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TNO report

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The policy mix for e-Business use by SMEs:

Inspiration from Denmark, Finland and other countries

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1 Introduction

The objective of this study is to provide inspiration for the programme Nederland Digitaal in Verbinding (The Netherlands connected digitally) and the overall policy mix for e-Business. The first part of this chapter will position e-Business in the context of productivity and competitiveness. Secondly, the evolution of the e-Business policy mix is sketched. SMEs remain the main target group, with an increased focus on the use of ICT for transactions and collaboration ('digital value chains'). Subsequently, it is explained why this study explores the e-Business policy mix in Denmark and Finland, and a selection of e-Business programmes in other countries. The chapter closes with a description of the methods of the study and the structure of this report.

Effective use of ICT by firms can increase the productivity of firms and hence the competitiveness of firms, sectors and regions. Increasingly, studies demonstrate how the use of ICT contributes to productivity gains in sectors and countries¹. One of the research topics is how the contribution of ICT to productivity interacts with factors at sector level (e.g. differences between manufacturing, construction and services sectors) and factors at firm level (such as process and organisational innovation, overall management quality and firm size). For example, the combination of ICT use and organisational innovation leads to an increase of productivity.²

Firms use a variety of ICT networks, products and services, to support a range of business activities. This includes 'the basics' such as the use of PCs, digital archiving, intranets, broadband access and websites with information about products and services. It also includes the use of ICT for transactions and collaboration with suppliers, clients and partners. For example, Electronic Data Inter-exchange (EDI), extranets and internet based solutions are used for procurement and to coordinate inventories and logistics across the value chain. In the 1990s, this type of ICT use by firms gained momentum; the label electronic Business emerged (e-Business). The label e-Commerce was used as well, especially in the context of consumer markets. Similar to productivity studies, researchers explore how e-Business dynamics are different between countries and sectors. The relevance of sectors lies in factors such as the nature of products and services (e.g. digital services, intangible products), the number of firms in a sector, the size of these firms, and the international orientation of the sector (e.g. export revenues).³

¹ O'Mahony, M. and B. van Ark (2003) EU productivity and competitiveness: An industry perspective. Can Europe resume the catching-up process? EC, Luxembourg: Office for official Publications of the European Communities. See also: Van Ark, Bart (2005) Does the European Union Need to Revive Productivity Growth? Groningen Growth and Development Centre. And: Commission staff working document, 21 Oct. 2007, accompanying document to the Communication from the Commission: Raising productivity growth: key messages from the European Competitiveness Report 2007.

² Ibid. See also: Crespi, Gustavo et al. (2007) Information Technology, Organisational Change, and Productivity. CEPR Discussion Paper No. 6105.

³ The European e-Business Report, 2006/2007 edition, A portrait of e-business in 10 sectors of the EU economy. And: Verhoest, Hawkins et al. (2002). Electronic Business Networks: An assessment of the dynamics of business-to-business electronic commerce in eleven OECD countries. A Summary Report

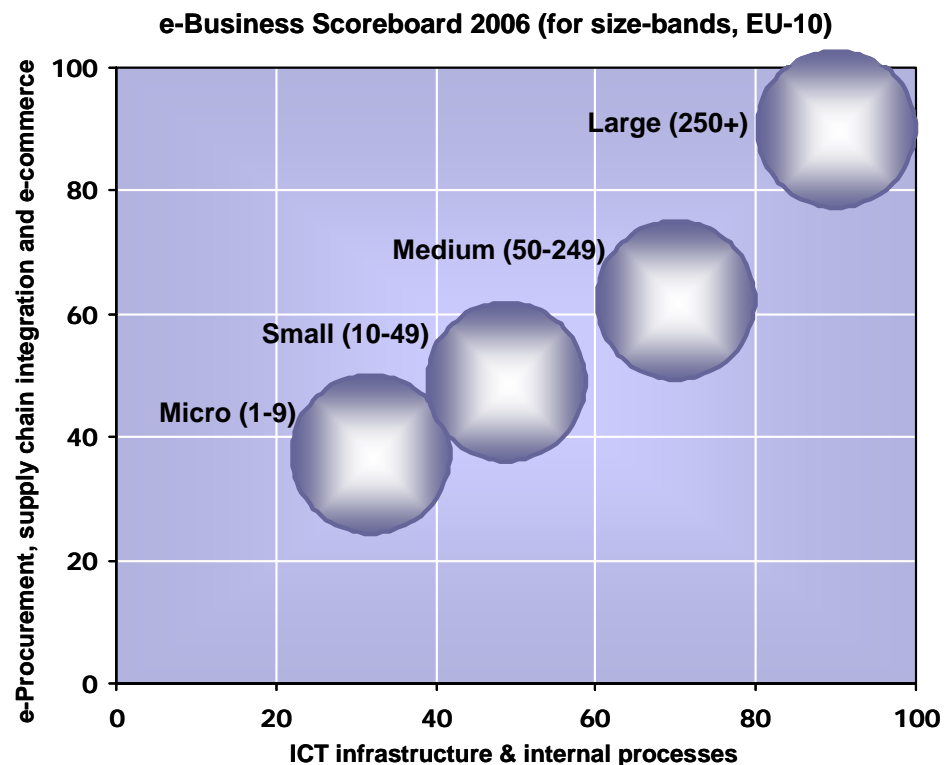
Substantial progress in e-Business is being made. This concerns the availability and quality of e-Business solutions and the effective use of e-Business by firms across a range of sectors and countries. The OECD has launched several studies.⁴ In Europe, progress is monitored by European Commission sponsored studies such as the e-business W@tch and the European e-Business Support Network. The 2006/2007 edition of the European e-Business Report presents four key trends:

- Supply chain integration is key.
- Better solutions for SMEs.
- ICT for customer service.
- Growing maturity of new technologies (such as RFID and mobile).

The European e-Business Report explains that more progress could be made on these trends (issues). Supply chain integration can be perceived an ‘advanced element of e-Business’ with high relevance for productivity yet with mixed progress in many sectors (such as construction, footwear, food/beverage and shipbuilding).

The European e-Business report also concludes that e-Business use is much lower in micro, small and medium sized firms, compared to large firms (Figure 1).

Figure 1: e-Business and firm size



Source: *The European e-Business Report, 2006/2007 edition (Empirica and EC, 2006)*

on the e-Commerce Business Impacts Project (EBIP). Report prepared for the OECD and the EC (JRC-IPTS).

⁴ Verhoest, Hawkins et al. (2002) and the 2004 OECD report ICT, e-Business and SMEs.

Figure 1 presents the differences related to firm-size: the smaller the firm, the less use of e-Business. This concerns e-Business within one firm (ICT infrastructure and internal processes, horizontal axis) as well as e-Business that involves suppliers, clients and partners (eProcurement, supply chain integration and e-Commerce (eMarketing and sales), vertical axis). The 'internal and external' elements of e-Business are related. For example, ICT infrastructure and internal processes must be in place in order to make progress in e-procurement and supply chain integration.

It must be mentioned that the European report is about the big picture, not about the details. For example, small hotels, independent designers and plumbers may not need all e-Business elements mentioned in the report. Also note that micro and small firms may be start-ups, with a focus on developing their product, whilst making progress in e-Business, step-by-step. This type of details has an impact on the e-Business scores of firms, sectors and countries.

Policy makers try to stimulate e-Business. The range of policy topics and policy instruments co-evolves with progress in e-Business. The 2003-2005 report of the European e-Business Support Network summarises how European and national policy makers have adapted legal frameworks to facilitate e-Business (e.g. digital signatures) and have created awareness, information and advice tools for firms. The report also mentions the increased focus on SMEs and on persistent problems such as standardisation and interoperability, legal issues related to the internal market (e.g. dispute settlement and taxes) and e-procurement by governments (SME friendly e-procurement). A 2004 OECD study – ICT, e-Business and SMEs – provides a similar message. The OECD stresses that large benefits can derive from e-Business in both internal processes and external transactions and collaboration. However, many policies 'only' stimulated firms to launch websites and to interact online with consumers. The OECD acknowledges that barriers for e-Business can be specific for sectors, for SMEs and even for SMEs that are well advanced or less advanced on the e-Business adoption ladder. For instance, even well advanced SMEs may be hindered by electronic market places that are controlled by and designed for large firms in a sector. For less advanced SMEs, security issues and skills may be the main issues. The OECD identifies a policy challenge. The complexity of e-Business and the differences between sectors and between firms calls for a customised or even personalised approach. Yet, policy programmes must remain coherent and manageable.

In The Netherlands, the policy mix for e-Business is being adapted. In 2002, the programme *Nederland Gaat Digitaal* (The Netherlands goes digital) was launched to stimulate SMEs to launch websites and to explore e-Business opportunities. The programme was added to the policy mix of broadband policy, changes in the legal framework (digital signatures) and programmes to stimulate trust in online environments. At the heart of *Nederland Gaat Digitaal* were awareness, information, demonstration and advice instruments. The programme was horizontal: all sectors were targeted. SMEs were the main target group. Increasingly, the programme *Nederland Gaat Digitaal* was linked to a programme that stimulates ICT use by innovative SMEs

(early adopters).⁵ The combination of these two programmes is referred to as Nederland Digitaal (The Netherlands Digital).

In 2007, a new programme was launched to follow up and integrate the two programmes mentioned above. The name of the programme signals the main priority: Nederland Digitaal in Verbinding (The Netherlands connected digitally). The main objective is to stimulate SMEs to use ICT for transactions and collaboration with suppliers, clients and partners. Again, the focus is on SMEs although it is recognized that initiatives for specific sectors may involve large firms as well. A number of initiatives for specific sectors and value chains are foreseen. The term value chain is used with caution, because many firms participate in several value chains, that are organised as flexible value networks, and because ICT has the potential to change value network rather than to confirm existing practices.

Projects in Nederland Digitaal in Verbinding can be initiated by the firms within a sector (consortia that include SMEs) and by public and public-private organisations that are involved in the programme. Several public agencies are involved: SenterNovem, Syntens, ECP.nl, HBD.nl, Media Plaza, Nederland BreedbandLand and the Dutch Ministry of Economic Affairs.⁶ The programme is targeted at individual SMEs and consortia. Sector organisations (industry associations) are involved to facilitate knowledge diffusions and to approach SMEs. The programme provides SMEs with knowledge and advice, by Syntens advisors and third party advisors/consultants. The programme will also include a set of financial and non-financial instruments for studies and implementation trajectories in specific sectors. In 2008, the selection and design of the full set of instruments is being finalised.

One of the questions for the selection and design of instruments, is how interventionist the programme should be. Direct support for the development of digital collaboration can be high risk-high gain. As was mentioned above, the barriers for e-Business can be different for specific sectors and for specific type of SMEs. Does policy makers have to choose between sectors? When does a customised programme for SMEs change into a personalised programme that tackles the barriers of individual firms? How to stimulate the use of ICT for transactions and collaboration, without lock-in of some firms and excluding some others? What is the rationale? Which barriers for e-Business qualify as market failures (e.g. information asymmetries and network effects) or system failures?

⁵ CIC Uitstraling: baanbrekend met ICT (Competing with ICT Competences: ground breaking with ICT). Given the links between the programmes Nederland Gaat Digitaal and CIC Uitstraling, the programmes were evaluated in one study. See Dialogic (2006). Evaluatie Nederland Gaat Digitaal en CIC Uitstraling / NBDI. Evaluation for the Dutch Ministry of Economic Affairs.

⁶ Syntens is an innovation agency/network, supported by the Dutch Ministry of Economic Affairs (www.syntens.nl). SenterNovem is an agency of the Dutch Ministry of Economic Affairs, to promote sustainable development and innovation (www.senternovem.nl). ECP.nl is a public-private partnership to improve the framework conditions for ICT innovation, e.g. via task forces on legal issues, security and standards (www.ecp.nl). HBD.nl is the sectoral organisation/association for the retail sector (www.hbd.nl). Media Plaza is a private, non-profit association that stimulates ICT innovation, e.g. via seminars, demonstrations and participation in innovation programmes (www.mediaplaza.nl). NederlandBreedbandLand is the independent national platform for 'better and smarter' use of broadband in public/social sectors (www.nederlandbreedbandland.nl).

(e.g. capabilities failures). What is the relevance of other policy domains such as R&D policy (e-Business solutions for SMEs), education and skills programmes, and economic policy to increase access to capital? Furthermore, competition issues may emerge. A large firm may already have launched an electronic marketplace for a sector. Does the programme stimulate an alternative? Also note that public support must be in line with the European framework on state-aid for R&D and Innovation.

As was mentioned above, the objective of this study is to provide inspiration for the programme Nederland Digitaal in Verbinding and the overall policy mix for e-Business. It is a small study that explores experiences in other countries.

Denmark and Finland consistently outperform The Netherlands with respect to e-Business use (Figure 2). The first two columns (rankings) provide an indication of the overall ICT readiness. This is relevant for e-Business but also for e-Government and ICT consumer markets. The third and fourth columns address e-readiness for e-Business only. The fifth and sixth columns address the actual use of e-Business. The seventh columns concerns business competitiveness, for which e-Business use is one of the important factors.

Figure 2: From ICT readiness to e-Business use

Ranking	Broadband penetration	ICT opportunity Index	e-business readiness: adoption	Networked readiness: business readiness	e-business readiness: use	Networked readiness: business usage	Business Competitiveness index
	OECD	ITU	EC	WEF and INSEAD	EC	WEF and INSEAD	WEF and Porter
	2007	2007	2006	2006-2007	2006	2006-2007	2007-2008
1	DK	SE	SE	CH	DK	JP	US
2	NL	LU	FI	FI	FI	SE	DE
3	CH	HK	DK	DE	DE	DE	FI
4	KO	NL	BE	US	NO	CH	SE
5	NO	DK	NO	JP	NL	IS	DK
6	IS	CH	DE	EI	MA	FI	CH
7	FI	SG	NL	DK	BE	DK	NL
8	SE	UK	LU	BE	SW	IS	AT
9	CA	IS	MA	AT	EI	NL	SG
10	BE	NO	UK	NL	LU	UK	JP
11	UK	CA	AT	SE	IT	KO	UK
12	AU	BE	SL	IL	GR	NO	HK
13	FR	US	ES	HK	AT	SG	NO
14	LU	AU	EI	UK	PO	US	CA
15	US	AT	EE	SG	UK	AT	BE

Sources: OECD (2007), ITU (2007), EC (2006), WEF and INSEAD (2007), WEF (2007)

Rankings - and the indicators, data and scores behind rankings - must be used with caution. For example, rankings are known to hide that differences between countries are small. Furthermore, the quality of data can be different from one country to the other. In the interpretation of rankings, researchers do not always acknowledge that the differences between countries may also be explained by factors such as - in this case - the size of different sectors and the number of SMEs. A quick scan of the sector mix in Finland, Denmark and The Netherlands does not indicate large differences with respect to the size of 'e-Business laggards' such as the construction sector and 'e-Business leaders' such as services sectors. The number of SMEs - relative to the total number of firms - is very high in all three countries (a more detailed analysis could differentiate between micro, small and medium-sized enterprises). Still, Figure 2 raises the question why Denmark and Finland outperform The Netherlands with respect to e-Business use, and how the national policy mix can have an impact.

Interestingly, The Netherlands outperforms Finland on broadband penetration and overall ICT opportunities (ICT readiness elements such as infrastructures, PCs, education and ICT skills). See the first two columns. The Netherlands and Denmark score quite similar on broadband penetration and overall ICT opportunities. Eurostat provides the most recent statistics on broadband (European countries only). Broadband penetration is 74% of Dutch households, 70% of Danish households and 60% of Finnish households.⁷ On the ICT opportunity index, Finland scores just outside the top 15. As was mentioned above, this concerns ICT in general, not only e-Business.

The two rankings on *e-Business adoption / readiness* (third and fourth column) are based on criteria such as PCs, internet access, websites, Local Area Networks (LANs), intranets and extranets. Two rankings (and sources) were used to reduce the chances that the relevant position of The Netherlands, Denmark and Finland is influenced by one indicator only or by the quality of data. The results are consistent. The Netherlands (firms in The Netherlands) scores below Denmark and well below Finland.

The two rankings on *e-Business use / usage* (fifth and sixth column) are based on criteria such as electronic procurement, electronic sales and IT systems that are linked to suppliers and clients. Again, two rankings and sources were used. And again, The Netherlands scores below Denmark and Finland. As was mentioned in the context of Figure 1, firms that score low on e-Business readiness (e.g. ICT infrastructures within the firm) also score low on e-Business use (e.g. electronic procurement and links with suppliers and clients).

The ranking on *business competitiveness* is included to signal the relevance of e-Business for the competitiveness of firms and countries. The relative position of The Netherlands, Denmark and Finland with respect to competitiveness is very similar to the relative position in e-Business rankings.

⁷ Eurostat, News release 3-12-07, More than 40% of households have broadband internet access.

The link between e-Business use and productivity is less easy to sketch via rankings or statistics. Labour productivity is higher in The Netherlands than in Denmark and Finland. This demonstrates that other factors play a role, in addition to e-Business use and business competitiveness. For example, labour productivity is influenced by the skills of persons employed, the sectoral composition of the economy (the sector mix), capital intensity and the quality of capital stock (e.g. the type of machines). In 2006, labour productivity in the Netherlands is higher than in Denmark and Finland (and lower than two European countries: Luxembourg and Ireland). The gap between The Netherlands and Finland is narrowing. Between 2000 and 2006 - a period of progress in e-Business - the annual increase of labour productivity in the Netherlands was much lower than in Finland and slightly higher than in Denmark.⁸

One of the factors to explain e-business progress in Denmark and Finland could be policy. This will be explored in this study. What is the e-Business policy mix in Denmark and Finland? Are there substantial differences compared to the policy mix in The Netherlands? How are SMEs, sectors, value chains and regions targeted? What is the rationale and what are the main barriers that are addressed? Are there indications that specific characteristics or programmes are effective? Any recent changes that provide for additional inspiration for policy makers in the Netherlands? The second and third chapter will present the analysis for Denmark and Finland respectively. Desk research was combined with two expert interviews in each country.

As was mentioned above, the focus of the Dutch policy mix for e-Business has evolved towards the use of ICT – by SMEs – for digital transactions and collaboration in specific sectors and value networks. This is the core of the programme *Nederland Digitaal in Verbinding*. To provide inspiration for this programme - in addition to the analysis of Denmark and Finland - six relevant programmes in other countries were analysed. The results are presented in chapter four. This concerns a concise and structured description of the programmes. The analysis is part of Chapter five.

The fifth chapter will present the conclusions and inspiration for The Netherlands, given the existing policy mix in The Netherlands and the programme *Nederland Digitaal in Verbinding*. The Dutch policy mix is confronted with the main conclusions of the Danish case, the Finnish case and the analysis of six programmes in other countries.

⁸ Commission staff working document, 21 October 2007, accompanying document to the Communication from the Commission: Raising productivity growth: key messages from the European Competitiveness Report 2007. COM (2007)666 final.

2 Denmark

2.1 Introduction

Country data	Total Area: 43,560 km ² Population: 5,411,400 No. SMEs: 192,365 Main sectors: trade, service, construction, and logistics. GDP per capita in PPS: 124.3 (Source: Eurostat) Comparative price level: 135.8 (Source: Eurostat)
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Source: Euro Info Centre Network, National Network Fact sheet, Denmark, 2007⁹

Denmark belongs to the group of affluent OECD countries. Traditionally seen as an agricultural country, Denmark has seen a decline of agriculture's share of GDP (less than 5% in 2002). Other primary trades well represented in the Danish economy include fishing and the extraction of oil and natural gas. In 2002, manufacturing accounted for 23% of production and building and construction for around 6.7%. The largest sector of the economy is the private sector services, which accounts for 45% of the total production in 2002. The sector includes, among others, trade, transport and financial institutions. In the same year, the public sector accounted for around 25% of GDP.¹⁰

The business climate in Denmark is very favourable, especially for SMEs. Compared to other EU countries, Denmark has one of the shortest procedures for setting up a new business. According to European Commission's 2005 Eurobarometer of SME access to finance, the use of an overdraft to finance SME activities was most common in Denmark (83%). Also quite common were loans longer than three years (50%) – in Germany that was 56%. 75% of managers in Denmark felt that access to loans granted by banks was easy (in Ireland that was 79% and in Finland 95%). Germany (87%), the UK (86%) and Denmark (81%) topped the list of countries where it was considered that obtaining a loan had become more difficult because of the amount of information requested by the loan lending banks. In Denmark however, only 6% of the SMEs considered simpler procedures for granting loans as the most important incentive for starting a business, in contrast with Germany where that was 58%. Only 2% of Danish SMEs regard shorter delays for granting loans as the most encouraging element whilst in Germany this is the view of 41% of SMEs.¹¹

The Danish workforce is highly educated and skilled. The high remuneration however is regarded as problematic.

⁹ http://ec.europa.eu/enterprise/networks/eic/pdf/nfactsheets-eic/EUG_5_0100_Country_DA.pdf.

¹⁰ From Peder J. Pedersen, Royal Danish Ministry of Foreign Affairs, Economic Life and Labour Market, 2007. <http://www.um.dk/publikationer/um/english/factsheetdenmark/economiclifelabourmarket/html/chapter01.htm>

¹¹ European Commission, EOS Gallup Europe, Eurobarometer, SME Access to Finance, September 2005, http://ec.europa.eu/enterprise/entrepreneurship/financing/docs/sme_access_to_finance_survey_summary_2005.pdf

In the private sector, adoption and use of ICT is very broad. The process of adoption of basic ICT by firms is virtually completed and the use of ICT is increasing steadily. By 2006, 98% of enterprises used ICT in the form of computers etc.; 97% had access to the Internet; and 82% had access to the Internet via a broadband connection.¹²

With the first stage (availability, access and skills) virtually completed, the priority of the Danish government has shifted to helping both the private and public sector make the most of the ICT resources available to them. That is seen as possible through the integration of ICT throughout the value chain. Specifically, in the private sector this the integration refers to internal production processes; in relation to financial and stock management; and in external relations to suppliers and customers. Also as a result of the early public commitment to promoting e-business, by 2005, 57% of Danish enterprises had integrated their ICT systems for buying and selling with payment and invoicing systems, and 18% had integrated their ICT systems with those of the suppliers. This is an increase from 30% and 8% respectively, in 2004 (the large increase can be attributed to a broader definition at EU level).¹³

Compared to other European countries, Denmark scores high in terms of enterprises receiving and placing orders over the Internet. In 2005, 63% of Danish enterprises had placed orders via the Internet and 35% had received orders via the Internet. This represents an increase from 57% and 27% respectively from the previous year. The contribution of ICT use to improving results has been rated positively by a large proportion of Danish firms. In 2005, 45% of Danish enterprises estimated that ICT projects had resulted in resources being released, and 33% found that it generated higher revenues. Figures from Statistics Denmark also show that enterprises which use ICT in an integrated manner had an increase in value per employee about DKK50,000 (about €6,700) higher than enterprises with conventional ICT use.¹⁴

The *second subsection* of this chapter will present the national strategy (the overarching policy programmes) with respect to ICT, innovation, SMEs and growth.

The *third subsection* will address the policy instruments. How does Denmark stimulate the uptake of e-Business by firms, across sectors and value chains? What are the main problems and opportunities that are addressed? By which types of instruments, e.g. information, co-ordination and financial incentives? How horizontal or specific are the policy instruments, e.g. innovation in general, ICT innovation, e-Business, only for SMEs, in specific sectors? Given the stage of developments in Denmark (and the Netherlands), we will focus on policy instruments other than the framework conditions for e-Business. Conditions such as digital signatures are in place.

The *fourth subsection* is an assessment of the policy mix for e-business. It is based on interviews with two independent Danish experts and an assessment by TNO. Given the policy questions in The Netherlands, one of the main topics in the expert assessment is the design and impact of policy instruments to stimulate e-Business across sectors and value chains (digital chains).

¹² Ministry of Science, Technology and Innovation, IT and Telecommunications Policy Report 2006, 03 May 2006, <http://videnskabsministeriet.dk/site/forside/publikationer/2006/it-and-telecommunication-policy-report-2006/html/hele.htm>

¹³ *ibid.*

¹⁴ *ibid.*

2.2 National strategy

An Interim Report prepared for the European Commission in 2004¹⁵ notes that “there are huge public investments in IT, extensive funding of research institutions and new incubator environments. There is strong support and commitment from the Public Sector in promoting the ICT Sector in Denmark, thus providing opportunities for public/private initiatives and projects.” The ICT innovation system is regarded as largely an important sub-system of the national innovation system as a whole.

In Denmark, the telecommunication infrastructure is advanced, as is the diffusion of ICT to both businesses and citizens. The Danish government regards ICT as a crucial factor to its commitment to further develop Denmark as a knowledge society. Danish public policy focuses primarily on creating the right conditions to enable and facilitate the process. Relative to e-business, public policies remain largely restricted to the pre-competitive stage; public intervention is regarded as opportune only in order to create general, framework conditions and remove market failures. As such, comprehensive policies have been defined in the field of ICT-related education, research and development, e-government, digital signature; open standards, etc.

However the business structure with a high proportion of small and medium sized firms is a challenge for the policy making. OECD recommended building on the strengths in the field of ICT, with priority being attached to setting quantitative policy goals, promoting common standards, improving the supply of venture capital, increasing focus on service industries, and improving evaluation.¹⁶

The government is committed to digitalizing all written communication between citizens, businesses and the public sector - this is known as the e2012 goal.¹⁷ To this end, a variety of tools and associated infrastructure were developed to enable businesses to trade electronically with each other and with public authorities. As of 2007, a number of these tools and infrastructure were launched. They included an open, internet-based infrastructure for both for easy and secure communication for B2B, B2G, and G2B, including electronic invoicing. The infrastructure is created in co-operation with private ICT suppliers and uses open, international standards.¹⁸ The use of common open standards is regarded as a priority by the Danish government. As such, the deployment of mandatory open standards in the public sector was scheduled for 2007. Open standards for e-business have been developed in co-operation with the private sector to cover the entire range of e-business processes (from electronic product catalogues to ordering and invoicing).¹⁹ Other commitments of the Danish government in this area included an official Danish version of the international catalogue classification standard

¹⁵ Interim Report (2004), Benchmarking national and regional policies in support of the competitiveness of the ICT sector in the EU, Prepared for European Commission, Directorate-General Enterprises, D4 under Contract FIF 20030871

¹⁶ From OECD, ICT Diffusion to Business, 2004, http://www.oecd.org/document/6/0,3343,en_2649_33757_34227910_1_1_1_1,00.html

¹⁷ Ministry of Science, Technology and Innovation, IT and Telecommunications Policy Report 2007, 30 March 2007, <http://videnskabsministeriet.dk/site/forside/publikationer/2007/it-and-telecommunications-policy-report-2007/html/hele.htm>

¹⁸ *ibid.*

¹⁹ *ibid.*

UNSPSC²⁰ (2005); the development of a public OIOXML standard for all documents in a basic purchasing process (catalogue, order, order confirmation, invoice, reminder etc.) based on the international standard UBL 2.0.

By the end of 2006, about 800,000 digital signatures had been issued. Further measures have been adopted in co-operation with regional and local administrations to ensure ease of use, user trust as well as making the electronic signature future-proof.²¹ These initiatives underscore the importance of e-Business, regarded by the Danish government as a 'frontrunner in establishing digital business processes between enterprises and public authorities, and in preparing the Danes for achieving the e2012 goal in terms of ICT skills and readiness.'²²

DKK70 million (about €9.5 million) has been allocated for ICT research in 2007 and 2008, including e-government and digital service delivery.²³

Recently, the Danish Government started focusing more on the issue of knowledge dissemination by promoting co-operation in networks of education and research institutions, industry associations and individual businesses, especially small and medium-sized enterprises.²⁴

The long-standing tradition of close co-operation between policy makers and interest groups (such as sector associations) in the process of formulating public policies is going to be continued.

2.3 Selected policy instruments

Awareness

With the ICT deployment and adoption stages virtually completed, public initiatives in the field of awareness have either been concluded, or incorporated in other types of programmes or restyled as benchmark facilities for businesses.

- **eBarometer**²⁵ offers companies to benchmark their position in relation to competitors, nationally as well as internationally, and further to assess the e-readiness among customers and contractors. The e-readiness is measured on the basis of the company's use of e-business. E-business is defined as an overall concept of the entire commercial utilization of Internet technology to streamline, improve or change the company or the organisation.

- **ICT-index**²⁶ is a benchmarking tool enabling small Danish businesses to compare their performance with others regarding digital business processes.

Trust and security

²⁰ *ibid.*

²¹ *ibid.*

²² *ibid.*

²³ ICA - Country Report from Denmark – ICA Conference 2006

http://www.ica-it.org/conf40/docs/Conf40_country_report_Denmark.pdf

²⁴ *ibid.*

²⁵ eBSN the European e-Business Support Network, National Best Practices,

http://ec.europa.eu/enterprise/e-bsn/bestpractices/national/index_en.html#4

²⁶ *ibid.*

The Government's initiative to give all citizens a digital signature will promote the deployment of secure communication for purposes such as e-government and e-business.²⁷

Supply side: equipment, software and services

- A comprehensive service-oriented infrastructure was deployed in 2007. Various initiatives mentioned below in the field of standardisation, interoperability, skills, etc. are components of this infrastructure.

Standardisation and interoperability

- In 2005, at the initiative of the National IT and Telecom Agency, sector standardization committees developed and managed data standards within the business areas of: environment; foods; roads; health; and universities. A cross-sectoral committee was set up to address the need of data standardization within the area of e-Business.
- As of 2005, it is mandatory for Danish enterprises to send **invoices to public authorities** electronically using the OIOXML format. By the end of 2005, it was estimated that over 95% of the invoices to public authorities were sent electronically, either via VANS or via the established read-in service centres.²⁸
- **OIOSI** is a programme aiming to design and develop a service-oriented infrastructure to support the exchange of business documents across disparate networks using open standards.²⁹

E-government and E-procurement by government

- **The Digital Businessman**³⁰ initiative is a tool for the digital purchaser in the public sector and their distributors. It comprises Den Digitale Indkøber (the digital buyer) and Den Digitale Leverandør (the digital distributor). Also part of the initiative is the Digital Businessman Award – an initiative of the Danish Ministry of Science, Technology and Innovation meant to promote e-commerce and more specifically online shopping.
- **The Public Procurement Portal**³¹ is a public electronic market place meant to increase the efficiency of processes of public procurement and promote value chain integration. The public sector regulates the functionality, interface, security and transaction costs of the portal which is open to both private and public purchasers

²⁷ Ministry of Science, Technology and Innovation, IT and Telecommunications Policy Report 2007, 30 March 2007, <http://videnskabsministeriet.dk/site/forside/publikationer/2007/it-and-telecommunications-policy-report-2007/html/hele.htm>

²⁸ ICA - Country Report from Denmark – ICA Conference 2006
http://www.ica-it.org/conf40/docs/Conf40_country_report_Denmark.pdf

²⁹ Ministry of Science, Technology and Innovation, IT and Telecommunications Policy Report 2007, 30 March 2007,
<http://videnskabsministeriet.dk/site/forside/publikationer/2007/it-and-telecommunications-policy-report-2007/html/hele.htm>

³⁰ eBSN the European e-Business Support Network, National Best Practices,
http://ec.europa.eu/enterprise/e-bsn/bestpractices/national/index_en.html#4

³¹ ICA - Country Report from Denmark – ICA Conference 2006
http://www.ica-it.org/conf40/docs/Conf40_country_report_Denmark.pdf

and suppliers. The portal offers full e-Business functionality including the electronic exchange of data (orders, invoices, payments, etc.), electronic contracts, and electronic product and price lists.

- **The Public Procurement Toolkit**³² – is a G2B public procurement toolkit - an online guide, which helps find the relevant accessibility standards, guidelines and requirements for public sector ICT-procurements. It was developed by the Centre of Excellence IT for All for public purchases of any goods within the ICT-area.

Skills and education

- Additional **bachelor programmes** at the IT University were created - A total of DKK40 million (over €5 million) has been allocated for the period 2007-2009 via the research funds of the globalisation pool.
- **Business PhD initiative.** In 2006, DKK50 million (over €6.5 million) has been allocated in the Finance Act and DKK15 million (€2 million) from the research reserve for the Business PhD initiative. The funds could accommodate 85 new Business PhD projects in 2006, including within the ICT area. A Business PhD project refers to a research PhD programme set up together with a private firm, a Business PhD candidate and a university for a particular, company-specific research project.
- **ICT skills barometer** – it was created in 2006 by the Ministry of Science, Technology and Innovation. The first measurement showed that 62% of the Danish population had medium to good ICT skills, 18% had low ICT skills, and the remaining 20% had never used a computer.
- The **job card scheme**, a measure that dates back to 2002, makes it easier for highly skilled foreigners (also in the field of ICT) to get work and residence permits in Denmark.

Sectors initiatives and digital collaboration

- **Innovation Centre for E-business** – planned to open in 2007 within the framework of the Approved Technological Service Institutes (known as GTS system). The Innovation Centre for E-business is to implement strategic initiatives that may break down some of the barriers to ICT use by small and medium-sized enterprises. Furthermore, the E-business Centre is intended to act as a supporting element in relation to rollout of the service-oriented infrastructure being launched in 2007.
- **E-business to SMEs**³³ is an initiative to support projects that can improve the SMEs' (in particular small and micro undertakings) use of IT and e-business. With a total budget: DKK9.7 million (approx. EUR 1.3m) for a period of two years, the grant aims to help to overcome the existing barriers regarding the use of IT and investments in IT infrastructure. Industry organizations, Business Councils and Business Service Centres must apply together for grants as consortia. A total of eight such projects were financed, with a maximum grant for each applicant set at DKK2 million (over €250,000).

³² *ibid.*

³³ e-Business W@tch, National initiatives, Denmark, http://ec.europa.eu/enterprise/e-bsn/policies/national/index_en.html#4

- €7 million of the budget of the Ministry of Science, Technology and Innovation's Danish National High Tech Foundation were earmarked for the funding of 6-9 SME projects. Application criteria included: clear potential of commercialisation, public-private co-operations, co-financing by partners, special emphasis on SMEs. Focus areas were: information and communication technology, biotechnology, nanotechnology.

Regional initiatives

- Four **regional ICT competence centres** set up in 2006 with a yearly budget of DKK30 million (€4 million). The programme runs for three years. A separate fund has been set aside for concrete **interregional projects** focusing on the support of development, conveyance and utilisation of new knowledge about ICT via close co-operation between businesses and participating research, knowledge and educational institutions. In 2007, two application rounds were launched for this pool.³⁴
- **Promoting innovative IT take up in SMEs**³⁵ is an e-business initiative in the Jutland-Funen region of Denmark where SMEs from the traditional manufacturing industries employ 30,000 people. Started in 2005 and planned to run for four years, the programme was allocated a total budget of about DKK130 million (about €17 million) and is part of the comprehensive **regional IS strategy eFyn** (2004-2008), addressing all major eEurope issues at regional level.. The programme finances regional technology centres (in the areas health science technology, creative industries economy, renewable energy, and wireless communications) and knowledge pilots for SMEs outside urban areas. The initiative includes new, intuitive collaborative learning and promote an integrated approach to IT uptake (combining ICT adoption, business process re-engineering and development of necessary skills). Networks of SME managers are offered internet learning facilities in the form of specially created so-called *learning islands*. The success of the Jutland-Funen regional initiative was extended in 2006 to take the form of a **nationwide regional ICT campaign**. This campaign is intended to generate growth by promoting cooperation between local enterprises and knowledge institutions. It is supported to the extent of DKK90 million (€12 million) over three years.
- **Eight regionally anchored pilot projects**³⁶ were started in 2005. With a total budget of DKK10 mil (about €1.3 million), they were intended to support the use and knowledge of e-business. Particular attention was paid to the needs of SMEs. To strengthen the e-business effort further, the Innovation Centre for e-Business was established in 2007 (see below).

³⁴ *ibid.*

³⁵ e-Business W@tch, National initiatives, Denmark, http://ec.europa.eu/enterprise/e-bsn/policies/national/index_en.html#4

³⁶ The Ministry of Science, Technology and Innovation, IT and Telecommunications Policy Report 2006, 03 May 2006, <http://videnskabsministeriet.dk/site/forside/publikationer/2006/it-and-telecommunication-policy-report-2006/html/hele.htm>

2.4 Expert assessment

The description of the policy mix in Denmark (see above) was discussed with two Danish experts on e-Business, ICT and innovation policy. As was mentioned in Chapter one, policy is one of the factors that influences progress in e-Business. Several other factors play a (large) role. The Danish experts were invited to assess the policy mix and to explore other factors that have contributed to the substantial use of e-Business by Danish firms. We talked to *dr. Anders Henten*, Associate Professor, CICT, Technical University of Denmark, and to *prof. dr. Bent Dalum*, Head of the Department of Business Studies, Aalborg University, Denmark. Eight key messages emerged.

ICT has become embedded in many activities

Progress in E-business is linked to the overall use of ICT throughout society and economy. Especially the last 10-15 years, the use of ICT by Danish consumers/citizens and firms has increased. Examples are the use of PCs, mobile phones, narrowband internet access, broadband, digital invoicing, electronic banking, electronic commerce (business-to-consumers), credit cards, e-Government and ICT in public sectors. Progress in these areas provides the context for e-Business and interacts with progress in e-Business. Consumers/citizens/employees have become used to ICT based solutions. Although e-Business has its specific barriers and dynamics, the analysis must acknowledge ICT developments in general, that take many years, and that are influenced by a range of policies and other factors. This includes national ICT strategies that were launched in the nineties in Denmark.

The role of policy must not be overestimated

Policy can have a positive impact on e-Business use, but the impact can be indirect, and many other factors are highly relevant. In Denmark, progress in e-Business was facilitated by a collaboration culture and well organised sector organisations that cover clusters and value chains within a sector (e.g. agriculture). A collaboration culture allows for efficient and fast diffusion of knowledge. The links between firms (e.g. large and small) and between firms, universities and research institutes are also stimulated by innovation policy. Furthermore, e-Business use was stimulated by the high level of education and skills (that is influenced by education policy). Other factors include the clear demand for e-Business by private sectors (e.g. banking), access to finance for SMEs (that is increased by fiscal instruments) and the widespread take-up of broadband (that is influenced by broadband policy and regulation).

ICT policy: priority, consistency and linked to innovation policy

E-Business policy and other elements of ICT policy are more effective if the political priority is high and consistent (e.g. commitment, attention and budgets). In Denmark, from the early nineties onwards, ICT has remained high on the agenda. Early documents include Information Society 2000 (1994) and IT action plan 95 (1995). Effectiveness can be increased if both the political priorities *and* the policy programmes are consistent. Too much changes and uncertainty should be avoided. This has been possible because the main political parties agreed on the large potential of ICT for the country *and* on the policy programmes to stimulate ICT. This includes the special attention for SMEs and the sectoral or regional approach in e-Business policy. Furthermore, ICT policy has increasingly been considered an important element of

innovation policy. The potential of ICT required 'separate treatment' but synergies and coherence with innovation policy were explored. This means that e-Business has benefited from the strong elements in Danish innovation policy (such as support for clusters and networks) and has suffered from weak elements (such as low budgets for R&D, compared to Finland and Sweden).

Sectoral organisations can facilitate horizontal e-Business programmes.

Policy makers can use sectoral organisations to implement e-Business policies and to reach individual SMEs, value networks and business consortia. Sectoral organisations can also be involved in the design of programmes. This is common practice in Denmark, e.g. in sectors such as shipping, dairy products and food processing, retail and travel. In nearly all cases, this concerns horizontal programmes such as the Innovation Centre for E-business and regional ICT competence centres. A large number of sectoral organisations is then used to make sure that these programmes reach a large number of SMEs and other firms. Three issues were raised. First, the influence of sectoral organisations on the design and implementation of programmes must remain 'healthy' and balanced vis-à-vis other interests. Second, policy makers must ensure that sectoral organisations are inclusive and acts on behalf of all members and firms in a sector. Third, to customise and implement programmes for/in each and every sector creates a risk for programme management and public support for too detailed and interventionist e-Business projects. In addition to national, horizontal programmes with a sectoral implementation, regional programmes were launched. The main rationales are to be closer to SMEs, to address regional barriers (e.g. broadband availability and industry-university interaction) and to create synergy with regional and local policy (e.g. regeneration of cities). This is considered effective, mainly because of the proximity to SMEs (more personal contact).

Programmes are targeted at the demand side

The Danish policy mix for e-Business has a clear focus on the demand side: SMEs and other firms that use e-Business. This concerns programmes for standards (standard committees for sectors/domains), awareness and monitoring activities (e.g. eBarometer), skills programmes (e.g. the Business PhD initiative) and regional programmes (such as the IT take-up programme in Jutland-Funen). Several programmes – including the Innovation Centre for E-business – also involve the supply side. This mainly concerns IT consulting, ICT/telecom services and software development. To some extent, this approach reflects that Denmark has a small ICT manufacturing sector, and that Denmark aims for effective implementation of ICT in society and economy. It was mentioned that a focus on the demand side does not necessarily mean an interventionist approach. Nearly all programmes facilitate rather than stimulate; financial instruments are not the main instruments; budgets are small; standardisation instruments are light; and implementation involves sectoral organisations as well as consultants, research organisations and universities. The interviewees didn't observe any signals that new instruments or more subsidies are required.

Transition issues in e-Business and business process integration

Several transition issues were mentioned. The label transition issues is used to reflect that several IT and business systems are involved, and that these systems are being adapted along the way. E-Business is more than implementing one system. It was

questioned whether the existing policy mix is capable of addressing this type of issues. First, the introduction on e-Business solutions such as Enterprise Resource Planning (ERP) needs to be linked to (or integrated with) IT systems that support business process integration (BPI). E-Business may also trigger (or be triggered by) organisational innovation and outsourcing. The links between e-Business systems, other systems and organisational innovation, may cause problems for the firm but also for its suppliers, clients and partners. It causes 'normal' interoperability issues and it may require firms to migrate to new IT systems and working procedures. In the meantime, business processes work sub-optimal, for the firm and for other firms in the value chain. A similar issue may rise for the customer interface: with business clients or consumers. Firms may migrate to online customer support, with direct links to all relevant business systems. The migration may cause more problems and cost more time than expected. There have been several cases where the 'old' helpdesk was phased out before the new system worked properly. Also note that many firms are already migrating from and 'old' e-Business solution to new ones. Again, this can create problems for the interfaces with business processes and (other) IT systems. For transition issues, awareness and information programmes appear not effective. More can be expected from programmes that improve the overall skills, schemes that allow researchers and students to work with SMEs, and programmes that provide financial support for SMEs to hire consultants that work closely with individual SMEs and business partners.

Consultants, researchers and students can assist SMEs

One of the approaches that works well in Denmark is (light) policy support to allow SMEs to find and hire consultants, researchers and SMEs. The effects on SMEs are positive. Furthermore, this approach stimulates the market for consultants, especially for small or specialised consultants that are independent from the main vendors and software providers. Researchers and students in the area of IT and business can use the hands on experience to improve their understanding of e Business topics (in addition to a financial compensation). This is an element in the regional programmes, in the Business PhD initiative and in several other programmes. At the same time, people that work within business are encouraged to attend courses at universities. This allows firms to better absorb new (IT) innovations. The interaction between business and the knowledge infrastructure is an important element of Danish innovation policy. It builds on the high skill level in Denmark and it seeks to further enhance the skill level and the effective of skills throughout business sectors. To some extent, it addresses one of the problems for SMEs: skilled staff may leave SMEs and join large firms, consultants and universities (with more prestige and higher salaries).

Policy instruments for standardisation and interoperability

With the ICT basics in place, and with more focus on the development of digital value chains, standardisation and interoperability have become one of the main issues for e-Business in Denmark. It was mentioned that the selection of policy instruments for this issue is difficult, in Denmark and in other countries. Policy makers in Denmark have made a clear contribution via standardised solutions for digital signatures, work on an open, internet-based infrastructure to exchange business messages (such as e-invoicing), a Danish translation of the international catalogue classification standards (UNSPSC), projects on XML and development of a set of open standards for widely used business documents, to be promoted by Danish government, and standardisation initiatives for

specific sectors/domains (see the previous section of this chapter). The experts stressed that it remains difficult and risky to impose standards. Consensus based approaches are preferred. It was also mentioned that interoperability can be achieved via interfaces rather than via one standard for a range of systems and components. An advantage is less lock-in; firms may decide on buying individual systems and components. One of the issues is that all systems and components must have a basic level of quality and security, in order to allow for end-to-end quality and security. Furthermore, the issues and policy instruments may be different for different types of e-Business: business to business (e.g. light and sectoral approach), business to government (government leading), business to consumer (e.g. light and with a view on business *and* consumer interests) and government to consumer (government leading). This was referred to as a differentiated standardisation policy, albeit with an eye on issues and applications that cut across all types of e-Business (e.g. signatures and payment).

3 Finland

3.1 Introduction

Country data	<p>Total Area: 338,145 km²</p> <p>Population: 5.1 million</p> <p>No. SMEs: Approximately 200.000 (Statistical Year Book of Finland)</p> <p>Main sectors: ICT sector (dominated by Nokia), specifically the electrical and electronics goods industry (production of radio, television and communications equipment).</p> <p>GDP per capita in PPS: 113.4 (Source: Eurostat)</p> <p>Comparative price level: 125.9 (Source: Eurostat)</p>
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Source: Euro Info Centre Network, National Network Fact sheet, Finland, 2007³⁷

Manufacturing industries are a large component of the Finnish economy, compared to Denmark and the Netherlands. The service sector is underrepresented making the situation in Finland unlike that in the majority of the developed countries in the region.

Important sectors of the Finnish economy include the wood and paper industry; the chemical industry; the food industry; and the textile industry.

Technology sectors are dominant in the Finnish economy. This includes the electronics and electro-technical industry, the mechanical engineering industry, and the metals industry. Notably, telecommunications equipment, part of the electronics and electro-technical sector, is very well represented in Finland. In 2003, Finland was the second European country (after Ireland) in terms of the share of the electronics and electro-technical industry in the total output of the technology industries (53% and 80% respectively). The premier representative of this industry is the Finnish Nokia.

The technology industry registered a significant growth during the 1980s and especially during the 1990s, a growth that exceeded that of all other sectors of the Finnish economy. Currently, it accounts for 60% of the total Finnish exports and employs about a quarter of the total Finnish work force.³⁸ Also, the sector accounts for 75% of total R&D investments in R&D. The contribution of the electronics and electro-technical industry is especially high - about € billion on a yearly basis, about four times the total public investment in R&D in Finland.³⁹

Another characteristic of the Finnish economy is the important role played by a small group of large firms: 0.2% of all firms and prominent among them, Nokia. Although the

³⁷ http://ec.europa.eu/enterprise/networks/eic/pdf/nfactsheets-eic/EUG_5_0100_Country_FI.pdf.

³⁸ The Federation of Finnish Technology industries,
<http://www.teknologiateollisuus.fi/english/index.php>

³⁹ The Federation of Finnish Technology Industries, A hundred years of technology industries in Finland Year Book 2006, 2005 Statistics,
http://www.teknologiateollisuus.fi/files/11946_Vuosikirja_lopullinen.pdf

larger majority of the firms in Finland are small and micro in size, together with the medium-sized companies they only account for about half of the total production output and only 61.7% of the work force. The average firm in Finland has six employees, which is also the European average.⁴⁰

The business climate is good in Finland, a country which benefits from above the average economic growth, stable socio-economic conditions, high quality of life, short time needed to set up a business, highly skilled personnel, relatively easy access to bank loans.⁴¹ Less advantageous are the high personnel costs and the shortage of skilled workers in the technologies industries. The latter can be attributed to the growth in this sector over the past years, above the average and exceeding the forecasts.

According to the OECD report on ICT Diffusion to Business, already by 2004, Finland had reached levels of ICT readiness in business well above the OECD average. Investments in ICT equipment and ICT-related skills were also high and consistent over longer periods of time. However, the same report points out that, although the overall performance was very good, not all sectors of the economy were performing equally well, especially with regard to the penetration of advanced ICT applications and ICT-related productivity.⁴² Also, there are significant differences between regions (in particular between south and the sparsely populated north and Lapland) as regards ICT availability, adoption and use.

The *second subsection* of this chapter will present the national strategy (the overarching policy programmes) with respect to ICT, innovation, SMEs and growth.

The *third subsection* will address the policy instruments. How does Denmark stimulate the uptake of e-Business by firms, across sectors and value chains? Given the stage of developments in Finland (and the Netherlands), we will focus on policy instruments other than framework conditions for e-Business.

The *fourth subsection* is an assessment of the policy mix for e-business. It is based on interviews with two independent Finnish experts and an assessment by TNO. Given the policy questions in the Netherlands, one of the main topics in the expert assessment is the design and impact of policy instruments to stimulate e-Business across sectors and value chains (digital chains).

⁴⁰ Ministry of Trade and Industry, Entrepreneurship Policy during Prime Minister Matti Vanhanen's Term of Government 2003-2007, Entrepreneurship Policy Programme - Final Report, Edita, Finland, 2007,

[http://julkaisurekisteri.ktm.fi/ktm_jur/ktmjur.nsf/All/0D333BE5864103BDC22572A6002FDDD6/\\$file/jul11esi_2007_eng_netti.pdf](http://julkaisurekisteri.ktm.fi/ktm_jur/ktmjur.nsf/All/0D333BE5864103BDC22572A6002FDDD6/$file/jul11esi_2007_eng_netti.pdf)

⁴¹ European Commission, EOS Gallup Europe, Eurobarometer, SME Access to Finance, September 2005,

http://ec.europa.eu/enterprise/entrepreneurship/financing/docs/sme_access_to_finance_survey_summary_2005.pdf

⁴² OECD, ICT Diffusion to Business, 2004,

http://www.oecd.org/document/6/0,3343,en_2649_33757_34227910_1_1_1_1,00.html

3.2 National strategy

The first Finnish strategy for the information society was formulated as early as 1994. The original strategy was subsequently adapted to correspond to the new realities of fast technological development, adoption, use, corresponding social changes, and international challenges.

Critical for the success of the Finnish national strategy in the fields of innovation, ICT, entrepreneurship, as well as other fields, has been continuity. So far, political changes have not been accompanied by drastic policy changes. On the contrary, each new strategy set forth the general lines of the previous ones ensuring continuity and consistency.

As of 2003, the Finnish government moved towards more horizontal and holistic policies. The Action Plan which was adopted in 2003 includes programmes to address four major subjects: entrepreneurship, employment, the information society, and citizen participation.⁴³ It was estimated that horizontal policy measures could promote better co-ordination and continuity and help avoid duplication or overlapping, thereby improving public performance as well as policy efficiency. Despite the reorientation towards horizontal policies, there still is attention for policy implementation that is sector-specific and user-centric.

Through its Information Society Programme, the Finnish Government promoted the use of ICT with a view to improving the competitiveness and productivity of the Finnish economy, equal opportunities for social and regional development and generally improve the quality of life. The programme was seen as important means to maintaining the leading position held by Finland as producer and user of ICT. The programme calls for close co-operation between the public and private sectors. The Entrepreneurship Policy programme, too, had as main objectives improved competitiveness and productivity.

The new National Knowledge Society Strategy for 2007-2015 was drafted in 2006 as part of the implementation of the above-mentioned Information Society Programme. It takes into account not only changes occurred nationally but also internationally since the original Programme had been drafted. An additional element of the new implementation strategy is the so-called 'Finish phenomenon'. It refers to the remarkable success of Finnish economy of the past years as well as to what the policy document describes as "the transformation of Finland into an internationally attractive, human-centric and competitive knowledge and service society. Development of skills and creativity, bold renewal of structures and operating models, and efficient utilisation of technology will make this possible, even under conditions of increasing global competition."⁴⁴ According to the same policy documents, the vision of the National Knowledge Society Strategy is 'Good life in information society'. The main themes of

⁴³ Ministry of Trade and Industry, Entrepreneurship Policy during Prime Minister Matti Vanhanen's Term of Government 2003-2007, Entrepreneurship Policy Programme - Final Report, Edita, Finland, 2007,
[http://julkaisurekisteri.ktm.fi/ktm_jur/ktmjur.nsf/All/0D333BE5864103BDC22572A6002FDDDD6/\\$file/jul11esi_2007_eng_netti.pdf](http://julkaisurekisteri.ktm.fi/ktm_jur/ktmjur.nsf/All/0D333BE5864103BDC22572A6002FDDDD6/$file/jul11esi_2007_eng_netti.pdf)

⁴⁴ Information Society Programme, Prime Minister's Office, The National Knowledge Society Strategy 2007-2015: A renewing, human-centric and competitive Finland, September 2006

the new strategy are the development of knowledge; application of existing and new information; creativity and innovation; structural and functional reforms; networking and the utilisation and development of technology.

The programme is illustrative for the holistic approach to policy making that is favoured in Finland, in ICT, innovation and other fields (and linking these fields). All related aspects, such as governance, technical, economical, social, cultural, etc. are addressed in policy documents and – to some extent – programmes. Programmes are based on close cooperation between the public and private sectors.

The total public investment in R&D in the area of science, technology and information society for the year 2006 was of 566 million, with an additional 1.113 million through the university sector which accounted for 9.9% and 19.4% respectively of the total R&D expenditure in this area.⁴⁵

3.3 Selected policy instruments

Awareness

- **eAskel (eStep)** is a programme offered by Employment and Economic Development Centres in Finland. The programme aims to create and increase awareness of the possibilities offered by the use of ICT by firms. The programme also offers independent business advice to SMEs and helps them draw business and strategic plans to include ICT at various stages of the production process. Such plans also take into consideration the supply chains of which the participating firms are a part. The programme aims to develop long-term solutions with a focus on e-business. Solutions developed as part of the programme are expected to impact positively the productivity of the firms taking part in the programme and constitute best practices for other SMEs interested in using ICT in their production process
- **PK-ICT⁴⁶** is a programme initiated by TEKES in 2003 to promote a wider and more efficient use of information technology by SMEs. The programme is ongoing and can be seen as a continuation of the eAskel programme (see above). The approach is much broader than awareness. The objectives are increased productivity, competitiveness and further development through the adoption and use of ICT. The programme focuses on optimal and innovative use of existing means rather than developing new ICT. Projects are co-financed by TEKES and the participating firms, and are carried out with the help of independent advisors. Project topics so far have included ICT strategy, logistics, purchasing, resource planning, and e-commerce readiness. More recently, the programme started addressing more explicitly the topic of networks (or value chains), for firms from both the manufacturing (technical) and service sectors, in terms of technological support or infrastructure so well as accompanying services.
- TIEKE administers a DataBank containing IT experiences of SMEs. TIEKE is a non-profit network for organisations in the field of ICT and the information society. Members include firms (ICT supply and demand) but also ministries.⁴⁷

⁴⁵ Statistics Finland, Science and technology statistics, 2007, http://www.stat.fi/tup/suoluk/suoluk_tiede_en.html

⁴⁶ <http://www.tekes.fi/pk-ict>

⁴⁷ http://www.tieke.fi/in_english/about_tieke/.

- Generic information material on SMEs and ICT is currently being made sector specific in a programme administered by TIEKE.

Supply side: equipment, software and services

- In general, e-Business programmes have a clear focus on the demand side. The development of e-Business software and services can be a (small) element of these programmes. Firms within the ICT sector but also consultants can take part in consortia that are driven by the needs of ICT users. There also programmes in the field of R&D and innovation that address the supply side of the ICT sector, e.g. equipment and software.
- Financial administration software suppliers are encouraged to integrate electronic invoicing into the software. This is part of the invoice programme of TIEKE, that is also linked to standardisation and e-procurement programmes. TIEKE coordinates the eInvoice Forum.⁴⁸

Trust and security

- This remains one of the priorities. It is an important topic in the new strategic plan for the information society. It involves a number of initiatives to enhance user trust in ICT and to ensure the security of ICT networks and applications. This is mainly done via information and coordination instruments.

Standardisation and interoperability

- As of 2006, the Electronic Commerce and Digital Contents Section's initiatives were implemented, with the aim of accelerating the introduction of standardised electronic identification and signatures, in order to create business opportunities, especially for SMEs.

E-government and E-procurement by government

- In 2007, Finnish government introduced an electronic billing / electronic invoicing procedures that is perceived to be attractive for SMEs.
- The public sector must redesign their service interfaces and make them more user-friendly so that SMEs are encouraged to make more extensive use of the public administration's electronic services (eGovernment services for business).

Skills and education

- The Ministry of Trade and Industry together with the Ministry of Labour, universities, business and industry will organize trainings designed to develop the competence level of employees in SMEs. These trainings are aimed in particular at entrepreneurs but also at the employees of existing enterprises. They will emphasise the use of ICT to promote business activities.

Sector initiatives and digital collaboration

- A programme to stimulate ICT use in a specific sector is KITARA. The target group is the mechanical, civil and automation engineering sector.⁴⁹ The programme

⁴⁸ http://www.tieke.fi/in_english/_ebusiness/einvoice_forum/.

⁴⁹ http://ec.europa.eu/enterprise/e-bsn/policies/national/finland/kitara_en.html.

addresses the use of ICT within firms (especially SMEs) and in value chains. The development of ICT solutions is included in the programme. This means that research institutes and ICT firms are involved, in addition to SMEs and other firms.

- Finnish government has supported the development of the Finnish Craftnet, an online marketplace for crafts products, services, entrepreneurs, shops and experts.⁵⁰
- The programme VERSO - Vertical Software Solutions - was launched by TEKES. The objective is to stimulate digital business processes and to promote expertise relating to business activities and internationalisation within businesses. Development and use of software solutions is at the heart of VERSO. A first set of ICT using sectors was selected: finance, trade, construction, telecoms and other operator solutions. A second set of clusters will be selected based on the results of a survey. More than Kitaro, the programme integrates supply and demand side stakeholders. Research and pilots will be launched on topics such as internationalisation, new business models (open standards, open-source) and the overall quality of software solutions (processes, data security, usability), for different customer sectors. VERSO is a combination of financial and coordination instruments.
- The PK-ICT programme that was mentioned above, includes projects to stimulate digital collaboration (digital supply/value chains). As yet, there is no clear preference for specific sectors.
- With the aid of TEKES, the existing compatibility competence centres are to diversify their activities with the aim of stimulating SMEs to switch to e-Business. Digital collaboration is one of the main topics.
- The Ministry of Trade and Industry and the Ministry of Labour are in charge of information programmes to promote the introduction of ICT, new business models and new ways of organising work within SMEs and across firms.

Regional initiatives

- Various initiatives are aimed at the areas of Lapland and North Finland (e.g. the Seinäjoki region). The main objectives are to expand broadband coverage, access to electronic assistance, and increase awareness of e-Business and other ICT solutions. Such measures are designed to help bridge the digital divide between these sparsely populated areas and the rest of Finland. In general, these regional initiatives are oriented towards 'the basics' rather than innovative use of e-Business solutions within sectors and value chains. The Seinäjoki Technology Centre is more ambitious. It also targets the ICT supply side. Regional initiatives are supported by Regional development agencies, Chambers of Commerce and sector organisations (industry associations).

⁵⁰ <http://www.craftnet.fi/>.

3.4 Expert assessment

The description of the policy mix in Finland (see above) was discussed with two Finnish experts on e-Business, ICT and innovation policy. The experts were invited to assess the policy mix and to explore other factors that have contributed to the substantial use of e-Business by Finnish firms. We talked to *prof. dr. Jukka Heikkilä*, Dean of the Department of Computer Science and Information Systems University of Jyväskylä, Finland, and to *Mr Timo Simell*, Development Manager Learning technologies at TIEKE, the Finnish Information Society Development Centre. Eight key messages emerged.

• **Many SMEs are in the first phase of e-Business**

Finland scores well in e-Business statistics, but many SMEs are still in the early phase of e-Business implementation. For example, they have launched a website with information about their products, they buy things on the internet or with email. The majority of SMEs is not yet using ICT for transactions and collaboration. Still, progress is being made and SMEs recognise the advantages and potential of e-Business. It takes a number of years before SMEs move up the e-Business adoption ladder. The barriers are well known (skills, financial resources, scale, lack of partners, customised and cheap solutions, etc.). Many steps can be made, in Finland and other countries. The perception that the added value of e-Business is small for (very) small firms can be challenged. If firms are small, collaboration is crucial. e-Business can become the main tool for collaboration, outsourcing, value networks, open business models, open innovation, etc. It was mentioned that the use of ICT is crucial to obtain a ‘cooperative advantage’ (a concept that is inspired by the concept of competitive advantage of large firms). Of course, collaboration among SMEs and other firms is also influenced by the overall business climate.

• **Business language**

Finland has observed a divide between the business language of SMEs – pragmatic and to-the-point – and the complex documents on e-Business. Technical, legal, economic and policy specialists write texts that not always appeal to SMEs. Especially ICT terminology can create a problem because many SMEs do not have a special ICT department or an in-house expert on ICT issues. Best practices and how-to-guides should be pragmatic. Any information overload must be avoided. For example, what are the steps and questions that SMEs can use when selecting ICT solutions? How to prevent security issues? The topics and questions can be different from one sector to the other. Because the ‘business language’ issue emerged in Finland, a range of ‘translations’ is now being prepared. The programme is managed by TIEKE, whose members include many SMEs and other firms that use ICT (and firms that provide ICT). The body of international and national documents on e-Business is ‘translated’, segmented and customised for specific topics and sectors. The project is running for two years now.

• **Information must be linked to assistance**

E-business information resources – in business language – must include clear references to contact persons for additional support. Information on paper and on websites is known to raise questions by readers. What exactly is meant? Does this apply to my

firm? Where do I start? Do I have the required PCs and systems? First-line support can be provided by consultants, university researchers, PhD students and other students in relevant areas (and with communication skills). This helpdesk-like service can be provided at low costs. To charge SMEs a small amount of money can generate income for the service and it can make sure that the service is used efficiently. The service can create the contacts and trust for next steps in knowledge transfer and implementation trajectories.

- **Personal contact via regional, local and sectoral networks**

Personal contact, including face-to-face contact, is highly effective to inform and assist SMEs. This is relevant for all phases and elements of e-Business, from awareness to implementation and follow-up support. Personal contact can also be used to recommend relevant documents, case studies and how-to-guides. Many SMEs will learn about e-Business through personal contact rather than via information documents (see above the remarks on information documents: business language, linked to assistance). Because the number of SMEs is very high - in Finland and many other countries - several networks must be used to reach all SMEs. In Finland, national policy makers use regional and local networks such as economic agencies, regional development agencies, city development agencies and Chambers of Commerce. Sectoral organisations (business associations) are involved as well. Finland also uses a network of local universities and adult education centres. For instance, there are local offices and local helpdesks that are staffed by students and experts from universities. In general, the approach can be summarised as decentralised implementation of national e-Business programmes. Small sectors and remote areas will require an extra effort.

- **The role of sectoral organisations could become more important**

Finnish experts stress that sectoral initiatives become more important. Because more SMEs are aware of e-Business and because the framework conditions are in place (legal, broadband, etc.), an important challenge is to use ICT for transactions and collaboration (including digital value chains). Here, the target of policy programmes is no longer the individual SME but its sector or business partners. This implies that sectoral organisations (industry associations) become more relevant to involve SMEs and to trigger firms to form consortia and to launch an e-Business project. Again, this is part of the decentralised approach in Finland. National and regional policy makers can involve sectoral organisations, yet still remain in control of the programme and instruments such as co-funding of projects. Furthermore, this approach allows for business language and personal contact.

- **Business and innovation ecosystem**

To some extent, e-Business is about implementation and business processes. To some extent, e-Business is about organisational innovation, product innovation and services innovation. A strict demarcation is difficult to make and not very useful, at least from the perspective of firms (if public support is involved, state-aid rules require a demarcation between innovation and implementation). Still, both 'worlds' may have their own players and policy, e.g. economic/business policy and R&D/innovation policy. ICT policy is known to cut across both policy domains (and other policy domains such as competition policy). Finland explores a more integrated policy approach. Policy makers stimulate the business and innovation ecosystem, that includes

firms, organisations in the knowledge domain, public agencies and users. If the links between business and knowledge are well developed, this is relevant for the development of e-Business solutions as well as for the implementation of e-Business. Knowledge that was used for development can also be used for implementation (e.g. helpdesks staffed by university researchers) and lessons from implementation can feed back into the development of better solutions. For example, how to develop solutions for SMEs and for specific sectors? Policy makers – in the field of business, ICT and innovation – can stimulate the ecosystem via support for R&D, networking, dissemination, etc. The relevance of the ecosystem stretches far beyond e-Business or ICT topics in general. To stimulate the overall ecosystem rather than to subsidise solutions on one topic, implies that policy makers stimulate flexibility, short and long term impact. If new topics emerge, the ecosystem can quickly adapt. It was recognised that the approach fits Finland with its substantial ICT manufacturing sector. However, the approach is relevant for other countries too, because R&D and innovation also involves software and IT consulting firms.

• **Assist, but maintain incentives for firms to innovate in ICT use**

Information documents, helpdesks, how-to-guides and best practices can make life easier for SMEs and other firms. However, it must be avoided that all firms implement the same basic ICT solutions. Also note the time-lag between the development of ICT solutions, the preparation of e-Business information documents and implementation by SMEs. In the meantime, new solutions and features have been developed. To some extent, this can be mitigated by personal contact and by close ties between business and knowledge organisations. But more can be done. The instruments within an e-Business programme should allow for personalised and innovative solutions. In large e-Business programmes, policy makers may include one instrument to explicitly stimulate e-Business projects that are highly innovative. Firms and sectors must be challenged to explore unique and innovative ICT solutions (or to use existing ICT in an innovative). This can have a real impact on productivity, quality and competitiveness. ICT is not a standard tool but something that can be used to create a competitive advantage in national and international markets.

• **Digital natives and the future of e-Business policies**

The label digital natives is applied to people that grow up with the internet, games and other ICT applications. The label can also be used for firms that were created in a period where ICT is a natural element of all its activities, e.g. start-ups in the ICT sector and start-ups in services and manufacturing sectors such as banking, consulting, logistics and retail. In older firms, digital natives will be hired. For the next generation of managers, employees and firms, it must be reconsidered whether and how e-Business policy can be of added value. Do they need advice with respect to ICT? Are the skills of digital natives relevant for the use of ICT in business processes? Does this imply that e-Business policy can be ended within ten or fifteen years? Or does this imply that a light and horizontal approach is sufficient? This type of questions on e-Business are relevant for ICT policy in general. Strong progress in ICT will trigger questions on the added value of ICT policy and ICT programmes, especially if ICT becomes an element of policy domains such as education policy, innovation policy and economic/competitiveness policy.

4 Six programmes for digital transactions and collaboration⁵¹

4.1 Information Technology Online (Australia)

INFORMATION TECHNOLOGY ONLINE (ITOL)	
Country or region	AUSTRALIA
Rationale, e.g. which market and system failures	<p>ITOL is an Australian Government funding program administered by the Department of Communications, Information Technology and the Arts (DCITA) designed to accelerate the national adoption of e-business solutions, especially by small to medium sized enterprises (SMEs). It supports the take up of collaborative e-business across a wide range of industry sectors by offering competitive funding.</p> <p>One feature of ITOL is its emphasis on collaboration between and among industry groups since these industry groups are seen as having a strategic role in diffusing e-commerce technologies and encouraging e-commerce uptake among SMEs.</p> <p>The Program provides funding on a competitive basis using a merit selection process. Applications are assessed and ranked in order of merit according to: how the project demonstrates an innovative e-Business solution; what specific market needs the project addresses; how well the consortium can undertake the project; and whether the project represents good value for money. It is a condition of funding that projects be completed within 12 months.</p> <p>Applications for funding must be consortium based, with at least three organizations that are able to demonstrate broad-based industry support for the project (such as the involvement of key organisations or stakeholders in the industry for which the B2B e-commerce solution is being proposed).</p> <p>(Source: 1, 3)</p>
Objectives	<ul style="list-style-type: none"> • Encourage collaborative industry based projects that aim to accelerate the adoption of business-to-business (B2B) e-commerce solutions across a wide range of industry sectors, especially by clusters of SMEs • Foster the awareness and strategic take up of innovative e-commerce solutions within and across industry sectors which deliver sustainable economy wide returns and contribute to increased competitiveness. <p>(Source: 1, 3)</p>
Type of policy instrument(s)	The ITOL Program aimed to accelerate Australian adoption of B2B e-commerce solutions by providing seed funding for diverse activities that encourage collaborative industry based projects. In particular, this Federal grant program

⁵¹ Because of the ‘fact sheet’ character of this chapter, many pieces of text are taken from the official documents and websites. The sources are listed for each of the six programmes.

	<p>aimed to enhance the adoption of b2b practices across a wide range of sectors, especially by clusters of SMEs; and foster awareness and strategic take up of innovative e-commerce solutions within and across industry sectors in order to deliver sustainable economy wide returns and contribute to increased competitiveness.</p> <p>The initiative provided funds, guidance, published case studies, published how-to guides (such as electronic payment guides for SMEs), organized seminars and exhibitions, created a dedicated internet site.</p> <p>(Source: 1, 2, 3)</p>
Main topics and barriers to be addressed	<p>ITOL encouraged industry groups and small business to identify and adopt commercial uses of the Internet to support productivity and profitability. The ITOL program aimed to be a catalyst for industry groups to work collaboratively to solve common problems on an industry wide basis, rather than working individually and developing multiple solutions and in some cases unnecessarily duplicating efforts. The preferred e-business solutions were open and inclusive for all participants.</p> <p>(Source: 1, 3)</p>
Target group: sector(s)	<p>The initiative was aimed at a wide range of sectors as diverse as agriculture, health and pharmaceutical, building and construction, automotive and welfare groups. These projects have been located in regional and metropolitan areas and in all Australian states and territories.</p> <p>(Source: 1)</p>
Target group: Business, SMEs, Micro, Small, Medium sized enterprises	<p>The initiative was aimed at a wide range of sectors, especially by clusters of SMEs.</p> <p>Applications for funding had to be consortium based, with at least three organizations able to demonstrate broad-based industry support for the project. Organizations were defined (for ITOL purposes) as companies, tertiary institutions, industry/business associations, government agencies, educational institutions and other not-for-profit organizations.</p> <p>(Source: 1, 2, 3)</p>
Policy makers and public agencies involved	<p>Responsibility for the administration of ITOL was transferred from the National Office for the Information Economy to the Office for the Information Economy in the Department of Communications, Information Technology and the Arts (DCITA)(2004) and later (2006) to the Department of Broadband, Communications and the Digital Economy.</p>
Start date and end date	1996 – 2007
Budget	<p>During the course of ITOL, which included 14 funding rounds, the Australian Government allocated more than AUD12 million (€7 million) to 110 e-Business projects. Funding per project was of up to 50% of the total eligible project costs or a maximum of AUD200,000 (almost €120,000).</p> <p>(Source: 1, 3)</p>

Monitoring and impact assessment: methods, indicators and indications

Mid-term evaluation: Forging and Managing Online Collaboration: The ITOL Experience available online at http://www.dcita.gov.au/communications_and_technology/publications_and_reports/2002/december/forging_and_managing_online_collaboration_the_itol_experience2

Performance Indicators in 2002-03 for ITOL included:

- knowledge creation (number of publications);
- knowledge diffusion (number of case studies developed to disseminate ITOL learning);
- collaboration (number of applications received per call round; number of collaboration arrangements forged in a given year) and
- awareness (number of persons/organizations accessing the programme in a given year; frequency of media coverage of the programme in a given year; number of persons accessing the internet site of the programme; number of people attending awareness raising meetings and exhibitions during a given year).

The mid-term evaluation revealed that in most (80%) of the projects surveyed, collaboration for the project was initiated by the principal grant recipient, commonly an industry association or an IT or management consultant. In a number of cases (20%), the consortium partners had worked together before. Consortium partners were generally (54%) based in both metropolitan and non-metropolitan areas (sometimes in multiple states). 'Co-opetition' was involved in 30% of the projects surveyed where members of the consortium were collaborating with their competitors.

The mid-term evaluation included a survey. The survey results showed that the majority (69%) believed project outcomes were better achieved because of collaboration and sharing of resources and there was ample evidence from the research that real collaboration is occurring across the different ITOL projects.

The research showed that the majority of all analysed ITOL collaborative projects could be regarded as successful. 63% of the projects surveyed said their consortium satisfactorily achieved desired outcomes with a further 12% saying they exceeded their original objectives. Of the 12 projects that had already been completed at the time the survey was conducted, most said their consortium members kept on working together on the same or other projects even though the official grant period had already ended. 69% said project outcomes were better achieved due to the combined efforts and contributions of the different consortium members. Only 17% said the project could have easily been implemented with or without a consortium. On the other hand, 6% said project implementation was made more difficult because of problems with partners, or it would have been easier to implement the project as a single organization rather than as a consortium.

Although most survey respondents identified 'operational problems' alongside 'technology' problems as having most influenced the outcome of their ITOL project, the in depth interviews revealed 'change management' and 'relationship' issues as more crucial determinants to the success of e-commerce collaboration. Although still posing some concerns, those relating to 'standards development' were regarded as not as crucial as the other problem categories.

Across a broad range of projects, many project participants have come to realise that managing people, relationships, and business processes is harder than managing technology. And so the choice of project manager is crucial to the

	<p>project's success.</p> <p>The research also revealed the importance of linking alliances with business strategy, the need to devote time for alliance preparation; and to have a precise outline of performance expectations, goals, and responsibilities. Vital also were: the need for industry association support; the importance of trust among project partners and beneficiaries; the need for projects to be driven hard, and the need for personal representation and effective communication.</p> <p>In each ITOL round the industry solutions have demonstrated high levels of innovation and reflected emerging e-business applications such as e-marketplaces, wireless solutions, value chains, introduction of industry standards and promoting interoperable solutions.</p> <p>(Source: 1, 2)</p>
<p>Contact person</p>	<p>General e-mail address: ITOL@dcita.gov.au</p> <p>Mrs Anne Liddell ITOL Manager Information Technology Online (ITOL) Program Department of Communications, Information Technology and the Arts itol@dcita.gov.au</p>

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- 2 Mid-term evaluation: Forging and Managing Online Collaboration: The ITOL Experience, available at http://www.dcita.gov.au/communications_and_technology/publications_and_reports/2002/december/forging_and_managing_online_collaboration_the_itol_experience2
- 3 OECD, Information Technology Policy Survey, Australia, 2004, <http://www.oecd.org/dataoecd/7/61/35180084.pdf>

4.2 CANARIE e-business Program (Canada)

CANARIE e-business Program	
Country or region	CANADA
Rationale, e.g. which market and system failures	<p>CANARIE is Canada's advanced network organization, a not-for-profit corporation funded by Industry Canada to facilitate the development and use of next-generation research networks and the applications and services that run on them.</p> <p>The e-Business Program was developed in support of CANARIE's Phase III Program objectives: to catalyze the development and diffusion of technologies, applications and services that may underpin and/or use advanced Internet infrastructure, and are based on open-systems standards.</p> <p>CANARIE's e-Business Program was a shared-cost funding program that would assist businesses, universities, and research institutions in developing, demonstrating, promoting and diffusing advanced innovative e-Business applications in a distributed environment.</p> <p>The eBusiness Program was project-oriented and designed to provide matching funds for a select number of e-Business development projects that aimed to accelerate significantly the development, adoption and implementation of e-Business solutions in Canada, and thereby contribute to national economic competitiveness.</p>
Objectives	<p>The overall objective of CANARIE's E-business Program was to assist Canadian industries in becoming world leaders in the development and use of e-Business, including applications, business models, and collaborative approaches. That was to be achieved through assisting organizations, especially SMEs, to develop and deploy E-business strategies and applications. Of special interest were strategies and applications that related to such business models as supply chain management, sell-chain management, customer relationship management or e-government initiatives, and which could exploit the capabilities of broadband networks.</p> <p>The specific program goals were to encourage innovative development projects that would address structural impediments and address opportunities for competitive advantage, which can also lead to new spin-off economic activity.</p> <p>Collaborative projects were seen as especially valuable, since an important objective of the program was to create leverage and have follow-on impacts. The undertaking of joint projects involving key players in a business sector or, more broadly, a "community of interest", was one means of diffusing advanced e-Business applications and services. In this context, a 'community of interest' might include, for example: users, suppliers, sources of venture funding, research institutions and related intermediaries such as legal firms</p>

	and industrial associations, and/or organizations participating in a supply chain in a particular industrial sector. Collaboration among key players on the 'build' side of the project was also seen as a means of increasing the likelihood of success by combining the skills and expertise of the participants.
Type of policy instrument(s),	<p>The program provided financial support (matching) for developing innovative e-Business applications, co-operation, and (diffusion of) best practices.</p> <p>This program aimed to encourage the definition and implementation of innovative projects, especially collaborative projects that would accelerate the development, demonstration, promotion and diffusion of e-Business strategies, applications and services.</p> <p>Projects that address e-Business awareness building or education and training for e-Business were <i>not</i> within the scope of this program.</p>
Main topics and barriers to be addressed	<p>The CANARIE program aimed to create synergy and momentum through collaborations and virtual cluster activity.</p> <p>The program supported the following two classes of projects:</p> <ul style="list-style-type: none"> • Projects developing innovative e-Business solutions relating to 'vertical' issues for enterprises and organizations that are part of an industry sector or segment or some other 'community of interest'. For example: an innovative supply-chain management or 'e-market' solution. • Projects developing innovative e-Business solutions relating to more generic technologies or infrastructure enablers that lie 'horizontally' across a number of sectors. For example: projects addressing a specific challenge or specific structural barrier to the widespread adoption of e-Business, such as customer communications, marketing or security concerns.
Target group: sector(s)	Participants could be from both the public and private sectors. The program was horizontal, targeting a broad range of sectors.
Target group: Business, SMEs, Micro, Small, Medium sized enterprises	<p>SMEs, defined as firms with less than 500 employees, were the main focus of the program.</p> <p>The lead contractor had to carry on business in Canada and be a Canadian corporation, or other Canadian legal entity.</p>
Policy makers and public agencies involved	<p>Industry Canada via its agency CANARIE.</p> <p>Work was carried out in close partnership with industry associations.</p>
Start date and end date	1999 - 2004
Budget	CANARIE budgeted up to CAD26 million (about €17 million) over the period 1999-2004 for e-Business-related acceleration activity.

	<p>CANARIE did not established strict upper or lower limits on the funding levels to support individual projects. There was a target range of CAD0.5 million – 2 million (€300,000 – 1.3 million). This amount could not represent more than 50% of the total funding for the project. If funding for the project included using other sources of government funding, then the federal government's stacking rules applied. The total federal, provincial and municipal assistance to a project could not exceed 75% of eligible costs. Eligible costs included: direct labour, direct materials, special purpose equipment, sub-contractors and consultants, travel costs and other costs (such as testing costs, specialized training costs, costs of patents and copyright searches and filing, rental costs, and audit costs that were a result of a CANARIE requirement).</p>
<p>Monitoring and impact assessment: methods, indicators and indications</p>	<p>Not yet available.</p>
<p>Contact person</p>	<p>Mrs Susan Baldwin Chief Administrative Officer CANARIE susan.baldwin@canarie.ca</p>

References

CANARIE, programme internet site:

- <http://www.canarie.ca/about/about.html>
- <http://www.canarie.ca/funding/ebusiness/faq.html>
- <http://www.canarie.ca/funding/ebusiness/guidelines.html>

4.3 PROZEUS (Germany)

PROZEUS - e-Business practice for SMEs (e-Business-Praxis für den Mittelstand)	
Country or region	GERMANY
Rationale (e.g. market and system failures)	<p>Prozeus stands for processes and standards ('prozesse und standards'). The initiative promotes the adoption of e-business among SMEs based on existing, proven and recognised standards. Studies have revealed the use of best practices as one of the most effective means of promoting the use of ICT, standardization, integration of processes in the value/distribution chain, etc. The projects supported by Prozeus are closely monitored and documented, and the results are made available to other SMEs to serve as 'ready-to-use' examples. Special emphasis is given to the practical uses of the standards/processes developed and the commercial benefits to be derived from employing them.</p> <p>One of the reasons for this public initiative was the increasingly more digitalized nature of inter-firm processes (e.g. procurement, logistics, sales and co-operative processes during product design and development). At the same time, SMEs, especially those in the manufacturing, retail and service sectors, are often reluctant to invest in ICT, make organizational changes, etc. necessary in order to be able to participate in the digital value chains (B2B). Prozeus addresses both these issues.</p> <p>(Sources: 1, 2)</p>
Objectives	<p>The general objective of the Prozeus initiative is to promote the e-Business competence of SMEs. Integrated processes and standards are competences that would enable SMEs to compete successfully in the global market.</p> <p>Prozeus aims to introduce new ICTs to SMEs and support the use of standards related to the new technologies.</p> <p>The main objectives of the PROZEUS initiative are:</p> <ul style="list-style-type: none"> • to promote transparency in e-business by developing know-how and sharing this information with others; • to increase security in planning and investment decisions for SMEs by providing recommendations for e-business standards and applications; • to increase the practical knowledge and managerial understanding of e-business by disseminating best practice examples; • to empower SMEs by enabling them to implement e-business solutions on their own. <p>The dissemination of best practices for co-operation in the value/distribution chain is one of the main objectives of the PROZEUS initiative. Pilot projects can prove that even small businesses are able to adopt complex and integrated business processes successfully. Detailed test results, both positive and negative, are published and the new insights gained from these companies' practical experience are made available to help other SMEs adapt and improve their own e-business activities.</p>

<p>Type of policy instrument(s),</p>	<p>The programme entails best practice co-creation and dissemination: selected SMEs implement e-business standards to serve as examples to other SMEs. It also makes available grants and consulting services; encourages the setting up of networks of experts.</p> <p>Specifically, Prozeus initiated five working-groups of standardisation and e-business experts from the public and private sector. The working groups consist of about 5-7 experts each, and focus on issues such as standards for identification, product classification and catalogue interoperability. The working groups make recommendations, issue policy advice and make available their gathered knowledge (free of charge as online downloads).</p> <p>Moreover, Prozeus encourages the creation of multiplier networks: experts inform and train so-called 'multipliers' from employers', industrial and trade associations, as well as representatives of IT service companies, on the subject of e-business and the dissemination and application of e-business standards.</p> <p>An additional activity is that of information dissemination: various resources are made available for download online and at no cost (e.g. documentation of best practices, various how-to e-business-related brochures and leaflets, etc.).</p> <p>(Sources: 1, 2, 3)</p>
<p>Main topics and barriers to be addressed</p>	<p>The increasingly higher degree of digitalization of (inter-firm) processes at all levels of the value/distribution chain and, concurrently, the slow pace of ICT adoption by SMEs. SMEs are often reluctant to invest in ICT, make organizational changes, etc. necessary in order to be able to participate in the digital value chains (B2B). Prozeus promotes learning by example.</p> <p>(Sources: 1, 2, 3)</p>
<p>Target group: sector(s)</p>	<p>SMEs from all sectors of the economy are eligible.</p> <p>However, calls for project proposals are geared towards specific sectors of the economy and towards companies active in the same or from closely related sectors. The pragmatic approach is evident in the selection of projects.</p> <p>The manufacturing, consumer goods and retail sectors have enjoyed particular attention within Prozeus. More specifically, selected projects involved SMEs from the following sectors: construction; chemical/pharmaceutical/health; services sectors; electrical/electronics equipment; food/non-food/ beverages; rubber/synthetic materials; logistics; the metal industry; heavy machinery; furniture; paper/publishing; and textile/sport apparel.</p> <p>(Sources: 1, 2, 3)</p>
<p>Target group: Business, SMEs, Micro, Small, Medium sized enterprises</p>	<p>SMEs (<250 employees) are eligible, if they have a maximum annual turnover of €50 million and are independent companies, not subsidiaries of a group.</p> <p>(Source: 1)</p>

Policy makers and public agencies involved	<ul style="list-style-type: none"> • The German Federal Ministry of Economy and Technology (BMWi) • Institut der Deutschen Wirtschaft Köln Consult GmbH (IW Consult) (implementation for the manufacturing industry) • GS1 Germany (implementation for the consumer goods sector) <p>(Sources: 1, 2, 3)</p>
Start date and end date	2002-2008 (covering phases one and two of the programmes). Negotiations are underway between Prozeus and the German Federal Ministry of Economy and Technology (BMWi) for a third phase to start in 2009.
Budget	PROZEUS is funded by the German Federal Ministry of Economy and Technology. The total budget is of €13 million. Funds are used for co-ordination, project grants and for the development and dissemination of information material about e-standards.
Monitoring and impact assessment: methods, indicators and indications	<p>The main operational target of the initiative was to initiate and support 25 SME e-business projects (during the first phase, i.e. until 2006) and 30 SME projects during the second phase (i.e. until the end of 2008). No other specific quantitative targets have been set for the programme as a whole.</p> <p>However, individual projects supported by Prozeus must have more specific targets. Proposals for projects are judged, among other criteria, on the proposed targets. Once selected to take part in Prozeus, progress and achievements are closely monitored: participating companies have to submit monthly progress reports about their e-business project.</p> <p>(Sources: 1, 2)</p>
Contact person	<p>Mr Ralf Wiegand Project leader Prozeus Institut der deutschen Wirtschaft Köln Consult GmbH Gustav-Heinemann-Ufer 84-88 50968 Köln wiegand@iwkoeln.de</p>

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4.4 TIC-PME 2010 (France)

TIC-PME 2010	
Country or region	FRANCE
Rationale, e.g. which market and system failures	<p>The adoption of ICT by the French economy was assessed to be lagging behind that of other European countries and the USA. That impacted negatively the competitive position of the French economy and slowed down the economic growth which translated into an estimated loss of up to 0.1% of GDP on a yearly basis.</p> <p>Following a number of public initiatives aimed at specific sectors of the economy (e.g. the automotive industry and the aeronautic industry), the French Government decided to reorganize its support strategy. Reasons for the change in strategy included: the need for a more efficient allocation of funds; the need for more continuity in order to favour the accumulation of experience; and the promotion of exchanges of best practices.</p> <p>(Sources: 1, 2)</p>
Objectives	<p>The objective of the TIC-PME 2010 initiative is to improve the competitive position of the French economy through an improved used of ICT.</p> <p>More specifically, the initiative aims to support co-operative initiatives of actors at various levels in the value chain, which have the potential to improve performance and competitiveness and focus on processes and exchanges that take place within the value chain. It is hoped that the initiative will stimulate firms to develop advanced uses of ICT such as the internet, RFID, etc. Such developments are deemed indispensable to firms, given the important role they can play in reducing (production) costs, improving the level of service to consumers, suppliers and other partners in the value chain.</p> <p>This should bring about improved exchanges of information between actors in the distribution chain/sector/profession or between several distribution chains. Such processes should bring about a 'digital distribution/value chain' and the redefining of processes from product creation to production and distribution.</p> <p>TIC-PME 2010 is intended as a laboratory, studying changes in production, distribution, etc. processes and the new 'digital distribution/value chain'.</p> <p>(Sources: 1, 2, 3, 4)</p>
Type of policy instrument(s)	<p>The initiative aims to develop best practices and standards to be implemented in specific value chains/sectors. To maximize effectiveness and relevance and avoid duplication, only one project per value chain/sector can qualify. This value chain/sector is excluded from any subsequent selection rounds.</p> <p>(Sources: 1, 2, 3, 4)</p>
Main topics and	Although the barriers (such as skills and financial resources) are not

barriers to be addressed	<p>mentioned explicitly, the selection criteria for project proposals signals the main topics to be addressed by TIC-PME 2010. This includes:</p> <ul style="list-style-type: none"> • the co-operative character of proposed projects (including expected impact, potential for reciprocity, and type of intellectual property proposed); • best practice potential; • availability of a large range of competences achieved through the co-operation of specialized firms in the same value chain; • economic, financial and technological viability and feasibility of proposed projects, also in the global marketplace; • the ability to finance and operate the project throughout its duration. <p>(Source: 1)</p>
Target group: sector(s)	<p>During the first round, 2005-2006, the following sectors took part: agriculture, forestry, fisheries, confections, footwear, watch making, furniture, automotive, the aeronautic and aerospace sector, mechanical equipment, electric and electronic components, wood and paper, transport and logistics, toys, perfumes and cosmetics, constructions and public works, finance, opticians, dental prosthetics, packaging and biotechnologies.</p> <p>During a second stage, TIC-PME 2010 intends to disseminate the results of the first stage (value chain best practices) to France's regions.</p> <p>(Source: 1)</p>
Target group: Business, SMEs, Micro, Small, Medium sized enterprises	<p>TIC-PME 2010 is a public initiative aimed at all French SMEs defined as firms with less than 250 employees, not a subsidiary, and with a maximum annual turnover of €50 million or alternatively a maximum equity of €43million. SMEs from all sectors are eligible. The benefits are expected to disseminate throughout the entire value chain.</p> <p>(Sources: 1, 3, 4)</p>
Policy makers and public agencies involved	<p>The French Ministry of Economy, Finance and Industry, the General Directorate for Enterprises (MINEFI / DGE) is the main co-ordinator of the project via the specially set up co-ordination body for ICT & SME. This co-ordination body is made out of public officials and industry representatives.</p> <p>Other organizations and agencies supporting the work of the co-ordination group for ICT & SME mentioned above include:</p> <ul style="list-style-type: none"> • a multisectoral group of organizations active in the field of digital standardization (AFNET - GS1 France - EDI France). • a working group of the MEDEF (the largest employers' organization) • the Assembly of French Chambers of Commerce and Industry (ACFCI); • various other trade organizations. <p>(Source: 1)</p>
Start date and end date	<p>The programme runs from 2006 to 2009. The first round of calls for proposals was launched in 2005. A second round of calls was launched in 2006. No subsequent round of calls has been planned.</p> <p>(Sources: 1, 3, 4)</p>

Budget	<p>At the time of the first round of calls for proposals (September 2005), the budget was €7 million. The initiative started effectively in 2006. The budget for the 2007 calls was €5 million.</p> <p>The subsidies can only be used finance activities in the pre-competitive stage (e.g. strategic studies, technology studies, supply chain advice) and the evaluation and dissemination stage (e.g. case studies and best practices). The participating firms must finance fully all other stages.</p> <p>(Source: 1)</p>
Monitoring and impact assessment: methods, indicators and indications	<p>Not yet available. The initiative is to be evaluated on a yearly basis and includes evaluations of each individual project.</p> <p>By 2007, about 20 digital supply chains had taken part in the initiative.</p> <p>(Source: 1)</p>
Contact persons	<p>General e-mail address: tic.pme2010@telecom.gouv.fr</p> <p>Mr Marc Moreau Director of projects Head of Information Society and Security Unit General Directorate for Enterprise Ministry of Economy, Finance, and Employment, 139, rue de Bercy 75012 Paris, France marc.moreau@industrie.gouv.fr</p>

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4.5 The supply chain management initiative (Ireland)

THE SUPPLY CHAIN MANAGEMENT INITIATIVE	
Country or region	IRELAND
Rationale, e.g. which market and system failures	<p>The Supply Chain Management programme is designed to provide the advice, funding and support needed in order to optimise performance from procurement, production, distribution and customer contacts (e.g. to tackle changing customer needs). This covers all aspects of the supply chain including production and operational issues.</p> <p>(Source: 1)</p>
Objectives	<p>The aim of the Supply Chain Management initiative is to:</p> <ul style="list-style-type: none"> • improve productivity and operational performance across all functional areas of the business; and • to develop the Company's logistics and supply chain management capability through the introduction of appropriate quality management and customer accreditation systems. <p>(Source: 1)</p>
Type of policy instrument(s)	<p>The main focus is on best practices.</p> <p>The initiative can offer participating firms assistance with diagnostic audits of current practice and performance report of the participating firms recommending an implementation programme to achieve maximum operational improvement at a pace the firm can afford. The agency can also provide consultants to facilitate the implementation process by providing technical and training support. Financial support is also available for in-company project management.</p> <p>(Source: 1)</p>
Main topics and barriers to be addressed	<p>The initiative aims to:</p> <ul style="list-style-type: none"> • enable participant companies to meet changing market requirements and become more globally competitive; • help them identify their operational performance gaps against best practices; • improve productivity; • improve logistics; • improve quality management systems; • encourage partnerships, co-operation; • provide a comprehensive approach to improving the supply chain/operations and achieve targeted and tailored improvements measures. <p>An additional focus of the initiative is constituted by customs requirements.</p> <p>(Sources: 1, 3)</p>

Target group: sector(s)	Manufacturing and internationally traded services. (Source: 1)
Target group: Business, SMEs, Micro, Small, Medium sized enterprises	Eligible firms are SMEs (10-249 employees) and High Potential Start Up companies (i.e. based on technological innovation; likely to achieve significant growth in 3 years (€1.0m per annum) and more than 10 employees). Furthermore, the firms must be export oriented; and ideally, led by an experienced team, with a mixture of technical and commercial competencies. (Sources: 1, 2)
Policy makers and public agencies involved	Enterprise Ireland, the Irish state development agency. Enterprise Ireland is funded by the Irish Government and part-financed by the European Union under the National Development Plan. (Sources: 1, 3)
Start date and end date	2007 - ongoing
Budget	Enterprise Ireland may approve funding of up to €50,500 or 70% of eligible Trainer costs and 50% of eligible Trainee costs, subject to maximum eligible expenditure of €75,000. Support under this initiative will form part of the €65,000 combined maximum level of support available for all funding awarded under Category 1 (Exploring New Opportunities) over a rolling two-year period. Category 1 includes funding for consultancy, recruitment of a key manager, feasibility studies, market research, mentor network service, trade fair participation and training support. (Source: 1)
Monitoring and impact assessment: methods, indicators and indications	Enterprise Ireland Programme management includes promotion, client assistance with project planning, review of a diagnostic audit and review of final close out report to determine impact on client company. This done via private sector consultants. A recent independent review of the programme found the programme to be a valuable intervention, delivering real benefits in a cost-effective way.
Contact person	Mr Hugh Stevens Programme Manager Supply Chain Management Initiative Enterprise Ireland hugh.stevens@enterprise-ireland.com

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4.6 The IT innovation network (South Korea)

THE IT INNOVATION NETWORK (BUILD-UP PROJECT)⁵²	
Country or region	SOUTH KOREA
Rationale, e.g. which market and system failures	<p>The IT Innovation Network (Build-up Project) is part of the National Strategy for Proliferation of e-Business started in 2001-2002. The Korean government is building IT innovation networks and B2B industrial networks to raise industrial competitiveness. In 2006, the government launched industry-specific networks through pilot projects.</p> <p>These networks are seen as an effective means to:</p> <ul style="list-style-type: none"> • promote innovation between companies and industries through the supply chain, production, and co-operative network; • boost productivity through the use of IT in the overall supply network ; • improve the competitive position of domestic firms (SMEs and large firms alike) and of the economy at large. <p>(Source: 1 & 2)</p>
Objectives	<p>The IT Innovation Network (Build-up Project) is an initiative of the South Korean Ministry of Commerce, Industry and Energy (MOCIE) to:</p> <ul style="list-style-type: none"> • create a foundation for production collaboration between large companies and SMEs by means of IT through the entire business value chain; • promote innovation throughout the economy. <p>(Source: 1 & 2)</p>
Type of policy instrument(s)	<p>The programme entails co-ordination and financial support for awareness, multi-sector dialogue, pilots, best practices and implementation.</p> <p>The programme involves the development of cross-company and cross-industry IT utilization models by applying new technology, such as RFID and</p>

⁵² An alternative translation of the original name of the programme is the IT Innovation Network Construction Project.

	<p>Internet-based solutions, to a first set of seven industries that scored high in IT infrastructure utilization readiness.</p> <p>(Source: 1)</p>
Main topics and barriers to be addressed	<p>The topics are more explicit than the barriers. The programme stimulates and provides support for closer co-operation between large companies and SMEs in order to promote innovation and increase productivity through the use of IT in the overall supply network. It promotes the integration of both on- and offline business information in the supply chain and to improve collaborative processes.</p> <p>(Source: 1 & 2)</p>
Target group: sector(s)	<p>The programme started by focusing on seven industries that scored high in IT infrastructure utilization readiness: automobile industry, steel, shipbuilding, textiles, paper & pulp, displays, and home appliances.</p> <p>Currently, the IT Innovation Network Build-up Project focuses on two topical areas - IT new technology utilization and IT production and design collaboration - linked to eight industry-specific consortia.</p> <p>(Source: 1)</p>
Target group: Business, SMEs, Micro, Small, Medium sized enterprises	<p>Although the programme is aimed specifically at SMEs, participating consortia consist of one leading company (often a large company) and several other participating companies (often SMEs). Consortia should consist of more than five firms.</p> <p>(Source: 1 & 2)</p>
Policy makers and public agencies involved	<p>The IT Innovation Network (Build-up Project) is an initiative of the South Korean Ministry of Commerce, Industry and Energy (MOCIE) and is being carried out by its specialized agencies. The activities that focus on the use of new ICTs are carried out by Korea e-Business Association (KEAG). Activities on IT for production & design collaboration are carried out by the Small Business Corporation.</p> <p>(Source: 1 & 2)</p>
Start date and end date	<p>2001/2002 – ongoing. The start of the actual programme was preceded by a pilot.</p> <p>Individual projects co-ordinated by the Korea e-Business Association run for a standard period of two years. After the first year, an evaluation of the programme is carried out. The decision whether to continue or discontinue the project depends on the results of this mid-term evaluation.</p> <p>(Source: 1 & 2)</p>
Budget	<p>No figures available.</p> <p>For the projects co-ordinated by Korea e-Business Association, public funding can be up to 50%, with a private sector contribution of at least 20%.</p>

	(Source: 2)
Monitoring and impact assessment: methods, indicators and indications	<p>Some of the results of the evaluation of the pilot ‘Securing Traceability of Production Process and Verifying Co-operation Process’ by the Kia Motors consortium are available. The production line utilization rate was improved by establishing a real-time procurement delivery system in the supply chain. Costs were reduced by about 1.5 billion Won (under €1.1 million) annually. Order placement rate to the supplier was improved from 58% to 99.8%. Parts shipment costs were reduced by about 16 billion Won (€1 million) annually.</p> <p>Individual projects co-ordinated by the Korea e-Business Association are evaluated after the first of the standard two years for which a project runs. The result of the evaluation determines whether the project is to be continued for a second year. A second evaluation is carried out upon the completion of each project.</p> <p>(Source: 1 & 2)</p>
Contact person	<p>Mr Lee Hyeok-seung IT Innovation Project Team Research Staff Korea e-Business Association Korea hslee@koeb.or.kr</p>

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5 Inspiration and recommendations for Dutch policy

This chapter will present the inspiration and recommendations for The Netherlands. The Dutch policy mix is sketched in Chapter one. Against the background of the existing policy mix in The Netherlands, what are the inspiration and recommendations that can be taken from the conclusions of the Danish case, the Finnish case and the analysis of six programmes in other countries? For example, some instruments within the Danish and Finnish policy mix are similar to instruments that are used in The Netherlands. This is relevant but it is more relevant to see how policy in Denmark and Finland is different from Dutch policy. As was mentioned in Chapter one, Denmark and Finland consistently outperform The Netherlands on e-Business use. Policy is one of the factors. Furthermore, Dutch policy makers are mainly looking for instruments to stimulate SMEs to use ICT for transactions and collaboration. This is done within the programme *Nederland Digitaal in Verbinding* (The Netherlands connected digitally) that was launched in 2007. The increased focus of Dutch policy makers on the use of ICT for transactions and collaboration ('digital value networks') is reflected in the inspiration and recommendations that are presented below.

- **The rationale, monitoring and evaluation of e-Business programmes**

The e-Business programmes that are addressed in this report do not always have a clear, specific and explicit rationale. The problems to be addressed (such as market failures and system failures) are sketched rather than defined and measured. Often, a set of problems is mentioned. This includes problems related to skills (which skills, why, in which firms?), financial resources (or priorities?) and SME-friendly e-Business solutions (price, functionalities, scalability, usability?). In general, e-Business programmes contain a set of policy instruments, to address a set of problems. Financial and non-financial instruments are combined. A deeper understanding of the problems to be addressed (solved) can lead to a more effective selection and design of policy instruments. It may also lead to clear priorities rather than the perception (by outsiders) that a large programme is launched to solve all problems, for a range of stakeholders ('catch all'). An explicit rationale also allows for better monitoring and evaluation. A study by Databank, empirica and IDATE on the evaluation of e-Business policy acknowledges that process and output indicators are less difficult to use than impact indicators.⁵³ The study provides a few examples of impact indicators (but only touches upon the main problems such as additionality). See also the process and output indicators in the Australian ITOL programme. Inspiration for impact assessment can be found in the evaluation of R&D and innovation policy.⁵⁴ One of the complexities for monitoring and evaluation is that e-Business is at the heart of business activities (e.g. compared to R&D) and that a wide range of factors has an impact on e-Business use. This includes market pressure, availability of e-Business solutions, financial resources, business strategies and a range of policy instruments. To assess the impact of the policy

⁵³ Databank, empirica and IDATE (2005). Impact Assessment of Regional & National E-Business Policies: methodological framework, 10 cases studies and overall conclusions.

⁵⁴ One example is OECD (2006). Government R&D Funding and Company Behaviour. Measuring Behavioural Additionality. Paris: OECD.

mix (and individual programmes and instruments) in depth case studies and surveys may be more effective than sector and macro statistics.

- **Digital SMEs or digital collaboration? Best practices or implementation?**

Two difficult topics in the rationale and design of e-Business programmes emerged. Several programmes in Denmark and Finland, and all six programmes in Chapter four, appear to stimulate the development of digital collaboration as well as e-Business use by individual SMEs. But these objectives need not be two sides of the same coin. If the main objective is to increase awareness and information for SMEs, digital collaboration projects (for specific sectors, and including large firms) may be less effective and efficient than light instruments that focus on information for micro and small enterprises. A similar topic the link (and tension) between best practices and implementation. In Chapter four, several programmes are partly motivated by the claim that digital collaboration projects (implementation projects) create valuable lessons and best practices for SME and sectors that are not involved in the projects. This assumption can be challenged. Sectors can be very different, so how relevant are the lessons that are learned by other firms in other sectors and value networks, and for which substantial subsidies are used? Is the focus on best practices (in official documents) intended to 'hide' that the core of a digital collaboration project is the implementation of e-Business? If development and implementation is the main objective, this must be made explicit (and different levels of state-aid apply). Furthermore, it requires that the programme is opened for consortia of large and small firms (see the Korean example). If several objectives are combined, it must be clear how which element/instrument of the programme is linked to which objective (and the underlying rationale/problem).

- **Horizontal programmes with an emphasis on specific sectors?**

Another element in the design of e-Business programmes is the choice (or balance) between a horizontal and a sectoral approach. Based on the programmes that were described in this study, policy makers tend to prefer horizontal programmes (that are open for all sectors) albeit with an emphasis on specific sectors. For example, The French TIC-PME 2010 programme is open for all sectors, but was based on a pilot in a small set of pre-selected sectors. The Korean IT Innovation Network programme started with seven sectors but the scope is now being increased. Because horizontal programmes 'should start somewhere', because some sectors are more advanced in e-Business and because it may be difficult to design support instruments that are effective in *all* sectors, it could be considered to prioritise specific sectors. For example, one instrument could be designed to fit a number of sectors that lag behind in e-Business use; another instrument could be designed to stimulate other sectors to optimise e-Business use and to increase organisational innovation. This approach allows for a customised approach, whilst making sure that the programme is coherent and that instruments can be used in several sectors (this has advantages for programme management, learning and knowledge sharing). In discussing the differences between sectors, it must be mentioned that some topics are relevant for all sectors. Examples are e-Business solutions and standards that are used in all sectors (e.g. e-procurement and e-invoicing by public organisations) and standardisation and interoperability across sectors.

- **Sectors and sectoral organisations/associations will become more important**

As SMEs from 'basic e-Business' to advanced digital transactions and collaboration, sectoral projects will become more important. This may include large firms but SMEs are still the main target group. The focus on SMEs and on sectoral projects provides challenges policy makers and programme managers to involve sectoral organisations/associations. For example, Denmark and Finland use horizontal programmes, that are implemented in collaboration with sectoral organisations/associations. This allows for effective and efficient communication to SMEs, and to trigger SMEs, sectors and value networks to create consortia and to submit proposals for e-Business projects. As was mentioned in the chapter on Denmark, several issues must be taken into account. First, the influence of sectoral organisations on the design and implementation of programmes must remain 'healthy' and balanced vis-à-vis other interests. Second, policy makers must ensure that sectoral organisation are inclusive and act on behalf of all members and firms in a sector, large and small, established and new. Third, to customise and implement programmes for/in each and every sector creates a risk for programme management and public support for too detailed and interventionist e-Business projects. It must be ensured that the programme remains coherent and that the instruments are applied consistently. Programme managers can also approach sectors that are less well organised and that have difficulty in finding programmes and subsidies. As was mentioned in the Finnish case, a regional and local approach can be added to the sectoral approach. The main reasons are to be closer to SMEs, to address regional barriers (e.g. broadband availability and industry-university interaction) and to create synergy with regional and local policy (e.g. regeneration of cities). This is considered to be effective, in Denmark and Finland.

- **Consultants, researchers and students can assist SMEs**

One of the approaches that works well in Denmark is (light) policy support to allow SMEs to find and hire consultants, researchers and SMEs. The effects on SMEs are positive. Furthermore, the market for consultants is stimulated, especially for small or specialised consultants that are independent from the main vendors and software providers. The positive role of researchers and students was also mentioned in Finland. Furthermore, nearly all digital collaboration programmes in Chapter four provide SMEs and consortia with financial support to hire consultants and researchers. As was mentioned in the Danish case, e-business information documents include clear references to contact persons for additional support. First-line support can be provided by consultants, university researchers, PhD students and other students in relevant areas (and with communication skills).

- **Assist, but maintain incentives for firms to innovate in ICT use**

Information documents, helpdesks, how-to-guides and best practices can make life easier for SMEs and other firms. However, it must be avoided that all firms implement the same basic ICT solutions. This point was raised by the Finnish experts. Also note the time-lag between the development of ICT solutions, the preparation of e-Business information documents and implementation by SMEs. This can take years. In the meantime, new solutions and features have been developed. To some extent, this can be mitigated by personal contact and by close ties between business and knowledge organisations. But more can be done. The instruments within an e-Business programme should allow for personalised and innovative solutions. In large e-Business

programmes, policy makers may include one instrument to explicitly stimulate e-Business projects that are highly innovative. Firms and sectors must be challenged to explore unique and innovative ICT solutions (or to use existing ICT in an innovative way). This can have a real impact on productivity, quality and competitiveness. In Finland and Denmark, innovative e-Business projects can involve the ICT supply side. This not only concerns ICT manufacturing but also software, consulting and ICT services sectors.

- **Strict and transparent selection of projects**

Especially the programmes in Chapter four – that have been launched recently – explicitly select of projects. This becomes more relevant as the focus of programmes is shifting from awareness, information and a small set of pilots, to development and implementation projects in several sectors. More money can be involved, for a smaller set of stakeholders, and for activities that are a mix of innovation and implementation. An e-Business programme must trigger high quality project proposals, with the right stakeholders, in order to have an impact (ideas and problems looking for money, rather than the other way around). The criteria must be derived from the rationale and objectives of the programme. See for example the consortia rules in ITOL (Australia) and PROZEUS (Germany) and the three-round process in CANARIE (Canada). To start with a light first round can be efficient for consortia that consist of SMEs and that explore whether the programme provides them with more advantages than administrative costs. Also not that project may include implementation elements and the procurement of IT systems and software. For different parts of a project, different state-aid levels are appropriate.

- **Business language**

This point was stressed by the Finnish experts. Technical, legal, economic and policy specialists write texts that do not always appeal to SMEs. Especially ICT terminology can create a problem because many SMEs do not have a special ICT department or an in-house expert on ICT issues. Best practices and how-to-guides should be segmented, pragmatic and customised. Any information overload must be avoided. For example, what are the steps and questions that SMEs can use when selecting ICT solutions? How to prevent security issues? The topics and questions can be different from one sector to the other.

- **Business and innovation ecosystem**

To some extent, e-Business is about implementation and business processes. To some extent, e-Business is about organisational innovation, product innovation and services innovation. A strict demarcation is difficult to make and not very useful, at least from the perspective of firms. Still, both ‘worlds’ may have their own players and policy, e.g. economic/business policy and R&D/innovation policy. ICT policy is known to cut across both policy domains (and other policy domains such as competition policy). This point is taken from the Finnish case, but it was also mentioned by the Danish experts. Finland explores an integrated policy approach. Policy makers stimulate the business and innovation ecosystem, that includes firms, organisations in the knowledge domain, public agencies and users. If the links between business and knowledge are well developed, this is relevant for the development of e-Business solutions as well as for the implementation of e-Business. Knowledge that was used for development can also be

used for implementation (e.g. helpdesks staffed by university researchers) and lessons from implementation can feed back into the development of better solutions. For example, how to develop solutions for SMEs and for specific sectors? Policy makers – in the field of business, ICT and innovation – can stimulate the ecosystem via support for R&D, networking, dissemination, etc. The relevance of the ecosystem stretches far beyond e-Business or ICT topics in general. To stimulate the overall ecosystem rather than to subsidise solutions on one topic, implies that policy makers stimulate flexibility, short and long term impact. If new topics emerge, the ecosystem can quickly adapt. It was recognised that the approach fits Finland with its substantial ICT manufacturing sector. However, the approach is relevant for other countries, because R&D and innovation also involves software and IT consulting firms. In Denmark, the link between ICT and innovation policy is improved, this has contributed to effectiveness, consistency and coherence of the policy mix.

- **Digital natives and the future of e-Business policies**

The label digital natives is applied to people that grow up with the internet, games and other ICT applications. The label can also be used for firms that were created in a period where ICT is a natural element of all its activities, e.g. start-ups in the ICT sector and start-ups in services and manufacturing sectors such as banking, consulting, logistics and retail. In older firms, digital natives will be hired. For the next generation of managers, employees and firms, it must be reconsidered whether and how e-Business policy can be of added value. Do they need advice with respect to ICT? Are the skills of digital natives relevant for the use of ICT in business processes? Does this imply that e-Business policy can be ended within ten or fifteen years? Or does this imply that a light and horizontal approach is sufficient? These questions are relevant for e-Business but also for ICT policy in general. Strong progress in ICT will trigger questions on the added value of ICT policy and ICT programmes, especially if ICT becomes an element of policy domains such as education policy, innovation policy and economic/competitiveness policy ('mainstreaming ICT policy'). Ireland provides an illustration with a programme to optimise business processes and value chains. E-business is not the starting point of the programme. Projects will explore how a range of technologies and (organisational) innovations can improve operational performance and productivity.

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