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- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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ICT & PRODUCTIVITY AND GROWTH BUSINESS: NEW RESULTS BASED ON INTERNATIONAL MICRODATA

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ABSTRACT

The relationship between information and communication technology (ICT), productivity and economic growth has been established at the aggregate level. However, the mechanisms by which the effect occurs at the enterprise level are still unclear. Statistical agencies have developed indicators of the ability of firms to use ICT (e.g. infrastructure of ICT, diffusion of specific technologies) and some indicators of the actual use (e.g. goals and frequency of use). The next step is to produce estimates of the impact of the use of ICT. A recent study by the OECD sought to address this question using aggregate data for OECD member countries and micro data for India and the United States. A second phase of the OECD study will consist of a series of projects involving two or three countries, achieved through new micro obtained recently for about a dozen countries. This paper describes one of these projects, to assess the impact of ICT in Denmark, Japan and the United States. Each country has recently collected new data on the use of ICT at the company and conducted a preliminary analysis of them. In addition, each country differs from others in its market structure and its institutional structure. The next phase of the project is to develop estimates of the effect of the use of ICTs based on this new micro and to make and test hypotheses that reflect differences in market structures and institutional structures of these countries.

KEYWORDS

Economic growth, information and communication technology (ICT), micro data, productivity.

INTRODUCTION

The development of statistics on information society - seen as a structured and coherent statistical framework - has been on-going since the mid-ninety. The statistical framework can be described as a set of building blocks that provide flexibility and adaptability. At present, the international statistical framework developed by OECD member countries include the following categories: 1) investment in information and communication technology (ICT), 2) infrastructure of ICT, 3) sector ICT, 4) access to ICTs and use them by households and individuals, 5) access to ICTs and use them by companies, 6) access to ICTs and use them by the public sector, 7) e-commerce and 8) skills and level of education.

A feature of statistics on information society inherent the constant evolution of ICTs and their dissemination in all sectors of the economy and all segments of societies is that instead of being fully developed, the field of statistical observation is in constant revision. Existing indicators are out-dated as the needs of users of ICT change and should be replaced with new indicators reflecting new technologies to continue to meet the needs of users. A recent example is the adoption of the eEurope 2005, making the statistical offices of the Member States of the European Union challenged to develop indicators related to areas of public interest, such as e-learning (e-learning) and telehealth (or e-health). If I examine the statistics to monitor the use of ICT, initial statistical indicators developed were designed to measure the ability (readiness) to use ICT. At present, the statistical coverage, both in terms of indicators that countries, is good enough for the capacity (infrastructure, penetration) and for the Use (purpose, frequency, barriers, etc.). I am now entering the phase of compiling statistics on the impact of the use of ICT.

Measuring the electronic economy touches nearly every aspect of the economy. No statistical agency has the resources and expertise needed to independently solve all the problems of measurement and to fill any information gaps associated with measuring the electronic economy. Therefore, collaboration between the various statistical agencies is needed. This article describes some initiatives to develop measures of the impact of the use of ICT on business, launched by the statistical offices of Denmark, Japan and the United States. It outlines a collaborative project undertaken as part of the second study based on micro data ICT and growth collected by the OECD.

The article describes the collaboration between Denmark, Japan and the United States. These three countries differ in their geography, as well as the size of their population and economy. Denmark is a small European economy, but it has been, within the European Union, a leader in respect to the collection of data on the use of ICT by businesses and survey served as a model to the survey type adopted by the OECD. Japan, meanwhile, is a large economy and a major producer of ICT. Finally, the vigorous growth of the U.S. economy in the late ninety, growth largely attributed to ICT, has led the world to study the relationship between ICT and growth (e.g. Colecchia and Schreyer, 2001; Bartlesman et al., 2002). The common thread between these three countries, and their right to participate in this collaborative study and based on micro data, is that all three come to collect detailed data on the use of ICT in one or more important areas of their economies.

1. MODES OF ACTION OF ICT AND PRODUCTIVITY GROWTH COMPANIES

Computers may affect productivity and business growth at least two ways. They can be used directly as input in the production process, so as a particular form of capital. This is the approach adopted by the authors of numerous studies conducted at national or industry, and studies at the institution or company (e.g., McGuckin et al. 1996, Brynjolfsson and Hitt, 2000, Dunne et al. 2000; Motohashi, 2001; Atrostic and Nguyen, 2002). Consider the case of steel. In modern steel mills, computers and automated processes are used to control production processes. Many business processes are computerised support. By example, computers can be used to maintain a database of customers, shipments, for accounting or payroll. Computers can replace paper-based systems without the need to change the underlying business processes. But computers can also be used to organise and simplify the underlying business processes. Put in networks, computers facilitate the standardisation of business processes such as order taking, inventory control, accounting services or monitoring of deliveries of products and become operational processes (e-business processes; Atrostic, Gates and Jarmin, 2000). These electronic processes are in place over computer networks that allow internal or external to easily exchange information from the process. Deliveries can be tracked live, stocks can be monitored automatically and suppliers warned when stocks reach a present level. The adoption of electronic business processes and automates links the existing business processes. They can also change the way business lead not only the process but also their business. The growing interest in supply chains illustrates the power what do computers affect the productivity growth outside the manufacturing sub-sectors that produce them. These effects occur; the least thinks it through organisational change. Many basic processes related to the supply chain are cited frequently as an example of successful implementation of electronic business processes, which, in turn, are supposed to move the location of the process to the participants in the supply chain. Brynjolfsson and Hitt (2000) argue that the effects of organisational changes may rival those of changes in production processes. From this perspective, computer networks represent a technology that improves productivity.

Although the authors of theoretical papers on ICT emphasise that this is an input multi-faceted, most are focus on the industry producing the ICT and on relatively simple indicators of the possible use of ICT by businesses. Relatively few studies (e.g. Greenan and Mairesse, 1996 for France, Motohashi, 2001 for Japan, Atrostic and Nguyen, 2002 for the United States; Bartlesman et al., 2002 for the comparison between the United States and India) is to determine how companies use ICT. Many studies focus on a single use of ICT, that is to say e-commerce.

2. MEASUREMENT OF COMMERCE TO THE EXTENT OF ELECTRONIC BUSINESS PROCESSES

By the mid-ninety, electronic commerce, and its projected growth and its expected influence on future arrangements doing business, especially on existing cross-border trade, have generated enormous interest. Therefore, in 1998, the OECD has been given the mandate of defining and measuring e-commerce (OECD Ministerial Conference, Ottawa). In 2000, OECD member countries have ratified two definitions of electronic transactions (electronic orders) based on a narrow definition and a broader definition of infrastructure communication. As defined in the OECD, the method by which the order is placed or received, the method of payment or the delivery circuit, determines whether the transaction is an Internet (running on the Internet) or an electronic transaction (conducted over computer networks). It is clear that the choice of the definition used has a strong influence on international comparisons of the level of electronic commerce (see Figure1). The variation in definitions used and the field observation Investigation of a country to another makes it difficult to compare the electronic business. However, Figure1 shows that, until now, e-commerce is still underdeveloped in many countries and has not experienced the expected growth, so that one wonders whether it is justified focus on the study.

TABLE 1: ESTIMATES OF ELECTRONIC TRADING ON THE WEB AND INTERNET (PERCENTAGE OF SALES OR TOTAL REVENUES)

	Commerce on the web	Internet commerce	E-Commerce
Expanded Business sector		2.04% (UK, 2000) 0.40% (Canada, 2000) 0.40% (Australia, 1999-2000)	5.83% (UK, 2000)
Business sector (excluding finance and insurance)	0.90% (Denmark, 2000) 0.70% (Finland, 2000)	0.94% (UK, 2000)	5.95% (UK, 2000)
Retail business	0.10% (France, 1999)	1.04% (UK, 2000) 0.40% (Canada, 2000) 0.30% (Canada, 1999)	1.39% (UK, 2000) 0.91% (USA, 1st tr. 2001) 0.70% (USA, 1st tr. 2000) 0.63% (USA, 1st tr. 1999)

Expanded

Source: OECD, Science, Technology and Industry Scoreboard 2001

Meanwhile, several studies reported in this volume, indicated consistently that the use of computers was associated with growth strong economic, especially the United States in the late ninety. How do computers influence their economic activity? It seems unlikely, until now, their main effect results from the relatively small number of activities related to electronic commerce over the Internet or other networks. Businesses use computers and computer networks for many other reasons, such as production management, advanced supply chain execution and support operations such as accounting. Yet while I know very little about these uses of computers, policy makers, scientists and statistical agencies have focused directly on the measurement of electronic commerce. This section describes different approaches taken by the offices Statistics Denmark, Japan and the United States to measure the impact of computers.

2.1 Denmark

Since 1998, Denmark's Statistik performs an annual survey on the use of ICT by businesses using a questionnaire almost identical to the standard questionnaire approved by the member countries of the OECD in October 2001. The questionnaire aims to provide guidelines for the measurement of indicators of the use of ICT, Internet and electronic commerce. It includes separate modules, independent, to make it flexible and adaptable to a rapidly changing environment. While the use of modules *'core'* allows for comparable measures at international level, other modules can be added to meet the changing needs or the needs of a country's policy in this area. In 2001, Denmark's Statistik has added a module specific integration Internet sales in the ICT systems, the reasoning being that the eventual automation of business processes is the basic element of electronic commerce and the main reason to focus on this issue may affect business organisation and job creation. The results indicate that in Denmark, a company selling its three products or services on Internet sales has included at least one type of ICT system. By integration, it is understood that the receipt of orders through the home page is automatically connected to one or more systems ICT. In all, 25% of companies with sales over the Internet have integrated receipt of orders in systems for order fulfilment, as the production or delivery. The second type of integration is common billing systems (14%) and procurement of new orders for goods from suppliers (6%). In 11% of cases, the integration is other ICT systems, such as reservation systems, mail systems, etc.

2.2 The Japan

In Japan, the METI (Ministry of Economy, Trade and Industry) conducts the annual survey of ICT in the workplace since the seventies. This is an investigation at the company surveyed about 9500 computer users in Japan. The survey questionnaire covers all aspects of this use, the cost of information processing of various types, such as the cost of hardware, software and data processing services, the penetration of computers in the workplace and the conditions for using networks of information processing, etc. As part of the project to increase the statistics on ICT in Japan, the survey was expanded and the 2001 version includes new questions on electronic commerce and electronic business processes. The investigation of electronic commerce is conducted using the definitions of *'large'* and *'restricted'* Electronic Commerce in the OECD. Data on the use of electronic commerce for each category of purchases and sales between companies and the retail market are collected according to the type of e-business process. The survey indicated that *'placing and receiving orders'* is commercial application for the most typical business e-commerce and that *'sales and inventory management'* followed. It should be stressed that the business e-commerce includes transactions through EDI networks usual, and that the rate of diffusion of electronic commerce over the Internet among Japanese companies is much lower. The survey shows that e-commerce on the retail market, by the way of the Internet, does not win so popular with companies Japanese. The survey of ICT in the workplace is not only on activities related to electronic commerce and electronic business processes, but also a wide variety of activities related to ICT at the company, such as investment in equipment and software, the use of ICT by employees and use of communication technologies by businesses. However, the survey had to be aligned with the baseline survey on the structure and business activities (EBSA) to study the productivity and use of computer networks. EBSA is the census survey at the company's business covers all enterprises with least 50 employees and a capital of at least 30 million yen. This Inquiry is central to various forms of investigations at the company METI, in the sense that those on specific issues, including the survey of ICT in the workplace, are based a list of survey companies in the EBSA. The latter, itself, to provide data on the performance of firms, the activities of globalisation, R&D and other variables related to innovation.

2.3 The United States

The U.S. Census Bureau has collected data at the institutional level, on computer networks in American factories. This was done to medium supplement [Computer Network Use Supplement (CNUS)] at the Annual Survey of Manufactures (ASM) in 1999. The CNUS, which was conducted among 50000 institutions, included questions on the use of procurement methods and online ordering, the existence of computer networks, the type of network (EDI, Internet, both), about 25 business processes (such as the procurement, payroll, inventory, etc., conducted over computer networks, *'electronic processes'*) and use these networks to interact internally or with customers or suppliers of the institution. The CNUS focused on the use of computer networks rather than the existence of computers only. Initial results, based on responses from more than 38000 U.S. factories have been published in a report analytic in June 2001. Detailed tabulations were released in March 2002 (for the two broadcasts, visit www.census.gov/estates). As the CNUS data were collected as a supplement to the ASM, I can link to current and past data on the same establishments collected in the ASM and the 1999 Census of Manufactures (CM) in 1997 and 1992. These couplings can examine the links between the economic behaviour of institutions and their use of computer networks. According to provisional results, in the middle of 2000, manufacturing establishments that responded to CNUS were *'connected'* (see Table1).Almost 90% had a computer network. Although more than 80% of responding institutions had Internet access, there are opportunities for further integration of electronic business processes.

TABLE 2: E-DELIVERY AND E-PROCUREMENT TO MID-2000 U.S. INSTITUTIONS MANUFACTURING SURVEY RESPONDENTS CNUS

Status of e-procurement	Status of e-delivery			
	All establishments	Conducts e-delivery	Doesn't e-delivery	unknown
All establishments	38985	12069	26462	454
Conducts e-delivery	13233	6063	7061	109
Doesn't e-delivery	25237	5901	19203	133
unknown	515	105	198	212

Source: Table B Manufacturing 1999 and mid-2000, www.census.gov /estates, 2001

3. OVERVIEW OF NEW ACTION OF ICT AND PRODUCTIVITY GROWTH

In principle, various methods of collecting data on the impact of ICT on growth and corporate performance should be introduced in the coming years. One of them is the enlargement of the survey type using existing modules on electronic business processes or the design of questions about the perceived benefits of using ICT. The reliability of this second option is questionable and one way to do would be to link the survey data on the use of ICT to economic data from other surveys in the company.

As mentioned above, the OECD launched a project of this genre whose report was presented in 2003. This article describes an initiative taken by the statistical offices of Denmark, Japan and the United States to use existing survey data to reach a better understanding of how ICTs affect performance of the company. The project is in the initial phase and the first step was to identify a number of important variables. As the statistics registers used by the three countries are not harmonised, the project is based on an analysis by country. I present below the individual projects and interim results.

3.1 Denmark

Statistics Denmark has developed a database containing data from three statistical registers (see also Appendix for a more detailed description) too namely:

- The database of the 1998 survey on the use of technology information by companies, conducted among 1,832 businesses;
- Statistics on company accounts for 1995 to 1999, covering all companies with more than 10 employees in manufacturing, construction and retail trade;
- The integrated database for the study of the labour market containing detailed information on each employee and his background personal.

The project aims firstly to profile companies that can be considered as representing the first group of users Internet, Intranet and Extranet and engaged in electronic commerce. Is it possible to identify links between the use of Internet, Extranet and E-commerce on the one hand, and the performance of the company or employee characteristics, on the other hand, at the micro level? The absence data on ICT investments and the need of having to use instead of data on the use of the Internet or an extranet as indicators of e-maturity of the company certainly hinders the Danish project. The work done so far has been to establish a database longitudinal covering the period from 1995 to 1999. These studies point to coupling starting at the enterprise level, data collected from 1832 companies that participated in the survey on the use of ICT in 1998 and those of the register statistics on company accounts covering the period from 1995 to 1999. Of 1832 companies, 853 in the registry statistics on company accounts for 1995-1999, as these cover only manufacturing, construction and retail trade. Analytical work has not started yet, but Table 2 gives an idea of information that could be extracted from this database.

3.2 The Japan

The data on computer networks for the analysis of productivity in Japan resulting from the combination of the survey of ICT in the workplace and the baseline survey on the structure and business activities (EBSA). However, the relationship between these two data sources is quite complex. EBSA is a large-scale survey covering all companies that meet a certain threshold for inclusion so that even longitudinal data covering a sufficient units for analysis. Every year it covers about 30000 companies, and panel data covering the period 1994 to 1998, cover approximately 18000 units observed. However, the most recent data available were those collected in August 2002 for 1999 and those collected in 2000 will be available in late 2002. The survey questionnaire covers a wide range of business activities, such as R&D, production and overseas outsourcing. The data collected include information from financial statements that can make calculations of productivity, as well as data on computer networks for the years 1991, 1994 and 1997. Therefore, it is possible to analyse the use of computer networks to the enterprise level using only data from the EBSA. Motohashi (2001) examines the impact of the use of computer networks by type of e-commerce based on data cross-EBSA 1991.

TABLE 3: PERCENTAGE GROWTH FROM 1995 TO 1997 AND FROM 1997 TO 1999 BY SECTOR AND USE OF INTERNET; DENMARK

Industry		Number of companies	Growth in value added (%)		Growth in terms of full-time employment (%)		Growth of value added per job (%)	
			95≥97 median	97≥99 median	95≥97 median	> 99 median	> 97 median	97≥99 median
Manufacturing	Intranet 1997?							
	- Intranet	568	13.2	4.3	3.5	0.0	7.0	5.0
	+ Intranet	99	15.1	8.7	7.1	2.3	7.8	4.2
	total	667	13.8	4.8	3.8	0.0	7.1	4.8
Construction	Intranet 1997?							
	- Intranet	114	21.8	4.3	13.5	-1.1	6.4	7.9
	+ Intranet	11	29.8	24.0	16.7	10.9	7.9	4.4
	total	125	22.3	6.7	14.0	-0.7	6.7	6.9
Retail business	Intranet 1997?							
	- Intranet	55	9.0	11.8	10.2	-1.0	-0.2	13.9
	+ Intranet	6	22.1	7.8	6.4	0.6	15.4	4.3
	total	61	10.5	11.8	9.5	0.0	0.1	12.5
Total	Intranet 1997?							
	- Intranet	737	14.4	5.2	5.3	0.0	6.4	5.9
	+ Intranet	116	17.5	10.0	7.8	3.0	7.9	4.3
	total	853	14.5	5.6	5.6	0.0	6.4	5.7

Source: Denmark's Statistik; ICT impacts database

The survey of ICT in the workplace provides more detailed and more up to date on activities at the enterprise level. Data from this annual survey are collected for 2000 already available, including detailed data on investment in ICT and electronic business processes, as mentioned in Section 2.2. However, as the sampling frame was changed considerably for the 2000 survey and the construction of panel data is difficult. The number of units observed in the 2000 survey of about 5000, but the coupling to the data of the previous year produces only 1 000 or less observations. If I couple the data with those of the panel of the EBSA for 1994 to 1998, the number of firms observed to almost 3000. Therefore, data from the survey of ICT in the workplace can be used to complement the panel data from the EBSA in that they provide additional detailed information and current technologies information.

In this paper, I present some elements of the relationship between the use of computer networks and corporate performance. To assess the relation of cause and effect between the use of technology Information and business performance, I use data EBSA panel covering the period from 1994 to 1998. (The survey of ICT in the workplace of 2000 provides data on the variables of use of ICT, but not on performance variables.) The results show that a company using system obtains ICT in general better results than a company not using ICT, both *'before'* that *'after'*. In this sense, it is impossible to assess the relationship of cause and effect from this table. In addition, it should be noted that the results for the applications of ICT for a specific sector, such as computer-aided design/computer-aided production (CAD/CAM) may reflect the effect of industry rather than the effects of the use of ICT. The next step should be a regression analysis taking into account the effect of the industry.

3.3. The United States

The results presented here are calculations made by Nguyen and Astrostic 2002 based on data collected from U.S. manufacturing establishments that responded to CNUS of 1999 (Table 3). These results are unweight and do not reflect the entire U.S. manufacturing sector, the totals are more likely to be representative of large manufacturing establishments (see Manufacturing 1999 and mid-2000 to www.census Government/estates). In addition, data from CNUS are coupled to the observations made for the same institution during the Annual Survey of Manufactures for 1999 and in the Economic Census for 1992 and 1997. Table 3 shows that the pro ductility of labour in the manufacturing establishments with U.S. computer networks was, on average, 30% higher than that of institutions with no network. Facilities with a network were significantly larger than those not being so.

TABLE 4: DEFINITIONS OF VARIABLES AND MEDIUM-SIZED SAMPLE OF INSTITUTE OF THE AMERICAN MANUFACTURING, 1999

Variable	Definition*	Average Settlements	
		With networks	without networks
Labour productivity	Total value of shipments / Total employment	284.79	222.39
Labour productivity Jobs	Value Added / Total Employment Total employment	133.65 235.70	103.29 118.64

Source: Atrostic and Nguyen (2002) based their calculations on data from the U.S. CNUS matched to the ASM.

The regression results by ordinary least squares (OLS) in Table 4 illustrate the effect of various control variables, corresponding to other facility characteristics (columns 1 to 3) and conditions previously existing in the institution (column 4). In theory, the gross output is the preferred measure of productivity of labour. Estimates based on this measure (columns 1 and 3) show that the productivity of labour in American manufacturing plants with networks is about 5% higher than that of institutions with no network. Estimates based on the measurement of labour productivity based on value added (column 2) show that productivity is about 11% higher for institutions with networks. These OLS estimates are robust to other specifications of the production function of Cobb-Douglas behind the model.

TABLE 5: RESULTS OF REGRESSION OF LABOUR PRODUCTIVITY; UNITED STATES DEPENDENT VARIABLE; LABOUR PRODUCTIVITY (T STATISTICS IN PARENTH)

Independent variables	**OLS estimates**			**Two-stage estimates**
	Gross output	Added value	Gross output	Gross output
	(1)	(2)	(3)	(4)
Constant	2.678 (159.95)	3.736 (144.57)	2.830 (119.48)	2.357 (32.50)
CNET	0.046 (5.76)	0.105 (7.85)	0.033 (3.00)	(-)
Pr (CNET)	(-)	(-)	(-)	0.505 (6.41)
SKILL	0.043 (12.28)	0.084 (14.12)	0.039 (8.40)	0.037 (8.12)
Log (K/L97)	0.091 (39.86)	0.186 (49.91)	0.088 (28.81)	0.084 (26.61)
MULTI	0.114 (19.30)	0.236 (24.17)	0.101 (12.58)	0.039 (3.31)
Log (M / L)	0.515 (206.74)	(-)	0.505 (148.93)	0.506 (150.48)
Size 2	-0.055 (7.92)	-0.049 (4.13)	-0.052 (5.52)	-0.047 (5.09)
Size 3	-0.084 (12.43)	-0.077 (6.72)	-0.079 (8.88)	-0.073 (8.35)
Size 4	-0.092 (11.25)	-0.097 (6.96)	-0.083 (7.77)	-0.071 (7.37)
Size 5	-0.090 (8.74)	-0.107 (6.19)	-0.070 (5.23)	-0.065 (4.88)
Size 6	-0.017 (1.21)	0.012 (0.53)	-0.008 (0.460)	-0.004 (0.22)
Industry (NAICS 3-digit)	Yes	Yes	Yes	Yes
R^2	0.756	0.261	0.750	0.756
Number of establishments	29.808	29.671**	17.787***	17.787

Source: Atrostic and Nguyen (2002) based their calculations on data from the U.S. CNUS matched to the ASM and CM.

NOTE: ** The number of observations in column (2) is smaller than that in column (1) because many institutions have a value of zero.

*** The number of observations in columns (3) and (4) is smaller than in column (1) for two reasons. Several institutions have not answered the question of investment in computers in 1992 used to construct the measure Pr (CNET) in the two-stage regressions of the column. In addition, the measure Pr (CNET) takes into account the condition of the situation so could not be built for existing establishments in 1992 and 1999.

The estimates in column (4) take into account the effect of conditions existing prior to the institution and are based on the predicted probability of having a computer network in 1999 (Pr (CNET)) rather than the existence or absence of a real network in 1999 (CNET). The coefficients variables and Pr CNET (CNET) are

not directly comparable. A way to interpret the two-stage estimates is to compare the effects computer networks on the productivity of institutions at two points for determining the predicted probability of having a computer network. A good example regarding our data is the comparison of institutions located in the 10th and 90th percentile of the estimated probability of having a computer network. (Recall that about 12% of schools in our sample are not equipped with computer network.) The estimated probability that these institutions equip themselves with a computer network (based on the results of probity regression not shown here) are 0.8422 and 0.9671, respectively. Using the coefficient of 0.505 estimated from the probity regression for the variable Pr (CNET) (column 4 of Table 2), I can calculate the expected gap in productivity between the two institutions, namely 0.505 (0.9671 to 0.8422) = 0.0631. The productivity gap means that an institution from the 10th percentile (less likely to have a computer network) to the 90th percentile (more likely to have a computer network) would increase the productivity of its workforce by 631%. Number of studies lead to the conclusion that the estimated effect of IT greatly reduces if one takes into account the conditions prevailing before adoption. But here, the estimate obtained by taking into account the effect of previous conditions is greater than 2 points to that obtained using OLS models.

CONCLUSION

This article provides a description of the first project under which each country is developing an analytical database for matching data from the new survey on the use of ICT to data from business surveys and, where appropriate, with other statistical records. From these databases, calculate basic statistics on the use of ICT. The results show that the most common uses of trade e-business in Japan were to receive and place orders and execute sales (about 20% of businesses reported each of these uses). The results for the United States show that 30% to 33% of U.S. manufacturing establishments were using the applications business e-commerce to make purchases of electronics and electronic delivery. Statistics for the manufacturing of Denmark and Japan will be calculated in the next step. Finally, I will issue a set of assumptions about the utilisation of ICTs and the likely changes as the industry or sector in the three countries. The assumptions are based on summary statistics and comparative differences in market structures and institutional structures of the three countries. For the main hypotheses, I conduct multivariate analysis, as performed regressions for India and the United States whose results were presented in the report of the first study based on micro data of the OECD or the U.S. results presented in this article, so as parallel as possible.

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