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The dilemma of quantifying IT expenditures in organisations

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1. Introduction

1.1 Background

The utilisation of information technology (IT) is often seen as the driving force of a whole new era that succeeds the industrial era. This era has been given many names, e.g. the New Economy, the Information Society or the Networked Economy. Regardless of name, IT has undoubtedly had a great impact on society. As part of this, enterprises and other organisations have changed their way of working. This is evident when looking at such phenomena as e-commerce, e-mail, Internet and cellular phone systems. IT is always present in modern organisations in the form of computers, networks and telephony. The new technology has become a very important, if not the most important, production factor together with human capital.

To assess the impact of IT, it is necessary to have information on the expenditures of organisations in this area. Statistics on IT expenditures from National statistical institutes are scarce in Sweden and many other countries. The National Accounts' experience and work with estimating investments in computer software through direct and indirect methods will, therefore, also be discussed in the paper.

1.2 Aim

This paper provides an overview of Statistics Sweden's experience and current work with measuring and quantifying IT expenditures. It also serves as a basis for discussing how to further develop methods for quantifying IT expenditures.

This paper should therefore be seen as an input in the ongoing discussion on the demand for statistics on IT expenditures. Hopefully, it will shed some light on the difficulties that statisticians face when trying to quantify this complex area.

1.3 Definition and delimitations

A definition of the term IT will not be given in this paper. The reason is that a robust definition does not exist that could be used for statistical purposes. There are, of course, definitions of IT, but none are precise enough to delimit the area from a statistical viewpoint. Statistics Sweden instead utilizes operational definitions when performing different tasks, e.g. requesting costs for programming and systems engineering in surveys or using groups of goods or industries to calculate trade or production. Even though no generic definition of IT will be presented, the term will be used as a foundation for discussion. A consequence of the general approach in this paper is that IT expenditures are discussed in terms of investments, depreciation and other costs related to IT, without defining more precisely the specific goods or services to include.

Each of the terms investments, depreciation, and other costs are briefly discussed below from a business accounting perspective.

- *Investments* represent the sum that organisations yearly spend on assets intended for permanent use, e.g. buildings, land and machinery. In the specific case of machines it is necessary that they are intended for permanent use in the production process of an organisation for a long period of time.

- *Depreciation* represents the amount of a certain investment that is consumed each year and appears on the profit and loss statements of an organisation. When deducting accumulated depreciation from an investment, the present value of the related asset is calculated, e.g. today's value of a three year old machine. The asset is accounted for on the balance sheet of an organisation.

- *Other costs* are costs for consumables, training, wages, licenses and leasing. In general, these costs appear on an organisation's profit and loss statement.

How the National Accounts treat investments in computer software is discussed below. Since the National Accounts have a perspective that differs from business accounting, other terms with slightly different meanings than those noted above will be used for that context. Their relations to the terms investments, depreciation and costs will also be explained later in this paper.

This paper does not deal with the topic of deflating IT expenditures. There is a great demand from users of statistics, especially economists, for deflators for IT expenditures. It is difficult, if not impossible, to illustrate the impact of IT on modern society over time without such information. It is a very complex area, since there is a rapid change in IT "capacity" over time, i.e. the PCs ability to compute and store information. Methods for deflating IT expenditures are nevertheless of utmost importance for making robust comparisons over time of IT expenditures. In addition to this historic, annual information on IT expenditures in fixed prices are often in demand to compute and compare productivity over time.

Without high quality data on IT expenditures in organisations, methods for deflating such expenditures or assets is however of less utility. Therefore, development of methods for deflation should be assigned lower priority before deciding on the best possible method for quantifying IT expenditures.

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2. Measuring IT expenditures

2.1 Current surveys

Statistics Sweden is currently measuring different aspects of enterprises costs for IT by means of the Investment Survey, which is produced on commission from the Swedish National Institute of Economic Research. This data is collected on a yearly basis. The following industries are monitored and the following data are collected:

Table 1 Outline of the Investment survey

Industry according to NACE[1] Rev1		**Enterprises included have more than:**	**Costs for programming and systems engineering**	**Costs for leasing of computer-controlled machines for construction and manu-facturing**	**Costs for leasing of other computer equipment**
10-37	Mining, quarrying and manufacturing	9 employees	**X**	**X**	**X**
40	Electricity, gas steam and hot water supply	4 employees	**X**	**X**	**X**
45	Construction	9 employees	**X**	**X**	**X**[2]
50-52	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal an household goods	19 employees	**X**	**X**	**X**
60	Land transport; Transport via pipelines	19 employees	**X**		
62	Air transport, supporting and auxiliary transport activities; activities of travel agencies	19 employees	**X**		
63	Supporting and auxiliary transport activities; activities of travel agencies	19 employees	**X**		
64	Post and telecommunications	19 employees	**X**		
65.1 and 66	Banks and Insurance companies	19 employees	**X**		
71	Renting of machinery and equipment without operator and of personal and household goods	9 employees	**X**	**X**	**X**
72	Computer and related activities	9 employees	**X**	**X**	**X**
73	Research and development	9 employees	**X**	**X**	**X**
74.2	Architectural and engineering activities and related technical consultancy	9 employees	**X**	**X**	**X**
74.3	Technical testing and analysis	9 employees	**X**	**X**	**X**

[1] Nomenclature Générale des Activités Economiques dans les Communautés Européennes.
[2] Data are collected from only part of the construction industry.

In the general advice for the Investment survey, costs for programming and systems engineering are defined as costs for the enterprise's purchases of software and programming during one year. Costs for the enterprise's systems engineering conducted by own staff or consultants should also be included under this heading. When asking for information regarding leasing, financial leasing is intended. The requested data are the purchase price of the goods, e.g. the value of lease contracts that have been signed during the reference year.

2.2 Previous attempts to measure IT expenditures

Statistics Sweden has on a number of occasions made attempts to measure IT expenditures. One attempt took place in 1993, when an ad hoc postal survey on the use of IT by enterprises was launched. This survey included questions on the use of IT and detailed questions on investments and costs for hardware, software, IT-related service, maintenance and education. After two written reminders and attempts to conduct large-scale telephone interviews, less than 30 per cent of the enterprises had responded. In addition, many enterprises that answered the questionnaire chose not to answer certain questions, especially those on IT expenditures. Therefore, it was decided at this stage to terminate data collection, since the information requested in the questionnaire seemed impossible to collect.

Another attempt took place in 1997, when Statistics Sweden, commissioned by the Swedish National Board for Industrial and Technical Development, conducted a survey on the use of IT in five industries. The questionnaire used in this postal survey included a very general question on IT expenditures. This question, with the wording *Estimate the expenditures in Swedish crowns for IT products and IT-related services during 1997,* had a much higher non-response rate than other questions in the survey. While all other questions in the survey were compiled and published, it was not possible to compile and publish the question on IT expenditures due to an unacceptable non-response rate.

A third example is the pilot study on the possibility of collecting detailed information on IT expenditures from smaller central government authorities, which Statistics Sweden conducted on commission from the Swedish Agency for Public Management. The main finding from this pilot study was that a majority of the small authorities had difficulties in supplying detailed information on IT expenditures.

2.3 Reflections

In general, there are a number of obstacles to measuring IT expenditures. One of the most significant obstacles relates to the difficulties in defining the term IT. There seems to be no general consensus on what IT really is.

This is not very surprising since there is an ongoing convergence between computers, telephony, radio and TV, which makes it very difficult to measure IT expenditures in a robust way.

Due to the lack of consensus on a definition of IT, some organisations include such costs as, for example, cell phone telephony costs, in IT expenditures while others do not. Another example is that some organisations might consider an investment in a telephony switchboard as an IT expenditure, while other organisations might not.

Thus, it is necessary to develop and supply a robust definition of IT to collect information on IT expenditures. This definition should be technology independent, i.e. it should be based on functionality to incorporate new breeds of IT.

Another obstacle in measuring IT expenditures is determining what part or parts of an organisation should be requested to supply information on IT expenditures. Statistics Sweden has measured IT expenditures in ad hoc surveys by conducting multipurpose surveys, e.g. aimed at measuring access to and use of IT together with incentives and barriers on the use of IT as well as IT expenditures. To be able to collect such diversified information the questionnaires were sent to the organisations' IT managers since they were the only ones with a natural overview of all aspects of IT in an organisation.

One speculation is that if IT expenditures were covered in a traditional accounting survey, which normally is the responsibility of the accounting department, the results might be more encouraging. However, this conclusion depends directly on that organisations track IT expenditures in their bookkeeping, which might not always be the case. One difficulty in tracking IT expenditure is that decisions on such expenditures, e.g. purchase decisions for computers and cell phones, in many organisations are delegated to junior management or ordinary employees. This delegation might prove inefficient when trying to create consistency and transparency in accounting of IT expenditures. This fact combined with the fact that accounting systems are not designed primarily to separate the vague area of IT expenditures from other expenditures produces difficulties in conducting surveys.

Another example is that costs for IT-related scheduled education is often almost impossible to separate from ordinary scheduled education in accounting systems. On the job training of IT skills is another problem, since very few organisations trace such expenses since these activities are part of everyday business, e.g. one colleague shows another colleague how to use the e-mail system. An educated guess is that these costs might be very high due to the complexity of today's software.

Moreover, there is a problem in identifying expenditures for embedded software, e.g. software used to control a lathe or a milling machine. The cost for the lathe or milling machine includes a cost for the embedded software, but it is impossible for the buyer to identify what proportion of the price that relates to the software. The expenditures of organisations on embedded software therefore seems difficult to quantify by means of surveys trying to measure the organisation's consumption of such goods.

Yet another obstacle is that organisations treat IT expenditures differently in their accounting, e.g. some organisations book expenditures for PCs as direct costs while others treat such goods as investments. One reason is that Swedish legislation allows for the booking of PCs in the accounting system as a direct cost if these machines are anticipated to have a life span shorter than three years and/or have a limited value[3]. Such reasoning is easy to apply in organisations using advanced applications in their operations. In addition, the booking of PCs as direct costs is an advantageous approach for some organisations to minimize taxation. The dilemma of direct costs and investments needs to be taken into account and dealt with to create useful statistics on IT expenditures and their components.

Thus, it is necessary to conduct thorough testing, e.g. in-depth interviews, before incorporating questions on IT expenditures in surveys to ensure that the questions can be deployed, i.e. so that organisations can give accurate answers.

The above indicates that information on IT expenditures in organisations is very difficult to collect by surveys. This seems to be a common Nordic viewpoint, which was evidenced by the exclusion of questions on IT expenditures in a joint project on developing Nordic harmonised surveys in 1997. These surveys are presently conducted on a recurrent basis in a majority of the Nordic countries. They measure access to and use of IT together with incentives and barriers to using IT. In contrast to the Swedish attempts at measuring IT expenditures, these surveys have been very successful. They provide useful and comparable information on how IT is used in the Nordic countries.

Finally, when developing methods for measuring IT expenditures, it is important to note that IT is an enabling technology. This means that an organisation can spend enormous amounts on IT without gaining productivity if it does not change its work methods, e.g. if an expensive computer is used just as an electronic typewriter. To assess the real impact of IT on organisations, it is necessary to analyse IT expenditures together with other factors, e.g. the use of computers and related equipment, work organisation and, of course, the employees' skills.

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[3]RSV 301 e.d. 19 and 17, "Handledning för beskattning av inkomst och förmögenhet m.m. vid 2000 års taxering". For example, the value is dependent on the size of the enterprise.

3. The National Accounts perspective - estimating gross fixed capital formation in computer software

3.1 Introduction

The system of National Accounts summarizes and describes the economic activity of a country or region. A central component of the system is the Gross Domestic Product (GDP). The current concept is the result of years of cooperation among organizations such as the UN, OECD and the EU.[4]

Economic statistics are an important basis for economic analysis and economic policy decisions. For instance, the convergence criteria[5] are formulated in quantitative terms, e.g. the consolidated government gross debt shall not exceed 60 per cent of GDP. As a consequence, the quality requirements of statistics have been raised, while the conditions for the measurement of economic development have become more difficult as the rate of technological and structural change in the economy increases.[6]

The National Accounts (NA) aim at closing the books on Sweden. And by doing so, present an aggregated statement of the economy, its development and its structure. Using an extensive system of accounts, all economic transactions are booked and grouped in a way suitable for economic analysis. This renders information on value added, the generation and allocation of income, the generation and allocation of capital, and transactions with the rest of the world. When the information is presented by institutional sectors – corporations, general government, households and the rest of the world – aggregates such as disposable income and savings can be derived. Furthermore, the supply and demand of around 400 different product groups are analysed. A balance can be established for each of these product groups. A balance can also be established for the economy as a whole; *Table 1* presents the balance of resources for Sweden in 1998.

In order to establish the level as well as the growth of GDP, each of the components in the balance of resources (*Table 1)* must be measured correctly. Supply must equal demand in current as well as constant prices. Some areas are more difficult to measure than others, depending on the availability and quality of the statistical data accessible to the NA.

[4] VälfärdsBulletinen Nr 3 1999, BNP – en värdemätare på Sveriges ekonomi", Jörgen Enmark.
[5] To participate in the European Monetary Union (EMU), EU-member countries must meet the demands of the convergence criteria as specified in the Maastricht treaty.
[6] SOU 2001:34, "Behovet av ekonomisk statistik", Delbetänkande av Utredningen om översyn av den ekonomiska statistiken.

Table 1 Balance of resources – Sweden 1998

Balance of resources - Sweden 1998	
	Current prices, SEK billion
GDP at market prices	1 905
Imports of goods and services	713
Imports of goods fob	542
Imports of services	172
Total resources (= total use)	2 619
Final consumption expenditures	1 466
Household and NPISH*	957
Central government	146
Local government	363
Gross capital formation	320
Gross fixed capital formation	305
Producers excl. govmt. non-market producers	259
Central government	24
Local government	23
Changes in inventories	15
Exports of goods and services	833
Exports of goods fob	680
Exports of services	153
Total use (= total resources)	2 619
* NPISH = Non-profit institutions serving households	

Measurement problems often arise when trying to quantify expenditures on information technology. A contributing cause is the absence of updated national and international classifications, standards and recommendations. The problem is complicated further by the fact that accounting standards and definitions differ from the standards and definitions used by the NA.[7]

There are also considerable problems with price measurements in the service sector. A consultancy service, for example, is often a unique product with a unique price and as such it is difficult to adapt to a standardized questionnaire. In addition, quality improvements in the IT sector occur rapidly and are difficult to capture. It is therefore difficult to assess the true price change and hence the growth in volume for this type of products. All of these difficulties affect the whole balance of resources in various ways.

This section of the paper focuses on the demand component gross fixed capital formation (GFCF), and specifically gross fixed capital formation in computer software.

[7] See the section 3.2 Conceptual Differences: Business vs. National Accounting.

3.2 Conceptual Differences: Business vs. National Accounting

International recommendations give directions regarding, for example, how different concepts should be defined and interpreted.[8] These recommendations are designed to ensure that the NA statistics provided by the National statistical institutes in different countries are comparable, consistent and operational. An overview of how some National Accounts concepts differ from their administrative counterparts follows.

Investment vs. Gross fixed capital formation
The National Accounts investment concept, gross fixed capital formation, includes not only acquisitions but also disposal of assets. These assets shall be used continuously in production processes for more than one year. National and business accounting differ here. Swedish legislation, for example, allows for the immediate write-off of assets with limited value and/or with an economic life less than three years,[9] implying that there is a risk of underestimation for some assets categories of gross fixed capital formation in the National Accounts.

Depreciation vs. Consumption of fixed capital
Consumption of fixed capital should be distinguished from the depreciation shown in business accounts. The term consumption of fixed capital represents the amount of fixed assets used up during the period under consideration as a result of normal wear and tear. It includes a provision for losses of fixed assets as a result of accidental damage that is insurable. In national accounting, it is estimated on the basis of the stock of assets and the probable average economic life of the different categories of those products; while in business accounting, the lifetime of a product can be based on fiscal rules. Furthermore, the depreciation figures in the annual financial statements of businesses are based on historical costs while current cost accounting is applied in national accounting.

Direct cost vs. Intermediate consumption
Theoretically, the NA concept intermediate consumption should consist of goods and services used up in the production process. Producer units do not usually record the actual use, but the purchases intended to be used as inputs, whether immediately written off or booked as assets. Intermediate consumption in national accounting therefore must be estimated by subtracting the changes in inventories of inputs from the purchases, since the inventory of inputs has not yet been “used up in the production process”.

[8]System of National Accounts 1993, published in 1993; European System of Accounts 1995, published June 1996.
[9]RSV 301 e.d. 19 and 17, “Handledning för beskattning av inkomst och förmögenhet m.m. vid 2000 års taxering”. For example, the value is dependent on the size of the enterprise.

3.3 Estimating Gross Fixed Capital Formation in Computer Software

3.3.1 Background

International recommendations have reclassified software from intermediate consumption to gross fixed capital formation.[10] The NA first published information on GFCF in computer software in 1999 for the years 1993-1998. The value of computer software in 1998 was approximately 12 per cent of the value of total GFCF. Total GFCF, in turn, comprised approximately 16 per cent of the value of GDP in 1998. High quality statistical data, where the supply and use side information are consistent, is therefore very important.

These investments include not only purchased software, but also software developed on own account. From a statistical viewpoint, these items are poorly covered and supply side information as well as register information such as the educational register and the employment register (both produced by Statistics Sweden) must be used in some cases to enable estimation of the investments in computer software.

3.3.2 Estimating GFCF in software developed on own account

Sources
One source is the Data consultancy and data service companies survey that provides *supply side information of production and exports* (as well as customer categories).[11] This survey has been conducted every third year and covers the Data consultancy and data services companies sector of Nace Rev. 1 section 72.[12]

The employment register and the educational register produced by Statistics Sweden provide information about the educational situation in different parts of the labour market. The educational register includes variables such as national registration data, highest education and examination year. The employment register seeks to produce information on the labour market situation, structure of the industry and to illustrate events and flows on the labour market. The variables included in the register are, for example, an individual's wage sum, income and educational code. It is also possible to derive the individual's work place number with the institutional sector code to which it has been classified.

[10] System of National Accounts 1993, Published in 1993; European System of Accounts 1995, Published June 1996.
[11] Data consultancy and data service companies 1996. Deeper analysis of the industry according to SE-SIC 92 (NACE Rev. 1). Report no. 33 from Services at Statistics Sweden.
[12] Nomenclature Générale des Activités Economiques dans les Communautés Européennes (Nace) Rev. 1 division 72 Computer and related activities. Nace Rev. 1 is in accordance with SE-SIC 92: Swedish Standard Industrial Classification 1992.

Model
The underlying identity is that the production value for software developed on own account in an industry shall equal the investment in own account software in the industry. Therefore, since there is no direct demand side information on GFCF in software developed on own account, the investment values for the industry are given if it is possible to estimate an industry's production value for software developed on own account.

The Data consultancy and data service companies survey provides information on business structure, i.e. number of enterprises and their size measured in number of employees. Turnover, measured as total revenues is presented as well as the breakdown of operating income by type of income and customer category, i.e. who bought what products sold by the industry. Costs are broken down by type of cost, for example, total wages, intermediate consumption, etc. The surplus generated by the industry as well as its contribution to GDP, i.e. value added, are also provided. There is other information on, for example, exports and imports, research and development, etc. The following information is used from the survey: total revenues and the distribution of costs by type of costs, which implies that the revenue share of the wages can be derived for the Nace 72 industry.

Total revenues indicate value of production. Since total wages for the industry are also known, the ratio revenues to wages, i.e. the ratio value of production to wages, can be calculated. Given that aggregate wages for those who work with own account programming in each industry can be calculated, the revenues to wages ratio for the Nace 72 industry can be used as a factor for calculating the value of production for those who work with own account programming for each industry.

These wages can be approximated by selecting specific educational codes within the area of programming and systems engineering. The educational register can be co-ordinated with the employment register for these codes, which results in industry allocated wages for those who work with own account programming.

By applying the value of production to wages ratio, known from the survey, to industry allocated wages, value of production for those who work with own account programming can be calculated for every industry. Therefore, GFCF in computer software developed on own account has finally been estimated.

3.3.3 Estimating GFCF in purchased software

Sources
The following sources are used: the Investment survey (described in section 2.1 Current Surveys) and the Data consultancy and data service companies survey (described in the previous section), both produced by Statistics Sweden.

Model
The Data consultancy and data service companies survey provides information on the domestic *supply of purchased computer software* divided by market producers and general government. GFCF in purchased software for market producers is given by the Investment survey on a detailed industry allocated level. The Investment survey is, however, not a census, which implies that the information must be reconciled with the Data consultancy and data service companies survey that provides information on domestic supply.

3.4 Reflections

The NA establish balances for all calculated product groups, i.e. for computer software as well. This method implies that reconciliation between production and final demand is possible, with GFCF in computer software as one of the demand components. However, uncertainty remains, for example in the *distribution* of GFCF in own account software *across industries*, since these are allocated by using own account programmer's industry allocated wages as the distribution key. The underlying assumption is that those who work with own account programming are only individuals with the sought educational codes. This is uncertain since there are many individuals working as programmers and systems engineers lacking formal education, or having formal education but with other educational codes than the sought ones. However, one can argue that the effect works both ways: some who work with own account programming lack the sought educational codes and some who do not work with own account programming have the education with the specific educational codes.

Furthermore, the described methods for computer software, purchased as well as own account, is only applicable every third year, since the Data consultancy and data service companies survey is only conducted every third year. The investment values for the intermediate years are extrapolated by using the development at current prices in the Nace 72 industry, which implies that no industry specific development is available – the same development is applied across industries.

The above paragraphs by themselves confirm that direct information covering the demand side is highly desirable.

Another specific problem concerns software embedded in hardware and sold as a package. Many organisations will book the hardware with the included software without specifying and separately booking the software. This implies that the value of the hardware will be overestimated while the value of the software will be underestimated. This is assuming that the hardware can be separated from GFCF in other machinery and equipment, which is uncertain.

The problems discussed in section 2 “Measuring IT Expenditures” are also relevant for the National Accounts. The absence of updated classifications, standards and recommendations is a serious problem; new goods and services are developing rapidly and the adaptation of business and national accounting rules must follow just as rapidly.

The discussion here has focused on the demand side of the economy. However, it is also necessary to consider the production side when discussing IT – who produces the goods and services demanded? That is, which industries should be classified as IT industries? The OECD has adopted a definition of the Information and communication technology sector that includes some industries within manufacturing as well wholesale, telecommunications and consultancy services.[13] This definition is currently used by the National Accounts when users ask for information about IT.

[13] In September 1998, the OECD adopted a definition of the Information and communication technology sector at a meeting of the Committee for Information computer and communications policy.

4. Summary and issues for Discussion

In summary, there are a number of problems related to measuring and quantifying the IT expenditures of organisations. One problem is that the term IT is difficult to delimit and that IT expenditures are therefore difficult to measure and quantify. Assuming that the requested information is available, another problem is determining where to tap the necessary information on IT expenditures, e.g. should a survey be addressed to the IT manager or the accounting department.

A problem relating to collecting information on IT expenditures is that accounting systems often do not reveal information on specific IT expenditures, e.g. IT-related training of employees by means of scheduled education or on the job training. Yet another problem concerns measurement of embedded software, e.g. software used to control a milling machine, since the buyer seldom knows what part of the price of a machine that relates to the software.

Even if it were possible to measure and quantify IT expenditures in a perfect world, one considerable problem unfortunately remains. This problem concerns the different accounting practices of organisations for IT-related equipment in terms of investments or costs, which makes comparisons very difficult.

Turning to the perspective of the National Accounts, to measure gross fixed capital formation in computer software is not uncomplicated. Problems arise since there is an absence of standards and classifications regarding IT products. Furthermore, business and national accounting are not always in accordance regarding, for example, valuation and time of recording for these products.

A reconciliation between production and final demand for the product group computer software is possible since the National Accounts establish balances for all product groups calculated. Problems can, however, arise on a more detailed level as for example in the *distribution* of gross fixed capital formation in own account software *across industries*. Therefore, when calculating gross fixed capital formation in computer software it would be ideal to have direct information from the demand side rather than having to estimate by using supply side information.

Based on these general conclusions and other information presented in this paper, a number of questions could be discussed from an international perspective. These are:

- How can a robust definition of the term IT be developed? How can such a definition be operationalised in terms of goods, services and industries, bearing in mind that statistical nomenclatures seldom can be used to delimitate such areas as IT, where there is very rapid development.

- How do other countries quantify IT expenditures? Is the quantification of IT expenditures conducted by direct measurement, by indirect information or by both methods?

- How are investment surveys designed in the other countries?

- Are annual accounting surveys used in the other countries for collecting detailed information on IT expenditures?

- Which models, or indirect information, are used in the other countries systems of national accounts when the requested statistics are not available from surveys or registers.

- Are statistics on the use of IT or perceived benefits from using IT equally or better measures than IT expenditures when trying to assess the impact of IT on organisations?

- Would it be possible to develop internationally harmonised method for quantifying IT expenditures?