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### Statistical Commission

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**Activities not classified by field: definition and measurement  
of e-commerce**

### Developing statistics of e-commerce

#### Note by the Secretary-General

In accordance with a request of the Statistical Commission at its thirty-second session,\*\* the Secretary-General has the honour to transmit to the Statistical Commission the reports of the Australian Bureau of Statistics, Statistics Canada and the Hungarian Central Statistical Office on their work on developing statistics of e-commerce, which, together with the reports contained in addenda to the present note, are intended to give members of the Commission and national statistical offices an indication of how some countries are approaching the definition and measurement of e-commerce. The Commission may wish to take note of the work described in the reports.

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\* E/CN.3/2002/1.

\*\* See *Official Records of the Economic and Social Council, 2001, Supplement No. 4 (E/2001/24)*, chap. I, sect. A.



**Reports of the Australian Bureau of Statistics, Statistics  
Canada and the Hungarian Central Statistical Office on  
their work on developing statistics of e-commerce**

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## I. Measuring e-commerce: Australian Bureau of Statistics experience

### Introduction

1. The present paper describes Australian Bureau of Statistics (ABS) work on measuring e-commerce. To set the context, the paper first summarizes Organisation for Economic Cooperation and Development (OECD) work on statistical standards for e-commerce measurement. It then outlines Australia's development and collection work in the area of e-commerce statistics and describes the major challenges encountered.

### OECD standards for e-commerce statistics<sup>1</sup>

2. OECD has been addressing the need for international standards for information and communication technology (ICT) statistics for a number of years. Following a recommendation made by ministers a conference on electronic commerce held in Ottawa in 1998, the OECD Working Party on Indicators for the Information Society set up an expert group on defining and measuring e-commerce at its April 1999 meeting. The aim of the expert group was to compile definitions of electronic commerce that are policy relevant and statistically feasible.

### *Definition of e-commerce*

3. Work by the Secretariat and members of the expert group over the following year culminated in a model that was submitted to the Working Party at its meeting in April 2000. The model specified the following dimensions of an e-commerce definition:

- The processes (e.g., whether they involve monetary exchanges or transfers of ownership);
- The medium (communications infrastructure);
- The actors involved (e.g. whether internal to firms or third parties).

4. Four definitions were proposed:

- Electronic commerce transactions;
- Electronic commerce business processes;
- Internet commerce transactions;
- Internet commerce business processes.

5. At its April 2000 meeting, the Working Party agreed to proceed with the two transactions definitions, subject to further work being done by member countries to clarify aspects of the definition, such as defining the communications infrastructure.

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<sup>1</sup> Several sources have been used to compile the present summary of OECD work, including the author's interpretation of meeting outcomes and debates, where official summaries are not yet available or do not show the detail required; in particular, much of the information contained in the paper is based on recent OECD debates, the outcomes of which were not officially available at the time of writing. The views expressed in the paper should therefore not be attributed to OECD or its member countries.

6. Following the work done by member countries during 2000 and early 2001, there are now agreed broad and narrow definitions of e-commerce transactions: the broad definition covers e-commerce transactions generally, while the narrow version covers Internet commerce only.

7. The broad definition is:

An electronic transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, Governments and other public or private organizations, 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 off-line.

8. The narrow definition (which is a subset of the broad version) is:

An Internet transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, Governments and other public or private organizations, 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.

9. Although there is reasonable consensus on the transactional definitions of e-commerce, there has been less progress made on the broader e-business concept (referred to, by the Working Party, as specific business processes on the Internet or computer-mediated networks). Nevertheless, there are some electronic business processes that the Working Party has identified as being currently measured across a number of surveys and therefore potentially available on an internationally comparable basis, including:

- Receiving and making online payments for goods and services;
- Conducting other financial transactions online, such as electronic banking;
- Digital delivery and receipt of products;
- Marketing and promotion;
- Use of online databases.

#### *Measurement of e-commerce*

10. In conjunction with the work on defining e-commerce, the OECD secretariat suggested a broad measurement model for e-commerce, consisting of the following stages:

- E-readiness (or e-infrastructure): preparing the technical, commercial and social infrastructures which are necessary to support e-commerce;
- E-intensity: the state of e-commerce usage, volume, value and nature of transactions;
- E-impact: relates to measurements of the difference made by e-commerce in terms of efficiency and creation of sources of new wealth. Such measures can be at a micro- or macroeconomic level.

11. At its April 2000 meeting, the Working Party considered this work and approved the measurement model. The Working Party attempted to define a set of core e-commerce indicators for each stage of the model, but because of

measurement difficulties agreed to initially restrict proposed indicators to the first two, e-readiness and e-intensity.

12. At its meeting in 2001, the Working Party approved the collection of a set of core e-commerce indicators for business and households. An initial collection of the core indicators was carried out in June 2001 and some data were included in the OECD publication *Science, Technology and Industry Scoreboard: Towards a Knowledge-based Economy* (issued in September 2001).

13. Collection will continue on a rolling basis in order to build a structured database of e-commerce statistics to be used in other OECD publications. It is expected that the core set of indicators will change somewhat as experience with the data is gained.

#### **Australia's work in the field of e-commerce measurement**

14. Since 1994, ABS has collected data on the use of information technology (IT) by households and individuals, businesses and government organizations. The range of information collected has developed over the years, shifting from an initial focus on computer use towards data on Internet use, web site features and Internet commerce.

15. Until now, the main emphasis for e-commerce measurement in Australia has been on commerce conducted via the Internet rather than use of other computer-mediated networks. It is expected that future developments may include extension of the ABS business technology use survey to include details of all electronic commerce, such as using non-Internet based electronic data interchange (EDI).

#### *Household use of technology surveys*

16. Quarterly household technology use surveys were conducted via the ABS Population Survey Monitor (PSM) in February 1994 and all quarters of 1996, 1998, 1999 and 2000. PSM, which ceased at the end of 2000, was an omnibus household survey and collected information on a range of topics from just over 3,000 households each quarter. From the year 2001, household technology use questions are included on available annual household survey vehicles. PSM and subsequent annual surveys collect household use of IT data via a face-to-face interview with a randomly chosen adult.

17. Household data are collected on a number of topics relating to the use of computers, the Internet and other technologies. Data are also collected on the selected adult's use of computers and the Internet at home, work and other places; details of their Internet purchases; barriers to Internet purchasing; electronic financial transactions and working from home activities.

18. Questions on Internet commerce activities have been asked of the selected adult in household surveys from 1999 to 2002. With minor variations between years, the questions are as follows:

- In the last 12 months, have you purchased or ordered goods or services for your own private use via the Internet?
- Did you purchase or order goods or services from Australia or overseas? (*Australia, overseas, both*)

- Did you pay for the goods or services online?
- In total, approximately how much have you paid for goods and services purchased via the Internet in the last 12 months? (*choices expressed in Australian dollar (\$A) ranges*)
- Approximately how much have you paid online for goods and services purchased via the Internet in the last 12 months? (*choices expressed in \$A ranges*)
- On how many occasions did you purchase goods and services via the Internet in the last 12 months? (*number*)
- What types of goods and services did you buy via the Internet in the last 12 months? (*list of items provided*)
- (*From 2000*) What was the main reason for not purchasing any goods or services for your own private use? (*list of reasons provided*)
- (*From 2000*) In the last 12 months did you sell or purchase shares over the Internet?
- In the last three months, did you use the Internet to pay bills, transfer funds etc?

#### *Business use of technology surveys*

19. ABS has conducted economy-wide surveys on the use of IT by employing businesses in respect of 1993-1994, 1997-1998, 1999-2000 and 2000-2001. The business technology use survey will be conducted annually for the foreseeable future. The scope of the surveys is all employing business units in the Australian economy, except for agriculture, forestry and fishing businesses, government administration and defence organizations, and education and religious organizations. Data on the farm use of IT have been obtained by including questions on the ABS annual agricultural commodity survey.

20. The focus of the 1993-1994 business technology use survey was mainly on issues related to computer use and IT income, expenditure and employment. The 1997-1998 survey collected a wider range of data, with an emphasis, for the first time, on Internet use by business, including details of Internet activities/services used and barriers to Internet access. An attempt was also made to collect a value for Internet sales transactions.

21. The 1999-2000 survey was much larger than the first two, with 15,500 businesses approached. The value of Internet sales was again sought, with the definition used being "online sales orders received via the Internet regardless of method of delivery or payment". A number of questions were dropped from the previous survey (e.g., IT income and expenditure and number of IT employees) and others were added (e.g. on web sites and their use).

22. For the 2000-2001 survey, about 14,000 businesses were approached, with many of the questions retained from the 1999-2000 survey. The major difference between the collections was a change in the approach to measuring the value of Internet commerce transactions, which was done to simplify solutions to conceptual and reporting problems posed by agents and intermediaries, such as financial services organizations (the issue being whether they should report value of

sales/transactions or the value of commissions/fees received on those sales etc). The concept was changed from a *value of orders* to an *attributed income* basis for the 2000-2001 survey. Attributed income is the value of income which has resulted from sales of goods or services via the Internet. It can be expressed as an aggregate value and as a ratio, the denominator of which is income (including non-operating income but excluding extraordinary items). That change has enabled a generalized questionnaire approach to be maintained for all businesses regardless of industry.

23. Questions on the benefits of Internet purchasing and the impact of Internet selling were also added to the 2000-2001 survey.

24. The 2000-2001 questionnaire included the following Internet commerce items:

- Which of the following Internet activities or services did this business use during the year ended 30 June 2001?
  - Activities relating to purchasing goods and services:
    - Ordered goods and services;
    - Made electronic payments/authorizations;
    - Received invoices;
  - Activities relating to selling goods and services:
    - Received orders for goods and services;
    - Received payments/authorizations;
    - Sent invoices to customers;
    - Delivered products electronically;
    - Provided after sales service;
  - Other transactions (relevant to electronic commerce):
    - Advertise or promote this business;
    - Banking and financial services;
    - Electronic lodgement of government forms, applications payments etc.;
- Which of the following did your web presence offer as at 30 June 2001?
  - Advertising of business' own products;
  - Customer account information;
  - Online ordering;
  - Shopping cart facilities;
  - Facility to track orders;
  - Online payment capabilities;
  - Capability for secure access or transactions;
  - Integration with backend systems;

- Did this business order any goods and services via the Internet or the World Wide Web during the financial period?
- Which benefits, if any, have been achieved by ordering goods or services via the Internet or the World Wide Web? (*list of benefits*)
- Did this business earn income from the sale of goods and services ordered via the Internet or the World Wide Web during the financial period?
- Of the business' total income, please estimate the amount which resulted from sales of goods or services via the Internet or the World Wide Web? (*total income is asked as a separate question*)
- Did this business start receiving orders via the Internet or the World Wide Web at the insistence of customers or clients?
- Please indicate how the ability to receive orders for goods or services via the Internet or the World Wide Web has affected this business (*list of items, each to be categorized by the respondent as having decreased, not changed, increased or not applicable*).

25. The ABS business technology use survey will change over time to reflect users' changing data requirements, developments in international standards and changes in technologies and their use. In line with those factors, testing for the 2001-2002 survey is expected to include such topics as:

- Electronic commerce by means other than the Internet, e.g. the incidence of use of such technologies as electronic data interchange;
- IT security technologies in use;
- IT skills issues;
- Methods of effecting Internet commerce from the seller's perspective (for instance, via simple e-mail, more sophisticated web site functionality via an Internet market place site etc.);
- The feasibility of dissecting Internet income according to the customer (a business-to-business/business-to-consumer split).

#### *Government use of technology surveys*

26. Technology use surveys of general government organizations were conducted in 1993-1994, 1997-1998 and 1999-2000. The first two collections were designed to complement the business surveys of technology use. The 1999-2000 collection deviated significantly from its business counterpart, instead measuring a range of government specific activities (such as outsourcing and provision of electronic services). The government technology use surveys cover federal, state/territory and local government organizations in Australia.

27. The 1997-1998 government survey asked a number of electronic commerce questions, as follows:

- Which of the following functions were undertaken using the Internet?
  - Purchase of goods and services:
    - Placing purchase orders;



- Receiving invoices;
- Making payments;
- Sales of goods and services:
  - Marketing/promotional activities;
  - Receiving sales orders;
  - Sending invoices;
  - Receiving payments;
  - Coordinating delivery arrangements;
- Other transactions:
  - E-mail;
  - Lodging government forms/tenders;
  - Other;
- Provision of electronic funds transfer point of sale facilities to clients.

28. Although many of those items are relevant to government organizations, there was a perceived need to focus more on the types of services that are being provided online by the Government. By using online services, the Government potentially becomes a key driver of growth of the information economy, as well as enabling the Government itself to become more efficient.

29. ABS designed its 1999-2000 survey to reflect those needs. As a result:

- The 1999-2000 government survey had a strong focus on electronic services being offered by the Government, particularly via the Internet;
- Those services include e-commerce activities, such as the ability to receive electronic payments by a variety of means (interactive voice response, call centres, web sites etc.) and the ability to offer online ordering via a web site;
- We also asked about use of some specific e-commerce related technologies, such as use of encryption technologies and whether the organization was undertaking online procurement.

### **Measuring Internet commerce: challenges encountered**

#### *Collection challenges*

30. There are several collection challenges in the measurement of Internet commerce, especially from the business perspective (the concept is much simpler for households and individuals). In ABS experience, they can be summarized as follows:

- Designing a collection form to suit varying levels of technological sophistication among respondents is difficult and requires a lot of testing. It is important to avoid technical language and concepts as far as possible;
- Structuring a collection form can be difficult. Our forms include items on use of IT, starting with computer use and ending with Internet selling (the order is

simplest to most sophisticated use). Use of filter questions and careful sequencing is important to achieve a logical flow and to minimize respondent load. A simple example of the complexity inherent in such surveys is the treatment of businesses which *do not* use a computer. Should they be filtered out of all subsequent questions (which we did for our 1999-2000 survey) or retained on the basis that they might use other technologies, such as web sites, via third parties (we followed this logic for our 2000-2001 survey)?

- Some aspects of e-commerce are still rare events and therefore require high sample sizes to produce good estimates. This is especially true of measures of the value of Internet commerce. For instance, our 1999-2000 survey was sent to nearly 15,000 businesses, yet the standard errors were such that we were only comfortable publishing an estimate of Internet commerce value at the “total” level;
- Record-keeping practices are not always aligned with the interests of statistical users. For instance, there is a strong interest in the split between business-to-business and business-to-consumer e-commerce, but the limited testing we have done on the subject indicates that businesses may not be able to distinguish transactions between other businesses and consumers. We expect to test that issue again for the 2001-2002 business collection;
- The income concept associated with Internet commerce transactions needs careful thought (see discussion below).

31. More information on some of these issues is presented below.

32. *Households and individuals.* Over the years, only minor methodological issues have arisen with the Household Use of Technology Survey. The relatively small quarterly sample sizes have generally restricted quarterly output to the main aggregates. There appear not to have been any major recall problems associated with questions asked about the last 12 months, including the value of Internet commerce transactions by the selected adult. It is possible that asking for expenditure within ranges has reduced that potential problem. It is also possible that the incidence of recall bias will grow as Internet purchasing becomes more commonplace (and therefore each purchase transaction less memorable).

33. *Businesses.* For the 1997-1998 survey, the main problems with Internet commerce items were high standard errors and reporting problems. Responses to a number of data items were considered of insufficient quality to publish. Of particular note was the value of Internet sales, which was affected by standard error problems, question design issues and record-keeping inadequacies. Only 315 of the 6,800 employing businesses selected answered positively to receiving sales orders via the Internet, and a large proportion had to make estimates because primary data were not available. In the 1999-2000 survey, the main problem encountered in respect of Internet commerce measurement was that some respondents were confused about what should be included in Internet sales, particularly businesses which acted as agents (e.g. stock brokers and travel agents) and financial institutions. Some reported commission or fee earnings, while others initially reported the whole transaction value.

34. *Government organizations.* A number of methodological issues have been encountered with the government technology use survey. The main issues concern the quality of the population frame, coverage of reporting by government

departments and reporting of some of the data. Those problems are mainly not specific to the measurement of Internet commerce but reflect the difficulties inherent in conducting surveys of this sector.

*Treatment of Internet income*

35. There is general agreement among OECD countries on what constitutes an e-commerce transaction. There has been less work on the associated value and income concepts. Australia is now conducting its fourth business use of technology survey. Both the second and third surveys sought the value of Internet sales and the value of total sales in order to produce the ratio of Internet sales to total sales. We wanted to be able to produce that ratio at a unit record level as well as for individual sectors and the whole economy.

36. We found the exercise far from simple and have posed a number of questions regarding the correct income concept, including:

- What is the appropriate numerator and denominator for the Internet: total type of ratios?
- Will they vary in different situations and for different sectors?
- How should we treat the finance and insurance sector?
- Assuming that organizations will not necessarily know the value of Internet transactions undertaken on their behalf, how do we capture that information?
- Should we be recording the value of sales made by agents or the value of commissions earned on those sales?

37. In our 1999-2000 business technology use survey, we used an income concept based on total sales of goods and services. We tried to include gross sales made by agents on behalf of other organizations. The denominator used in order to calculate the proportion of Internet to total sales was also based on that gross sales concept (that is, it included sales made by organizations on their own or others' behalf). The use of that concept resulted in a complex form and confusion to respondents.

38. We regarded the agent's problem as one which was important to solve. Not only are there a large number of agents operating in the economy (including real estate agents, travel agents, betting agents and ticket agents) but we thought that they were likely to find that Internet selling could bring efficiencies and therefore they might be early adopters of enabling technologies.

39. Another problematic area of Internet commerce is financial transactions (e.g. banking, stockbroking and insurance). We were definitely not interested in collecting the value of such transactions where they occurred over the Internet but assumed that we needed the value of fees on those transactions.

40. At time of writing, it is too early to tell whether use of the attributed income approach for the 2000-2001 collection has solved those problems (see para. 22 above).

*Technology boundary issues*

41. By and large, the definition of e-commerce transactions formulated by the OECD Working Party on Indicators for the Information Society is not reliant on

technological developments. For instance, the narrow definition refers simply to the Internet rather than naming or referring to Internet protocols. Indicating a possible departure from that stance, at its 2001 meeting, the Working Party debated whether e-mail was a valid medium for conducting Internet commerce.

42. Several countries, including Australia, argue that defining Internet commerce on the basis of technologies used would make it difficult to maintain a definition and therefore any time series of statistics based on it. It can also present problems in trying to convey concepts to users. For instance, e-mail can be several things: it can be a simple message (arguably analogous to a fax) sent through the Internet, a message generated by pressing a button in a web site or a so-called interactive e-mail, where the receiver of the e-mail really sees a web page and by a simple click can transmit an order that ultimately is a web order. Other OECD countries have argued just as strongly that only interactive e-mail should be considered to be a medium for effecting Internet commerce because it is the only form of e-mail which enables efficiencies from automatically linking front- and back-end processes. It is likely that more work on that issue will be done leading up to the 2002 meeting of the Working Party.

### **Conclusion and future developments**

43. ABS work in the field of e-commerce measurement has been significant and will continue to expand and evolve. Impetus for change includes users' changing data requirements, developments in international standards, introduction of new technologies and changes in patterns of technology use.

44. In the near future, the business technology use testing programme will include such e-commerce topics as:

- Electronic commerce conducted by means other than the Internet;
- Methods of effecting Internet commerce from the seller's perspective;
- The feasibility of dissecting Internet income by type of consumer.

45. Although immediate changes in respect of e-commerce measurement are not planned for household and government technology use surveys, they can also be expected to develop in response to user needs and technology developments. Topics likely to be of future interest include online procurement by the Government and use of an expanding range of Internet services offered to householders.

46. In the future, we can expect more collaboration in the Asia and Pacific region on the measurement of information technology and telecommunication (IT&T), including e-commerce. That work was advanced in May 2001, with the first technical meeting of Asia and Pacific statisticians on IT&T statistics. The meeting was held in Brisbane, Australia, and the following countries or areas were represented: Singapore; Japan; Republic of Korea; Hong Kong, China; New Zealand; and Australia.

47. The broad aim of the meeting was to share experience and work together to better understand the issues and future directions for statistical work in this field. A number of proposals were agreed at the meeting, covering statistical classifications and standards, statistical frameworks and the compilation of data on several IT&T topics.

**Further information**

48. Further information on ABS work in the information technology and telecommunications statistics field can be obtained from:

Sheridan Roberts  
Director, Science and Technology Statistics  
Australian Bureau of Statistics

E-mail: [sheridan.roberts@abs.gov.au](mailto:sheridan.roberts@abs.gov.au)

49. ABS releases the following publications on the use of IT in Australia:

- *Government Use of Information Technology, Australia* (catalogue No. 8119.0);
- *Business Use of Information Technology, Australia* (catalogue No. 8129.0);
- *Household Use of Information Technology, Australia* (catalogue No. 8146.0);
- *Use of Information Technology on Farms, Australia* (catalogue No. 8150.0).

50. Summary information on IT publications is available on the ABS web site (see “Main features”, at [www.abs.gov.au](http://www.abs.gov.au)).

51. The Information Technology statistics theme page on the ABS web site has links to the above-mentioned summaries and other information on the IT&T statistics programme. The theme page can be accessed from the ABS web site (go to [www.abs.gov.au](http://www.abs.gov.au), select “Themes” from the menu shown on the left side of the page and select the “Information technology” theme page).

52. More information on the meeting of Asia and Pacific statisticians on IT&T statistics can be accessed from the “Information technology” statistics theme page on the ABS web site.

## **II. Measuring electronic commerce: the Canadian experience (Statistics Canada)**

### **1. Introduction**

1. There is considerable policy interest in the magnitude and “transformative” effect of electronic commerce. In response to that interest, Statistics Canada has been measuring the extent of electronic commerce in both business practice and households since 1999: both the proportion of businesses, households and public sector enterprises engaged in electronic commerce, and the value of sales over the Internet. In addition, we have provided information on the technologies that lead to or enable electronic commerce, such as computer use, Internet use, the presence of web pages and EDI over proprietary networks. The development of the statistical programme did not happen in isolation. The content and conceptual framework have been crafted with our partners in Industry Canada and in collaboration with OECD. As a result, the information produced supports the formation of policy and is internationally comparable.

2. The present paper describes how Statistics Canada measures electronic commerce. The first part provides background on the policy environment that gave rise to the Government’s connectedness project (of which the measurement of electronic commerce is a part). Second, a description of the survey programmes measuring business and household electronic commerce is provided. Finally, there is a discussion of where the electronic commerce programme is going.

### **2. Setting the stage**

3. The Government of Canada, in 1998, adopted the policy of “Connecting Canadians”. This policy called for the promotion of universal access of businesses, households and communities to the Internet to support online sales or delivery of goods or services, both from the public and private sectors.

4. The Government’s electronic commerce strategy involved the creation of certain “framework conditions” that would provide an environment conducive to performing commercial transactions over the Internet, including the creation of technology-neutral taxation, the development of policies on cryptography and public key infrastructure, the development of guidelines to protect consumers and legislation to protect personal information.

5. Coincident with the Government’s focus on connectivity was an increasing preoccupation with the topic in OECD. An OECD ministerial conference held in Ottawa in 1998 identified gaps in official statistics, and the OECD Working Party on Indicators for the Information Society was invited to develop working definitions of electronic commerce and guidelines for their use, as well as model surveys of the use of ICTs and electronic commerce. The Working Party produced definitions of electronic commerce in 2000, and in 2001 revised them slightly and added guidelines for their application. The definitions, guidelines and a model survey of business were released by OECD in November 2001. Work continues on model surveys of other sectors. Although Canada derives the benefit of internationally agreed concepts and definitions, Canadian statisticians and policy makers have been actively involved in the process of building international consensus.

6. Parallel with those developments, Statistics Canada proposed to the Government to establish a “fund” (actually an annual budget allocation) with the explicit purpose of shedding light on issues of direct and current policy interest to federal departments. The information “gaps” would be identified by an interdepartmental group, but with a veto option on any project by the Chief Statistician of Canada. The Government approved the creation of the fund and one of the projects funded through that initiative was the development of an annual programme of socio-economic indicators of connectedness, of which electronic commerce was a part. That resulted in a collaborative partnership between the policy department and the statistical office, a condition which has been a key to the success of the electronic commerce programme, ensuring that the creation of new data sets would be used to support policy analysis.

### **3. The statistical programme and some results**

7. Although the sale of goods and services over the Internet is often thought to be the epitome of electronic business, it is only one facet of it. Others include the use of the Internet as a tool to help develop products, communicate with suppliers, arrange for production and delivery and provide after-sales service. Similarly, from the perspective of households, data on orders placed over the Internet cannot be examined in isolation from other related activities, such as Internet use and the use of the Internet to facilitate commercial transactions (i.e., research over the web or “window shopping”). Official statistics have provided some insight into the reach of electronic commerce into the Canadian economy.

8. Statistics Canada uses the OECD definition of an Internet transaction, which includes orders placed over the Internet, with or without online payment or delivery.

#### *Internet purchases from home*

9. Within households, electronic commerce can be viewed as a continuum of activities. Just as a child will crawl before walking and then running, an individual typically proceeds through several stages before actually placing an order over the Internet: he must use a computer, proceed to become an Internet user, explore the goods and services available on the Internet etc. All those stages are measured in the Statistics Canada Household Internet Use Survey (HIUS).

10. First conducted for the 1997 reference year, HIUS was created to measure the use of the Internet, by location, categorized by various household characteristics (income, type of family, geography and characteristics of the household maintainer). In 1999, the content expanded to include information on Internet shopping. For 1999 and 2000, HIUS collected information on electronic commerce by households, which typically accessed the Internet from home (as opposed to the workplace, school or some other location), for the sole consumption of the household. The sampling unit is the household, and a designated member of the household is interviewed with respect to the online orders made by all members of the household.

11. HIUS is administered as a supplement to a sub-sample of the Labour Force Survey. With a sample of 43,000, it is representative of households in the civilian,

non-institutionalized population, 15 years of age and older in Canada's 10 provinces.<sup>2</sup>

12. Two limitations are inherent in the survey as currently implemented. First, data are collected only for the household, not for the individual. Although households can have a geography, income and type of Internet connection (i.e., telephone dial-up access versus high speed), they cannot have an age, sex or education (i.e., individual characteristics). Also, electronic commerce information is being sought only from households that regularly use the Internet from home; purchases over the Internet from other locations are excluded.

13. Despite those limitations, it has still been possible to create a telling portrait of the state of electronic shopping in Canada. In 2000, among Canadian households that regularly used the Internet from home, over half (55 per cent) used the Internet to support a decision to purchase a good or service, either for research on the commodity (window shoppers) or to place an order online. In turn, 56 per cent of those Internet shopper households placed an order online. Canadian households spent \$1.1 billion on 9.1 million orders over the Internet placed from home. Almost four fifths of those electronic commerce households paid for their purchases online. Domestic sales accounted for slightly more than half (55 per cent) of orders and 58 per cent of spending online.

14. Cycle 14 of the General Social Survey measured individual as opposed to household use of the Internet; it found that in 2000 Internet users were generally younger, had a higher income and were more educated than those that did not. Additionally, anglophones were more likely to use the Internet than francophones. The survey also found that adults banking or placing an order over the Internet tended to be in their late 20s and 30s. Also, men were more likely to purchase goods and services over the Internet.

15. Privacy and security was a significant concern among Internet users. Among francophones, language was also cited as a barrier to making purchases or banking over the Internet. Men were slightly less concerned about security issues than women. Also, younger Internet users were generally less concerned about privacy and security.

#### *Businesses electronic commerce*

16. Since 1999, surveys have been conducted by Statistics Canada to quantify the nature of ICT use by business: the use of computers, the use of the Internet, the creation of web sites and the use of the Internet for direct commerce.

17. In 1999, the Survey of Information and Communications Technology and Electronic Commerce (ICTEC) focused on the use of ICTs and electronic commerce across almost all public and private sector enterprises.<sup>3</sup> At its inception, a very detailed questionnaire was developed to measure the uses of various ICTs and electronic commerce (sales and purchases). The survey was to be administered at the establishment level and it ran as a supplement to the Survey of Capital Expenditures.

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<sup>2</sup> Excluding residents of the Yukon, Northwest Territories and Nunavut; also excluding people living on Indian reserves, full-time members of the Canadian Armed Forces and inmates of institutions.

<sup>3</sup> This survey excluded from its sample frame agricultural and construction industries, as well as municipal governments.



This well-established survey is establishment-based and covers almost all public and private sector industries.

18. In retrospect, that decision was a mistake. Indeed, a poor response rate was initially experienced during data collection and two things became apparent. First, the establishment was not the proper level in an organization to collect much of the information sought (i.e., sales over the Internet). Second, the respondent for the Survey of Capital Expenditures was not always the proper respondent for ICTEC. As a remedial measure, two steps were taken: a short form of the questionnaire was developed as a follow-up and the methodology was revised to produce estimates at the enterprise level.<sup>4</sup>

19. Released in August 2000, the data in this survey provided a baseline measure of the use of computers, e-mail and the Internet by Canadian business and public enterprises. It outlined the extent to which public and private sectors had developed web sites and engaged in electronic commerce, including the value of sales over the Internet. Barriers to electronic commerce were also identified (Bakker, 2000).

20. The survey was repeated in 2000 as the Survey of Electronic Commerce and Technology. In order to avoid some of the difficulties experienced in the previous year, the content of the questionnaire was reduced, focusing on questions that could be answered by a single person for the entire enterprise. For instance, it included questions on sales over the Internet but excluded purchases, which are largely made in a decentralized fashion. Although the survey continued to use the Capital Expenditure sample, some aspects of the methodology changed. The collection unit became the enterprise (eliminating the need to aggregate establishment data to enterprises).<sup>5</sup>

21. In addition to the data elements indicated above, estimates from the 2000 survey included the use of intranets, extranets, wireless communications, EDI on proprietary networks and electronic funds transfer. The 2000 survey also yielded a richer dataset on electronic commerce, including not only the value of the sales over the Internet but also the percentage of those sales made to households (business to consumer) and businesses (business to business) as well as export sales.

22. The 2000 survey yielded some important results. In 2000, private sector sales over the Internet amounted to \$7.2 billion, a 73 per cent increase over 1999. However, expressed as a percentage of total operating revenue, sales were 0.4 per cent, an increase of 0.2 per cent over 1999. The value of sales over the Internet was small.

23. Also, between 1999 and 2000, the proportion of businesses selling online fell from 10 per cent to 6 per cent. For the enterprises that were in the sample for both 1999 and 2000, for every two businesses that started to sell online in 2000 five stopped. Finally, the proportion of economic activity accounted for businesses that sold over the Internet in 2000 was 25 per cent, up from 17 per cent in the previous year. Electronic commerce appeared to become concentrated into fewer and larger

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<sup>4</sup> To do this, enterprise-level data were generated from the establishment data collected. Then the enterprise data was disaggregated to all establishments within the enterprise (whether or not in sample). The sampled establishments were then used in the same manner as originally intended under the establishment sampling design (Whitridge and Beaucage, 2000).

<sup>5</sup> Despite the collection unit being the enterprise, the sample unit remained the establishment; consequently, the same weight share method was used to calculate the estimates.

businesses. Statistics Canada was the first organization in Canada, public or private, to publish those insights, which had a considerable impact on public discourse on electronic commerce in Canada. The clear implication of that finding is that there is considerable volatility behind the apparent strength of electronic commerce.

#### **4. Next steps**

##### *Households*

24. HIUS was originally designed to measure Internet use by households, not specifically as a tool to measure electronic commerce. As stated above, the survey in 1999 and 2000 measured electronic commerce from home. For the 2001 reference year, that will be expanded to include orders placed over the Internet from any location (home, work, school, public libraries).

25. A remaining weakness of the survey is that it measures only the characteristics of the household or the characteristics of the household maintainer: it does not set out to measure the characteristics of individual users of the Internet. Plans are being made for redesigning the survey programme for the 2003 reference year to collect information on sales over the Internet that can be categorized by both individual and household characteristics.

##### *Businesses*

26. The sample for the 2001 survey was drawn at the enterprise level, independently of the Survey of Capital Expenditures, which will take some of the sample away from more capital intensive industries (i.e., manufacturing) and reallocate it to others (wholesale and retail trade and services). The sample unit is the enterprise, eliminating the need for the special methodology needed to convert an essentially establishment-based survey into an enterprise survey.

27. The results of the 2001 survey will also provide some insight on inter-firm linkages. Recall that five businesses stopped selling online in 2000 for every two that started. When asked about barriers to electronic commerce, respondents in general replied that their products did not lend themselves to Internet transactions or that they preferred to maintain current (i.e., face-to-face) business models. The businesses that “exited” electronic commerce in 2000 were more likely to reply that their customers or suppliers were not ready. Some understanding on how information and electronic commerce transactions move along the supply chain will provide valuable insight on where those bottlenecks may be occurring.

#### **5. Conclusion**

28. Statistics Canada has developed an annual programme to measure electronic commerce and related enabling technologies in households, businesses and the public sector. The framework underlying those statistics has been developed in close collaboration with the policy department and OECD. Plans are in place to improve the data and to broaden the coverage to continue the contribution to the public policy debate.

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### **III. Development of e-commerce statistics in Hungary**

#### **1. Importance of measuring e-commerce**

1. Changes which, in terms of importance, can be compared to those that took place during the industrial revolution have brought the issues related to the development of the information society into public focus. Decision makers in political, business and scientific spheres are more and more aware of the historical importance of the current process. A new strategic raw material has appeared on the scene — knowledge — which is available via the new information and communication technologies and is suitable to provide a long-term definition of the development prospects, growth rate and economic strength of countries, as well as the quality of life of their population. A growing number of Governments realize that a new world order is taking shape, that a rearrangement of power relations is under way and also that regions and countries that are falling behind must be given a chance to catch up if they are not to continue to decline.

2. Therefore, more and more Governments deem it necessary to steadily promote the spreading of this process by administrative means. Those who are quick to react are making serious endeavours to develop national strategies and action plans to find the required financial sources and create the conditions for measurement.

3. The global significance of the information society also involves the importance of its prominent sub-systems, which often get in the limelight, even separately. Application of ICTs is the basic issue of the penetration of the process, and e-commerce is the paramount area that stands out from among the application possibilities. By many, e-commerce is regarded as the most important catalyst of business processes in the long run.

4. Penetration of e-commerce may, hopefully, bring about the acceleration of business and financial processes, an increase in the turnover rate of goods and money, a reduction of inventories and funding charges and a decrease in the costs on the supply side of goods and services.

5. On the demand side, much less time will be needed to sum up supply; prices and quality parameters will become fully comparable; the market position of the buyer will be reinforced; and as a result a decrease in prices may be expected.

#### **2. Governmental endeavours to stimulate the process**

6. When Hungary officially applied for accession to the European Union (EU), it meant not only a decision to become a member but also a commitment to accept burdens incidental to keeping up with the development rate of EU countries. That also means commitment to the development of a knowledge-based information society. The development of e-commerce is of paramount importance in Hungary.

7. In order to intensify this process, the Government has played an increasing role in recent years:

- In 2000, an independent governmental organization, the Government Commissioner's Office for ICT, was set up to coordinate the development of the information society;

- In 2001, the first version of the national information society strategy was prepared by the specialists of various areas most affected in the development of the information society;
- In early 2002, the statistical monitoring system for measuring the efficiency of strategic steps will be completed;
- In 2001, a long-term programme for national development, the Széchenyi Plan, was launched, in which the information society and economic development programme constitutes a separate chapter. Concrete action programmes are outlined and resources defined in the plan in order to achieve the objectives set forth.

8. Remarkable progress has been made in setting up the statutory and regulatory background. Among others, acts have been passed on:

- Telecommunication;
- E-commerce, together with any information society-related services;
- Electronic signatures.

9. As far as the penetration of e-commerce is concerned, the establishment of the infrastructural and human conditions is essential, to which end the above governmental endeavours have been made. Some of the conditions may be regarded as already provided for, including the relatively developed mobile and public switched telephone network, the continuous improvement of ICT devices in the business sector and the existence of intellectual capital and its international competitiveness. Another favourable condition is that the establishment of the telecommunication infrastructure in Hungary has been accomplished in the past 10 years. Owing to a very purposeful development, major indices of telecommunication services have reached the European Union average. Digital data transmission, e-business and e-commerce are already used by Hungarian companies. However, the process for catching up is not moving fast enough and the participants of the economy — depending on the type and size of enterprises — are not equally affected. Although many large companies are equipped with state-of-the-art electronic communication networks, the number of small and medium-sized companies operating such networks is insignificant.

### **3. Situation of e-commerce in Hungary**

10. Since official statistical data about the situation of e-commerce in Hungary will only be available in 2002, the present paper is based on surveys made by professionally recognized private market analysis companies and international organizations.

11. According to a survey performed by Bell Research and Thin Consulting market analysis companies, 70 per cent of Hungarian enterprises with more than 10 employees had Internet access in the first half of 2001. That value represents 100 per cent in the case of big companies, 80 per cent in medium-sized companies and 62 per cent in small companies. In 2001, enterprises with more than 10 employees spent about 14 billion forints (Ft) on their Internet connections. Some 45 per cent of companies with Internet access have their own home pages; however, that value amounts to only 32 per cent when the complete sphere of companies is examined. About half of those companies that do not have their own web pages plan to develop

them in 2002; therefore, penetration may reach 50 per cent by the end of the year. In most cases, enterprises use the Internet to e-mail, advertise their goods and services, surf the web and acquire market information. Interestingly, in Hungary small enterprises report making a higher proportion of their total e-purchase through the Internet than large companies. In spite of relatively high Internet penetration and a large number of web pages, only about 5 per cent of the companies surveyed are connected to e-commerce.

*Product profiles on consumer e-commerce web sites, in 2000*

12. As in other countries, book stores and CD shops were the first in Hungary to seize the opportunities provided by Internet by selling their products online. The scope of products is increasing all the time, and almost everything is available online: IT devices, technical equipment, food products, fast food, flowers, stationery, jewellery, communication devices, cinema and theatre tickets, car parts etc. Approximately 100 to 140 e-shops operate in Hungary. Most entrepreneurs had their e-shops designed by a popular content provider. Virtual shops and stores are operated by companies already performing commercial activities.

13. E-commerce in Hungary falls under the same category as the other commercial activities and is regarded as mail-order business. To date, decree No. 17/1999 (II.15) regulated remote commercial transactions and was based on EU guidelines. The decree is soon to be replaced by a new law regulating e-commerce, as indicated above.

*Business-to-business e-trading in Hungary, 1998-2001*

14. Business-to-business e-commerce in Hungary is relatively developed and online transactions are continuously increasing in terms of value. According to estimates, such e-commerce is expected to increase from Ft 135 billion in 2000 to Ft 387 billion in 2002. By 2004, the value of European e-trading is predicted to approach approximately US\$ 350 billion, 1 to 2 per cent of which will represent the Hungarian e-commerce market. Several hundred companies are already registered as suppliers on the two currently existing Hungarian e-markets — marketline.hu and First Hungarian E-Market. However, transactions have not yet started so that no forecasts are available about future e-trading. Owners of the two markets comprise multinational telecommunication, system development, information equipment and system suppliers. It is, however, a characteristic feature of business-to-business activities that they do not take place on the open market but are conducted between multinational companies as well as companies and banks selected on the basis of conventional quality criteria. A good example is General Electric, with considerable sales in Hungary, which is planning to perform an increasing proportion of its purchases by such means.

*Business-to-consumer e-trading in Hungary, 1998-2001*

15. Business-to-consumer e-commerce in Hungary is rather underdeveloped. In addition to a low communal Internet penetration, the main reason for this lies in the lack of confidence in online modes of payment and in the uncertainty of deliveries. The value of business-to-consumer e-commerce in 2000 was about Ft 171 million, less than 0.1 per cent of total retail trade turnover. The first business-to-consumer

sales in Hungary were of books, CDs, airline tickets, cinema tickets, IT and stationery products. Returns on online sales are extremely low for the time being.

16. Based on the data supplied by Carnation Consulting, a dynamically developing but (in terms of final value) still hardly significant turnover can be expected. Commercial activities in banking and securities are not included in the data. The preferred mode of payment is cash on delivery on more than 80 per cent of the sites. Some 94 per cent of suppliers uses the Hungarian post for deliveries to the customer, while 1.4 per cent of the adult population (based on interviews) are happy to use deposit and credit cards for online shopping and 3.8 per cent of respondents have already made purchases through the Internet. The Hungarian business-to-consumer market is dominated by big companies that have sufficient financial resources and can therefore afford to invest in such business and establish their future presence in this special market. The first online broker companies appeared on the scene in 1998, all owned by independent local financial groups. The low number of Internet users and the lack of investments have been an impediment to the growth of online invested funds, and the number of accounts is still below 10,000.

#### *Use of bank cards*

17. By the end of 2000, 4.5 million bank cards were in use; in that respect Hungary is ranked third among the Central and Eastern European countries — every fourth adult has a bank card. But the country is still cash-oriented and 85 per cent of bank transactions involve drawing cash. Nevertheless, business-to-consumer commerce is rendered possible as far as bank cards are concerned, even if Hungarians remain distrustful of online shopping for the time being. A survey conducted by Europay and MasterCard found that only 30 per cent of Hungarians trust that banks will handle their personal data confidentially. Also, one fifth of Hungarian Internet users doubt that their personal data disclosed in the course of online shopping are safe.

#### **4. Major international issues of development**

18. The difficulties of development are evident in the complexity of the phenomenon of e-commerce, its development rate, the vagueness of its conceptual and classification system, and the difficulties of meeting the increasing requirements as a result of globalization for the international comparability of data. Based on our experience, the following problems of methodology are encountered by statisticians participating in the development:

- Measurement of e-commerce is more complex compared to conventional commerce. Definitions must differentiate between processes completed electronically based on how closely they are related to concrete commercial transactions, and must consider the concepts of e-transaction, e-commerce, e-trading, e-business. On the other hand, definitions must also consider the conceptual scope of e-commerce and the means through which it is mediated (Internet, Extranet, EDI, EDI via Internet, e-mail, WAP), as well as those participating in the process on the basis of the direction of connections (business to business, business to consumer, business to government);
- Although there is an urgent and global requirement for the measurement of e-commerce, the penetration and development levels of the phenomenon to be measured show considerable differences among countries. Apart from a few

countries that produce outstanding penetration indices (United States of America, Japan) the relevant indices of OECD countries and EU member States are unremarkable, and e-commerce is hardly measurable at all in Central and Eastern European countries;

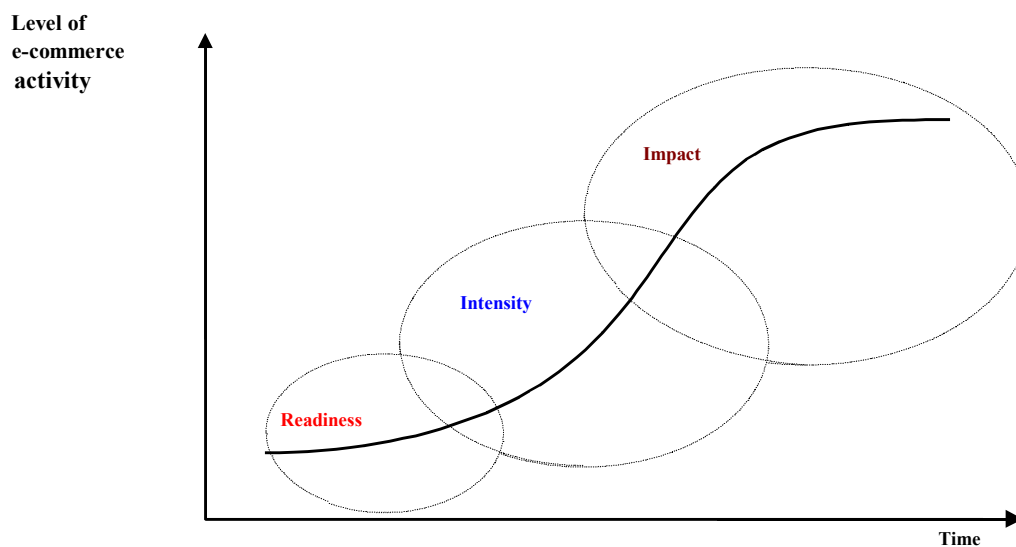
- No new internationally accepted conceptual and classification system has yet been developed, although the definition process is already in an advanced state. Recommendations for the most important definitions (e-business, e-trading, e-commerce, e-transaction) have been completed as a result of the work accomplished by experts of the OECD Working Party on Indicators for Information Society and the Eurostat Working Group on Information Society Statistics, and their alternatives for compromises have been accepted as well.

19. In addition to the difficulties of development, the results of the outstanding development work carried out in the workshops of the OECD Working Party and Eurostat Working Group must also be mentioned. Their impacts are already very tangible in the process of drafting definitions and classification system revisions associated with the ICT sector, the content sector and e-commerce, as well as in the creation of sample questionnaires and the organization of samplings. Those international development workshops made it possible for Hungary and other Central and Eastern European candidate countries to be involved in common activities as equal parties and to obtain the information and experience that is indispensable for development. Those relationships have promoted the development of the Central Statistical Office to an extremely high level.

#### 5. Hungarian answers to questions

20. The first development decision concerning the measurement of e-commerce was to define the phases of e-commerce penetration and development in Hungary.

#### S curve demonstrating the development phases of e-commerce



Source: OECD.



21. International development differentiates between three characteristic development phases:

- (a) Readiness: the development of e-commerce-related readiness and receptiveness;
- (b) Intensity: the start of intensive activity;
- (c) Impact: the manifestation of the impact of the activity.

22. Difference indices are emphasized for the measurement of various phases, as follows:

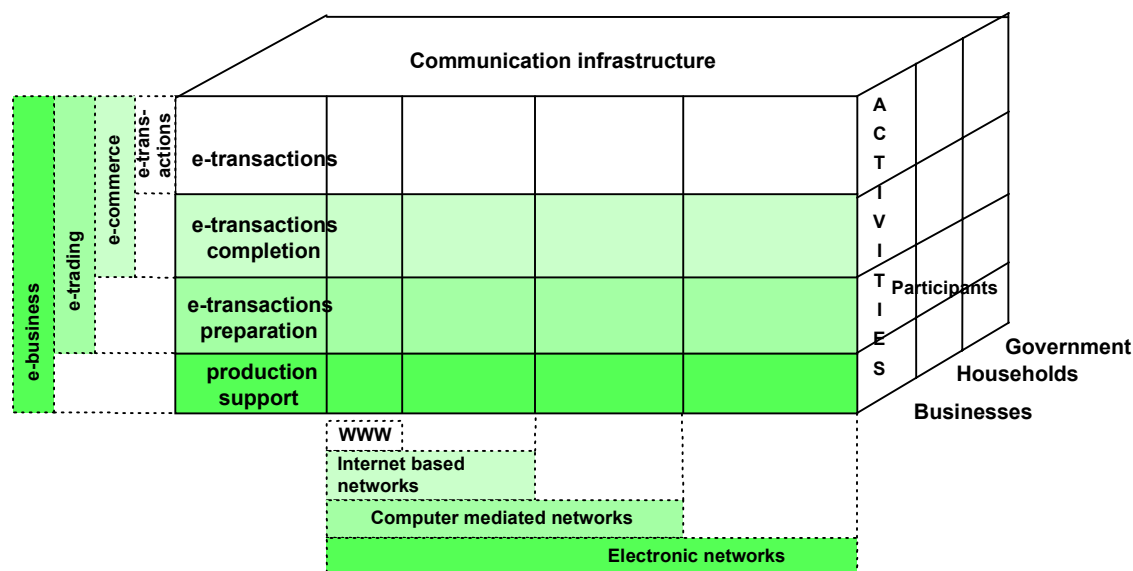
- (a) Readiness: the number of Internet service providers, telecommunication service providers, telephone lines and access possibilities to the Internet and Extranet, factors impeding e-commerce, advantages of e-commerce, number of employees with IT qualification, expenditures on e-commerce, number of Internet hosts;
- (b) Intensity: the intensity and frequency of Internet use, expectations for Internet use, number and value of Internet transactions, penetration rates;
- (c) Impact: impacts on the performance of the company, advantages of e-commerce.

23. Based on the above, project specialists participating in the development of the Central Statistical Office decided at the time of compilation of the questionnaire that Hungary is basically in the first development phase; however, development has arrived to a point where the intensity indices have to be integrated already so that the first signs of the intensity phase could be measured by the time the conduction of the first survey falls due. Therefore, when compiling the questionnaire the emphasis was, in the first place, put on the measurement of readiness, and in the second place on the measurement of intensity, whereas the measurement of impacts has been deemed by us as a further step of development. It was exactly the economic importance of the initial phase and penetration that made us conclude that the process reached the most advanced state in the business sphere and, owing to its expected impacts, it is right here that measurement becomes most urgent, therefore these initial surveys have to target the business sector.

24. At the time of making our decision about the second important definition, only definition recommendations were made available to us. On the basis of the recommendations, the process has three important dimensions, therefore we had to make a decision about the following three dimensions at a time for the compilation of the questionnaire:

- (a) Scope of activities: what portion of e-process should be covered by the survey (e-transaction, e-commerce, e-trading, e-business);
- (b) Scope of communication of infrastructure: how many of the possible means mediating the activities should be included in the definition (Internet, Extranet, EDI, EDI through the Internet, e-mail, WAP);
- (c) Scope of participants: which connection types of trading should be covered by the survey according to the direction of the connection (business to business, business to households, business to government)?

## Activities and communication infrastructure: definition categories



Source: OECD.

#### Scope of activities

25. In conjunction with our project specialists, we agreed that since we are at the beginning of the process and presuming that penetration direction will follow a course from the simpler to the more complicated ones, we assumed that simpler processes should be measured first after which, in the following phases of development, we should proceed to the measurement of more complicated processes. Definition recommendations of OECD assisted us in making a decision about the ranking of the listed concepts from the simplest to the most complicated ones (e-transaction, e-commerce, e-trading, e-business). The above concepts had the following contents:

- e-transaction: order, purchase, sale;
- e-commerce: e-transaction + invoicing, payment, financing, delivery, after sales services;
- e-trading: e-commerce + marketing, advertising, market analysis;
- e-business: e-trading + purchase, inventory adjustment, production system management.

It appeared obvious that, realistically, the measurement of the simplest process has to be targeted in the first place.

#### Scope of communication infrastructure

26. Concerning the possible means which mediate activities and depending on the judgement about our level of infrastructure development, we had four alternatives to choose from (from the narrowest interpretation to the broadest one), namely, which e-transactions on what mediating means should be taken into account:

- www: only the active, public Internet web pages;
- Internet-based networks: www + Extranet, EDI over the Internet, WAP, web TV;
- Computer mediated networks: Internet-based networks + EDI, VAN;
- Electronic networks: Computer-mediated networks + fax, telephone network.

27. As opposed to the judgement of e-processes, in this case we felt that the development of the infrastructure and network penetration were more advanced in the business sphere than the penetration of e-processes mediated by them, and data acquisition about the ICT infrastructure was very important also in the initial phase, even if the e-processes mediated through them were hardly measurable. According to our international experience, networks independent of the Internet, such as EDI, play a very important role in e-transactions in many countries. In addition, we believe that by monitoring only Internet mediated transactions we will fail to notice the time when e-transactions outside Internet-based networks are started. That is why we decided, in this case, on the third more complicated stage of definition possibilities, i.e., we have extended our survey to all computer-mediated networks.

#### *Scope of participants*

28. Depending on the direction of connections, we had to make a decision about connection types to which our survey would be extended. In conjunction with the expert group, an unambiguous decision was made, namely that all types of connection possibilities should be included in the survey (business-to-business, business-to-consumer, etc.), even if they are aware of the fact that transactions of the business sphere are characterized only by the business-to-business connections for the time being.

29. Summing up the definition applied by us, we can establish that the definition is comprised by definition modules on the basis of international recommendations about the three dimensions (e-process, means mediating the activities and types according to connection direction).

30. Therefore, the scope of the survey can be summarized as follows: concerning the contents, every e-transaction is included (order, purchase, sale), together with any possible connection direction thereof (business-to-business, business-to-consumer, etc.), which is completed through computer-mediated networks (Internet-based networks + EDI, VAN) regardless of the fact whether the delivery and payment are performed online or in a conventional way.

#### **6. Definition of miscellaneous characteristic features of the survey**

31. While defining conceptual questions, we made a decision about some other important characteristic features of the survey. We have encountered the question whether we should treat e-commerce as an independent survey or combine it with other, already existing data acquisitions and also, what kind of sample we should use during the survey. The time of decision-making coincided with a parallel project about the survey of ICT use in the business sphere. Hungarian experts felt that such a survey should be conducted on the largest possible sample of national-economy level applied by CSO and the same would be required for the survey of e-commerce, as well. The choice fell on the sample of one of the structural business statistics

surveys of investment of CSO. The development made it clear for us that e-commerce is actually one of the manifestations of ICT use, therefore it was an obvious decision to treat the two questions as one survey. It could be established about our questionnaire (compared to the sample questionnaire tested by the latest test survey conducted by Eurostat in 2001) that it was in compliance with EU requirements. Being of modular structure, it comprises the three basic modules of the Eurostat sample questionnaire (use of ICT, use of e-commerce in purchases and use of e-commerce in sales). As far as the questions are concerned it can be stated that the majority of questions of each block have been included, and those left out for reasons of professional considerations have also been left out by such EU member States which are, otherwise, in the forefront both in terms of information society development and statistical measurements (Sweden, Finland, the Netherlands). Our questionnaire compiled according to the above has been subjected to the internal and external specialists of the office for expert opinion and a part of their comments have been incorporated for the improvement of the questionnaire (detailed particulars of data acquisition are contained in para. 36 below).

#### **7. Experience gained during the test survey and the utilization thereof**

32. For the testing of the questionnaire, we deemed it necessary to conduct a test survey in July 2001 among future data suppliers. The aim of the survey was to receive comments from data suppliers concerning the correctness, lucidity of questions and how easily the questionnaire can be filled in. Some 24 enterprises were included in the circle of data suppliers for the survey, so that all areas concerning the branch, size and location could be covered. Two enterprises were selected from each branch. Half of them represented enterprises with low net return on sales (1 to 20 million/month), whereas the other half represented companies with high (over 4 billion) net return on sales. Some 63 per cent of companies were located in the capital while 37 per cent in the countryside. An independent company was appointed to conduct the survey by way of personal interviews, employing external interviewing officers.

#### *Problems*

33. The survey helped to reveal several typical problems:

(a) It was apparent that some data suppliers (especially the small ones) had serious problems in differentiating between the Internet, EDI and EDI over the Internet, in having a clear definition of the concepts and identifying them in their records. This will cause a problem with those who do conduct e-commerce activities, however are either unable to provide data about revenues and costs realized through the various networks, or can do that only with considerable distortion;

(b) Similarly and in keeping with international experience, e-purchase proved to be the most problematic block in our survey as well. On the basis of feedback received, this is going to be the area where we are likely to receive the least number of answers suitable for evaluation owing to a low level of active participation. It is considered to be the biggest impediment that it does not appear in their accounts: purchases are often decentralized in case of companies with more than one premises, therefore a central assessment is not possible. Experience supports our decision to ignore separate questions about the limitations of purchases

and sales, and combine them for incorporation in our questionnaire, as we considered the level of activity here rather low and assumed that limitations were similar for both activities;

(c) In the case of the e-sales block, the requirement for an e-commerce limit value came up several times. Since the e-commerce activity level is very low, with many data suppliers, limit values have to be decided above which turnover should be reported, and under which it could be ignored. If no limit values are set we might run the risk of losing data because data suppliers will arbitrarily decide to ignore their turnover which, otherwise, might not be ignorable. In our opinion, internationally accepted limit values would be necessary for the sake of comparability; however, as long as no such limit values are available, we have to ask for every assessable data to be supplied on the first occasion to enable us to safely establish what can be regarded in present day Hungary as an ignorable value on the present level of activity;

(d) A decisive part of data suppliers deems it impossible to answer according to the breakdown of e-sales activities to directions (business-to-business, business-to-consumer, etc.), on the other hand, they find it possible to provide an answer for the total value;

(e) Feedback confirms that the majority of data suppliers is unable to differentiate between the concepts of various Internet channels (Internet, e-mail) in the course of measurement of sales; therefore, a part of e-mail traffic will unavoidably get mixed up in Internet traffic. And in spite of the fact that Eurostat recommendations suggest ignoring e-mail traffic (we can agree to that from a professional aspect), we preferred to further include the e-mail option separately among the possible answers. In our opinion, a better wording of the definition part of the guide will help to avoid the mixing up of those two concepts and we will also be able to produce data (without the e-mail component) in accordance with Eurostat recommendations;

(f) In the course of conducting the survey, a problem has been encountered whereby a lot of data suppliers were unable to provide answers to question groups aiming at the limitations of the use of Internet and e-commerce on the current levels of Internet penetration. Accordingly, we have clarified the question. By adding a few explanatory sentences, we managed to make it clear that even those who do not yet use the Internet and conduct no e-commerce activities should respond, since their replies would be regarded as reasons for abstaining from use rather than limitations to use, which provides equally important information for the assessment of limitations to penetration;

(g) In some cases, it became obvious to us that the definitions must be made more accurate to receive better quality data. This will be done in the relevant paragraphs of the guide;

(h) One significant result of the survey led us to realize that the structure of the questionnaire should be altered so that it followed the logic of the data supplier when filling it in. It became necessary to include in one group blocks that would be completed by an expert in one special area within a company. It was also required to indicate for each block which special department was authorized to provide answers to a given group of questions. Since the cooperation of several special areas is required owing to the complexity of the questionnaire, the above-mentioned

indications will facilitate the coordination of the completion of the questionnaire within the company. All necessary alterations have been incorporated in the questionnaire on the basis of recommendations received from data suppliers.

#### *Findings*

34. The findings of the survey can be summarized as follows:

- Owing to the shortcomings in the required level of information culture, small enterprises will face huge problems when attempting the proper completion of the questionnaire, especially those that are too small to employ an independent IT specialist;
- Questions should be further clarified for small enterprises that are inactive in the areas to be surveyed and are unable to provide answers to certain questions and blocks;
- The number of questions should be reduced and their clarity improved, and some definitions need further clarification;
- Questionnaire blocks should be adjusted according to the logic of data suppliers filling them in.

#### *Future developments*

35. Further tasks of development are:

- We would like to maintain our intensive participation in the international development activities of the working groups of OECD and Eurostat; any new results of those activities will be continuously adapted;
- We intend to further enhance the user-friendly character of the questionnaire. As an experiment, we plan to divide the guide partly or wholly, and depending on which block they belong to, we will insert explanatory parts in the relevant blocks in order to provide easy access to background information needed for filling in the questionnaire;
- In line with the contents of development of e-commerce in Hungary, we will make another step forward to monitor e-activity categories (e-commerce, e-trading, e-business), whose contents are continuously growing;
- The questionnaires have been subjected to the county directorates of the Central Statistical Office to obtain their expert opinion. That process has been completed recently. As their data recording and controlling activities have a considerable impact on data quality, several of their useful comments will be taken into account when further developing the questionnaire. Due to the conceptual novelty of the questionnaire and its strong demand for IT-related information, we must face a new task that is completely different from any previous questionnaires to date; therefore, the personnel employed in the directorates must be thoroughly prepared.

36. The particulars of data acquisition are as follows:

1. Title of data acquisition.

Report on the inventories and application of information and communication devices

2. Subject of data acquisition.  
Survey on the inventories of information and communication devices, the changes in their values, the proportion of access to such devices and the situation of e-commerce in Hungary
  3. Type of data acquisition.  
Questionnaire-based survey
  4. Reference period.  
The data acquisition surveying the inventories and application of information and communication devices is conducted annually; data refer to the year under survey
  5. The sample.  
All enterprises with more than 19 employees are data suppliers; enterprises with less than 20 employees are included in the survey. The source is the Register of Economic Organizations; enterprises are selected for data supply by means of a random stratified sampling procedure. Altogether, 23,564 enterprises have been selected. Branches A through O according to the Hungarian activity classification TEAOR are surveyed
  6. Mailing of the questionnaires.  
The questionnaires and accompanying guides for completion are posted in December 2000
  7. Deadline for returning the questionnaires.  
The enterprises return the questionnaires by post by 31 March 2002 at the latest
  8. Reminder.  
If enterprises selected for data supply fail to return the questionnaire by the specified deadline, they will be reminded by telephone about the expiry of the deadline
  9. Access to data.  
The processed data of the questionnaire will be published in a periodical, which is expected to be issued at the end of 2002.
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