Data Interchange (EDI), dominated e-commerce; and

(c) Manufacturing led all industry sectors with e-commerce shipments that accounted for 21% of the total value of manufacturing shipments.

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

- *E-commerce*, on a percent change basis, **outperformed** total economic activity in all four major economic sectors (i.e. manufacturing, merchant wholesale, retail trade, service industries) measured between 2002 and 2003. For example, in manufacturing the percentage change in shipments was 1.5% in total, but 12.1% for e-commerce. E-commerce as percent of total shipment increased from 19% in 2002 to 21% in 2003[39].
- *Business-to-Business (B2B)* activity, which depends critically on Electronic Data Interchange (**EDI), dominated** e-commerce. For example. EDI as percent of total sales in merchant wholesale trade increased from 10.5 to 11.3% from 2002 to 2003.
- *Most e-commerce occurred in a handful of industry groups within each sector*. Among 21 manufacturing industries, for example, **transportation equipment manufacturing** accounted for almost 40% of the e-commerce shipment value, followed by chemical manufacturing which accounted for 10%.

### E-commerce sales by industry sectors

In 2003, e-commerce – both its dollar value and percentage share of economic activity – varied markedly among key economic sectors.

- **Manufacturing** led all industry sectors with e-commerce shipments that accounted for 21.2% (USD 843 billion; € 746 billion[40]) of the total value of manufacturing shipments.
- Merchant **Wholesalers** including MSBOs (Manufacturers' Sales Branches and Offices) ranked second with e-commerce sales that represented 16.9% (USD 730 billion; € 646 billion) of their total sales. MSBOs contributed 47% (USD 343 billion; € 304 billion) of the total Merchant Wholesalers Trade e-commerce sales.
- **Retail** Trade had e-commerce sales in 2003 that accounted for 1.7% (USD 56 billion; € 50 billion) of total retail sales.
- E-commerce revenues for the special grouping of service industries created for the *E-Stats* reports, called "Selected **Service** Industries", accounted for 1.0% (USD 50 billion; € 40 billion) of total revenues for these industries.

[39] Source: http://www.census.gov/eos/www/papers/2003/table1.xls

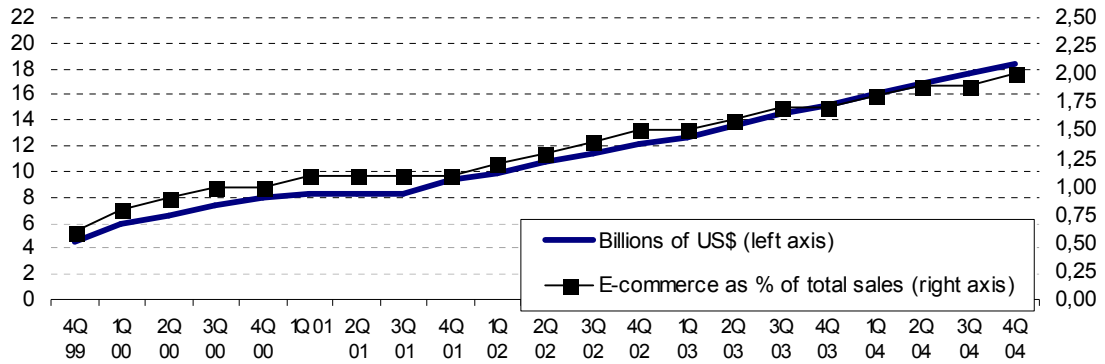
[40] All exchange rates used to convert USD values into EUR are annual average exchange rates (at Interbank rate) for a given year, based on the daily averages from the respective year. Source: OANDA.com currency converter (www.oanda.com/convert/fxhistory). See Annex II. Figures are rounded.

## US retail e-commerce sales over time – B2C grows steadily and strongly

While synthesis results for all industries, as reported by E-Stats, are only available for the year 2003, data for US **retail e-commerce sales** are collected and reported on a quarterly basis. Historically, the US Bureau of Census has begun collecting e-commerce sales from retailers included in the monthly retail survey (sample of about 12,000 retailers) in October 1999. The first estimates were released on March 2, 2000 and reported e-commerce retail sales for the 4th quarter 1999, i.e. including that year's Christmas holiday season. Since then, data has been collected quarterly, which allows precisely tracking the growth of e-commerce.

Exhibit 3-16 shows data for US retail e-commerce sales as percent of total quarterly retail sales for the time period of 1999 to 2004. It shows that e-commerce retail sales represent a slowly but steadily increasing share of total retail sales, in terms of both value and volume.

**Exhibit 3-16: Estimated[1] quarterly US retail e-commerce sales[2]**




1 Estimates are adjusted for seasonal variation and holiday and trading-day differences, but not for price changes.

2 E-commerce sales are sales of goods and services where an order is placed by the buyer or price and terms of sale are negotiated over an internet, extranet, Electronic Data Interchange (EDI) network, electronic mail, or other online system. Payment may or may not be made online.

Source: US Bureau of the Census (2004).

As Exhibit 3-16 above indicates, the total e-commerce retail sales volume (in millions of dollars) has been estimated at USD 18.4 billion (€14.8 billion) for the fourth quarter of 2004, an increase of 4.7% from the third quarter of 2004 (left axis). Total e-commerce retail sales amounted to only 2.0% of total retail sales in the fourth quarter of 2004 (right axis). However, this e-commerce volume is nearly twice as large as that of 2001 (1.1%) and almost four times as large as 1999 (0.6%) – US Census Bureau, 2005.

E-commerce retail sales represent a steadily increasing share of total retail sales in the period covered (3/1999 to 4/2004), both in terms of value and volume (on an adjusted basis). The steady growth of e-commerce is also supported by the fact that the annual rate of growth of total retail e-commerce in the United States in the year to the end of the first quarter of 2004 was 28%, while the rate of growth of total retail in the same period was only 9% (UNCTAD, 2004). The same UNCTAD report projects this positive trend to continue: "*On current trends, retail e-commerce in the United States could amount to USD 100 billion by mid-2006, at which moment it could represent between 2.5 and 3% of total retail sales in that country*" (UNCTAD, 2004, p. 12).

## B2B – e-commerce stronghold with a drop in performance

The most recent data for B2B electronic commerce in industries other than retail are available for 2003. According to the United States Census Bureau,[41] e-commerce represented 19% of all commercial transactions between enterprises (B2B) in 2003 (see Exhibit 3-17, 3rd column). Further, B2B amounted to about 94% of all e-commerce in the United States.

After a decrease of 1.3% in 2002, the recovering economic environment resulted in a growth of 2.9% in total B2B transactions (traditional and electronic) in 2003. In the same year, B2B e-commerce increased by 10.5% (compared to 2002). Even in 2002, B2B e-commerce had increased by 6.1%. The superior performance of B2B e-commerce compared with traditional transactions occurred in all the major economic sectors.

**Exhibit 3-17: US shipments, sales, revenues, and e-commerce, 2003 and 2002**

| | Value of Shipments, Sales, or Revenue | | | | | | Year to Year change in % | | % Distribution of E-commerce | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2003 | | | 2002 | | | | | 2003 | 2002 |
| | Total | E-com | % | Total | E-com | % | Total | E-com | | |
| **Total** | **16648** | **1679** | **10.09** | **16073** | **1510** | **9.39** | **3.6** | **11.2** | **100.0** | **100.0** |
| B2B | 8296 | 1573 | 18.96 | 8063 | 1424 | 17.66 | 2.9 | 10.5 | 93.7 | 94.3 |
| Manufacturing | 3980 | 843 | 21.18 | 3921 | 752 | 19.18 | 1.5 | 12.1 | 50.2 | 49.8 |
| Merchant Wholesale | 4316 | 730 | 16.91 | 4142 | 672 | 16.22 | 4.2 | 8.6 | 43.5 | 44.5 |
| Excluding MSBOs | 2946 | 387 | 13.14 | 2824 | 343 | 12.15 | 4.3 | 12.7 | 23.1 | 22.7 |
| MSBOs | 1370 | 343 | 25.04 | 1318 | 329 | 24.96 | 4.0 | 4.1 | 20.4 | 21.8 |
| B2C | 8352 | 106 | 1.27 | 8010 | 86 | 1.07 | 4.3 | 23.3 | 6.3 | 5.7 |
| Retail | 3275 | 56 | 1.71 | 3141 | 45 | 1.43 | 4.3 | 24.7 | 3.3 | 3.0 |
| Selected Services | 5077 | 50 | 0.98 | 4869 | 41 | 0.84 | 4.3 | 21.3 | 3.0 | 2.7 |

Source: US Census Bureau, 2005. Absolute values in USD

From a sectoral perspective, the weight of B2B e-commerce was higher in manufacturing, where it represented 21% of the value of all shipments, than in merchant wholesale (17%). E-commerce represented 10% or more of shipments in 15 out of the 21 industry groups into which manufacturing is divided[42].

[41] Cf. *E-Stats* report of 11 May 2005 (http://www.census.gov/eos/www/papers/2003/2003finaltext.pdf).

[42] Cf. http://www.census.gov/eos/www/papers/2003/table1.xls

# 4 Summary: Comparative Overview

## 4.1 e-Business Measurement

This section offers a comparative overview of monitoring activities of adopting ICT and e-business in the five countries under study and in the European Union. The comparison to the EU is mainly made with reference to the Eurostat survey of ICT use by enterprises. The comparison focuses on the following issues:

- E-business definition
- Survey metadata
- Data collection methods
- Data reporting authority and contacts

### 4.1.1 Focus and basic definitions

Exhibit 4-1 summarises how e-business in defined and conceptualised for monitoring purposes in the five countries under study. It can be seen that some surveys focus on e-commerce transactions, while others integrate monitoring ICT infrastructure diffusion with observations on how this infrastructure is used to support (internal and external) business processes.

#### Definitions

All five countries under study endorse the **OECD definition** on e-commerce, with some important country specifications. In the USA, for example, transfer of ownership is constitutive element of defining e-commerce. Japan, on the other hand, has introduced a new and very concise definition within the framework of its ECOM / METI / NTT survey (2001). There, e-commerce represents the 'conduct of commerce' through computer network systems using the internet technology, the transactional values of which can be identified.

In this context, internet technology "represents those using TCP/IP protocol. Network lines include the internet, extranet, internet VPN, and dedicated IP lines. "'*Conduct of commerce 'represents the exchange of goods, services, information and money between suppliers and buyers, associated with the commercial transfer of assets between economic units*". Identification of transactional values means that "*giving quotations, providing information and other pre-order conducts are included as 'conduct of commerce', as long as it is clearly identified that the conduct has led to purchase/sales orders*".

#### Focus

The surveys in Australia, Canada and the EU take a **broader** perspective. Although e-commerce transactions are an important module in those surveys as well, they make an effort to obtain a picture on e-business activity in the broader sense. Here, e-business is wider than e-commerce. This broader e-business definition can be exemplified with the following citation. *"In addition to on-line purchases and transactions (referred to as e-commerce), e-business includes portfolio management, business planning, and internet- or intranet-based communication between a business and its clients, suppliers and other partners*" (Boston Consulting Group Canada, 2000, p. 11). Surveys in these countries encompass items on ICT- and e-business related infrastructure issues (i.e. structure-related), and process-related activities of business organisations.

An important specification to be considered for comparisons is always whether networks other than the internet (e.g. **EDI**) are included or excluded in the definition of e-business transactions and its measurement. Some surveys are rather internet-focused (for example in Australia), while others differentiate between protocols used, for example the Eurostat survey. In the case of Japan, settlement and commercial trade among establishments within the same incorporated enterprise is specifically excluded.

### 4.1.2 Survey metadata

Exhibit 4-2 presents a comparative overview of survey metadata. Official surveys on business e-commerce activities are undertaken in all countries under study. Some are dedicated by national law, some are privately supported initiatives of National Statistical Offices (NSOs).

**Purpose**: The surveys in all countries follow the purpose of collecting data, measuring business adoption and use of ICT, and monitoring data on corporate e-business activities in the field. Japan explicitly refers to a "trend watch function" of its NSO surveying activities.

**Measures**: As the key measures differ across the five countries under study, any comparisons must be taken cautiously. Survey measures include:

- "E-commerce value of shipments" (ASM survey, US) defined as “the market of all commodities shipped from a manufacturing plant".
- "Value of shipments" includes "shipments to outside customers as well as affiliated plants, business income resulting from orders received via the internet/web for goods and service".
- "E-commerce sales of merchandise and other operating receipts", as measured by the ARTS survey (US).
- Australia measures "benefits by ordering goods and services via the internet/web".
- Korea includes "value of contracts by electronic bidding".

**Unit of measurement**: In all five countries, the surveys focus on business **enterprises**. National specifications are made by size and type of enterprise and thus market impact. Business size is measured by number of full-time employees, business **type** by nature of legal entity. Japan, for example, focuses on "incorporated enterprises", i.e. capital companies such as stock-listed companies engaged in e-commerce transaction activities. By contrast, not incorporated establishments belong to industry sectors such as agriculture, forestry and fishery. Company **sizes** are limited by number of full-time employees. Cut-off limits regarding the enterprise size are imposed in Japan (which excluded establishments with less than 5 employees and companies with less than 100 employees under the CUTS survey regime, and enterprises with less than 50 employees in the "Survey on ICT Workplaces".

**Sampling frames**: In all surveys, sampling frames are based on the *National Industry Classification Schemes*. The US and Canada apply specific codes of the North American Industry Classification System (NAICS), Japan applies the Japan Industry Classification Scheme (JICS), Australia the Australian an New Zealand Standard Industrial Classification (ANZSIC), and Korea the Korean Standard Industrial Classification (KSIC).[43] Sample sizes differ considerably between the various surveys compared (see Exhibit 4-3).

[43] In order to link the national industry classification schemes to ISIC (International Standard Industrial Classification of All Economic Activities, Revision 3.1), most countries provide correspondence tables between ISIC and their national system. More information is available at the "National Classifications" website of the UN Statistics Division at http:///unstats.un.org/unsd/cr/ctryreg/ctrydetail.asp?id=200 (July 2005). See also chapter 1.3.2 for an overview of national classification schemes in the countries studied.

### 4.1.3 Data collection

Exhibit 4-3 provides an overview of data collection methods and sampling techniques used in the countries under study.

**Method of data collection**: Postal **questionnaires** is the prevailing data collection method in the Australia, Canada, Japan and the USA. Korea applies direct interview methods and self-enumeration techniques[44] through e-mail and internet (CASI). Australia used computer-assisted telephone interviews (CATI) for the 2002/3 BUIT survey cycle.

**Sampling technique**: The sampling technique used in almost all cases was **stratified** sampling according to type of business, economic activity and enterprise size by employee. Measuring units are chose randomly. Australia applies synchronised sampling since 1983 to control sample rotation within surveys and overlap between surveys.

**Frequency of data collection**: Surveys are taken **periodically** in all five countries under study. Survey dates, and the reference period (i.e. the latest implementation of the survey) vary.

**Mode of participation**: User participation to surveys is **compulsory** in most countries. In Australia, for example, all ABS surveys are conducted under the authority of the Census and Statistics Act 1905. Initially, the respondent is being requested to answer the questions, but if the Australian Statistician directs the respondent in writing to provide the information, he/she is legally obliged to do so. In the US, participation in the economic census and the annual survey are required by law and thus compulsory. Similarly, Canada collects SECT questionnaires under the Authority of the Statistics Act, Revised Statutes of Canada, 1985, Chapter S-19. Completion of the questionnaire is a legal requirement under this Act.

[44] Survey methods in which the electronic survey form is available online and a respondent can access and key in the form electronically. CASI (computer-assisted self interviewing) is such a method.

**Exhibit 4-1: E-business definitions used in surveys**

| | Non-EU | | | | | EU |
|---|---|---|---|---|---|---|
| **Country** | **Australia** | **Canada** | **Japan** | **Korea** | **USA** | **EUROSTAT** |
| |  |  |  |  |  |  |
| **Definition** | - following broad OECD e-commerce definition (a)<br>- commitment to purchase via the internet as a constitutive element | - following broad OECD e-commerce definition (a)<br>- EDI, ATM transactions excluded | CUTS:<br>- following broad OECD e-commerce definition (a)<br>- excludes commercial trade among firms of same incorporated enterprise<br>ECOM / METI / NTT:<br>- conduct of commerce through computer networks using internet technology, transactional values identified | - coincides with OECD e-commerce definition<br>- different classifications of e-commerce | - following broad OECD e-commerce definition (a)<br>- transfer of ownership of goods/services as a constitutive element | - co-developed with OECD and Member States<br>- broad (a) and narrow (b) e-commerce definition |

Notes:

a) The OECD defines '**broad**' e-commerce as "*an electronic transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organisations, conducted over computer-mediated networks. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the good or service may be conducted on or offline*" (OECD, 2001b).

b) The OECD defines '**narrow**' e-commerce as "*an internet transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organisations, conducted over the internet. The goods and services are ordered over the internet, but the payment and the ultimate delivery of the good or service may be conducted on or off-line*" (OECD, 2001b).

Basically, the narrow definition covers all sales and purchases of goods and services through the internet, whereas the broad definition includes also non-internet EDI.

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

**Exhibit 4-2: Survey metadata compared**

| | Non-EU | | | | | EU |
|---|---|---|---|---|---|---|
| | **Australia** | **Canada** | **Japan** | **Korea** | **USA** | **EUROSTAT** |
| |  |  |  |  |  |  |
| **No. of surveys** | 1 | 1 | 9 relevant | 2 | 5 | 1 |
| **Acronyms / names of the relevant surveys** [(a)] | - BUIT | - SECT | Most relevant:<br>- EEC<br>- CUTS<br>- ECOM | - Cyber Shopping Mall Survey<br>- E-commerce Survey on Enterprise (B2B) | - ASM<br>- ATS<br>- ARTS<br>- SAS<br>- Economic Census | Survey on ICT Usage in Enterprises |
| **Purpose** | - collect data on use of ICT by businesses | - monitor use of ICT by businesses | - clarify structure<br>- provide a sample frame for various surveys<br>- identify trends | - monitor adoption of ICT for e-business | - provide detailed industry measures | - Use of internet<br>- E-commerce via internet, EDI and other networks<br>- E-commerce barriers |
| **Key measures** | - business income resulting from internet purchasing and selling<br>- barriers to sales | - total gross sales over the internet with or without online payment | - engagement in e-commerce<br>- ratio of e-commerce by industry, by networks used, by partners for trade (B2B/ B2C), and by size of enterprise | - transaction value of e-commerce<br>- value of contracts by electronic bidding | - E-commerce value of shipments<br>- E-commerce sales of merchandise and other operating receipts<br>- Merchant wholesale e-commerce sales and components<br>- E-commerce sales, shipments, receipts and revenue<br>- E-commerce revenue for selected service industries | - general information on ICT systems used<br>- use of internet for processes related to purchase and sales of goods/services<br>- e-commerce transactions (value, customers, geographic destination, % of total sales / purchases)<br>- barriers to ICT use for business |

| | Non-EU | | | | | EU |
|---|---|---|---|---|---|---|
| | **Australia** | **Canada** | **Japan** | **Korea** | **USA** | **EUROSTAT** |
| **Unit** | - Enterprise<br>- No minimum firm size | - Enterprise / enterprise group<br>- Type of Activity Unit | - Establishments<br>- Companies<br>- No cut-off in EEC<br>- Cut-offs in CUTS: min. of 5 employees (establishment survey) and 100 (enterprise survey) | - Leading establishments<br>- KSE companies<br>- KOSDAQ companies<br>- Government agencies | - Business establishments<br>- No minimum firm size | - Business enterprise<br>- Cut-off: minimum firm size of 10 or more full-time employees |
| **Sampling frame** | **ANZSIC** | **NAICS** | **JSIC** | **KSIC** | **NAICS** | NACE |
| **Sample size** | - 9,000 businesses (2002/3)<br>- stratified by industry, state/territory, and number of employees | - 17,000 enterprises (2004) | - CUTS: 5,600 establishments and 3,000 companies<br>- ICT WP 9,500<br>- EEC: 6 million establishments, 1.6 million companies | The quarterly e-commerce survey on enterprise (B2B) consists of a panel of about 2,500 firms. | - ASM: 55,000<br>- ARTS: 23,000<br>- ATS 6,500<br>- EC: 5 million<br>- SAS: 45,000 | - From 1,000 to ca. 30,000<br>- stratified by region<br>- total gross sample size 99,332 (2004); 66,126 (in 2003) |

Note: (a) All acronyms used in this table are explicitly defined in Annex 1.

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

**Exhibit 4-3: Data collection methods compared**

| | Non-EU | | | | | EU |
|---|---|---|---|---|---|---|
| | **Australia** | **Canada** | **Japan** | **Korea** | **USA** | **EUROSTAT** |
| **Method** | - Postal questionnaire<br>- CATI (a) | Postal questionnaire | Postal questionnaire | - Direct interview<br>- CASI | Postal questionnaire | Postal questionnaire |
| **Sampling technique** | synchronised sampling | stratified random sampling | - EEC: complete enumeration<br>- CUTS: systematic sampling on regular employee size for each industry<br>- ICT WP: Random Stratification by kind of business and size | Not available | - stratified simple random sampling except ASM (probability sampling proportionate to size) | two-way stratified sampling according to economic activity and enterprise size |
| **Periodicity** | Annually | Annually | - EEC: every 3-5 yrs.<br>- CUTS monthly | - Monthly<br>- Quarterly | - Annually<br>- Monthly (MRTS) | Annually |
| **Reference Period** | FY 2002/3 | 2001 | - EEC 2001<br>- CUTS 2002<br>- ICT WP 2001 | 2000 | All 2001, except EC: 2002 and SAS 1998-2001 | Jan. 2004 and/or 2003 (for e-commerce questions) |
| **Participation** | mandatory | mandatory | Not available | Not available | mandatory | voluntary |

Note: (a) All acronyms used in this table are explicitly defined in Annex 1.

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

## 4.2 e-Business Deployment

This chapter presents a comparative summary of the main results of e-business monitoring activities in the five countries and in Europe (see Exhibit 4-4).

### Australia

The proportion of businesses which reported placing orders via the internet was 31% for 2003/04, an increase of 3 percentage points from the previous year. This **growth** is a continuation of the trend seen over recent cycles for this business practice. Over the same period, however, the proportion selling via the internet slightly decreased from 13% to 12% of all businesses. Orders received via the internet represented approximately 2.0% of total income for all businesses surveyed, and approximately **7.2% of total income** reported by those businesses which allow online ordering.

### Canada and the USA

In **Canada**, **B2B sales** drive e-commerce growth. Sales from B2B (business-to-business) amounted to CAD 19.8 (€12.3) billion, which represented about 75% of total e-commerce by private firms, up from 68% the year before. Online sales by both companies and government departments grew substantially for the fifth consecutive year in 2004, but e-commerce still accounted for less than 1% of total operating revenues for private businesses. The value of business-to-consumer (**B2C**) sales in 2004 amounted to CAD 6.6 (€4.1) billion. Findings confirm the importance of firm size in conjunction with the sector of activity: Sales from one business to another are still concentrated in large, private sector companies. Overall, e-business adoption by **SMEs** was found to grow **rather slowly** compared to large enterprises.

In the **USA**, electronic commerce, on a percent change basis, **outperformed total economic activity** in all four major economic sectors that were monitored in terms of their e-commerce activity between 2002 and 2003 (manufacturing, merchant wholesale, retail trade, service industries). B2B activity, which still depends critically on EDI, dominated e-commerce. This is in line with findings in almost all countries. In US retail, the total e-commerce sales volume has been estimated at USD 18.4 (€14.8) billion for the fourth quarter of 2004, an increase of 4.7% from the third quarter of 2004. In spite of the substantial growth rates, e-commerce sales still amounted to only **2.0% of total retail sales** in the 4$^{th}$ quarter of 2004.

### Japan and Korea

While Japan leads in market size for e-commerce (in value terms) in Asia-Pacific, **Korea has gained much ground in e-commerce**. In 2003, the total e-commerce volume (B2B, B2G and B2C transactions) was about KRW 235,000 billion (€176 billion), growing by 32% from 2002. Data for the 1$^{st}$ quarter of 2004 indicated further growth. By type of transaction, B2B is by far the biggest contributor to e-commerce with close to 90%. Closed transactions (i.e. transactions between large corporations and their long-term suppliers, rather than 'open market' transactions), accounted for about two thirds of the total e-commerce volume.

**Japan is a major e-commerce adopter in the Asia-Pacific region**. In 2003, 30% of corporations responded that they had implemented B2B e-commerce, while 11.5% said they practised B2C e-commerce. B2B was projected to account for close to 90% of total e-commerce sales in 2005, B2C was estimated at roughly 10%. In B2B trade, electronic commerce already accounts for about 14% of total revenues. In B2C markets, e-commerce is estimated to account for 4.5% of revenues.

**Exhibit 4-4: Main results of the monitoring activities**

| | Non-EU | | | | | EU |
|---|---|---|---|---|---|---|
| | **Australia** | **Canada** | **Japan** | **Korea** | **USA** | **EUROSTAT** |
| |  |  |  |  |  |  |
| **Market size** (= e-transaction volume) | AUD 33 (€ 20) billion | CAD 26.4 (€ 16.4) billion<br>(2003: CAD 18.6 b)<br>(private only) | JPY 142 trillion<br>(€ 104 billion) | KRW 235 billion<br>(€ 176 billion) | Not available | Not available |
| **E-commerce activity** | 85% of firms use a computer, 74% use the internet and 25% have a web presence.<br>31% of firms place orders on the internet (+3%-points compared to 2002/03).<br>12% have received orders via internet or web. Out of those, 44% generated 5% or more of their total income in this way. | The volume of e-B2B transactions is CAD 19.8 (€ 12.3) billion, representing 75% of total e-commerce by private firms.<br>The volume of e-B2C transactions is CAD 6.6 (€ 4.1) billion (25% of total e-commerce).<br>7% of firms, representing 27% of gross business income, engage in e-commerce. | In 2003, 80% of corporations had a website. 30% engaged in B2B e-commerce and 12% in B2C e-commerce. While B2B increased, B2C was stagnating.<br>Projections for 2005 estimate that e-commerce will account for 14% of total B2B and 4.5% of total B2C trade volume. | B2B transactions account for about 88% of total e-commerce. In 2003, the B2B transaction volume increased by more than 30% compared to 2002.<br>B2C transactions account for about 3%, B2G (business-to-government) for about 9% of electronic trans-actions.<br>B2C increased by 20% in 2003. | E-commerce accounts for 16.3% of total B2B and 2.0% of total retail sales.<br>92.7% of total e-commerce is B2B, 7.3% B2C.<br>In manufacturing, e-commerce accounts for more than 20% of the total value of shipments.<br>E-commerce outperforms total economic activity in all sectors studied. | E-commerce accounts for about 8.6% of total turnover of EU enter-prises. The highest shares were found for Ireland (20%) and the Nordic countries (11-14%).<br>About 13% of enter-prises have received online orders, and about 3% have received online payments for internet sales.<br>About 27% of firms have made online purchases themselves. |
| **Reference year** | 2003/04 | 2004 | 2005 (projected) | 2003 | 2004 | 2004 |

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

## Contact points

**Exhibit 4-5: Data reporting and contacts**

| | Non-EU | | | | | EU |
|---|---|---|---|---|---|---|
| | **Australia** | **Canada** | **Japan** | **Korea** | **USA** | **EUROSTAT** |
| |  |  |  |  |  |  |
| **Reporting** | Australian Bureau of Statistics | Statistics Canada | Japanese Statistics Bureau | Korea National Statistical Office | U.S. Census Bureau, E-Stats | European Statistical Data Support |
| **Contact URLs** | www.abs.gov.au | www.statcan.ca | www.stat.go.jp/ | http://www.nso.go.kr/english | http://www.census.gov/ | http://europa.eu.int/comm/eurostat |

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

# 5 Conclusions and Policy Challenges

## 5.1 Conclusions on monitoring activities

Information society statistics can be considered as one of the most challenging areas for the statistical community, especially on the enterprise level of analysis. This is due to the complexity and rapid change in this area, which has made the measurement of ICT and e-business usage difficult.

### Different national frameworks for e-commerce / e-business monitoring

Research carried out for this special report on e-business developments on an international scale shows that e-business monitoring activities in Australia, Canada, Japan, Korea and the USA differ in their structure and focus. Therefore, the **international comparability of results is limited and problematic**. A truly international benchmarking of e-business developments is, thus, only possible through special studies that have the resources to conduct primary research on their own, but rather not by comparing the results of different monitoring activities ex post.

National differences in frameworks, definitions, scopes and classifications that exist between the countries under study in monitoring the adoption of e-business in enterprises enable direct comparisons of results only on a very general level. This was confirmed by an effort to synthesize results for specific indicators from a number of different sources undertaken by the OECD[45], which shows considerable differences in results from different sources, even if similar survey questions were used. The most significant barriers for a direct comparison of findings can be summarised as follows:

- **Different concepts and definitions of e-commerce and e-business**: definitions can be 'broad' or 'narrow', the transfer of ownership can be a constitutive element or not; some surveys exclude commercial trade among firms of the same incorporated enterprise; there are different classification systems for e-commerce and e-business, for example the 'narrow' and 'broad' definition as proposed by the OECD (OECD, 2001b).
- **Different focus in terms of networks**: Some surveys focus on internet-based transactions only, while others include all computer-mediated networks (e.g. not-internet based EDI transactions, e-marketplaces).
- **Measures applied**: Surveys focus on different measures. The focus can for example be on the "value of shipment", "benefits by ordering goods and services via the internet", the "value of contracts by electronic bidding".
- **Measurement units** differ as well (national specifications by size and type of enterprise and thus market impact).
- **Differences in sample techniques and sample sizes**: The sampling technique used in almost all cases was stratified sampling according to type of business, economic activity and enterprise size by employee. Measuring units are chosen randomly.

[45] See OECD Information Technology Outlook 2004, "E-Business Developments", p. 105-140.

- **Data collection methods**: Postal questionnaires are the dominant data collection instrument in most of the countries under study. Korea, however, uses direct interviews and CASI (computer-assisted self interviewing)[46] methods.
- **Data availability / timeliness**: Differences also occur as for the level of data availability offered. Periodicity (annually, monthly), reference periods (12 months or shorter) and reference year greatly vary in the countries under study. This makes comparisons at a given point of time very difficult.

## Efforts in harmonising instruments

Significant improvement has been made in harmonising the instruments used for monitoring e-business on the international level. Activities of the OECD, in cooperation with the national statistical offices, have been very influential and helpful in this context. Ultimately, however, an ex-post synthesis of results from different surveys will always be problematic, as there are too many parameters that have a significance influence on results. Data collection for benchmarking purposes needs to be coordinated in advance.

The International Benchmarking Study "Business in the Information Age" (IBS) by the UK Department of Trade and Industry[47] is a recognised and widely quoted example of such a study. The study is based on a survey similar to the surveys by *e-Business W@tch*. The survey carried out for IBS 2004 includes five EU countries (Germany, France, Italy, Sweden and the UK), Australia, Canada, Japan, South Korea and the USA. Some of the results are used in the following chapter, together with results from the national surveys introduced in this report, as evidence supporting conclusions on the performance of EU firms compared to their international counterparts.

[46] CASI is normally a web-based survey method in which the electronic survey form is available at the internet and a respondent can access and key in the form electronically. Alternatively, respondents can use a software (offline) to type in the answers and then send a data file with completed answers by e-mail.

[47] The International Benchmarking Study "Business in the Information Age" is regularly conducted by the UK Department of Trade and Industry (DTI). The latest studies (2003, 2004) were carried out by Booz Allen Hamilton (see http://www2.bah.com/dti2004/). Main results are summarised in the *e-Business W@tch* special study on ICT indicators, July 2005, www.ebusiness-watch.org ('resources').

## 5.2 The e-business performance of EU firms

Even if direct comparisons of the international monitoring activities featured in this report are hardly possible, some general conclusions can still be drawn regarding the state-of-play of e-business in Europe.

**Main conclusions on the performance of EU enterprises**

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

The following paragraphs (see Exhibit 5-1) present a few examples to illustrate these observations. Data have been collected from different sources (see references at Exhibits), including those featured in this report, Eurostat, and IBS 2004.

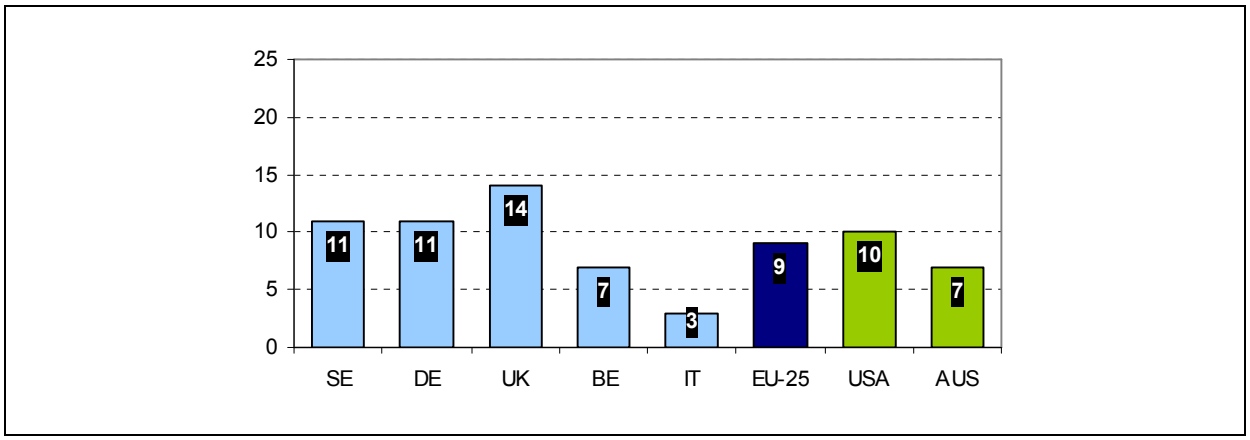
[48] For example, the wider use of customer-facing e-commerce activity in South Korea, compared to e-procurement, is not to be found in any of the other countries.

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

The percentage of enterprises' total turnover from e-commerce appears to have reached comparable levels in Europe (EU-25), the USA and Australia with about 7-10% in each of these economies. This indicates that the significance of e-business activity for sales transactions is quite similar in these countries, at least on the aggregate level.

However, as observed in the summary box above, gaps are more pronounced when comparing individual EU Member States. Eurostat reports that enterprises from the EU-25 make 8.6% of their total turnover from e-commerce (see Exhibit 5-1).[49] Figures vary considerably between Member States. For Greece, for example, Eurostat reports a share of 1.6% of turnover, for Poland 2.8%. In contrast, shares are highest for Ireland (20%), the UK (13.7%), Denmark, Finland, Sweden and Germany.

**Exhibit 5-1: Percentage of enterprises total turnover from e-commerce (2003/04)**




Sources: Eurostat survey on ICT use by enterprises 2004 (for EU countries); ABS-BUIT 2003/4 (for AUS); US Census Bureau 2005 (for USA).

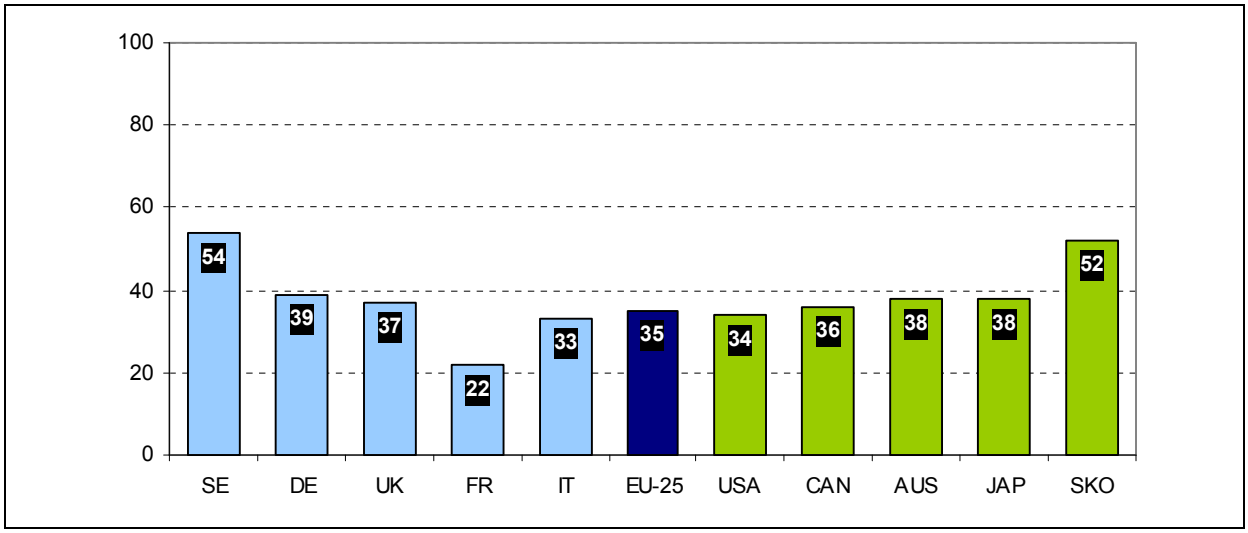
## Adoption of e-commerce activity: making / enabling online orders

The percentage of companies that let customers order their goods or services online is remarkably similar when comparing advanced international economies, at least when data represent the share of those firms in total employment. In Europe, the USA, Canada, Australia and Japan, companies representing about 35-38% of employees allow customers to order goods online (see Exhibit 5-2). Customer facing e-commerce activities appear to be soaring in South Korea where more than 50% of businesses (by employment) report that customers can place orders online.

Similarly, findings regarding the diffusion of online procurement activity are also comparable for enterprises from the EU, the USA, Canada, Australia (see Exhibit 5-3). In all these economies, firms representing about 50-60% of employment have started to buy at least some goods or services from their supplies online. Interestingly, adoption rates of e-procurement activity appear to be slightly lower in Asia than in the Western economies. In Japan and South Korea, 'only' about 35-40% of firms (by employment) use e-procurement. Thus, online sales activity has reached equal or even higher diffusion levels in these countries than online purchasing activity, which is in contrast to findings for the Western economies.

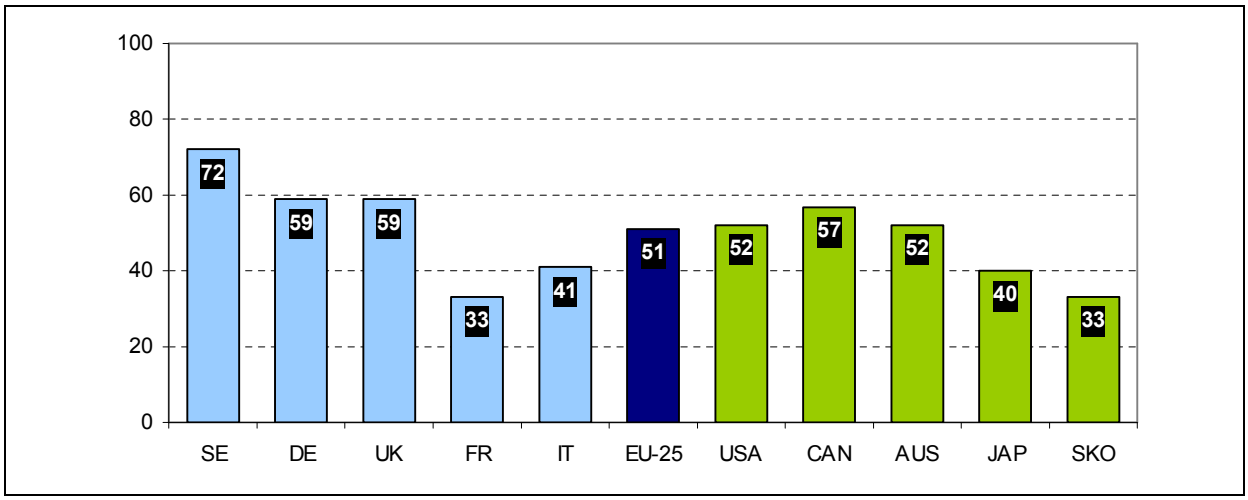
[49] Eurostat survey on ICT use by enterprises (2004). Data for this indicator are available on the Eurostat website http://epp.eurostat.cec.eu.int/portal/page?_pageid=0,1136195,0_45572097&_dad=portal&_schema=PORTAL (downloaded in July 2005). Percentages relate to the base of enterprises with at least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

**Exhibit 5-2: Businesses allowing customers to order online (2004)[50]**




Sources: IBS 2004 (for single countries); estimate for EU-25 by *e-Business W@tch* based on surveys by Eurostat (2004) and *e-Business W@tch* (2005)[51]

**Exhibit 5-3: Businesses placing orders online (2004)**




Sources: IBS 2004 (for single countries); estimate for EU-25 by *e-Business W@tch* based on surveys by Eurostat (2004) and *e-Business W@tch* (2005)[52]

[50] Surprisingly, figures differ considerably from results of *e-Business W@tch* for the question "*Does your company sell goods or services online on the internet or through other computer-mediated networks?*" The fact that percentages resulting from this question are much lower than the ones obtained by IBS 2004 for the question "*Can your customers order online*?" (by a factor of about 2 for most countries) indicates that many companies do not necessarily regard "allowing customers to order online" as "making online sales".

[51] The figure for the EU-25 is based on results from a similarly phrased question of the Eurostat survey (2004). Estimates were needed for transforming the data from enterprise-weighted presentation (as used by Eurostat) to employment-weighted presentation (as used by IBS 2004). The estimate is based on weighting variables from *e-Business W@tch*, and on comparisons of data for individual countries between Eurostat and IBS 2004.

[52] Data provided by IBS (2004) for "businesses placing orders online" are – by and large – comparable to results by *e-Business W@tch* (2005) for the question "*Does your company use the internet or other computer-mediated networks to purchase goods or services online*?". France is an exception, as *e-Business W@tch* results point at a higher share of firms than IBS findings.

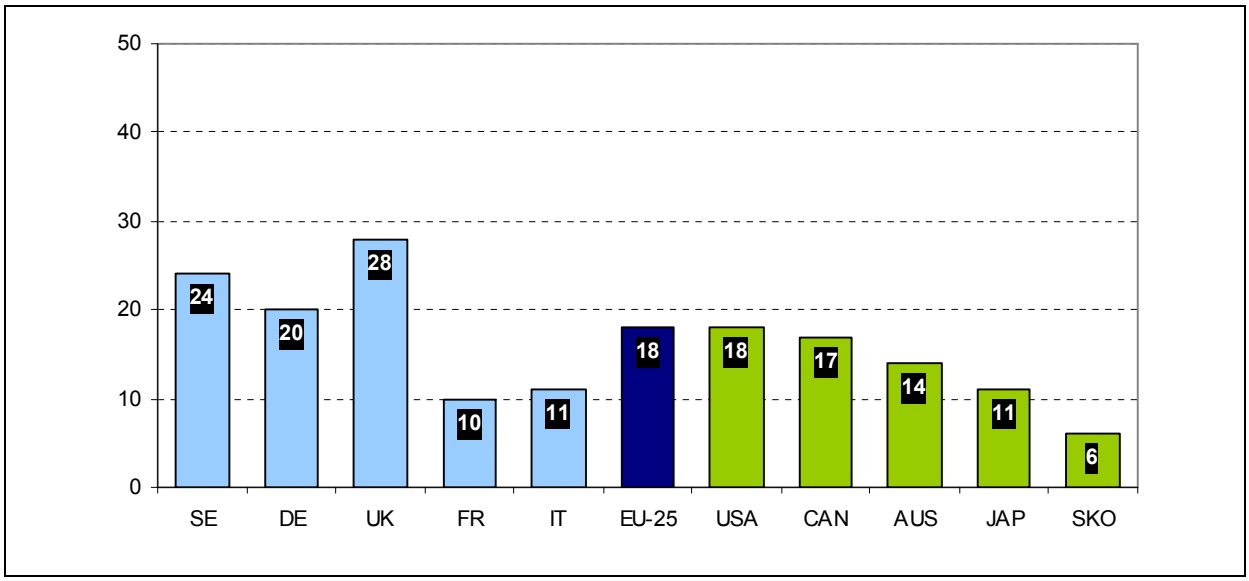
## Deployment of advanced ICT infrastructure

Basic ICT infrastructure has been widely adopted among enterprises in all advanced economies. Internet access is near saturation level, even among small firms. Attention has therefore shifted to broadband adoption. Figures on broadband that are available for different countries are difficult to compare, however, due to different definitions of 'broadband'[53] and because of the diversity of telecommunication infrastructures used to connect to the internet.

Notwithstanding national specificities, it appears that – all in all – the endowment of EU enterprises with advanced network infrastructure compares well with the situation in the USA, Canada, Japan and other countries. Again, as already observed for e-business activity, the national differences within the EU are more pronounced than those between the EU as a whole and its competitors in the global marketplace.

Diffusion of Wireless LAN in enterprises can serve as an example (see Exhibit 5-4). While companies from the Nordic countries and the UK are found to be more advanced in this regard than their North-American counterparts, adoption rates for firms from France and Italy are lower. Again, the proximity of aggregate data for the Western economies (EU, USA, CAN, AUS) is remarkable, while Wireless LAN technology is not as widely adopted in some of the Asian countries, notably in South Korea.

**Exhibit 5-4: Businesses using a Wireless LAN (2004)**




Sources: IBS 2004 (for single countries); estimate for EU-25 by *e-Business W@tch* based on surveys by Eurostat (2004) and *e-Business W@tch* (2005)[54]

[53] The Australian Bureau of Statistics, for example, defines broadband as an "*always on' Internet connection with an access speed equal to or greater than 256 Kbps*". *e-Business W@tch* defines broadband as internet connections with at least 2 Mbps. Eurostat defines broadband by type of internet connection, including 'DSL' and 'other broadband' connections.

[54] The figure for the EU-25 is based on results from a similarly phrased question of the Eurostat survey (2004). Estimates were needed for transforming the data from enterprise-weighted presentation (as used by Eurostat) to employment-weighted presentation (as used by IBS 2004). The estimate is based on weighting variables from *e-Business W@tch*, and on comparisons of data for individual countries between Eurostat and IBS 2004.

## 5.3 Recommendations for policy

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

**Possible policy approaches for improving the availability of internationally comparative e-business data**

| Approach | Focus | Potential initiator(s) |
|---|---|---|
| **1. Coordination of methodology development** | • Focus on development of common definitions, guidelines and instruments<br>• Encourage adoption of these instruments in as many surveys as possible | • OECD<br>• UN<br>• Statistical working groups |
| **2. International cooperation of official statistical institutes** | • The (European) Community Survey on ICT Use in Enterprises as a model for an international survey<br>• Central coordination of methodology development<br>• Local data collection in participating countries | • Official statistical offices in EU, USA, Japan etc.<br>• Government (Ministries or departments responsible for e-business in EU, USA, Japan etc.) |
| **3. The International *e-Business W@tch*** | • Implementation of an international observatory<br>• Observatory put in charge of collecting data and preparing reports<br>• Possibly in international cooperation (e.g. EU – USA) | • European Commission<br>• EU Research Programmes (FP 7)<br>• World Bank |

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

## Approach 1: Coordination of methodology development

The first approach to strengthen international cooperation focuses on the development of common methodological frameworks for e-business monitoring activities, and on promoting broad agreement among players on the definitions, guidelines and instruments resulting from this work. An advantage of this approach is that it does not have to start from scratch, but can build on existing initiatives which have gained momentum over the past few years. Work coordinated by the OECD has been very influential in this context (see chapter 1.3.1).

However, considering the non-binding nature of such recommendations, it is also evident that the impact on the comparability of survey results will always be a limited one. Moreover, the comparability of data does not only depend on the survey instruments, but also on the definition of the population. In enterprise surveys, the definition of the population in terms of sectors and firm-sizes, as well as the sampling method have a significant influence on results. The following table confronts advantages with challenges that are involved with this policy approach.

| Advantages | Challenges |
|---|---|
| + Can **build** on existing initiatives (e.g. OECD Working Group, model questionnaire)<br>+ Exchanges of methodology and best practice, as well as agreements on common definitions have gained **momentum** over the past 2-3 years.<br>+ **Cost efficient** approach, does not require additional surveys or organisational set-up. | – Recommendations (guidelines, model questionnaires) are **non-binding**; no guarantee of impact<br>– Surveys tend to adopt elements of **guidelines**, rather than a full model questionnaire; therefore very **limited comparability** of data even in case of partial adoption<br>– Comparability of survey results also **depends on the definition** of the survey population and on sampling. Recommendations for a common methodology cannot, normally, influence these decisions (e.g. whether to include micro-firms or not). |

## Approach 2: International cooperation of official statistical institutes

Another possible approach is to use the "Community Survey on ICT Use in Enterprises" as a model how an international survey of e-business could be organised. Such a survey would probably involve Eurostat and its international counterparts. While data collection would be managed and carried out locally by the participating organisations (e.g. by Eurostat for the EU), one organisation would have to take the role of the coordinator (like Eurostat does for the Community survey).

European official statistics, represented by Eurostat and the national statistical institutes, has made a considerable effort to improve the availability of statistics on ICT and e-business adoption of European enterprises. The main vehicle for delivering these statistics is the annual "Community Survey on ICT Use in Enterprises."[55] Data on ICT adoption and e-business activity are now available for all EU countries, including the new Member States. While data collection is carried out locally by the national statistical institutes, Eurostat takes the role of the coordinator and ensures the comparability of results. In particular, Eurostat coordinates the process of agreeing on common instruments, definitions and sampling

[55] This Community survey is discussed in more detail in chapter 2.1.1 or the *e-Business W@tch* special report on ICT indicators, July 2005. www.ebusiness-watch.org ('resources')

methods, before field-work takes place. The survey was first piloted in 2001 and has been continued annually since. Selected results of the 2004 survey are available on the Eurostat website.[56]

Such an international cooperation would have several significant advantages: While the participating countries would oblige themselves to provide harmonised data and meta-data, they could also retain some flexibility in adapting their national surveys, e.g. by adding items or deleting optional questions. The involvement of official statistical institutes would ensure the availability of expertise in methodological issues and improve access to companies, which poses a significant problem in ICT surveys (as refusal rates rise due to 'over-researching'). It can be taken for granted that results of such an international venture would gain enormous attention both in research and policy communities.

However, this approach also involves many challenges and question marks. Experience from the Eurostat survey shows that the coordination process before field-work can be quite bureaucratic and time-consuming, as participating countries tend to have their own 'agenda' in terms of preferences for certain questions, timing or definitions. This situation would probably be even more complex at an international level.

| Advantages | Challenges |
|---|---|
| + Involvement of official statistics ensures high level of **expertise** in methodological issues (survey design, statistics).<br>+ Better **access** to companies, if official statistical offices are involved.<br>+ Opportunity to launch a **panel** survey, which would greatly facilitate insights in ICT adoption trends and e-business impacts.<br>+ All evidence suggests that results of such an effort would have an extremely high **visibility**.<br>+ Data, if made available, would be a valuable **source** for researchers around the world. | – **Commitment** to participate from many players in different countries / organisations needed.<br>– **Coordination** process before field-work can be difficult and time-consuming, as each participating country / organisation will have its own 'agenda' (e.g. preferences for certain questions, timing, definitions).<br>– **High dependence** on each participating country / organisation: data analysis and presentation can only commence once all members have completed field-work and submitted the data.<br>– **High total costs** for coordination (requires international meetings) and field-work. |

### Approach 3: An international *e-Business W@tch*

The third approach that could be considered is to implement an international observatory for monitoring e-business developments. The European Commission's *e-Business W@tch* could serve as a role model. The Enterprise & Industry Directorate General of the EC launched *e-Business W@tch* back in 2002 to monitor the growing maturity of electronic business across different sectors of the economy in the enlarged European Union. With a similar organisational structure, an "*International e-Business W@tch*" could take on the task of benchmarking and assessing global e-business developments.

This international observatory should not be mistaken as a new institution with its own facilities and staff employed, but would rather be implemented as an international consortium of organisations with expertise in ICT and e-business issues, based on some sort of service

[56] http://epp.eurostat.cec.eu.int/portal/page?_pageid=0,1136195,0_45572097&_dad=portal&_schema=PORTAL (July 2005)

contract. Initiators could be government bodies such as the European Commission, for example in the context of the EU Research Framework Programmes, or international organisations such as the World Bank.

An "*International e-Business W@tch*" would have several advantages, mainly from an operational perspective. This includes efficient management and coordination of activities, which is facilitated by the lower dependency on players in other countries (in contrast to approach 2, for example). Assignments to the observatory can be held flexible, including elements of on-demand service delivery.

However, there are also some challenges. The main barrier to this approach is the high cost for data collection, since private sector market research companies would probably be needed to carry out the surveys in the selected countries to be covered. Another issue to be considered is a possible overlap with existing initiatives, such as the "International Benchmarking Study" by UK Department of Trade and Industry. A duplication of work already being done should be avoided.

| Advantages | Challenges |
|---|---|
| + **Efficient** management and coordination of activities.<br>+ **No dependency** on other players (activities can be centrally planned and carried out).<br>+ **Flexible** definition of services to be delivered (type of reporting, country coverage, definition of the population).<br>+ Observatory can be established as a "**think-tank**" to deliver ad-hoc analysis and expertise. | – **High cost**, in particular for data collection (if to be carried out by private sector market research companies).<br>– **Overlap** with other initiatives or studies, such as "International Benchmarking Study" by UK DTI.<br>– **Limited sustainability**; activity will be terminated after end of contract. |

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# Annex I: Glossary of Terms and Abbreviations[57]

| Term | Definition |
|---|---|
| **ABS** | Australian Bureau of Statistics |
| **ANZSIC** | Australian an New Zealand Standard Industrial Classification |
| **ARTS** | ARTS - Annual Retail Trade Survey (US) |
| **ASM** | Annual Survey of Manufacturers – Computer Network Use Supplement (US) |
| **ATS** | ATS - Annual Trade Survey (US) |
| **ATM** | Automated Teller Machines, cashpoints |
| **AUD** | Australian Dollar |
| **BUIT** | Business Use of Business use of Information Technology survey (Australia) |
| **CAD** | Canadian Dollar |
| **CASI** | Computer-Assisted Self Interviewing |
| **CATI** | Computer assisted telephone interviewing, i.e. A method of data collection by telephone with questions displayed on a computer and responses entered directly into a computer. |
| **CEBI** | Canadian e-Business Initiative |
| **CUTS/Enterprises** | Communications Usage Trend Survey – Enterprises (comprising establishments and companies). |
| **Data collection** | The process of gathering data. Data may be observed, measured, or collected by means of questioning, as in survey or census response. Data collection refers to all activities (collection, processing, storage and dissemination) within the data life cycle of a survey or administrative collection, i.e., data collection means survey or administrative collection. (Measuring the Non-Observed Economy: A Handbook, OECD, IMF, ILO, Interstate Statistical Committee of the Commonwealth of Independent States, 2002, Annex 2, Glossary) |
| **Data Editing** | The activity aimed at detecting and correcting errors (logical inconsistencies) in data. Editing techniques refers to a range of procedures and processes used for detecting and handling errors in data. Examples of different techniques include the different approaches to editing such as micro-editing/ macro-editing, input/output editing, or to the various tools available for editing such as graphical editing, interactive editing, etc. Edit types refer to the actual nature of edits applied to data during input or output processing. These include:<br>validation edits; to check the validity of basic identification of classificatory items in unit data; logical edits - ensure that two or more data items do not have contradictory values; consistency edits - check to ensure that precise and correct arithmetic relationships exists between two or more data items;<br>range edits - identify whether or not a data item value falls inside a determined acceptable range; variance edits - involve looking for suspiciously high variances at the output edit stage. Edit types may also refer to whether these edits are fatal or query type, i.e. whether they detect errors with certainty or point to suspicious data items. Micro-editing and macro-editing may be distinguished in order to calculate rate of edits. |
| **Disclosure control** | The complex of measures preventing unauthorised access to sensitive statistical information. |
| **ECOM** | Electronic Commerce Promotion Council of Japan |

[57] Statistical Terms are mainly taken from the OECD Statistics Portal Glossary available under: http://cs3-hq.oecd.org/scripts/stats/glossary.

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|---|---|
| **E-commerce receipts/revenue (U.S. Bureau of Commerce)** | Sales and receipts from any transaction completed over an internet, extranet, EDI network, electronic mail, or other online system. Transactions are agreements between buyers and sellers to transfer ownership of, or rights to use, goods or services. Payment for these goods and services may, or may not be, made online. Examples of e-commerce revenue include:<br>• Revenue from online orders for goods or services placed by a buyer.<br>• Revenue from online services provided where charges are based on the usage of those services. (e.g., commissions or fees from the use of computerised reservation systems, financial transaction processing systems, etc.)<br>• Commissions or fees from the trading of securities or the sale of other financial products online.<br>• Commissions or fees from selling or from facilitating the sale of third party products through a company's website.<br>• Revenue from orders or contracts negotiated online with a buyer and seller on the price and terms for transferring ownership or the rights to use goods and services.<br>• Revenue from telephone transactions using interactive voice response systems. Examples of receipts/revenue excluded from e-commerce figures are:<br>• Online billings where the order or contract was not negotiated online.<br>• Delivery of services online where the order or contract was not negotiated online.<br>• Provision of telecommunications and related infrastructure systems (e.g., data transfer, Web hosting, Internet access) where the order or contract for such services was not negotiated online.<br>• Orders for goods or services placed by facsimile |
| **EEC** | Establishment and Enterprise Census 2001 (Japan) |
| **ECIF** | Integrated Forum on Electronic Commerce (Korea) |
| **EDI** | Electronic data interchange is the exchange of data usually in compatible forms so that software or a combination of individuals and software can put in a compatible form at the receiving end if necessary. EDI offers businesses the opportunity to retrieve information electronically from their internal systems and to forward that information to trade partners/suppliers/customers/government through a communications network. An example might be pulling data of one type of data base management system into a sequential format and then transferring the data to a second location where the data are stored in a format different from the originating data base management system. |
| **Electronic transaction (OECD broad definition)** | The sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organisations, conducted over computer-mediated networks. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the good or service may be conducted on or offline. |
| **Electronic transaction (OECD narrow definition)** | The sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organisations, conducted over the Internet. The goods and services are ordered over the Internet, but the payment and the ultimate delivery of the good or service may be conducted on or off-line. |
| **Establishment** | A single physical location where business is conducted or services are performed. |
| **Imputation** | A procedure for entering a value for a specific data item where the response is missing or unusable. Imputation is the process used to resolve problems of missing, invalid or inconsistent responses identified during editing. This is done by changing some of the responses or missing values on the record being edited to ensure that a plausible, internally coherent record is created (Statistics Canada, "Statistics Canada Quality Guidelines", 3rd edition, October 1998, p. 38). |
| **Incorporated Enterprise** | An incorporated enterprise is composed of a head establishment and branch establishments under its management, or a head establishment without its branch establishments, and the legal organisation includes a stock company, a limited company, a limited or unlimited liability partnership, and a mutual insurance company. |

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| **ICT** | Information and Communication Technologies[58] refer to information technology plus telecommunications equipment and telecommunications services. |
| **IT** | Information Technologies[59] refer to the combined industries of hardware for office machines, data processing equipment, data communications equipment, software and services. |
| **ISIC** | International Standard Industrial Classification |
| **JSIC** | Japan Standard Industrial Classification |
| **KCALS** | Korean Electronic Trade Association/Technical Association |
| **KIEC** | Korea Institute for Electronic Commerce |
| **KISA** | Korea Information Security Agency |
| **KISDI** | Korea Information Society Development Institute |
| **KNSO** | Korean National Statistical Office |
| **KorCham** | Korea Chamber of Commerce & Industry |
| **KOSDAQ** | Korean Stock Market (venture firms) |
| **KRW** | South Korean Won |
| **KSE** | Korea Stock Exchange (listed enterprises; both large enterprises and SMEs) |
| **KSIC** | Korean Standard Industrial Classification |
| **KTNET** | Korea Trade Network |
| **MCT** | Ministry of Culture & Tourism (Korea) |
| **METI** | Japan Ministry of Economy, Trade and Industry (METI) |
| **MOCIE** | Ministry of Commerce, Industry and Energy (Korea) |
| **MIC** | Ministry of Information and Communication (Korea) |
| **MPHPT** | Ministry of Public Management, Home Affairs, Posts and Telecommunications (Japan) |
| **NACE** | Nomenclature générale des activités économiques (EU) |
| **NAICS** | North American Industry Classification System (USA, Canada) |
| **NCA** | National Computerization Agency (Korea) |
| **NOIE** | National Office for the Information Economy (Australia) |
| **NSO** | National Statistical Office |
| **Non-sampling error** | An error in sample estimates which cannot be attributed to sampling fluctuations. Non-sampling errors may arise from many different sources such as defects in the frame, faulty demarcation of sample units, defects in the selection of sample units, mistakes in the collection of data due to personal variations or misunderstanding or bias or negligence or dishonesty on the part of the investigator or of the interviewer, mistakes at the stage of the processing of the data, etc. (Source: The International Statistical Institute, "The Oxford Dictionary of Statistical Terms", edited by Yadolah Dodge, Oxford University Press, 2003). |
| **Periodicity** | The frequency of compilation of data. |
| **Population (statistical)** | The total membership or "universe" of a defined class of people, objects or events. There are two types of population, i.e. target population and survey population. A target population is the population outlined in the survey objects about which information is to be sought and a survey population is the population from which information can be obtained in the survey. The target population is also known as the scope of the survey and the survey population is also known as the coverage of the survey. |

[58] See, EITO, 2005.

[59] See, EITO, 2005. This definition is based on a set of definitions and methodologies agreed between the EITO Task Force and IDC, and upon the European Union standards for trade statistics.

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| **Probability sample** | A sample selected by a method based on the theory of probability (random process), that is, by a method involving knowledge of the likelihood of any unit being selected (Source: United Nations Statistics Division, "Handbook of Vital Statistics Systems and Methods, Volume 1: Legal, Organisational and Technical Aspects", Studies in Methods, Series F, No. 35, United Nations, New York, 1991). |
| **Reference Period** | In one sense, this is synonymous with base period. It may also refer to the length of time, e.g. week or year, for which data are collected. Population, statistical units and variables relate to specific times, which may be limited to a reference time point (e.g. a specific day) or a reference period (e.g. a month, calendar year or fiscal year) (Eurostat, "Quality Glossary"). |
| **Sample** | A subset of a frame where elements are selected based on a randomised process with a known probability of selection. |
| **Sample size** | The number of sampling units which are to be included in the sample. In the case of a multi-stage sample this number refers to the number of units at the final stage in the sampling. |
| **Sample design** | The sample design provides information on the target and final sample sizes, strata definitions and the sample selection methodology. The usage is not uniform as regards the precise meaning of this and similar terms like “sample plan”, “survey design”, “sampling plan” or “sampling design”. These cover one or more parts constituting the entire planning of a sample survey inclusive of processing, etc. The term “sampling plan” may be restricted to mean all steps taken in selecting the sample; the term “sample design” cover in addition the method of estimation; and “survey design” may cover also other aspects of the survey, e.g. choice and training of interviewers, tabulation plans, etc. |
| **Sample survey** | A survey which is carried out using a sampling method, i.e. in which a portion only, and not the whole population is surveyed. |
| **Sample unit** | This term is often synonymous with sampling unit but would be better confined to the denotation of any of the units constituting a specified sample. |
| **Sampling** | The process of selecting a number of cases from all the cases in a particular group or universe. Sampling is the research strategy of collecting data from a part of a population with a view to drawing inferences about the whole. The “population” in this sense is often termed the “universe". (Survey Design and Statistical Methodology Metadata, Software and Standards Management Branch, Systems Support Division, United States Bureau of the Census, Washington D.C., August 1998, Section 3.3.17, page 28). |
| **Sampling error** | The part of the difference between a population value and an estimate thereof, derived from a random sample, which is due to the fact that only a sample of values is observed; as distinct from errors due to imperfect selection, bias in response or estimation, errors of observation and recording, etc.; The totality of sampling errors in all possible samples of the same size generates the sampling distribution of the statistic which is being used to estimate the parent value. Sampling errors arise from the fact that not all units of the targeted population are enumerated, but only a sample of them. Therefore, the information collected on the units in the sample may not perfectly reflect the information which could have been collected on the whole population. The difference is the sampling error (Eurostat, Quality Glossary). (Source: The International Statistical Institute, “The Oxford Dictionary of Statistical Terms”, edited by Yadolah Dodge, Oxford University Press, 2003). |
| **Sampling fraction** | The ratio of the sample size to the population size. (Source: Statistics Canada Quality Guidelines, 3rd edition, October 1998, page 22). URL http://www.statcan.ca/english/freepub/12-539-XIE/12-539-XIE.pdf |
| **Sampling frame** | A list of all members of a population used as a basis for sampling. Without such a frame, or its equivalent, methods of sampling with assured properties such unbiasedness are not available. The frame in effect defines the study population (The International Statistical Institute, “The Oxford Dictionary of Statistical Terms”, edited by Yadolah Dodge, Oxford University Press, 2003). |

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|---|---|
| **Sampling technique** | The name or other identification of the specific process by which the entities of the sample have been selected. (Source: United States Bureau of the Census, Software and Standards Management Branch, Systems Support Division, "Survey Design and Statistical Methodology Metadata", Washington D.C., August 1998, Section 3.3.23, page 32). |
| **Sampling unit** | One of the units into which an aggregate is divided for the purpose of sampling, each unit being regarded as individual and indivisible when the selection is made. The definition of unit may be made on some natural basis, e.g., household, persons, units of product, tickets, etc., or upon some arbitrary basis, e.g., areas defined by grid co-ordinates on a map. (Source: The International Statistical Institute, "The Oxford Dictionary of Statistical Terms", edited by Yadolah Dodge, Oxford University Press, 2003). |
| **SAS** | SAS - Service Annual Survey (USA) |
| **SECT** | Survey of Electronic Commerce and Technology (Canada) |
| **Simple random sampling** | Sampling in which every member of the population has an equal chance of being chosen and successive drawings are independent as, for example, in sampling with replacement. |
| **SISCA** | Standard Institutional Sector Classification of Australia |
| **Stratification** | The division of a population into subsets (called strata) before the selection of a sample within each of these subjects, especially for the purpose of drawing a sample, an assigned proportion of the sample then being selected from each stratum. The process of stratification may be undertaken on a geographical basis, e.g. by dividing up the sampled area into sub-areas on a map; or by reference to some other quality of the population, e.g. by dividing the persons in a town into strata according to sex or into three strata according to whether they belong to upper, middle or lower income groups. The term stratum is sometimes used to denote any division of the population for which a separate estimate is desired, i.e. in the sense of a domain of study. It is also used sometimes to denote any division of the population for which neither separate estimates nor actual separate sample selection is made, e.g. see the use of (sub-) strata in multiple stratification without control of sub-strata; or, e.g. the use of strata in stratification after selection when it is used to improve the estimate pertaining to the entire population. (A Dictionary of Statistical Terms, 5th edition, prepared for the International Statistical Institute by F.H.C. Marriott. Published for the International Statistical Institute by Longman Scientific and Technical). |
| **Survey metadata** | Data that define and describe other data. |
| **Synchronised sampling** | Synchronised sampling is an attempt to control respondent burden (or avoid overlaps) while maintaining a statistically valid sampling process. Synchronised sample selection involves assigning a random number between 0 and 1 to each unit on the frame. The random number line is then split, where possible, into non overlapping parts and one part is allocated to each of the surveys that use synchronised sampling.<br>The sample in each stratum is specified as an interval and overlap is achieved by, for each stratum, constraining the selection interval to move within a survey range. While it does not automatically control rotation or overlap when the stratification of a survey changes, some control is achieved by careful choice of selection intervals and survey ranges. |
| **Timeliness** | The delay between the reference point to which it pertains and the date on which the information becomes available. |
| **UNCTAD** | UNCTAD (United Nations Conference in Trade and Development) |
| **USD** | US-Dollar |
| **VPN** | A Virtual Private Network is a way to use a public telecommunication infrastructure, such as the Internet, to provide remote offices or individual users with secure access to their organisation's network. |

# Annex II: Exchange Rates

All currency exchange rates used in this report, for example to convert e-commerce values reported for Japan (in JPY) or the United States (in USD) into EUR, are annual average exchange rates (at Interbank rate) for a given year, based on the daily averages from the respective year. Exchange rates were computed with the OANDA.com currency converter (www.oanda.com/convert/fxhistory). The following table gives an overview of the average annual exchange rates from 2000 to 2005 between EUR and the currencies of the five countries compared.

**Average annual exchange rates in EUR for AUD, CAD, JPY, KRW and USD**

| | Australian Dollar | Canadian Dollar | Japanese Yen | South Korean Won | US Dollar |
|---|---|---|---|---|---|
| | 1 AUD = | 1 CAD = | 1 JPY = | 1 KRW = | 1 USD = |
| 2000 | 0,63021 | 0,73063 | 0,01007 | 0,00096 | 1,08500 |
| 2001 | 0,57856 | 0,72161 | 0,00920 | 0,00087 | 1,11691 |
| 2002 | 0,57650 | 0,67587 | 0,00847 | 0,00085 | 1,06106 |
| 2003 | 0,57599 | 0,63285 | 0,00764 | 0,00075 | 0,88540 |
| 2004 | 0,59288 | 0,61932 | 0,00744 | 0,00071 | 0,80510 |
| 2005 | 0,60260 | 0,63170 | 0,00735 | 0,00077 | 0,77983 |

Source: OANDA.com (www.oanda.com/convert/fxhistory)

# Annex III: Questionnaires

Eurostat Model Questionnaire 2005.

SECT Questionnaire (Canada), 2004.

CUTS Questionnaire (Japan), 2003.