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ICT and e-Business Impact in the **Banking Industry**

Study report
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ICT and e-Business Impact in the Banking Industry

A Sectoral e-Business Watch study by
Rambøll Management

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About the Sectoral e-Business Watch and this report

The European Commission, Enterprise & Industry Directorate General, launched the Sectoral e-Business Watch (SeBW) to study and assess the impact of ICT on enterprises, industries and the economy in general across different sectors of the economy in the enlarged European Union, EEA and Accession countries. SeBW continues the successful work of the *e-Business W@tch* which, since January 2002, has analysed e-business developments and impacts in manufacturing, construction, financial and service sectors. All results are available on the Internet and can be accessed or ordered via the Europa server or directly at the SeBW website (www.europa.eu.int/comm/enterprise/ict/policy/watch/index.htm, www.ebusiness-watch.org).

This document is a final report of a Sector Impact Study, focusing on electronic business in the banking industry. The study describes how companies use ICT for conducting business, and, above all, assesses implications thereof for firms and for the industry as a whole. The elaborations are based on econometric analyses, expert interviews and case studies.

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Executive Summary

About this study

This is a study of the Sectoral e-Business Watch, focusing on ICT and e-business usage in the banking industry (hereinafter the BI). The study objectives are to describe how companies in this industry use ICT for conducting business, to identify opportunities and barriers for ICT adoption, and to assess impacts of this development for firms and for the industry as a whole. The analysis is based on a literature review, expert interviews, case studies and the Eurostat Community Survey on ICT usage in the financial sector. Moreover, results of an econometric analysis of ICT drivers and impacts is included and analysed in the study.

The banking industry

For the study purpose, the banking industry is defined to cover the following business activities: NACE Rev. 1.1 65.12 "Other monetary intermediation" (Rev. 2 64.19), and 65.22 "Other credit granting" (Rev. 2.0 64.92).¹ The BI employs about three million people in the EU (European Central Bank) and generates about 490 billion euros in value added (latest available figures – 2004, Eurostat). Within the EU, the financial services sector is relatively largest in the UK, which generates just over one fifth of the total value added (21%).

Major trends in the industry include the renewal of branch and processing capabilities, a focus on improving and innovating customer relationship management strategies, and the renewal of the automated teller machines. Major challenges to be addressed by the industry include anti-money laundering, i.e. the fight against the misuse of the BI. Important issues with regard to ICT are ensuring data protection (notably in online transactions), abilities of

disaster recovery, and the provision of ever more sophisticated e-banking services in response to increased customer expectations in this domain.

Key findings: ICT & e-business adoption

Process efficiency

Productivity growth rose in the EU from the year 2000 onwards, while average working hours per employee were decreasing in most countries. ICT capital investments are largely substituting labour, particularly in retail banking. This is done by standardising ordinary financial services and having customers perform basic financial services online, thus rendering the tellers redundant. However, the econometric analysis also shows that the ability to empower the work force by appropriate investments in training and skill-formation is very important. Without sufficient capabilities of the human workforce to use the ICT-investments efficiently, the costly investments bear a high risk of becoming ineffective.

Case studies (see Section 5) provide examples that banks have retrained the tellers so that they are now able to perform more complicated financial services and have thus not dismissed any tellers. That the personnel are retrained is also indicated by the econometric analysis, which shows that ICT has a significant skill-bias especially towards medium-skilled labour, which is what tellers become once they are retrained.

The analysis and the case studies developed for this study could not provide conclusive evidence regarding shortage of personnel with ICT skills. The survey data indicated no gap between availability and demand for ICT-skilled labour. This can partly be explained by the labour dynamics presented above, as much low-skilled labour is retrained to become medium-skilled labour, which can perform the necessary services in the bank. Sourcing can

¹ NACE Revision 2 is a four-digit classification of business activities. It is a revision of the "General Industrial Classification of Economic Activities within the European Communities", known by the acronym NACE and originally published by Eurostat in 1970. NACE Rev. 2 replaced version Rev. 1.1 on 1 January 2008.

be another explanation as banks are increasingly outsourcing or co-sourcing large ICT-investments to ICT-firms, in order to focus on their own core competences.

Branch renewal

The introduction of ICT in the European BI has had a significant impact on banks operating with physical branches. Especially the internet has made it possible for banks to cut cost by offering online banking at a lower cost. The econometric analysis show that ICT use is positively correlated with firm restructuring activities. Thus, ICT enables companies to redefine the boundaries of their organisations and possibly gain a competitive advantage.

A prevalent change in the branch structure in the BI is the dual combination banking. With dual-combination banking, traditional manual banking services can now be performed online while the more sophisticated banking services are still performed in the branch bank, thus taking advantage of the low-cost nature of e-banking and the face-to-face advisory services of the branch bank. Numerous case studies support this trend.

The process of branch renewal may however encounter some barriers. When traditional banking services are performed online the role of the teller is diminishing, why staff re-education and skills development is essential to a successful transformation of a traditional teller-intensive branch office towards an advisory-based branch bank network. As mentioned, the econometric analysis and the case studies indicate that this largely takes place.

SEPA

SEPA gives benefits to different elements of the banking value chain. The benefits for the industry, as seen from the point of view of the legislators, comes from increased transparency, less risk of money laundering, increased transactions across borders and access to new markets. It is however observable that the business case for SEPA, seen from a bank's perspective, may not be as clear. Due to uncertainty about the actual role of SEPA, many banks are settling for minimum solutions

that only implement the basic, required SEPA instruments but do not make full use of the embedded potential in SEPA.

The BI has as of yet taken only the minimum measures required to comply with SEPA. This has to do with the fact that in the short term the BI is expected to make significant ICT-investments in order to comply with SEPA, which can make the short-term benefits of SEPA harder to reap for the BI. However, SEPA is expected to bring substantial benefits in the long term for end users, businesses and banks in Europe, and product innovation such as the development of e-Invoicing is could also happen as a result of ICT-investments.

The impact of ICT on market structure

The market structure in the BI is changing as a result of mergers and acquisitions. The recent mergers and acquisitions seen in the BI have called for an increased investment in ICT in order to integrate the different banking systems, as can be seen in the case of the National Irish Bank (NIB). However, ICT also helps implementing the merger more smoothly, as the IT-system from Danske Bank could be implemented directly in NIB, thus providing a common ICT-ground for the employees from day one. Mergers and acquisitions also happen as a result of ICT, when large branch banks acquire innovative Internet-only banks in order to obtain both a well-known brand from the traditional bank and an innovative business model from the Internet-only bank. For instance, the UK-based Egg bank was acquired by Citibank because of its ICT-capabilities.

Customer and bank readiness for the use and provision of e-banking

e-Banking has now developed into an advanced ICT solution where most everyday banking can be conducted online. The statistics do, however, indicate that e-banking across Europe is still not widely implemented among both private and corporate customers. Basic understanding of and confidence in the Internet is required to adopt e-banking and not all Member States may have reached a critical mass of behavioural change among customers. Moreover, not all banks are ready for e-banking

either. According to the Eurostat survey, 56% of the banks provide online financial services to customers via the Internet, and 46% offer online payment services.

The case studies suggest that the ICT uptake differs greatly across the Member States. In Slovenia, an Internet bank is a great achievement in itself, while in the UK Internet-only banks are acquired by traditional banks in order to provide innovation to the banks. A study by Deutsche Bank Research showed that offline customers still perceive online banking to be unsafe, despite the objective fact that online banking has proven to be very secure. However, due to the significant differences in ICT-uptake across Member States, and in an effort to increase customer's perception of safety, a pan-European initiative to either increase safety to an equal level in all Member States or to promote the high security level towards customers could be beneficial.

Policy recommendations

Reinforce standardisation and harmonisation to increase efficiency

Increased e-business harmonisation is expected to help obtain a more effective BI, as for instance payments will be carried out in the same way no matter which country in the European Union the banks and/or their customers are doing business with. SEPA and e-invoicing are two of the recent initiatives in this area discussed in this report.

The expected gains from increased harmonisation such as a well-functioning SEPA and standardised procedures for e-invoicing are numerous. Companies with substantial numbers of cross-border payments can benefit both from the standardised payments and standardised e-invoicing and payments procedures can also lead to easier market access for the companies in question. Banks are expected to gain from the easier work processes, as there will be less paper-based work related to the transactions. If banks are able to take the SEPA principles and develop them further to include other business processes, such as e-invoicing, they might even gain a competitive advantage. As illustrated in

Section 3.2, the overall success of the SEPA initiative rests on the adaptation by banks and in achieving critical mass in the number of transactions within a reasonable time frame.

Despite the benefits, banks still only opt for the minimum requirements in complying with SEPA. The case studies show that banks need to substantially invest in ICT in order to reap the benefits from SEPA, but the banks have difficulties in seeing that these ICT-investments can be compensated by the potential gains from SEPA.

In order for the BI – and Europe in general – to reap the potential benefits stemming from increased standardisation and harmonisation, the European Commission could play a more active role along with industry organisations. For instance, the industry organisations could support ICT development projects in the BI by bringing banks together and helping the banks in deciding what is needed in order to fully reap the benefits of the SEPA or e-invoicing. Moreover, the industry organisations could facilitate a forum where banks could cooperate on developing the ICT systems needed for further harmonisation, and thereby share the costs. Discussions on how these ICT-investments could be used for further product innovation in the respective banks could also be discussed in these forums. The European Commission could support the initiatives from the industry organisations with grant schemes, if needed.

Increase customer's perception of safety

The general uptake and use of ICT in the BI is rather high. For instance, 99% of the banks in the BI have access to the Internet and about 5 in 10 banks use a computer connected to the Internet every day. Hence, the preconditions for increased e-business in the BI are in place. But in order to conduct e-banking, the safety measures must also be in place.

Despite the measures taken by the BI to secure safe e-banking, the analysis shows that the customers currently *not* using e-banking (offline customers) are not entirely ready to embrace e-banking. While online customers' (customers already engaging in e-banking) perception of

security is on the rise, the same cannot yet be said for offline customers. This obviously has to be seen in the light of the fact that e-banking is one of the most well-developed e-services, and that many customers are increasingly using e-banking as part of their everyday banking routines. Nevertheless, this study shows that it is still possible for the BI to improve consumer confidence for especially offline customers, a finding supported by a recent Deutsche Bank study².

There are two aspects of increasing consumer safety in the BI. The first is related to what banks can do and the latter is related to what customers can do. With respect to the first aspect - what banks can do - it seems from the survey and the analysis conducted in this study and referred to above that banks are in general doing what is needed in order to ensure safe e-banking. This finding is also supported in the aforementioned study by Deutsche Bank Research. However, one way for the banks to enhance customer safety could be to establish clear audit trails (clear overview of the processes in all transactions, in order to ensure increased transparency), which could provide the customers with increased transparency. The Commission could support this by promoting the establishment of such audit trails in cooperation with the industry organisations, or make it mandatory for the banks to establish such trails. It should however be further investigated if this is the right way to go for the banks in increasing consumer confidence.

With respect to the second aspect, customers can take reasonable safety measures before engaging in e-banking, by for instance applying anti-virus software to their computers. The Commission could help facilitate responsible behaviour on the Internet and increase consumer knowledge on how to behave responsibly when engaging in e-banking by promoting a "Safety on the Internet"-campaign in all Member States. For instance, in the Netherlands a campaign called 3XKloppen was initiated, educating customers to "check for

three things", namely if it is a secure connection/if the user's software is up to date, if the web site actually what it says it is and if the total amount or order is correct³. This campaign could be looked further into and possibly be used for inspiration. National governments could also be responsible for this campaign; however, this would not help align customers' perception of safety across the Union.

It should be mentioned that as the global reach of the Internet implies that financial services can increasingly become borderless and global, a pan-European initiative for could increase customer confidence, as certainty for customers that all banks are protected in a similar fashion may increase the customer's perception of security.

Support the skills development among bank personnel

e-Banking and ICT have caused the traditional branch-based banks to change the service offerings in their branches. The business model of dual-combination banking (banks offering internet-banking *and* branch-based banking) is emerging, which implies that customers are increasingly performing basic banking tasks online while relying on bank branches only for more sophisticated, advisory tasks. The dual-banking model can give traditional branch banks the opportunity to adjust their branch network towards advisory functions and away from traditional teller services, thus adding value to their customers from direct and customised bank advisory services.

This development however means that an increasing number of jobs are being changed from traditional tellers to branch advisors/counsellors. Bank staff is increasingly asked to provide highly qualified financial advice rather than perform simple teller functions. As both the econometric analysis and the case studies show, bank staff is being retrained to perform such tasks. From the econometric analysis it can be seen that ICT usage in financial services have a significant skill-bias towards medium-skilled labour, which

² Deutsche Bank (2008): Secure online banking needs a little help from its customers

³ <http://www.3xkloppen.nl/over-3xkloppen/>

corresponds very well with the findings from the case studies, which shows that tellers are increasingly being retrained to perform more advanced financial services in the banks, thus moving from the low-level skill class to the medium-level skill class.

Thus, restructuring of branches and using ICT to increase process efficiency may not necessarily result in a decrease of the work force. In the BI, it can be seen from the econometric analysis and the case studies that there is not a shortage of qualified staff, rather, it is a question of ensuring that the existing personnel in the banks are retrained so that their skills can be used to create high value for the banks. In order to maintain and reinforce this positive development, it is recommended that trade federations and industry associations play an active role in skills development among branch bank staff to prepare them for the new role of the branch banks. The industry organisations could arrange training courses for the staff in risk of becoming redundant in order to ensure that they are able to perform the more sophisticated tasks which add value. It is believed to be vital that these training courses to upgrade the bank personnel's skills to be able to perform more advanced advisory functions in the banks are arranged by the industry organisations, as it is not likely that banks would want to share their training courses with each other, as this would mean revealing to the competitors how they add value to their banks. However, industry organisations could arrange forums where banks could meet and possibly exchange best practises to the benefit of the entire BI. Training courses by the industry organisations will ensure that the positive trend of retraining redundant tellers continues. The European Commission could support these training courses, for instance in the form of grant schemes to develop the curricula, or facilitating exchange of best practise.

1 Introduction

This study focuses on the adoption and implications of e-business practice in the BI. It describes how companies in this sector use information and communications technology (ICT) for conducting business, assesses the impact of ICT for firm performance and identifies potential policy implications. The analysis is based on literature reviews, interviews with industry representatives and experts, company case studies and an international survey of enterprises on their ICT usage conducted by Eurostat in 2006. The study takes into account results of earlier sector studies on the banking industry, published by *e-Business W@tch* in 2003.⁴

The BI, as defined for the study purpose, covers the following business activities: 65.12 Other monetary intermediations (NACE Rev. 2 64.19) and 65.22 Other credit granting (NACE Rev. 2.0 64.92).⁵ The study is part of the Sectoral e-Business Watch (SeBW) programme and has been conducted in parallel with five other sector studies and four cross-sectoral thematic studies.

Study structure

This report is structured into **six main sections**. Chapter 1 explains the background as to *why* this study is being conducted: it introduces the Sectoral e-Business Watch (SeBW) programme of the European Commission, presents a conceptual framework for the analysis of e-business, and describes the specific methodology used for this study. Chapter 2 provides general information about and key figures on the banking industry in Europe. Chapter 3 illustrates the current state-of-play in e-business in this industry, focusing on specific ICT-related issues that are found to be particularly relevant to this sector. Special attention has been paid to SEPA, the Single Euro Payments Area. Chapter 4 assesses the economic impact of the developments described in Chapter 3 on work processes and employment, innovation and productivity, and – at sector level – on value chain characteristics. Chapter 5 presents the case studies which provide further evidence to the issues discussed in Chapters 3 and 4. The final Chapter 6 summarises the key findings and draws conclusions on policy implications.

Combining descriptive and analytical approaches

The study approach is exploratory, descriptive and explanatory, thus applying a broad and sound methodological basis: A qualitative **case study** approach (Chapter 5) is combined with a descriptive presentation of quantitative **survey data** (Chapter 3) and an **economic analysis** of ICT adoption and its impacts (Chapter 4). This threefold approach is meant to produce an in-depth understanding of current e-business issues in the industry (the "practitioner's view") as well as the state of the art of e-business practice (the "empiricist's view"), while also assessing the economic effects of this practice, for

⁴ The previous study reports on the banking industry are available at the Sectoral e-Business Watch website at http://www.ebusiness-watch.org/studies/on_sectors.htm.

⁵ NACE Revision 2 is a four-digit classification of business activities. It is a revision of the "General Industrial Classification of Economic Activities within the European Communities", known by the acronym NACE and originally published by Eurostat in 1970. NACE Rev. 2 will replace the currently used Rev. 1.1 on 1 January 2008.

instance on firm productivity and innovation (the "economist's perspective"). While the results from these different approaches are presented like self-sustained pieces of research in separate chapters, they are intertwined and cross-referenced.

1.1 The Sectoral e-Business Watch

Mission and objectives

The "Sectoral e-Business Watch" (SeBW) explores the adoption, implication and impact of electronic business practices in different sectors across the European economy. It represents the continued effort of the European Commission, DG Enterprise and Industry to support policy in the fields of ICT and e-business, which started with "*e-Business W@tch*" in late 2001.

In ICT-related fields, DG Enterprise and Industry has a twofold mission: "*to enhance the competitiveness of the ICT sector, and to facilitate the efficient uptake of ICT for European enterprises in general.*" The services of the SeBW are expected to contribute to these goals in the BI. This mission can be broken down into the following main objectives:

- to assess the **impact of ICT** with regard to productivity and growth on enterprises, industries and the economy in general;
- to highlight **barriers for ICT uptake**, i.e. issues that are hindering a faster and/or more effective use of ICT by enterprises in Europe;
- to assess the role of ICT with regard to organisational changes and new forms of **business processes**;
- to identify and discuss **policy challenges** stemming from the observed developments, notably at the European level;
- to engage in **dialogue with stakeholders** from industry and policy institutions, providing a forum for debating relevant issues.

By delivering evidence on ICT uptake and impact, SeBW is supporting informed policy decision-making, in particular in the fields of innovation, competition and structural policy.

Policy context

The original *e-Business W@tch* programme was rooted in the **eEurope Action Plans** of 2002 and 2005. The goal of eEurope 2005 was "*to promote take-up of e-business with the aim of increasing the competitiveness of European enterprises and raising productivity and growth through investment in information and communication technologies, human resources (notably e-skills) and new business models*".⁶

The **i2010 policy**⁷, a follow-up to eEurope, also stresses the critical role of ICT for productivity and innovation, stating that "*... the adoption and skilful application of ICT is one of the largest contributors to productivity and growth throughout the economy,*

⁶ "eEurope 2005: An information society for all". Communication from the Commission, COM(2002) 263 final, 28 May 2002, Section 3.1.2.

⁷ "i2010 – A European Information Society for growth and employment." Communication from the Commission, COM(2005) 229 final.

leading to business innovations in key sectors" (p. 6). This Communication anticipates "a new era of e-business solutions", based on integrated ICT systems and tools, which will lead to an increase in business use of ICT. However, it also warns that businesses "still face a lack of interoperability, reliability and security", which could hamper the realisation of productivity gains (p. 7).

In February 2005, the European Commission proposed a **new start for the Lisbon Strategy**. While it recommended changes in the governance structures, i.e. the way objectives are to be addressed, the overall focus on growth and jobs remained the same. Some of the policy areas of the renewed Lisbon objectives address ICT-related issues. Central Policy Area No. 6 deals with facilitating ICT uptake across the European economy. Policy-makers in this area will require thorough analysis of ICT uptake based on accurate and detailed information on the most recent developments. Such evidence-based analysis is also needed when targeting individual sectors to fully exploit the technological advantages, in alignment with Central Policy Area No. 7 "Contributing to a strong European industrial base". Furthermore, Guideline No. 9, addressed to Member States, encouraging the widespread use of ICT,⁸ can be effectively addressed only if actions are based on understanding of the potential for and probable effectiveness of interventions.

"ICT are an important tool ..."

"More efforts are needed to improve business processes in European enterprises if the Lisbon targets of competitiveness are to be realised. European companies, under the pressure of their main international competitors, need to find new opportunities to reduce costs and improve performance, internally and in relation to trading partners. ICT are an important tool to increase companies' competitiveness, but their adoption is not enough; they have to be fully integrated into business processes."

Source: European Commission (2005): Information Society Benchmarking Report

In 2005, taking globalisation and intense international competition into consideration, the European Commission launched a **new industrial policy**⁹ with the aim to create better framework conditions for manufacturing industries in the coming years. Some of the policy strands described have direct links to ICT usage, recognising the importance of ICT for innovation, competitiveness and growth.

The SeBW is one of the policy instruments used by DG Enterprise and Industry to support the implementation of the industrial policy and related programmes. Its activities are complementary to other related policy programmes in the field of ICT, such as:

- the e-Business Support Network (**eBSN**), a European network of e-business policy makers and business support organisations,

⁸ "Working Together for Growth and Jobs: a New Start for the Lisbon Strategy", Communication, COM (2005) 24, Brussels, 02.02.2005
http://europa.eu.int/growthandjobs/pdf/COM2005_024_en.pdf .

⁹ "Implementing the Community Lisbon Programme: A Policy Framework to Strengthen EU Manufacturing - towards a more integrated approach for Industrial Policy." Communication from the Commission, COM(2005) 474 final, 5.10.2005

- the **eSkills Forum**, a task force established in 2003 to assess the demand and supply of ICT and e-business skills and to develop policy recommendations,
- the **ICT Task Force**, a group whose work is to draw together and integrate various activities aiming to strengthen Europe's ICT sector, and
- activities in the areas of **ICT standardisation and harmonisation**, as part of the general standardisation activities of the Commission.¹⁰

In parallel to the work of the SeBW, the "**Sectoral Innovation Watch**" (see www.europe-innova.org) analyses innovation performance and challenges across different EU sectors from an economic perspective. Studies cover, inter alia, the following sectors: chemical, automotive, aerospace, food, ICT, textiles, machinery and equipment.

The banking industry in a policy context

Within the BI, standardisation and harmonisation has been an important issue and several initiatives have been initiated by for instance the European Commission and the European Central Bank, in order to facilitate better harmonisation of rules in the European Union. The most prominent initiative is the introduction of the Single Euro Payments Area (SEPA), which is an initiative for the European financial infrastructure launched by the European Central Bank and the European Commission. SEPA will allow customers to make non-cash Euro payments to any beneficiary located anywhere in the Euro area using a single bank account and a single set of payment instruments, and all retail payments in Euro will thereby become "domestic". In this respect, a new Directive on Payment Services introduced by the European Parliament will help facilitate SEPA by harmonising the legislation in the EU countries. This is further discussed in section 3.2.

As Europe is adopting the SEPA, it is logical to link this to the business processes in the banks that necessitate a vast majority of Business-to-Business and Business-to-Government payments. The European Commission (The Informal Task Force, Dec. 2006 – June 2007) has therefore written a report on European Electronic Invoicing (EEI). EEI is expected to contribute substantially to Europe's competitiveness by reducing supply chain costs, help streamlining business processes and drive innovation. The European Commission has made the development of e-Invoicing an objective in both the 2002 and the 2005 eEurope Action Plans, and wishes to establish an EEI Framework within Europe which standardises the exchange of e-Invoices by the participants in a commercial supply chain, particularly those involved in purchase and supply¹¹.

Scope of the programme

Since 2001, the SeBW and its predecessor "e-Business W@tch" have published e-business studies on about **25 sectors**¹² of the European economy, annual comprehensive synthesis reports about the state-of-play in e-business in the European Union, statistical pocketbooks and studies on specific ICT issues. All publications can be

¹⁰ The 2006 ICT Standardisation Work Programme complements the Commission's "Action Plan for European Standardisation" of 2005 by dealing more in detail with ICT matters.

¹¹ European Commission Informal Task Force on e-Invoicing (2007): European Electronic Invoicing Final Report, http://ec.europa.eu/information_society/eeurope/i2010/docs/studies/eei-3.2-e-invoicing_final_report.pdf

¹² see overview at www.ebusiness-watch.org/studies/on_sectors.htm

downloaded from the programme's website at www.ebusiness-watch.org. In 2007/08, the focus is on the following sectors and specific topics:

No.	Sector / topic in focus	NACE Rev. 1.1	Reference to earlier studies by SeBW
1	Chemical, rubber and plastics	24, 25	2004, 2003
2	Steel	27.1-3, 27.51+52	--
3	Furniture	36.12-14	--
4	Retail	52	2004, 2003
5	Transport and logistics services	60, 63 (parts thereof)	--
6	Banking	65.1	2003
7	RFID adoption and implications	(several sectors)	--
8	Intellectual property protection in ICT-producing SMEs	30.01+02, 32.1-3, 33.2+3; 64.2; 72 (parts thereof)	--
9	ICT implications for energy use		--
10	Drivers and impacts of ICT adoption		--

The SeBW presents a **'wide-angle' perspective** on the adoption and use of ICT in the sectors studied. Studies assess how ICT is having an influence on business processes, notably by enabling electronic data exchanges between a company and its customers, suppliers, service providers and business partners. The underlying conceptual framework is explained in more detail in the following section. In addition, the studies also provide **background information** on the respective sectors, including a briefing on current trends.

1.2 "e-Business" – key terms and concepts

A definition of ICT

This study is about the use of information and communication technology (**ICT**) in European businesses. ICT is an umbrella term that encompasses a wide array of systems, devices and services used for data processing (the "I" and information part in ICT) plus telecommunications equipment and services for data transmission and communication (the "C" and communication part in ICT). The European Information Technology Observatory (2007) structures the ICT market into four segments with an estimated total market value of about €670 billion in 2007 (Exhibit 1.2-1).

Exhibit 1.2-1: The EU ICT market according to EITO (2007)

Market segment	Products / services included (examples)	Market value for EU (2007) (EITO estimate)
ICT equipment	computer hardware, end-user communications equipment (such as mobile phones), office equipment (such as copiers) and data communications and network equipment (such as switching and routing equipment, cellular mobile infrastructure)	€ 159 billion
Software products	system and application software	€ 76 billion
IT services	consulting, implementation and operations management	€ 140 billion
Carrier services	fixed voice telephone and data services, mobile telephone services, cable TV	€ 293 billion

Source: EITO 2007

In its widest sense, 'e-business' refers to the application of these technologies in business processes, including primary functions (such as production, inbound and outbound logistics or sales), and support functions (such as administration, controlling, procurement and human resources management). Companies in all sectors use ICT, but they do so in different ways. This calls for a **sectoral approach** in studies of ICT usage and impact. The following section introduces a wider framework for the discussion of e-business developments that will be used in the following analysis of the chemical, rubber and plastics industry.

Gaining momentum after a phase of disappointment

When the bust phase of the previous economic cycle – commonly referred to as the 'new economy' – started in 2001, the former internet hype was suddenly replaced by a widespread disappointment with e-business strategies. Companies adopted a more reserved and sceptical attitude towards investing in ICT. Nevertheless, ICT has proved to be the key technology of the past decade (OECD 2004, p. 8), and the **evolutionary development** of e-business has certainly not come to an end. The maturity of ICT-based data exchanges between businesses and their suppliers and customers, fostered by progress in the definition and acceptance of standards, has substantially increased across sectors and regions over the past five years. In parallel, **recent trends** such as 'Web 2.0' and social networking are widely discussed in terms of their business

implications and it is widely recognised that 'e'-elements have become an essential component of modern business exchanges. In short, e-business has regained momentum as a topic for enterprise strategy both for large multinationals and SMEs.

"Measurement of e-business is of particular interest to policy makers because of the potential productivity impacts of ICT use on business functions. However, the ongoing challenges in this measurement field are significant and include problems associated with measuring a subject which is both complex and changing rapidly."

OECD (2005): ICT use by businesses. Revised OECD model survey, p. 17

Companies use ICT in their business processes mainly for **three purposes**: to reduce costs, to better serve the customer, and to support growth (e.g. by increasing their market reach). In essence, all e-business projects in companies explicitly or implicitly address one or several of these objectives. In almost every case, introducing e-business can be regarded as an ICT-enabled process innovation. Understanding one's business processes and having a clear vision of how they could be improved (be it to save costs or to improve service quality) are therefore critical requirements for firms to effectively use ICT.

The increasing **competitive pressure** on companies, many of which operate in a global economy, has been a strong driver for ICT adoption. Firms are constantly searching for opportunities to cut costs and ICT holds great promise in this respect as it increases the **efficiency of a firm's business processes**, both internally and between trading partners in the value chain.

While cutting costs continues to motivate e-business activity, innovative firms have discovered and begun to exploit the potential of ICT for delivering against key business objectives. They have integrated ICT into their production processes and **quality management** and, most recently, in **marketing** and **customer services**. These last sectors are widely considered key to improve competitiveness in the current phase of development of European economies. Competing in mature markets requires not only optimised cost structures, maximal efficiency, and products or services of excellent quality but also the ability to communicate effectively and cooperate with business partners and potential customers.

A definition of e-business

As part of this maturing process, electronic business has progressed from a rather specific to a very broad topic. A central element is certainly the use of ICT to accomplish **business transactions**, i.e. exchanges between a company and its suppliers or customers. These can be other companies ("B2B" – business-to-business), consumers ("B2C" – business-to-consumers), or governments ("B2G" – business-to-government). In the broad sense, transactions include commercial as well as other exchanges, such as sending tax return forms to tax authorities.

Glossary

Definitions by standardisation groups (ISO, ebXML)

The term "business transaction" is a key concept underlying the development of e-standards for B2B exchanges. Therefore, definitions have been developed by the various standards communities as an underpinning for their practical work. Examples are:

- **Business:** "a series of processes, each having a clearly understood purpose, involving more than one party, realised through the exchange of information and directed towards some mutually agreed upon goal, extending over a period of time [ISO/IEC 14662:2004]
- **Business transaction:** "a predefined set of activities and/or processes of parties which is initiated by a party to accomplish an explicitly shared business goal and terminated upon recognition of one of the agreed conclusions by all the involved parties even though some of the recognition may be implicit" [ISO/IEC 14662:2004]
- **e-Business transaction:** "a logical unit of business conducted by two or more parties that generates a computable success or failure state [ebXML Glossary]

If transactions are conducted electronically ('e-transactions'), this constitutes e-commerce. Transactions can be broken down into **different phases** and related **business processes**, each of which can be relevant for e-commerce (see Exhibit 1.2-2). The pre-sale (or pre-purchase) phase includes the presentation of (or request for) information about the offer, and the negotiation about the price. The sale / purchase phase covers the ordering, invoicing, payment and delivery processes. Finally, the after sale / after purchase phase covers all processes after the product or service has been delivered to the buyer, such as after sales customer services (e.g. repair, updates).

Exhibit 1.2-2: Process components of transactions

Pre-sale / pre-purchase phase	Sale / purchase phase	After sale / purchase phase
<ul style="list-style-type: none"> ■ Request for offer/proposal ■ Offer delivery ■ Information about offer ■ Negotiations 	<ul style="list-style-type: none"> ■ Placing an order ■ Invoicing ■ Payment ■ Delivery (with information about status) 	<ul style="list-style-type: none"> ■ Customer service ■ Guarantee management ■ Credit administration ■ Handling returns

Practically each step in a transaction can either be pursued electronically (online) or non-electronically (offline), and all combinations of electronic and non-electronic implementation are possible. It is therefore difficult to decide which components actually have to be conducted online in order to call a transaction (as a whole) 'electronic'.

In 2000, the OECD proposed broad and narrow definitions of electronic commerce, both of which remain valid and useful today¹³. While the narrow definition focuses on 'internet

¹³ In 1999, the OECD Working Party on Indicators for the Information Society (WPIIS) established an Expert Group on Defining and Measuring Electronic Commerce, in order to compile

transactions' alone, the broad definition defines e-commerce as "*the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organisations, conducted over **computer-mediated networks**. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the goods or service may be conducted on- or offline*" (OECD, 2001). The addendum regarding payment and delivery illustrates the difficulty mentioned above to specify which of the processes along the transaction phases constitute e-commerce (see Exhibit 1.2-2). The OECD definition excludes the pre-sale / pre-purchase phase and focuses instead on the ordering process. The SeBW follows the OECD position on this issue,¹⁴ while fully recognising the importance of the internet during the pre-purchase phase for the initiation of business.

Glossary

Definition of key terms for this study

- **e-Transactions:** *commercial exchanges between a company and its suppliers or customers which are conducted electronically. Participants can be other companies ('B2B' – business-to-business), consumers ('B2C'), or governments ('B2G'). This includes processes during the pre-sale or pre-purchase phase, the sale or purchase phase, and the after-sale / purchase phase.*
- **e-Commerce:** *the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organisations, conducted over computer-mediated networks. (OECD)*
- **e-Business:** *automated business processes (both intra- and inter-firm) over computer mediated networks. (OECD)*
- **e-Interactions:** *covers the full range of e-transactions as well as collaborative business processes, such as collaborative online design processes which are not directly transaction focused.*

Using the OECD definition, e-commerce is a key component of **e-business** but not the only one. A wider focus oriented on business processes has been widely recognised. This vision of e-commerce also covers the digitisation of **internal business processes** (the internal processing of documents related to transactions) as well as **cooperative** or **collaborative processes** between companies that are not necessarily transaction-focused (for example industrial engineers collaborating on a design in an online environment). The OECD WPIIS¹⁵ proposes a definition of e-business as "*automated business processes (both intra-and inter-firm) over computer mediated networks*" (OECD, 2004, p. 6). In addition, the OECD proposed that e-business processes should integrate tasks and extend beyond a stand-alone or individual application. 'Automation' refers here to the substitution of formerly manual processes. This can be achieved by replacing the

definitions of electronic commerce which are policy-relevant and statistically feasible. By 2000, work of the Group had resulted in definitions for electronic commerce transactions.

¹⁴ The respective survey questions ask companies whether they "place / accept online orders".

¹⁵ Working Party on Indicators for the Information Society.

paper-based processing of documents by electronic exchanges (machine-to-machine) but it requires the agreement between the participants on electronic **standards** and processes for data exchange.

e-Business and a company's value chains

In some contexts, the term c-commerce (collaborative commerce) is used. Although this concept was mostly abandoned when the 'new economy' bubble burst in 2001, it had the merit of pointing towards the role of ICT in cooperations between enterprises and the increasing digital integration of supply chains. These developments go beyond simple point-to-point exchanges between two companies.

Despite dating back 20 years to the pre-e-business era, Michael Porter's framework of the company value chain and value system between companies¹⁶ remains useful to understand the relevance of e-business in this context. A **value chain** logically presents the main functional areas ('value activities') of a company and differentiates between primary and support activities. However, these are "*not a collection of independent activities but a system of interdependent activities*", which are "*related by linkages within the value chain*".¹⁷ These linkages can lead to competitive advantage through optimisation and coordination. This is where ICT can have a major impact, in the key role of **optimising linkages** and increasing the efficiency of processes. The **value system** expands this concept by extending its scale beyond the single company.

However, as the BI is a service industry, a traditional value chain model does not apply. Instead, in order to thoroughly understand the dynamics in the BI, we refer to the **BI sector value chain** in Exhibit 2.1-2.

Applying the concept to the banking industry

The conceptual framework outlined above is as mentioned partly applicable to the BI. The traditional Porter value chain does not entirely apply to the BI, but the thoughts behind it have been used to develop the value chain pictured in exhibit 2.1-2. However, companies in the BI still use ICT to optimise linkages, for instance between products/services and transactions, and thus increase process efficiency.

In the BI, all the main purposes for the use of ICT and e-business are highly relevant, as companies in the BI use ICT to reduce costs by increasing process efficiency, to better serve the customers by developing new products and services to meet customer's needs, and enabling growth by increasing market reach, either by acquiring companies with innovative ICT skills or by using ICT to smoothen mergers and acquisitions. The study shows that the ICT-uptake is rather large in the BI, but that there is still room for improvement. ICT-uptake differs largely among Member States, and not all customers are ready to use the ICT-based products and services offered by the banks, mainly due to security issues. In addition, the SEPA and the increased focus on for instance e-invoicing are expected to contribute with standards to further fuel the ICT-uptake in the BI.

¹⁶ Porter, Michael E. (1985). *Competitive Advantage*. New York: Free Press. Page references in quotations refer to the Free Press Export Edition 2004.

¹⁷ *ibid.*, p. 48

1.3 Study methodology

The methodological framework of the SeBW builds upon the methodology established for previous e-Business Watch studies. However, the methodology has been adapted to the new focus of activity, supporting the progress from monitoring "e-readiness" and "e-activity" to the evidence-based analysis of "e-impact".

Data and information sources

The Sectoral e-Business Watch approach is based on a mix of data collection instruments, including the use of existing sources (e.g. the Eurostat Community Survey on ICT usage in enterprises) as well as primary research (notably the SeBW Survey and case studies). The main sources of information used for this study on the Banking Industry are:

- **Eurostat Community survey on ICT usage in enterprises** (2006): Results of the Eurostat survey are used as a source for the analysis of ICT adoption in companies from the sector. The Banking Industries are covered by the Eurostat survey (2006); although the NACE aggregation used by Eurostat deviates from the sector definition in this study, results can be used as a good proxy.
- **EU-KLEMS**: The EU KLEMS Growth and Productivity Accounts are the result of a research project, financed by the European Commission, to analyse productivity in the European Union at the industry level (see also Annex III). EU KLEMS data were used for the economic analysis of ICT impact (see Chapter 4).
- **ZEPHYR**: ZEPHYR is an information solution containing mergers and acquisitions, IPO and venture capital deals with links to detailed financial company information. The database has five years of global coverage and includes deals involving European or American companies going back to 1997 (see Chapter 4).
- **Case studies**: 10 case studies on e-business adoption in companies from the sectors covered are conducted specifically for this study. The selection was made with a view to achieve a balanced mix of cases in terms of countries, business activities (sub-sectors), and company size-bands. Cases may include best practices, innovative e-business approaches, as well as typical examples of e-business activity (state-of-the-art) in the sector.
- **In-depth interviews**: In addition to the interviews conducted with firm representatives as part of the case study work, in-depth interviews with company representatives, industry and e-business experts have been conducted.
- **Information from industry federations**: Annual reports and position papers of industry federations were a further source, for example from:
 - EBF – European Banking Federation (www.ebf-fbe.eu)
 - ECBS – European Committee for Banking Standards (www.ecbs.org)
 - EPC – European Payments Council (www.europeanpaymentscouncil.org)
 - ECB – European Central Bank (www.ecb.int)

Data analysis

For data analysis, descriptive and analytical statistical methods are used.

Descriptive statistics: For the present study, it was not possible to conduct a tailor-made survey by the SeBW itself. Instead, the study uses results of the Eurostat Community Survey in the financial services sector (2006). However, it was difficult to assess and comment on longer term trends in ICT adoption, since only some of the data were available for an earlier point of measurement as well (2002). Moreover, there was little data available to underpin the specific research themes of this study. Thus, significant parts of the analysis rely mostly on evidence from the case studies. The discussion of the Eurostat survey results in Chapter 3 is mostly based on descriptive cross-tabular presentation of simple frequencies (typically percentages of enterprises with a certain activity).

Analytical statistical methods: Descriptive presentation and discussion of survey results, including the use of compound indicators derived from simple frequencies, is useful as a first step; however, it is limited in its power to explain ICT impact. Therefore, advanced statistical methods (such as growth accounting) were used to gain better evidence on the economic impact of ICT. This economic analysis, which is mainly presented in Chapter 4, focuses on links between ICT adoption on the one hand and productivity growth, innovation dynamics and market characteristics on the other. It combines micro-data analysis (using data from the e-Business Survey 2007) and macro-data analysis (using the EU-KLEMS Growth and Productivity Accounts). More information about the methodology used for the econometric analysis of these issues is provided in Annex II.

Validation of results

The study was conducted in consultation with an Advisory Board that was specifically implemented to critically accompany the study from the start. Members of the Advisory Board for this study have been:

- Mrs. Anna Arbussá, University of Girona
- Mr. Peter Potgieser, ABN AMRO Group
- Mr. Barry O'Mahony, ML Consulting

Each Advisory Board is supposed to meet three times, in addition to informal exchanges with the respective study teams during the research phase (e.g. via telephone, e-mail and in bilateral meetings). The **first meeting** took place on 30 May 2007 in Brussels, during the inception phase. At this meeting, the study exposé and research plan was discussed. A **second meeting** was held on 5 December 2007 in Brussels where the findings of the interim report were discussed and validated. The **third meeting** was held on 20 May 2008 where opportunities for the dissemination of study results to target groups and for future research were considered.

2 Context and Background

2.1 Sector definition – scope of the study

This study focuses on ICT implications for credit institutions and banks. This combined sector covers a number of financial activities. The respective NACE Rev. 2 groups and their correspondence in NACE Rev. 1.1 are shown in Exhibit 2.1-1. The names of financial activities refer to NACE Rev. 2¹⁸.

Exhibit 2.1-1: Business activities covered by the sector study

NACE Rev. 2	NACE Rev. 1.1 (Proxy)	Financial activity:
K 64	K 65.1	Financial intermediation, except insurance and pension funding
64.1		Monetary intermediation
64.19	65.12	Other monetary intermediation
64.92	65.22	Other credit granting

This definition excludes activities of holding companies found in NACE Rev. 1.1 65.23/74.15/NACE Rev. 2 64.2/64.20 and trusts, funds and other financial vehicles, found in NACE Rev. 1.1 65.23/ NACE Rev. 2 64.3 and 64.30. This sector definition is in line with the definition of “Banking” used in the Eurostat Community Survey on ICT Usage in Enterprises of the Financial Sector¹⁹.

This survey does not allow for an analysis of micro firms (<10 employees), as the obligatory size-class breakdown in the Eurostat Community Survey does not include the micro-firm category.

The sector value system

The BI value system consists of several main players, where the central role is occupied by the banks themselves, offering their services to customers – these being businesses (B2B), individual consumers (B2C) and public authorities (B2G). Many stakeholders in the BI exert influence over banks. Banking regulators, investors and other stakeholders have an impact on the banking value chain. Universities and other research institutions are, due to their academic work, relevant for the development in the BI. Payment Card associations, funds and banking federations are included in the “supporters” category even though they may also act as banks, banking regulators and/or investors.

The services offering of a bank can be divided into (non-exhaustive list):

- Products (accounts, mortgages, deposits, investment and pension funds, credit, loans, mortgages, guarantees).
- Services (credit cards, cheques, promissory notes, receipts, transfers)

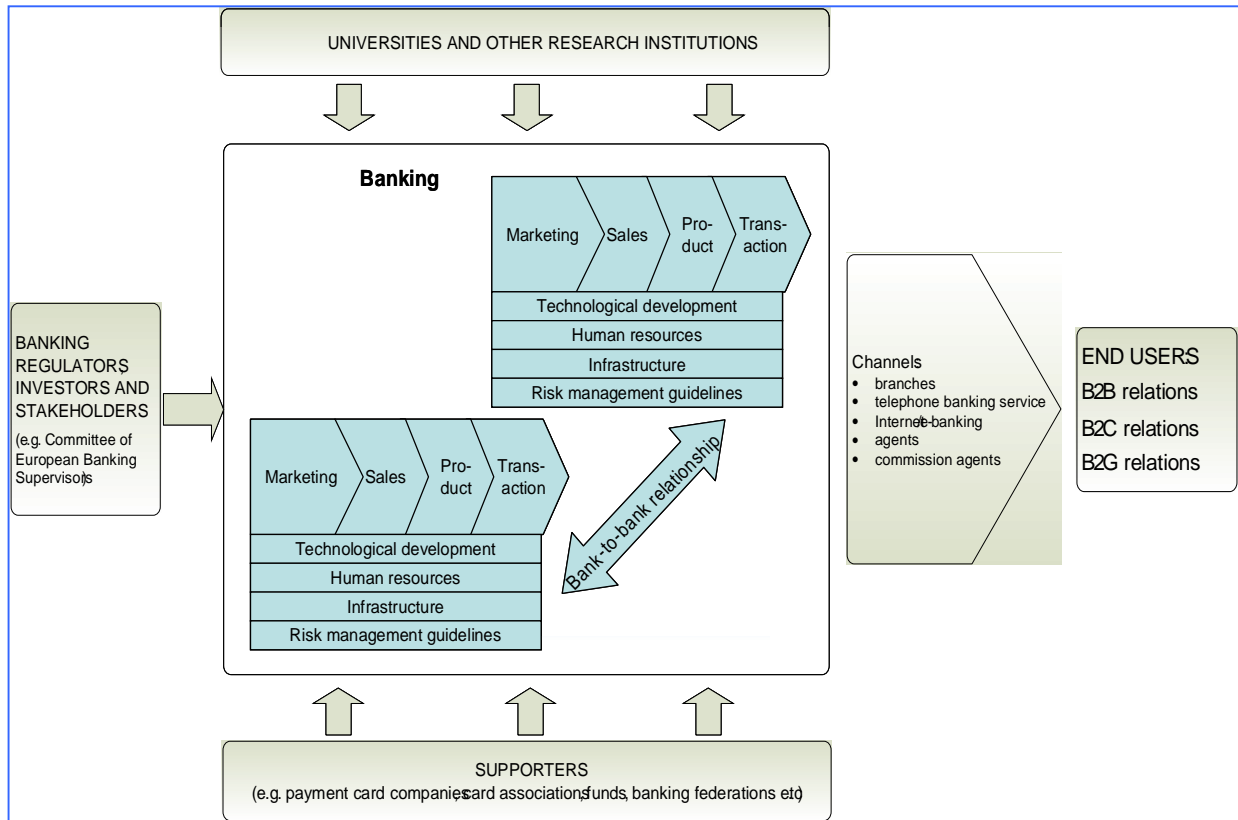
¹⁸ NACE Rev. 1.1 is a 4-digit classification of business activities. It is a revision of the ‘General Industrial Classification of Economic Activities within the European Communities’, known by the acronym NACE and originally published by Eurostat in 1970. A new version, Rev. 2, has been approved by the European Commission and will come into force in 2008.

¹⁹ Eurostat model for a Community Survey on ICT Usage and e-Commerce in enterprises of the Financial Sector 2006, Model Questionnaire Version 5.

- Channels - means through which banks reach their clients (branches, telephone banking service, Internet/e-banking, agents, commission agents)

Based on these definitions of bank offerings and relevant stakeholders, the BI value system is illustrated below in Exhibit 2.1-2:

Exhibit 2.1-2: The BI sector value chain



Source: Rambøll Management 2007, inspired by Montes (2004) and Lammers (2004)

The analysis of ICT-enabled development and impact from ICT on the BI in this study is based on the above understanding of the BI (its role in the value chain and the activities performed in a normally efficient bank). The section on SEPA (Section 3.2) focuses on the value chain element of “Transaction”, while the analysis conducted in Section 3.3 on process efficiency²⁰ primarily focuses on the value elements of “infrastructure” and “technological development” with special focus on ICT. Section 3.4 on branch renewal addresses developments in the marketing, sales, products and human resources areas presented above.

As will be seen later on in the report, SEPA has as of yet limited influence on the element of transactions. It has the potential to transform this element substantially in the future, if banks see the full potential in investing in ICT to reap the full benefits of SEPA. Likewise, if standardised, e-invoicing could also potentially transform the transaction element. The potential is there but the results still remains to be seen. It might also ease the processes for the employees, thus affecting human resources as well.

²⁰ Process Efficiency is a focus on finding improvements with the way work is currently done. This could include such improvements as job, process, or structural redesigns, depending on the situation.

However, the new business model introduced in the BI of dual banking largely influences the transactions element, as customers are increasingly interfering with the transactions as these are being performed by the customers themselves as a result of ICT. Hence, the banks are forced to create value for the customers in other elements of the value chain, which means that human resources are also affected by the dual banking concept, as tellers are increasingly being retrained to focus on more sophisticated banking assignments.

The report also shows that ICT has led to process efficiency in the BI, by transforming current processes to become more effective. For instance, Greek-based Eurobank has introduced process efficiency in the form of a new Business Process Management system. The preliminary result from the implementation of this system has been positive, especially in terms of decreased processing times, thus affecting the infrastructure element. In addition, process efficiency has also shown to impact on human resources, as implementing new business processes often are met with scepticism among the personnel, which can be afraid that their jobs are in danger. In this respect, the lessons learned from the case studies are that it is highly important to have a visible and committed management that can lead the project and encourage the employees to take a positive view on the new processes. The case studies have shown that if the management owns the project and passes their commitment on to the employees, the employees will with time embrace the new systems and often like them even better than the old systems.

Branch renewal have in this report proven to affect especially the infrastructures in the banks, as new ICT systems often are the result of branch renewal. This can for instance be seen in the case study on National Irish Bank, which as a result of a merger had to adopt Danske Banks' ICT systems. But branch renewal also affects human resources, as employees not only have to familiarise themselves with new ICT-systems, but are also often met with customers increasingly performing more and more routine tasks themselves. As mentioned, this implies that tellers are increasingly being retrained, thus affecting the entire HR-structure in the banks.

The concepts of SEPA, harmonisation, standardisation, process efficiency and branch renewal are discussed in more detail throughout the report.

2.2 Industry background

Europe remains a highly financial intermediation-based economy with the majority of savings and investment in the economy being channelled through banks. The restructuring of the BI has gained momentum after the introduction of the Euro and the European Single Market.

When it comes to the size of the industry, worldwide assets of the largest 1,000 banks grew by 15.5% in 2005, reaching about 83 trillion Euros (60.5 trillion Dollars). Of these, the EU banks held the largest share, 50% at the end of 2005 rising from 38% a decade earlier²¹. Large European banks now generate a large share of their revenues abroad. In 2004, the aggregate foreign earnings share for large European banks was 40%. In comparison, the three biggest banks in the United States averaged a foreign earnings share of 27%.

During the last two decades fundamental changes occurred in the European financial sector. Due to the creation of the European Single Market in financial services and financial market liberalisation, the volume of mergers and acquisitions in the European financial sector accelerated²². As a result of this process, the level of concentration significantly increased. The wave of mergers recorded within the BI during the 1990s resulted in fewer but larger credit institutions, with the number of enterprises declining in most European countries. Between 1983 and 2000, the number of banks in the European countries was reduced by more than 4,400 units, from 12,700 to approximately 8,300 banks (a decrease of about 34%)²³. A good example of this development can be found in Germany, which in 1990 had 3,913 banks. By 2003, this number was down to 2,076, a decrease of about 47%. In addition, the number of branches was reduced by about 15%, from 39,576 to 33,623 in the same period²⁴. In this respect, it is likely that ICT enables the companies to implement the merger or acquisition smoother on the technical level by making the process of merging company systems etc. more effective. This will be investigated further in the case studies.

The ICT readiness in the BI has two dimensions. ICT readiness is defined by the Economist Intelligence Unit as the ability to use ICT to develop one's economy and to foster one's welfare - the "state of play" of a country's ICT infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit²⁵. The first dimension is the technical level, where the banks need to have the appropriate ICT systems in order to be able to introduce ICT in their everyday routines. The second dimension relates to the "cultural" aspect of ICT readiness, where customers must be ready to take up the ICT-based services offered by banks. It is expected that especially the security issue – or rather, customers' perception of security – is still a relevant barrier for customers to fully adopt the ICT-based banking services. This will be discussed further later in this study.

²¹ International Financial Services, London, March 2006, www.ifsl.org.uk, 10.04.07

²² Anna Arbussa Reixach, Universitat de Girona, July 2001

²³ e-Business Watch, ICT and e-Business in the Financial Sector, No.4 II/January 2003

²⁴ OECD Database on Income Statement & Balance sheet- Germany Vol 2005 release 01

²⁵ http://graphics.eiu.com/files/ad_pdfs/2007Ereadiness_Ranking_WP.pdf, 17.01.08

Size of the EU banking industry

According to Eurostat, financial services generated 489.4 billion euros in value added in 2004, which represented 7.0% of gross value added in the EU-25 (NACE sections C to K)²⁶. The sector's contribution to the economy fell from 6.9% in 1996 to 6.3% in 2001, before rebounding to 7.2% in 2003 and dropping back to 7.0% in 2004²⁷. In employment terms, the contribution of financial services was around 4.5% to 4.7% in the EU between 1996 and 2004²⁸. Overall, the number of employees in the EU-25 BI fell slightly from about 3,2m in 2001 to 3,0m in 2004²⁹. This decrease in employment is partly due to the introduction of ICT-enabled process efficiency measures and partly to the – often accompanying - increasing focus on cost reduction. According to the Labour Force Survey, there were 6.1 million persons employed in financial services in 2005. Of these just over three fifths (62%) were employed in financial intermediation activities other than insurance and pension funding (NACE Division 65), one fifth (20.8%) in insurance and pension funding activities (NACE Division 66), while the remainder (17.0%) were occupied in activities auxiliary to financial intermediation (NACE Division 67)³⁰.

In value added terms, the financial services sector was relatively largest in the United Kingdom, which generated just over one fifth (21%) of the EU-25's value added in 2004, followed by Germany (19%).

The contribution of the financial services sector to total national value added in the business economy in 2004 was particularly high in Luxembourg (26.5%) and Ireland (12.8%). In Member States with data available, the contribution of financial services to the business economy was greater in value added terms than in employment terms, most notably in Estonia and Latvia³¹.

²⁶ Eurostat, European business - Facts and figures, 2006 edition

²⁷ Ibid.

²⁸ Ibid.

²⁹ European Central Bank (October 2006) – EU Banking Structures, 23.04.2007.

³⁰ International Labour Organisation, Labour Survey 2005.

³¹ Eurostat, European business - Facts and figures, 2006 edition

2.3 Trends and challenges

This section briefly presents and discusses current trends in the European BI. These trends originate both from legislation initiatives, changes in business and industry dynamics, and technological developments.

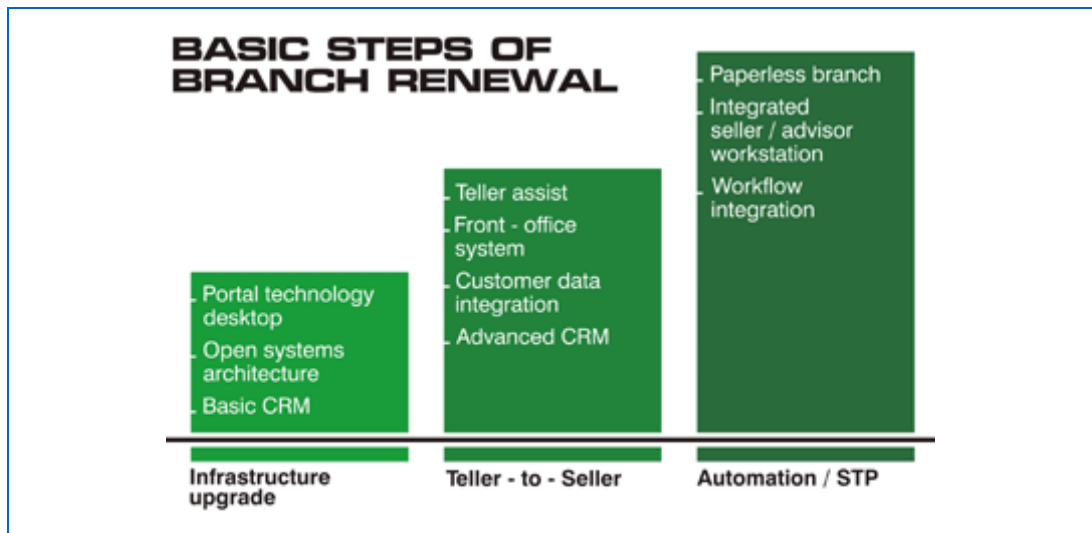
The renewal of branch and processing capabilities

e-Banking has become a commodity in Europe and banks are reporting that more than 30% of the standard banking transactions are conducted online. This has led to an increasing pressure on the service offerings among branch banks³². Banking anywhere at any time is normal procedure for many customers today and has driven banks to improve their ability to act as a mere mediator.

With the introduction of e-banking and the increased price focus, banking clients expect standard services at minimum cost or free of charge. Hence, little margin is left to pay the teller's³³ salary. The increased amount of self-service has taken away a substantial workload from the tellers, who are expected to use this new working scenario to sell high-level and high-margin products. Qualified advice and improved consulting is argued to be the best way to re-establish or retain face-to-face customer relationship.

A branch renewal process can however be viewed as a dramatic change, and the actual branch renewal process should therefore be carried out incrementally. A branch renewal process can be structured as shown in Exhibit 2.3-1 below:

Exhibit 2.3-1: Basic steps of branch renewal



Source: Datamonitor / Interactive Net Design,
www.brokat.de/megoldasok/Branch_renewal (March 2007)

³² Interactive Net Design, www.brokat.de, 11.04.2007.

³³ The personnel cashing checks, accepting deposits and loan payments, and processing withdrawals.

Introduction and improvement of customer relationship management

The European BI is increasingly focusing on creating greater customer loyalty through an improved focus on customer relationship management (CRM). CRM is not just a technology, but rather a holistic approach to an organisation's philosophy of dealing with its customers. This includes policies and processes, customer service, employee training, marketing, systems, and information management. Hence, it is important that any CRM implementation takes into account not only the technology requirements, but also the broader organisational requirements. The challenge for banks in this respect is to introduce an extensive training and skills development program to support the introduction of an ICT-based CRM system.

Protection of data and abilities of disaster recovery

With the increased use of information technology and the reliance on business-critical data, the importance of preventing the loss of customer financial data and business operation data has increased significantly. It is believed that some companies spend up to 25% of their budget on disaster recovery plans; however, this is only to avoid even bigger losses. Of companies that have had a major loss of computerised records, 43% never reopen, 51% close within two years, and only 6% will survive in the long term³⁴. European banks currently invest heavily in disaster recovery management both in terms of process and ICT, in order to avoid data loss and to develop support systems for data recovery.

e-Business and e-banking security

Customer data protection is another important aspect when discussing the increased use of ICT in the BI. According to a recent study by Deutsche Bank Research, there are still a relatively large amount of offline bank customers (customers that have not yet used e-banking) that refrain from using online banking services as they do not perceive online banking to be safe. The study claims that "The positive trend of online-banking adoption glosses over clients' underlying security concerns"³⁵. It should be highlighted that online banking users in general are confident of online security while offline customers doubts the safety of online banking. This means that offline customers' resistance towards e-banking is not based on bad experiences³⁶, but rather on a general perception that e-banking is risky. This further indicates that the insecurity perceived by offline customers presents a real barrier to the expansion of online banking. This reluctance by especially offline customers has been felt by the Swedish supermarket bank ICA Banken, which is primarily an online bank. Despite competitive interest rates the bank had difficulties attracting customers. These differences were partly attributed to the online concept, as the customers preferred the larger, "safer", Swedish banks which offered both online and offline services.

However, when discussing Internet security as being a barrier to the expansion of online banking, it should be kept in mind that the number of Europeans accessing bank services

³⁴ Cummings, Haag, & McCubbrey, 2005.

³⁵ Deutsche Bank Research (2008): Secure online banking needs a little help from its users, http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD000000000220572.pdf

³⁶ Deutsche Bank Research (2008): Online Banking: What we learn from the differences in Europe

over the Internet is constantly increasing. According to a recent study from Deutsche Bank Research, the share of online banking customers in EU-15 increased from 19% in 2003 to 29% in 2007. e-Banking is thus a rather widespread e-service, but the uptake and the positive development could be fuelled even more by ensuring that the sceptical 70% of the European population gets the best possible conditions to join e-banking. Moreover, the adoption rate of e-banking varies greatly within the EU, which is also something that could be looked into and improved. While the Nordic countries have a very high adoption rate (Iceland being in the top with around 70% of its population using e-banking), it is only 2% of the Bulgarian population that uses e-banking. Also, there is a tendency that it is primarily young, relatively well-educated people that engage in e-banking³⁷.

The Deutsche Bank Research study further states that online customers' sense of security rises with online experience. This has to do with two factors: first of all, customers become more confident with e-banking over time and, secondly, after a while users know how to handle typical Internet security risks. Actually, most users have faced some kind of Internet scam, which may be scary but at the same time makes users more resilient as they get used to being vigilant and to applying reasonable safety measures³⁸. This is supported by a recent statement from the Danish Bankers Association which shows that although the number of hackings into clients' accounts has risen in Denmark, the confidence in e-banking remains high³⁹, which further indicates that once the customers are using online banking, security is less of an issue.

For offline customers to be persuaded to use online banking, comprehensive security guarantees from the bank are according to the Deutsche Bank Research study very important to customers. However, such guarantees are not feasible as, according to the study, they would open up for irresponsible behaviour on the Internet, thus making e-banking less safe. Online customers should instead take reasonable safety measures, which they also do measured by the positive correlation between the number of online customers in Europe and the application of anti-virus software. Hence, the Deutsche Bank Research study concludes, if e-banking is to be safe the customers need to take action themselves as well.⁴⁰

The Eurostat Community Survey on the current usage and uptake of ICT in the BI shows that banks are increasingly getting the security measures needed in order to offer safe e-banking. The statistics used in this report differ from earlier studies, as they are based on the 2006 Eurostat Community Survey on "ICT usage in enterprises", and not a customised survey by the Sectoral e-Business Watch. The Eurostat survey nonetheless provides us with a basis for commenting on how security facilities are used in the BI. Thus, the survey illustrates a movement in the BI towards increased uptake of safety measures, as the availability of basic security measures has gradually become standard in the BI, also across size bands. For instance, more than 9 in 10 of the surveyed financial institutions now have firewalls, and almost all banks are using virus checking or protection software. Consumers have probably been an important influence in enforcing

³⁷ Deutsche Bank Research (2008): Online banking: The young and well-educated extend their lead until 2010

³⁸ Deutsche Bank Research (2008): Secure online banking needs a little help from its users, http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD000000000220572.pdf

³⁹ <http://www.computerworld.dk/art/44422> (in Danish).

⁴⁰ Deutsche Bank Research (2008): Secure online banking needs a little help from its users, http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD000000000220572.pdf

this, by demanding a safe and reliable environment for online banking. The issue of consumer trust in online banking is in this respect important, if banks should be able to transfer customer routine banking services to their self-service internet banks.

What is however interesting from the survey, and a possible area where there is room for improvement, is that 8 in 10 companies in the BI uses secure servers. This varies across size bands, with 7 in 10 of small banks using secure servers, compared to 9 in 10 of the large banks. This difference can have to do with the investment needed in order to get a secure server. Moreover, when looking at the number of companies having encountered ICT-related security problems in the last 12 months, it is actually 2 in 10 banks in total, and 3 in 10 of the large banks. Hence, as the survey shows, there is still room for improvement, and bringing the number of companies having experienced security-related problems down might be able to affect consumer confidence in e-banking.

e-Business Standards and e-Invoicing

In order to obtain an effective BI, e-Business standards, such as standards regarding e-Invoicing are important. According to a recent Commission report on European Electronic Invoicing⁴¹, streamlining the information flow in a value chain leads to inefficiency reductions, improves certainty and reduces costs.

As Europe is adopting the SEPA, it is logical to link this to the business processes that necessitate a vast majority of Business-to-Business and Business-to-Government payments. According to the Commission report, European electronic invoicing (EEI) can contribute substantially to Europe's competitiveness. It is expected that electronic invoicing could reduce supply chain costs by 243 billion EUR across Europe, help streamline business processes and drive innovation. For instance, in Denmark the introduction of e-Invoicing in the public sector alone has saved the public sector an estimated 100-134 million EUR per annum⁴².

The European Commission has made the development of e-Invoicing an objective in both the 2002 and the 2005 eEurope Action Plans, and wishes to establish an EEI Framework within Europe which standardises the exchange of e-Invoices by the participants in a commercial supply chain, particularly those involved in purchase and supply.

However, three barriers to e-Invoicing standardisation can according to the EC report be identified. The first one is legal issues. According to the report on EEI, the current legislative environment in the EU presents a solid foundation that could be used for guaranteeing integrity and authenticity of an invoice. However, many legislative areas are influenced by possible standards for e-Invoicing (such as VAT, accounting, payment, authentication and the like), which complicates the implementation of an e-Invoicing solution for both supplier and buyer. Legal uncertainty, non-compliance with requirements as well as lack of confidence in the implementation of e-Business solutions are legal and administrative barriers that e-Invoicing – as well as many other e-Business activities in the EU – suffer from. This is further complicated by different practices across Member States, such as different levels of security implemented or different methods used to ensure authenticity.

⁴¹ European Commission Informal Task Force on e-Invoicing (2007): European Electronic Invoicing Final Report, http://ec.europa.eu/information_society/eeurope/i2010/docs/studies/eei-3.2-e-invoicing_final_report.pdf.

⁴² Ibid.

The second barrier identified has to do with trust and operational issues. Storage of electronic invoices as well as the risk associated with the electronic exchange and automated processing should be better managed. Operationally, there are no significant issues for suppliers and buyers with the migration from paper-based invoicing to e-invoicing. However, Member State differences in applying operational controls and in managing commercial and tax law implications complicate standardisation procedures, which again hamper the commercial adoption of e-Invoicing. This is also a legal issue and consequently is also linked to the first barrier. According to the report, “the highest cost incurred in many e-Invoicing implementation projects stem from confusion and uncertainty with regards to legal obligations”⁴³. Both a clarification of the legal obligations as well as a consistent approach across Member States with respect to the detailed legal requirements for e-Invoicing would be beneficial. Clear “good practices” which are applicable to e-Invoicing across the EU should be established.

The last barrier has to do with the current limited standardisation of electronic invoices. Many specifications are in use both in Europe and globally, which presents a barrier to adopting a harmonised EEI Framework. Moreover, it also prevents widespread commercial support of e-Invoice services. According to the report, an international e-Invoice standard should be developed building upon existing commonly used business practices⁴⁴.

The renewal of automated teller machines

When it comes to the renewal of ATMs, there are several technologies in the pipeline that have not yet reached worldwide acceptance, but are expected to influence the development of ATMs in the near future. Examples include biometrics⁴⁵, where authorisation of transactions is based on the scanning of a customer's fingerprint, iris or face; Cheque/Cash Acceptance, where the ATM accepts and recognises cheques and/or currency without using envelopes; Bar code scanning; On-demand printing of "items of value" (such as movie tickets, Travellers Cheques); Dispensing additional media (such as phone cards); Co-ordination of ATMs with mobile phones; Customer-specific advertising; and Integration with non-banking equipment.

These upcoming technologies force the banks to invest in renewal of the ATMs to align with customer expectations and to decrease the reliance of customers on bank branches for standard banking interactions such as account balancing and cash withdrawal/payment.

Anti-money laundering and fight against the misuse of the BI

As a result of the increased ICT integration in the global financial industry, increased misuse of the BI has been observed in recent years. These include the use of banking services for activities like financing of terrorist activities, drug trafficking and money laundering. In countries where a comprehensive legislative system and well defined enforcement mechanism do not exist, credit institutions and banks are exposed to reputational, operational, and legal risks. Risks include having to pay possible

⁴³ Ibid.

⁴⁴ European Commission Informal Task Force on e-Invoicing (2007): European Electronic Invoicing Final Report, http://ec.europa.eu/information_society/eeurope/i2010/docs/studies/eei-3.2-e-invoicing_final_report.pdf

⁴⁵ Biometrics on ATMs can be found in Asia

investigation or penalty charges, decline in stock value, assets seizures, or temporary termination of banking services. Handling this issue requires a coordinated effort of the banking institutions, regulators and law enforcement agencies.

Summary: trends, challenges and the role of ICT

In sum, all of the above-mentioned trends and challenges are ICT-driven and therefore relevant to include when analysing ICT uptake in the BI. The renewal of branch and processing capabilities is largely driven by the demand for e-banking. The increased focus on CRM is possible thanks to ICT, and the data protection has been fuelled by increased investment in ICT in order to create systems to support data recovery. Customer confidence is only an issue with respect to online banking. Also, the development of standards is increasingly necessary with increased online banking and thereby increased banking across borders, but also allows for streamlining the information flow in a value chain, which can give Europe a competitive advantage in the long run. The introduction of ATMs is largely possible due to investments in ICT, and the fight against the misuse of BI can be further enforced by using ICT to block activities like money laundering.

However, the introduction of ICT to the BI also calls for an increased focus on data protection and fighting the misuse of the BI, as ICT has made it possible for instance to hack into other people's bank accounts. The above-mentioned trends and challenges will be discussed and analysed further in the case studies and when discussing impacts.

2.4 Review of earlier sector studies

e-Business W@tch covered the BI in its surveys of 2002 and 2003⁴⁶, but not in the more recent surveys of 2005 and 2006. In the 2002/03 studies, banking was identified as one of the sectors (together with tourism and ICT services) where customer-related online transactions were most important⁴⁷.

The studies concluded that the European banking and financial systems had experienced structural changes in the previous decade, the most important being the launch of the Euro and the deregulation of traditionally protected markets. The use of ICT, and especially of the Internet, was the other factor that drastically impacted the sector and reshaped the competitive scenario. The increasing use of ICT and e-business in the BI has not only increased competition among banks as well as competition from other actors in the financial markets; Internet banking has also shifted power from banks to their customers, by allowing customers to shop around for the best price for products⁴⁸. Also, branch restructuring (fewer tellers and more advisors), as well as the new business models such as dual banking are changes that have happened in the sector as a result of ICT.

⁴⁶ To access the previous studies on the BI please visit www.ebusiness-watch.org.

⁴⁷ According to e-maturity index, ICT services have a value of 100, while banking enjoys a 5th place with a value of 79.

⁴⁸ <http://www.ebusiness-watch.org/studies/sectors/banking/banking.htm>

The increased uptake of ICT in the BI has brought great changes to the banking system by making it easier to integrate banking systems. Examples include an increasing concentration of banks and organisational changes within the banks, such as restructuring of branches, all of which will be elaborated later in this report. Product and process innovation, a redefinition of strategy and a revision of organisation patterns were among the main issues that credit institutions had been dealing with in the previous years. Strategic alliances and co-operation agreements between banks on the production side (development of common standards, sharing of development costs, processing of payments) and on the distribution side (compatible ATMs) had taken place.

The technological development in the retail financial sector was expected to have an impact on the distribution of physical branches in the BI, on the role of other physical channels (such as ATMs and POS), and on the role of remote channels (such as the telephone and the Internet). However, in the earlier case studies, no significant evidence was found that the development of e-banking created excess capacity and banks consequently closed their physical branches. European banks were scaling down their physical network more slowly than expected, and in a few cases, even further expansion was taking place. Local units, being the physical contact points with the customers, were far from losing their role.

The e-Business Survey among banks confirmed that a high level of availability and usage of basic ICT infrastructure was present in banks in all countries, while networks such as extranets, WAN, and EDI were less used. More than 90% of medium-sized and large banks had a website in 2003, and 84% of the small banks.

The diffusion of ICT was strongly associated with the digital literacy of the personnel operating within financial firms. Also, at that point in time, the usage of the Internet to perform online transactions and the percentage of banks selling online was not very high. However, this may partly have to do with the concept of "selling online" which is difficult to fully apply to financial services.

Regarding barriers to ICT adoption and the impact of ICT and e-business on financial institutions, the reluctance of customers to buy online and the low propensity of financial products to be traded electronically were found to be the most important obstacles to electronic commerce. Customers' reluctance to buy online and their mistrust in online banking is still a challenge, although it can be seen that once the customers start using e-banking, their perception of security changes significantly. As mentioned in the previous section, customers need to take reasonable safety measures themselves in overcoming this barrier, as the security measures in banks are already at a high level⁴⁹.

Thus, in general, the results of the previous e-banking study suggested that the Internet (and new ICT in general) was a complementary channel to traditional brick-and-mortar banking, but that it was not the predominant channel with respect to banking activities. The e-Business W@tch study of the BI from 2002-2003 concluded that this situation was unlikely to change in the near future, as it seemed that banking activity was very much based upon traditional commercial transactions and that new technologies had a more significant impact on the efficiency of internal processes than on the overall business activity of banks. Thus, a complete shift from traditional brick-and-mortar banks to e-banks was not foreseen when the study was conducted in 2002-2003. The above-mentioned trends in 2007-08 however suggest that customers are increasingly using

⁴⁹ Deutsche Bank Research (2008): Secure online banking needs a little help from its users, http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD000000000220572.pdf

online banking, and that the BI experiences more and more mergers and acquisitions. However, although there are indications of a shift towards more online-based banking, the trend is rather to combine “the best from both worlds” and offer online banking along with branches to handle the more complicated financial inquiries from customers. This dual-bank approach can for instance be found in the Tapiola Bank case and the Egg/Citibank case, where both banks aim at creating synergies by offering online banking while still maintaining a branch network. Many banks are thus seeking to take advantage of low-cost, self-service and time-efficient online banking, which in turn are factors which are contributing to further implementation of ICT in the BI. The European Community Survey (which as mentioned is used in the study of the banking industry as no customised SeBW-survey is available for the BI) does however show that online banking may be in the process of, but has not yet become standard across the industry. Only 6 in 10 banks (CIs) currently offer services via the internet. Most banks do, however, have a basic ICT-infrastructure.

In terms of expenditures on electronic business technologies, the previous reports on the BI showed that a majority of banks (almost 60%) stated that they would maintain the current level of expenditure on ICT, but a significant proportion of banks – mostly the large ones – planned to increase the expenditures.

To sum up, the previous reports implied that the BI had experienced structural changes in the previous decade, such as the launch of the Euro and the deregulation of traditionally protected markets, and that the ICT uptake in the industry had increased, especially for medium-sized banks. However, there was also evidence that the banks were not likely to change from traditional brick and mortar banks to entirely Internet-based banks in the foreseeable future. The internet-only model is still not dominant, but an integrated model with the combination of branch- and online based banking (dual-combination banking) has become more and more common. This can be seen in the growth in the usage and uptake of ICT in the BI from 2002-03, where the only 1 in 10 (11.6%) offered their banking products online, compared to the current 6 in 10 banks providing financial services online (according to the Eurostat Community Service). Moreover, the case studies illustrates that customers are increasingly becoming familiar with online banking, together with other kinds of remote banking opportunities. Mobile banking, for instance, is among other things performing balance checks, account transactions, payments etc. via a mobile phone, normally via text messages. In the EU, where mobile phone penetration is high, there is a great potential for mobile banking. However, a recent study by Forrester Research shows that mobile banking is still in its very early days⁵⁰, but at the same time, US-based Celent consultants believe that it is a product with great appeal to the clients, especially the younger segment (18-25 year-olds). Celent predict that by 2010, 35% of online US-based households will be using mobile banking⁵¹. In any case, mobile banking is one of the remote banking opportunities that could gain ground in the nearby future and that should be kept an eye on.

Customers' increased familiarisation with online banking and other remote banking opportunities has allowed new banking concepts to be introduced to the market, and banks which rely on the internet as their main channel for customer interaction have now become established players in the European BI. However, although customers are moving towards using online banking and other kinds of ICT-driven technologies to an

⁵⁰ <http://www.forrester.com/Research/Document/Excerpt/0,7211,40623,00.html>

⁵¹ <http://www.celent.com/PressReleases/20070517/MobileBanking.htm>

increasingly greater extent, uptake is by no means total. According to Eurostat, only 30% of the EU citizens have used online banking within the last three months. Though more advanced than other sectors, the BI still has underused potential in terms of promoting ICT usage among customers, online banking has still not replaced the brick-and-mortar branches as the primary choice for banking for most Europeans⁵².

Another interesting difference between the current and earlier studies is how medium-sized banks were emphasised as being first-movers when it came to recognising and acquiring new and innovative ICT solutions. This picture seems to have changed since then, as the current survey shows that the costly investments needed to implement innovative ICT have increasingly become something mainly done in larger banks. Instead, small and middle-sized banks seem to rely on outsourcing and externally developed standard ICT-solutions, where larger banks still mainly utilise in-house expertise in developing and maintaining ICT.

Lastly, earlier studies generally emphasised the large proportion of banks in the BI, for whom ICT played no role, 1 in 10, and others for which it only played a moderate role, 4 in 10. This survey and case studies shows how this picture is changing, as ICT is an important driver in allowing banks to be flexible, efficient and a resource-saving investment, which most banks depend heavily on. We shall discuss the actual development in this area further in Section 3 and in the case studies.

⁵² Deutsche Bank Research (2008): Secure online banking needs a little help from its users, http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD000000000220572.pdf

3 The state-of-play: ICT adoption and e-business activity

ICT developments in recent years have had a profound impact on the BI. The emergence and development of for instance e-security, e-banking and e-marketing have been topics of increasing interest in recent years for both academics and practitioners, as the changes taking place in the field are clearly observable. However, the growing interest has not been matched well enough with relevant studies that would give insight into the processes and behaviours underlying the process of how the increasing use of ICT can foster new business models, marketing and sales channels, and business processes in the BI.

An example of how ICT has had an impact on the BI is that its emergence allows banks to apply credit-scoring techniques to consumer credits, mortgages or credit cards. Hence, products that used to be highly dependent on the banks' evaluation of its customers have now become more standardised. Other examples of ICT impact on the BI include the increased process efficiency, which can reduce costs in banks, and the branch renewal, where focus is gradually shifting away from traditional brick and mortar banks towards the dual-bank concept presented earlier.

The tendencies above have also produced changes in the structure of bank income. As a result of increased competition that has lowered margins in lending operations (the banks' traditional business), banks have diversified their sources of income and rely increasingly on income from fees services rather than interest rate spreads. Fees charged for services include typical banking activities like payment transactions, safe custody and account administration.

The increasing use of e-banking in the BI has increased competition within the industry. Due to the introduction of ICT in the BI, the entry barriers to the industry have been lowered as the demand for fixed assets in order to start up a bank has decreased. This has opened up the BI to competition from other actors in the financial markets, as can be seen in Tapiola Bank, where an insurance company has entered the BI. Also, supermarket chains⁵³ in the UK and Spain function as distribution channels for banking affairs, allowing these chains to enter the BI. The introduction of ICT in the BI has also entailed that in banking, and especially e-banking, power has shifted away from banks to their customers, by allowing the customers to shop around for the best price for products.

Research objectives

Based on the previously mentioned industry trends, and on the findings from earlier studies conducted on the BI, the following questions will guide the research work for this study:

- **Dynamics of adoption:** What is the current state-of-play concerning ICT uptake and usage?
- **Key applications:** Which are the key e-business application areas in the BI?

⁵³ Examples include Marks & Spencer, Tesco and Sainsbury's

- **Difference in ICT uptake/ICT readiness:** How pronounced is the gap in ICT uptake between large and small-and medium-sized banks?
- **ICT-skilled labour:** Is there a lack of ICT-skilled labour in the BI and does this present a barrier to the development of the industry?
- **Impact on firm performance:** What is the impact of ICT on employment, productivity, organisational structure and firm performance in this industry, in comparison to other sectors?
- **Impact on competitive advantage:** Is there a link between e-Business/ICT developments and competitive advantage and where are the niche players in this?

In addition to presenting and analysing the Eurostat Community Survey on ICT in the financial sector, this chapter will provide insights into current trends of ICT use and e-business activities which are specific to the BI. The chapter does however not claim to provide a comprehensive overview, as that first of all would exceed the limits of this study, and secondly be difficult to realise, as ICT and e-business are relevant for nearly all core business areas of the BI. Therefore, the issues analysed should rather be understood as representative examples of ICT and e-business usage in the industry as well as the related opportunities and barriers/challenges. The following three issues were selected in coordination and agreement with DG Enterprise and Industry:

- **Implementation of the SEPA:** Section 3.2 discusses the role played by the scheme initiated by the European Central Bank, the national central banks in the Euro area, and the European Commission to create a single European market for payment across Member States. This issue is expected to impact the current business processes of the BI greatly, especially as all transactions in a bank within the Euro area now are to be regarded as national transactions. In addition, the implementation of SEPA may challenge the current sources of income for many banks, as they now compete with banks from the entire Euro area. The case studies illustrate that the European BI was struggling with implementing the necessary required changes in business process and ICT systems to support SEPA payments/transfers in due time to meet the deadline set by the European Commission. The interviewed banks have mainly opted for minimum requirements in order to comply with SEPA.
- **ICT as a driver for process efficiency:** Section 3.3 addresses the subject of ICT in connection with the ongoing process efficiency initiatives in the BI. These initiatives are put in place by European banks to gain a competitive advantage by lowering the internal business process costs. With increased competition arising from e-banking, banks are increasingly looking to the potential gains from ICT-enabled banking processes. The case studies show that the introduction of ICT drives the reorganisation of human resources and changes the cost structure and the services offerings in best-practice banks.
- **The impact of ICT and e-banking on branch renewal:** The further uptake of e-banking solutions by private and corporate clients has put increased pressure on the service offerings, the human resource setup and the business processes in bank branches. European banks are forced to rethink their approach to banking to better match the customer requirements for e-banking, especially in terms of everyday banking interaction (which can be done online) and access to customised financial advice in specific instances (which often in the customer's perception requires a physical branch). This dual requirement among some customers (B2B,

B2C and B2G) has sharpened the competition among European banks. The case studies support the finding that branches have been greatly affected by the introduction and uptake of e-banking, especially in terms of the changed use of human capital (mainly the role of the teller).

3.1 ICT uptake and usage in the European Banking Industry

This section presents and analyses the 2006 Eurostat Community Survey on ICT usage in the financial sector. The findings from the survey will be supplemented with findings from the case studies (Chapter 5) and the analysis of selected ICT-themes in Sections 3.2-3.4.

The 2006 Eurostat Community Survey on ICT usage in the financial sector was a survey conducted to analyse the uptake of ICT in the European financial sector (the NACE classes Rev. 1.1 65.12, 65.22 and 66 except 66.02). The optional coverage was NACE Rev. 1.1 67.12, 67.13 and 67.2. This report will use the term Credit Institution (CI) for the NACE Rev. 1.1 65.12 and 65.22. The Community Survey on ICT Usage and e-Commerce in Enterprises was carried out in the first quarter of 2006, and the variables in the questionnaire are predominantly of a qualitative nature (yes-or-no-questions or tick-box-questions). Techniques used in the data gathering include face-to-face interviews, telephone interviews and postal surveys, with national variations in terms of applied method. A total of 6244 enterprises were interviewed for the survey, this number being the subtotal of interviews conducted across NACE 65-67.

The tables in this study feature a breakdown of the population of enterprises based on the aggregate of the (then) 25 EU countries. The survey was carried out as an enterprise survey, i.e. focusing on the enterprise as a business organisation (legal unit) with one or more establishments, which means that comparisons should mainly be made between size-bands of enterprises. The following presentation and analysis of the survey only include selected areas of the survey that, in itself and in conjunction, represent findings of interest in the analysis of ICT uptake in the European BI.

3.1.1 ICT infrastructure used by banks

Internet access

An important indicator of the general uptake of ICT in the BI relates to the use and availability of Internet. Internet access is a precondition for e-Business, as this is the main channel for e.g. e-banking. The general availability of Internet allows for the analysis of overall ICT-readiness in the BI. 99% of banks (employee-weighted) have access to the Internet, and about 5 in 10 use a computer connected to the Internet at least weekly. The latter finding shows that ICT nowadays is not necessarily an integrated part of operating a bank. The case study on Glitnir Bank, serves to illustrate how a high availability of internet among customers, can be an important facilitator to inducing improved usage of online banking.

A slight increase in Internet availability can be observed by comparing the results (total) from the 2002 survey (95%) with the 2006 results (99%). This increase is most evident in

the small and large credit institutions (CIs), which have both gone from a respectable availability to complete or nearly complete coverage. The medium-sized banks had 100% availability of Internet access in 2002 and 99% in 2006 (the slight decrease might be explained by statistical uncertainty in the sample). The observations made in the size-band of medium-sized banks shows, interestingly, that this size band in general has a higher frequency of Internet access.

The different broadband connections used to access the Internet are not only used as the basis for advanced e-business applications, but also to support internal and external collaboration and to provide customer services over the Internet. Furthermore, broadband represents a faster way to connect to the Internet and is a technology which changes the way the Internet is used. While the general availability of Internet is almost complete across size bands, the Internet technology used in the BI is quite different across the different size bands. The broadband technology used is to some extent related to the size of the CI. About 8 in 10 of the large companies connect to the Internet via a >2Mb/sec DSL connection, while about 6 in 10 of the small enterprises use a connection >2Mb/sec DSL connection. This confirms the general assumption of a correlation between company size and ICT uptake.

Exhibit 3.1-1: Use of Internet in the European BI

	Have access to Internet	Use a computer connected to the www at least once a week	Connect to the Internet below 144 Kb/s	Connect to the Internet >=144 Kb/s and < 2Mb/s	Connect to the Internet via DSL (< 2 Mb/sec)	Connect to the Internet via DSL (>= 2Mb/sec)
2006 (EU25)						
Total (10+ empl.)	99	64	6	38	27	54
Small (10-49 empl.)	98	57	11	47	33	41
Medium (50-249 empl.)	99	71	4	39	61	56
Large (250+ empl.)	100	64	1	15	11	84
CIs (BI)	99	65	7	40	27	50
Insurance	99	63	2	32	26	65
CIs & insurance	99	77	6	35	26	58
Base (100%)	firms using computers	firms using computers	Computers linked to the Internet	Computers linked to the Internet	Computers linked to the Internet	Computers linked to the Internet
Questionnaire reference	B1	B2	B4	B4	B4	B4
2002 (EU Total)						
Total	95			50	29	
Micro & small (<50 empl.)	95			62	10	
Medium (50-249 empl.)	100			59	22	
Large (250+ empl.)	94			47	32	
Base (100%)	firms using computers			Computers linked to the Internet		
Questionnaire reference	A2a			A4a	A4b	

Source: Eurostat Community Survey on ICT usage in enterprises 2006 (data extraction and table by SeBW)

Use of internal networks

The application of networks is a vital part of an effective ICT-enabled system, which is especially true in the case of banks with a branch network. Local Area Network (LAN) may also be seen as a basic indicator of the minimum infrastructure required to enable companies to conduct e-banking at a substantial level⁵⁴.

Wire-based LAN is currently the dominating technology. The survey shows that 9 in 10 companies use wire-based LAN. The fact that LAN is a relatively low-tech and easily attainable ICT solution, would to some extent explain the wide coverage of this technology. Interestingly enough, the middle-sized CIs have a wider coverage of wire based LAN than large CIs, which however might be explained by their higher uptake of wireless LAN (W-LAN).

Exhibit 3.1-2: Use of networks in the BI

	Use wireless LAN	Use wire based LAN	Use Intranet	Use Extranet	Have remote employed persons who connect to IT systems through electronic networks
2006 (EU25)					
Total (10+ empl.)	17	91	84	53	37
Small (10-49 empl.)	13	87	74	40	26
Medium (50-249 empl.)	17	96	90	59	39
Large (250+ empl.)	26	94	97	74	60
CIs	14	92	85	53	29
Insurance	25	90	81	52	63
CIs & insurance	21	90	74	46	44
Base (100%)	firms using computers	firms using computers	firms using computers	Firms using computers	firms using computers
Questionnaire reference	A6	A6	A6	A6	A2

Source: Eurostat Community Survey on ICT usage in enterprises 2006 (data extraction and table by SeBW)

Wireless LAN is a relatively new technology in the BI, and is e.g. used to permit bank employees to access network resources from nearly any convenient location. About 14% of the banks use this kind of technology. The uptake of wireless LAN seems to be related to company size, as 26% of the large CIs use wireless LAN, which is above the corresponding uptake in the small and medium banks. Comparing with another ICT intensive industry, the uptake of wireless LAN is much higher in the telecommunications sector, which showed a 44% uptake of wireless LAN⁵⁵. The BI is often compared to the telecommunications sector in terms of ICT uptake, which makes this difference in uptake of W-LAN interesting. The reason for the lower uptake of wireless LAN in the BI may be related to data security concerns. Security is an important topic in the BI, as the

⁵⁴ e-Business W@tch, Sector Study on the Financial Industry, 2002/2003

⁵⁵ e-Business W@tch, survey on the Telecommunications Industry 2006.

continuing digitalisation of information means that bank processes are increasingly becoming dependent on reliable ICT operations. The application of wireless LAN may hence be limited by concerns about the secure application of this technology.

An Intranet is a private network that uses Internet protocols and network connectivity to securely share part of a banks' information or operations with its employees. Intranets are among other things used by banks to facilitate collaboration across functions or to advance productivity and efficiency by supporting business operations and decisions across the inter-networked enterprise. 8 in 10 banks (CIs) use Intranet. The usage, however, differs across size as only 7 in 10 of small CIs (10-49 empl.) have a working Intranet, compared to almost all large CIs (250+ empl.). This may be explained by economies of scale as the value of Intranets increases with the number of employees using it, meaning that large CIs naturally are more inclined to implement such systems than small and medium-sized banks.

Extranets on the other hand are not as commonly used as Intranets. An Extranet is a system by which banks can provide Internet/Intranet access to customers and suppliers. The Extranet is considered as a safer way of conducting e-banking services compared to communicating over the Internet, as it is a closed data network between a bank and its customers. The uptake of Extranet in the BI is fairly low with only 5 in 10 CIs using Extranet. The rather low uptake might be explained by the fact that an Extranet is often customised to individual customers, as it has to correspond with the customers' own ICT systems. The "one-size fits all" approach of the Internet may hence not be applied to the Extranet, with increasing development and maintenance costs as a result. As a result, some banks may prefer to use Internet-based interfaces with customers instead of Extranet-based solutions. Extranet is also often used in business settings where a supplier has a limited amount of large customers, which is not the typical scenario for a bank.

Large CIs (+250 empl.) are more advanced in the uptake of Extranet with 7 in 10 having one, compared to about 4 in 10 of the small and middle-sized CIs. The case study of Tapiola Bank indicates that the small and medium-sized banks with a branch network, operating with a relatively limited ICT-budget, may view the development of both Extranet and e-banking too costly, when taking the potential value of it into consideration.

Remote access means that employees can access data from the banks' networks remotely, e.g. when working from home or travelling. Traditionally, remote access is used to increase flexibility in the workplace. The total uptake of remote access is relatively low (37%), however, the uptake of remote access is more common in large CIs with 6 in 10 utilising this feature, compared to 4 in 10 of the middle-sized CIs. The organisational size and the economies of scale from developing and maintaining remote access technologies may be a contributing factor to this development. Security concerns might also be an issue, as increased remote access to often confidential material, could increase the likelihood of security breaches correspondingly.

The BI as a whole is still behind the insurance industry where 6 in 10 have employees using remote access to connect to IT systems through electronic networks. This might be explained by the trend in the insurance industry of employing people who are physically placed in different regions, but it does seem that there is room for CIs to catch up in terms of using remote access. The survey however shows that the usage of ICT has improved in comparison to the earlier studies, as the availability of e.g. intranet has grown from 3 in 10 companies having intranet (across size-bands), to the current 8 in 10 companies. The use of extranet has grown from 1 in 10 companies in 2002/03 to 5 in 10 companies in

2006. Moreover, the availability of LAN has grown drastically, as the former studies showed that only 4 in 10 had this as a part of their ICT infrastructure, whereas the current European Community Survey shows a rise to 9 in 10 banks have this kind of ICT.

Specific ICT software systems

IT systems for managing orders or purchases are increasingly being introduced across sectors to facilitate automation and improved process efficiency with regard to purchases. With a dedicated IT system, all procurement processes are gathered into one system, across functions and locations. This ensures a transparent, effective and automated management of all purchases. About half of the banks have implemented dedicated systems for managing orders and purchases. There is, however, a difference in uptake across size-bands, as about 7 in 10 large banks (250+ empl.) have dedicated systems for managing orders, and about 6 in 10 have that system linked to an internal IT system (normally an ERP system). In contrast, less than 50% of small and middle-sized CIs have this type of system implemented.

Exhibit 3.1-3: Specific use of IT systems in the BI

	Have dedicated IT systems for managing orders or purchases	Have IT systems for orders and purchases which link to an internal IT system of your enterprise or enterprise group	Have IT systems for orders and purchases which link to IT systems of customers business systems
2006 (EU25)			
Total (10+ empl.)	48	42	13
Small (10-49 empl.)	36	31	8
Medium (50-249 empl.)	54	48	16
Large (250+ empl.)	67	61	24
CIs	50	44	14
Insurance	44	36	14
CIs & insurance	44	37	12
Base (100%)	firms using computers	firms using computers	firms using computers
Questionnaire reference	A7	A8	A8

Source: Eurostat Community Survey on ICT usage in enterprises 2006
(data extraction and table by SeBW)

The apparent relationship between the uptake of IT systems for managing orders and purchases may be explained by the volume of operations, as larger banks have larger procurement volumes that can justify the development and maintenance of an ICT-enabled procurement system. For this reason, the large CIs, often also with a branch network, stand to achieve greater benefit from such technology than small and medium-sized banks. In addition to the higher procurement volume, the uptake of e-procurement is also based on the implementation of IT systems for orders and purchases. If a bank has these systems, it is able to interact with suppliers via e-procurement. Again, the procurement volume plays an important role, and the implementation of e-procurement is hence expected to be smaller in small and medium-sized banks.

Substitution of postal mail

The BI is currently being renewed in many areas. One of these areas relate to the digitalisation of formerly paper-based processes. Electronic mail is increasingly being applied for especially non-legal correspondence like account statements, marketing and sales. Despite the development in electronic mail, postal mail is still the preferred medium. About 5 in 10 banks have only done minor substitution of postal mail, and only 4% have substituted most or all of their postal mail by electronic means. Only 1 in 4 have completed major digitalisation of postal mail, and 1 in 5 have yet to substitute any postal mail with electronic means.

Because only 3 in 10 of the CIs have taken significant steps⁵⁶ towards the effective usage of electronic communication, the majority of the CIs still have considerable room for implementing electronic mail. In relation to the best practice case studies presented in Chapter 5, this constitutes an interesting finding as the advancement of e-mail among best-practice banks does not seem to be strongly rooted in the industry. This could indicate that the ICT process efficiency gains from electronic mail are still to be reaped. This finding does not contradict the observations in the case studies but it is an indication that the industry is highly fragmented in its uptake of electronic mail as a means of communication.

Exhibit 3.1-4: Substitution of postal mail in the BI

	The enterprise has not substituted postal mail by electronic means	The enterprise has done minor substitution of postal mail by electronic means	The enterprise has done major substitution of postal mail by electronic means	The enterprise has substituted most or all of its postal mail by electronic means
2006 (EU25)				
Total (10+ empl.)	18	51	25	3
Small (10-49 empl.)	21	49	25	4
Medium (50-249 empl.)	17	54	25	3
Large (250+ empl.)	15	52	28	4
CIs	19	52	24	4
Insurance	16	48	30	3
CIs & insurance	19	49	25	5
Base (100%)	firms not using electronic mail	firms using electronic mail	firms using electronic mail	firms using electronic mail
Questionnaire reference	A9	A9	A9	A9

Source: Eurostat Community Survey on ICT usage in enterprises 2006
(data extraction and table by SeBW)

Both large enterprises and small and middle-sized enterprises have to a lesser degree substituted postal mail for electronic means, which would indicate that size is not necessarily an issue in the uptake of electronic mail. The usage of electronic correspondence is increasing, but full digitalisation of formerly paper based processes is

⁵⁶ Defined as the enterprise having done major substitutions of postal mail by electronic means or substituted most or all of its postal mail by electronic means

still limited. In most cases only minor digitalisation has been done, and only 24% of the CIs have altered processes through major organisational transformation.

ICT security measures

The security issue is of special concern in the BI, as banking is highly based on trust from its customers. Hence, the risk of hackers, denial of service attacks, technological failures, breach of privacy of customer information, and opportunities for fraud created by the anonymity of the parties to electronic transactions all have to be managed. Depending upon its nature and scope, a breach in security can seriously damage public confidence in the stability of a financial institution or of a nation's entire banking system. Hence, by introducing the appropriate security measures and putting security concerns at ease, the BI might be able to attract the segments among consumers who previously were not inclined to use e-banking. Furthermore, it is also in the banks' own interest to improve security, as digital fraud can be costly both in financial losses, and in terms of the damage it does to the brand of the bank in question. However, with the above being said, Exhibit 3.1-2 shows that security in general is high in the BI. It is true that offline customers could be attracted to online banking if comprehensive security guarantees from the bank are present, but there is a limit as to how much security a bank can provide in order not to encourage irresponsible behaviour from customers. Moreover, as the Deutsche Bank Research study showed, online customers should themselves take reasonable security measures in order to avoid digital fraud⁵⁷.

Exhibit 3.1-5: Security facilities used in the BI

	Use of virus checking or protection software	Use of firewalls	Use of secure servers	Use of off-site data backup	Have encountered ICT related security problem in the last 12 months
2006 (EU25)					
Total (10+ empl.)	98	95	78	85	19
Small (10-49 empl.)	97	92	70	78	15
Medium (50-249 empl.)	99	97	80	90	20
Large (250+ empl.)	100	99	92	94	27
CIs	98	94	78	87	17
Insurance	99	97	77	80	25
CIs & insurance	98	93	70	84	22
Base (100%)	firms using security facilities	firms using security facilities	firms using security facilities	firms using security facilities	firms using security facilities
Questionnaire reference	B10	B10	B10	B10	B12

Source: Eurostat Community Survey on ICT usage in enterprises 2006 (data extraction and table by SeBW).

As mentioned, the use of security facilities in the sector as a whole is high. Nearly all banks use ICT-enabled security facilities, such as virus checking software, firewalls and

⁵⁷ Deutsche Bank Research (2008): Secure online banking needs a little help from its users, http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD000000000220572.pdf

off-site data backup. Anti-virus and firewall software are used in more than 9 in 10 banks across size-bands. The sensitivity of the stored data necessitate that all possible measures are taken in securing data maintenance. This focus on security might be one of the reasons why only 1 in 5 banks experience ICT-related security problems. An interesting observation is that 1 in 4 of large banks have experienced some kind of security related problems in the last 12 months, as opposed to only 1 in 5 of the small and middle-sized CIs. Hence, the security-related problems are proportional with the investments in technology for security problems. This, however, might be explained by the difference in the scope of IT operations. In addition, the small banks are expected to have a lower general level of ICT uptake, making them less vulnerable to ICT related problems than ICT-intensive banks, which are more commonly found among the medium and large size banks. Lastly, ICT-related security problems might also be related to hacking attempts, which are often more common in larger, well-known banks.

A security facility not fully used in the BI is the secure server technology. Secure servers are not as frequently implemented in banks as firewall and anti-virus technology, as only 4 in 5 CIs make use of this technology. Especially the small CIs have yet to fully implement secure servers, which may be explained by the sheer magnitude such an investment represents for a small bank with limited resources in terms of finances and human capital.

87% of the banks in the survey use backups compared to 80% of the insurance companies. This might not seem as a big difference, but it could serve as an explanation for why 25% of the insurance companies have encountered ICT related security problems, compared to only 17% of the CIs. 1 in 5 companies in the two sectors have in the last 12 months experienced ICT-related security problems. This indicates that there is further room for IT risk management in the financial industry, and especially among small and middle-sized banks, which are less developed in their use of internal security facilities.

e-Business Watch analysed security controls and other measures applied by European enterprises to counter security threats in detail in its survey of 2005. The results, which were presented in a special report⁵⁸, indicated that basic components such as firewalls and secure servers – for those enterprises requiring these – already exhibited high levels of penetration.

Authentication

The common concern among users of e-banking is related to the authentication of users and data connections. 36% of the CIs use digital signatures, compared to 28% of the companies in the insurance industry. The use of digital signatures is interestingly enough not as widespread as the application of PIN codes (68%) or encryption (61%). The use of digital signatures is however increasingly being introduced, especially in the Nordic countries where national standards have been developed and implemented as a result of government-sponsored digital signature projects. Given that this is a relatively new technology, it is not surprising that only 4 in 10 of the CIs use this technology.

The survey findings are interesting in the context of the current discussions at European level regarding a pan-European authentication system for, among other, electronic

⁵⁸ See e-Business W@tch Special Study on ICT Security, e-Invoicing and e-Payment Activities in European Enterprises, September 2005. Available at www.ebusiness-watch.org.

financial transactions. Some banking representatives are currently advocating such a pan-European standardisation work on digital authentication to promote more cross-border banking interaction, thereby liberalising the market for financial services and increasing the efficiency and effectiveness of the information society⁵⁹. The reasons for the limited application of digital signature presented in the survey above may originate both from the cost associated with developing customised digital authentication systems in each bank as well as a possible hesitant approach by some banks due to the ongoing discussion on the development of a pan-European standard. As long as this discussion is ongoing, the investment in customised authentication systems in banks may be put on hold. Hansabank is an example of how a variety of security facilities such as id-cards, mobile authentication and digital signatures can be used as means to secure banking transactions. Especially digital signatures are, in the case of Hansabank, a feature used in many B2C and B2G operations, offering customers much flexibility in terms of using Hansabank to e.g. deliver income statements.

Exhibit 3.1-6: Security facilities used in the BI (II)

	Use of electronic digital signature as customer's authentication mechanism	Use of other authentication mechanism (e.g. PIN code)	Use of data encryption for confidentiality
2006 (EU25)			
Total (10+ empl.)	36	68	61
Small (10-49 empl.)	35	60	47
Medium (50-249 empl.)	33	72	67
Large (250+ empl.)	42	81	85
CIs	38	72	61
Insurance	28	54	60
CIs & insurance	22	63	50
Base (100%)	firms using security facilities	firms security facilities	firms security facilities
Questionnaire reference	B11	B11	B11

Source: Eurostat Community Survey on ICT usage in enterprises 2006
(data extraction and table by SeBW).

3.1.2 ICT in exchanges with customers

e-Marketing and sales

E-marketing involves moving elements of marketing strategies and activities to a digitalised environment such as the bank's homepage. Marketing has in this sense moved on to the Internet, and has become an important strategic tool for creating, distributing, and promoting goods and services to the consumers over the Internet or through other digital tools. e-Marketing is often performed through websites, which makes the availability of websites and usage of these in relation to marketing a good indicator of the extent to which a bank is using e-marketing.

⁵⁹ Interview with CIO Peter Schleidt, Danske Bank, 23.09.07.

Almost all large banks have a website, compared to about 8 in 10 of the small enterprises and 9 in 10 of the middle-sized enterprises. The possibility to use e-marketing is hence greater in large banks. The larger number of large banks with websites also affects the number of banks using their website to market products and services. The fact that the small and medium-sized enterprises have not taken advantage of websites as a means of promotion is surprising, as this is a relatively low-cost technology. As the SkandiaBanken case showed, efficient e-marketing can be a key parameter for success. E-marketing and CRM were two of the most effective tools used by SkandiaBanken to attract new customers and maintain existing ones⁶⁰. This was furthermore true for Egg bank, which only used the Internet to promote itself. Personal assistance in the form of branch personnel is still regarded as the best medium for customer interaction; however, online banks such as Egg have proven that it is possible to deliver satisfactory services online, despite not having the face-to-face opportunity of brick-and-mortar banks.

Exhibit 3.1-7: Use of websites in the BI

	Have a web site or a homepage	Uses the website to market own products
2006 (EU25)		
Total (10+ empl.)	87	71
Small (10-49 empl.)	77	59
Medium (50-249 empl.)	93	77
Large (250+ empl.)	99	89
CIs	89	75
Insurance	87	59
CIs & insurance	84	n. a.**
Base (100%)	firms using computers	Firms using computers
Questionnaire reference	B8	B9

Source: Eurostat Community Survey on ICT usage in enterprises 2006 (data extraction and table by SeBW).

Effective e-Marketing might be very helpful for the small and medium-sized banks with limited resources available for advertisement. It has been seen that small banks with a working website in a given period experienced improved financial performance compared to small banks that had not yet launched their websites.⁶¹ This example illustrates how improved usage of websites and e-marketing in general may be a competitive factor not yet fully exploited by the small and medium-sized CIs.

Offer of e-banking services

About 6 in 10 banks offered financial services online (e-banking). Offering financial products online is more common in large CIs (74%) than in small CIs (45%). The survey results thus indicate a difference in the adoption of e-banking among different size spans. Large geographical variations in the uptake of e-banking are also evident, with the Nordic countries (especially Finland and Sweden) as the front runners. The findings from the survey need additional research and the final report will focus on a validation of the survey findings compared with the case study findings.

⁶⁰ For more information on the case study see Section 5.6.

⁶¹ DeYoung, Robert (2007): The limits of information technology: how much will the banking industry change? InTechnology Driven efficiencies in Financial Markets, Bank of Finland

Among services offered in e-banking, payments services are the most common. This is supported by the case studies, which illustrate that payments services are often the first element developed by banks for an online setting. Payments services also show the greatest potential for quick gains as the labour-intensive work traditionally conducted by tellers in a branch office can be made more efficient. Again, small banks do not apply online financial services as often as larger banks. This is in line with the general observation that small (especially small branch-based banks) have a lower ICT uptake and usage. In addition, small banks may have more difficulties in financing large investments in e-banking and ICT systems. Section 3.3.3 also analyses this difference between small and large banks.

Exhibit 3.1-8: Provision of financial services via the Internet

	Enterprise provided on-line financial services to customers via the Internet	Products/ services provided via the Internet:				
		Payment services	Savings deposits	Loans	Investment services	Banking products/ services
2006 (EU25)						
Total (10+ empl.)	56	46	28	27	30	50
Small (10-49 empl.)	45	37	22	22	26	40
Medium (50-249)	62	51	27	27	34	57
Large (250+ empl.)	74	59	42	40	45	64
CIs	65	60	36	34	39	64
Insurance	33	7	5	7	7	11
CIs & insurance	41	27	14	15	18	33
Base (100%)	Firms using computers	Firms providing financial services via the Internet				
Questionnaire reference	C1	C2	C2	C2	C2	C2

Source: Eurostat Community Survey on ICT usage in enterprises 2006
(data extraction and table by SeBW).

Customer interaction via the Internet

Looking into the share of customers using interactive ordering via enterprise websites, the most common scenario is that 10-25% of a bank's customers use interactive ordering online. Only 2% of the banks have more than half of their customers ordering online. This indicates that the Internet-only banks are still niche players and that the majority of the banks still operate on a traditional branch-based platform or a combination of the two. The low uptake of online ordering may be one of the main challenges for the future BI, if the trend of self-service is to manifest itself among the majority of consumers. The pressure from online banks may in the long force retail banks to promote e-banking among consumers to a larger extent in order to retain their market share. However, from the case studies it seems that the Internet-only banks remain a niche in the BI and that banks increasingly apply the dual combination concept. This manifest itself either by brick and mortar banks offering an increased number of services online, by brick and mortar banks starting up an online branch or by brick and mortar banks acquiring Internet-only banks.

Looking into the same aspect among the corporate clients, the same picture emerges. It can however be argued that a slightly higher share of banks experience that 25% or more of their customers use the Internet for ordering. This could be explained by the earlier uptake among corporate customers of phone banking and ERP integration. The overall uptake of this kind of online financial transactions is however still limited to less than 10%, as less than 1 in 10 corporate account holders use online banking on a daily basis. It is surprising that the time-efficient use of online banking has not been utilised to a greater extent than it has among the corporate clients, who on a regular basis request banking services. Some large financial dealings might require a more thorough expertise from the bank than what can be offered online, but the routine payments and services could be performed online, thereby saving numerous man-hours in terms of transportation time. However, a possible explanation could be security issues, as it can have great impacts on a corporate client's business if it is subject to digital fraud.

Exhibit 3.1-9: Percentage of private account/ deposit holders who use interactive ordering via enterprise website

	Percentage of private account /deposit holders who use interactive ordering via enterprise website:					
	< 1%	1-5%	5-10%	10-25%	25-50%	50+%
2006 (EU25)						
Total (10+ empl.)	6	8	8	11	7	2
Small (10-49 empl.)	6	8	8	6	4	2
Medium (50-249 empl.)	6	9	8	15	9	2
Large (250+ empl.)	6	7	8	19	12	4
CIs	7	10	10	15	9	3
Insurance	1	0	0	0	0	0
CIs & insurance	5	5	4	7	4	1
Base (100%)	firms receiving online orders from private customers					
Questionnaire reference	C3b	C3b	C3b	C3b	C3b	C3b

Source: Eurostat Community Survey on ICT usage in enterprises 2006
(data extraction and table by SeBW).

Exhibit 3.1-10: Percentage of corporate account/ deposit holders who use interactive ordering via enterprise website

	Percentage of corporate account /deposit holders who use interactive ordering via enterprise website:					
	< 1%	1-5%	5-10%	10-25%	25-50%	50+%
2006 (EU25)						
Total (10+ empl.)	7	7	6	9	8	5
Small (10-49 empl.)	7	6	4	7	3	3
Medium (50-249 empl.)	8	10	7	10	10	6
Large (250+ empl.)	8	6	6	10	14	10
Base (100%)	firms receiving online orders from corporate customers					
Questionnaire reference	C3c	C3c	C3c	C3c	C3c	C3c

Source: Eurostat Community Survey on ICT usage in enterprises 2006
(data extraction and table by SeBW)

Interaction with the public sector

Another important element of ICT uptake and usage in the BI is the banks' interaction with public authorities via the Internet. As illustrated in Exhibit 3.1-11 below, about 8 in 10 banks use the Internet for interacting with public authorities. There is no significant difference between size bands, but it is evident that CIs (banks) are slightly more likely to contact public authorities via the Internet compared to the insurance industry. The simpler online interactions like information gathering are more frequent than the more advanced interactions like e-tendering or e-filing, which is rather normal in almost any industry. The low share of banks engaging in e-tendering could however be explained by the mere fact that banks seldom engage in public tenders for financial services.

Exhibit 3.1-11: Interaction in the BI with the public sector

	Use Internet for interaction with public authorities	Use Internet for interaction with public authorities for:			
		Obtaining information	Obtaining forms	Returning filled in forms	Submitting a proposal in an electronic tender system
2006 (EU25)					
Total (10+ empl.)	80	75	74	64	5
Small (10-49 empl.)	78	72	72	61	3
Medium (50-249 empl.)	83	77	77	68	5
Large (250+ empl.)	82	79	75	64	9
CIs	82	76	75	65	4
Insurance	77	72	70	61	6
CIs & insurance	74	69	67	55	5
Base (100%)	firms using computers	firms using B2G Interaction			
Questionnaire reference	B6	B7	B7	B7	B7

Source: Eurostat Community Survey on ICT usage in enterprises 2006 (data extraction and table by SeBW).

Given that the BI is heavily regulated and in dialogue with government institutions on security and administrative issues, the possibility of interacting with public authorities online provides the individual banks with several opportunities. First, the time saved when obtaining information and forms online, allows both the banks and public authorities to use these man-hours elsewhere. Second, online interaction can reduce bureaucracy as online processes are often more transparent and accountable. Third, the often paper-intensive processes are performed online, which allow enterprises in the BI and the public authorities to pursue digitalisation even further by digitalising other processes in the company affected by the paperwork. The fact that 8 in 10 banks use this kind of online interaction is evidence of an increasing familiarity of non-personal information exchange, a trend which might spill over to corporate and private clients in the future. Earlier eBusiness W@tch studies of the BI highlighted the relationship between the public sector and banking industry as being one of investment rather than cooperation. Hence, the earlier studies did not deal with how a relationship between the public and banking

industry can exist, and the apparent advantages of using ICT in this connection to facilitate improved efficiency for both parts.

3.1.3 Demand for and supply of ICT skills

The case studies analysed in Chapter 5 illustrate how a modern bank could be considered like an IT company or an IT platform provider. In this respect, attracting competent ICT staff for the development and maintenance of ICT solutions and e-banking services is of key importance to the competitiveness of a modern bank. In the BI, the demand for personnel with the required ICT skills has grown correspondingly with the development of new market segments related to the Internet.⁶² With so many of the banks' operational processes being ICT-related, the competition for skilled labour among the CIs in the BI has increased. Achieving the best personnel is increasingly developing into a competitive advantage for the companies in question. The general development of a bank to become more ICT-focused in terms of work force composition can however not be supported by the survey findings presented in Exhibit 3.1-12 below.

Exhibit 3.1-12: Recruitment of personnel with ICT skills

	Had difficulties in recruiting personnel with ICT skills	No difficulties in recruiting personnel with ICT skills	Did not need to recruit	Problems the enterprise faced trying to recruit personnel:		
				Personnel with required skills in the use of ICT applications were not available or not entirely suitable	ICT specialists were not available or not entirely suitable	High remuneration costs of ICT specialists
2006 (EU25)						
Total (10+ empl.)	9	49	42	5	6	4
Small (10-49 empl.)	5	48	48	4	2	2
Medium (50-249 empl.)	10	49	42	5	7	4
Large (250+ empl.)	18	53	30	9	16	10
CIs	8	48	45	5	5	4
Insurance	13	53	34	7	10	6
CIs & insurance	8	56	37	3	7	6
Base (100%)	firms using computers			Firms with difficulties recruiting ICT personnel		
Questionnaire reference	A4	A4	A4	A5	A5	A5

Source: Eurostat Community Survey on ICT usage in enterprises 2006 (data extraction and table by SeBW)

Only about 1 in 10 banks reported difficulties in recruiting personnel with ICT skills. On the other hand, 4 in 10 responded that they did not need to recruit personnel with ICT skills. These observations are in contrast to the picture presented by the case studies in Chapter 5, where the general notion is that attracting qualified labour to vacant positions across the BI is problematic. According to the survey, only 1 in 5 of the large banks (+250 empl.) has experienced difficulties in recruiting personnel. This can however be due to

⁶² <ftp://ftp.jrc.es/pub/EURdoc/20749-ExeSumm.pdf> (August 2007).

another trend observed, namely that many ICT-related jobs are being outsourced abroad, which could have been triggered by ICT-labour shortage in native countries.

4 in 10 banks did not have to recruit ICT-skilled labour at all. Normally, the expansion of ICT-related business processes in the BI corresponds to a similar expansion in ICT-labour. Again, this could be due to the fact that ICT-related jobs and thereby processes are increasingly being outsourced. Another possible explanation is that the CIs in the BI have not expanded their ICT-operations in the reference year, or educated / upgraded existing personnel in how to use new ICT.

1 in 10 banks are experiencing difficulties recruiting personnel with ICT skills. However, only a limited number of respondents state the reason as being lack of candidates in general, lack of people with specific skills or too high remuneration costs. The difficulties in recruiting ICT-personnel are most apparent in the large enterprises, and might be explained by the scale of operations.

The survey indicates that there is currently no divide between availability and demand for ICT-skilled labour in the BI. This finding is in contrast to the findings from the case studies, which suggest that there is a need for ICT skilled labour in the BI, exemplified by the number of job offers given to graduate students with a relevant university background⁶³. One of the possible explanations to this could be that banks, as previously discussed, increasingly outsource these services either to national or international ICT subcontractors and that this reduces their need for ICT-skilled labour.

3.1.4 Conclusions: ICT and e-business adoption

The BI has a high uptake of computers, and a high application rate of the Internet, LAN and Intranet. In addition, many banks apply security measures like firewalls and encryption systems to secure data. Surprisingly, however, the overall high uptake of general purpose technologies has not yet influenced the uptake of authentication technologies, e-banking and e-marketing. Two observations from the survey were particularly interesting, namely the low uptake of e-banking and the lacking divergence between demand and availability of ICT-skilled labour.

The case studies indicate that two business models have emerged in the BI, these being 1) Internet-only banking and 2) Dual branch/Internet banking. The survey could however not support this, as it shows limited uptake of e-banking across the BI. In addition, the basic systems for e-banking like electronic authentication are not yet widespread in the BI. If the fundamental systems for e-banking have not been implemented in banks, they are not able to offer a reliable and safe e-banking product. A difference between banks in terms of e-banking capability may arise and the competition between banks may be affected by their ability to develop or implement the necessary technologies of e-banking.

The second important finding from the survey concerned the access to ICT-skilled labour. The general notion from the case studies and from expert interviews is that the European BI is experiencing a shortage in highly skilled IT personnel. This could however not be confirmed by the survey. According to the European Community Survey, a large share of banks did not need to hire personnel with ICT skills in 2006. This could be due to the fact that the growth of ICT operations did not require a corresponding enlargement of ICT-skilled labour, or, as previously discussed, that the ICT services in the banking industry

⁶³ Interview with Professor Mark Wahrenburg, Johann Wolfgang Goethe-Universität, 04.12.07

has been outsourced to national or international ICT-subcontractors. Of the limited number of banks experiencing problems in recruiting ICT-skilled labour, some banks mentioned the increased salary demands as the key issue in acquiring ICT-skilled labour. In the previous e-Business W@tch studies of the BI there are no indications on the access to ICT-skilled labour. However, the case studies in Chapter 5 support the notion that attracting ICT-skilled labour is currently not problematic within the BI. When asked, the respondents in the conducted case studies denied the lack of ICT-skilled employees, at least to the degree that it was not perceived as an obstacle to further developing their ICT-infrastructure.

The conclusions regarding e-banking and ICT-skilled labour are further discussed in Section 3.3.

3.2 The Single Euro Payments Area

3.2.1 Introduction

Up until January 2008, the Euro area economy was not fully exploiting the benefits of a monetary union and a single market. When making Euro retail payments in other Euro area countries, stakeholders were subject to different rules and requirements depending on their country of origin⁶⁴, and these payments therefore often turned out to be time-consuming. This implied that companies with a substantial number of cross-border payments had to maintain bank accounts in the countries in which they do business, in order to manage their payments. This fragmentation not only affected cross-border payments but also national Euro payments, as it prevented innovation and competition at the Euro area level.

To overcome this issue, the SEPA was launched on 28 January 2008. SEPA is an initiative for the European financial infrastructure launched by the European Central Bank and the European Commission. SEPA involves the creation of a Euro-zone in which all electronic payments are considered domestic, and difference between national payments and cross border payments among Member States thus does not exist. As one European Payment Council release put it: "SEPA is meant to turn the fragmented national markets for Euro payments into a single domestic one. Once SEPA is fully realised, citizens and industry will *be able to make payments as easily and inexpensively as in their hometown*. National boundaries will not matter"⁶⁵. A new Directive on Payment Services⁶⁶ introduced by the European Parliament sets out to help facilitate a Single Euro Payment Area by harmonising the legislation in the EU countries. Among other things, it removes legal barriers to the payment services⁶⁷.

The aim of the Payment Services Directive 2007/64/EC (PSD) is to ensure that electronic payments within the EU become as easy, efficient, and secure as domestic payments within a Member State. The PSD provides the legal foundation for the SEPA, and will in this respect serve as the legal framework to license banks and payment service

⁶⁴ SEPA Brochure, European Commission, 2006, p 10.

⁶⁵ SEPA strives to ease electronic payments across European Union, Contractlessnews, September 12, 2007.

⁶⁶ Member States must incorporate the directive into their national laws by 1 November 2009.

⁶⁷ Norges Bank (2006): Annual Report on Payment Systems 2006, http://www.norges-bank.no/Templates/Report_66314.aspx

providers, and allow them to introduce European-wide payment initiatives for electronic credit transfers, certain debit and credit card payments, pan-European Direct Debits or regular payments via Credit Cards. The new legal framework will come into force by 1st November 2009 at the latest.

The purpose of PSD is in part to reinforce the rights and protection of all users of payment services (consumers, retailers, large and small companies and public authorities).⁶⁸ The PSD also seeks to improve competition by opening up payment markets to new entrants, thus fostering greater efficiency and cost-reduction. Furthermore, it aims at guaranteeing fair and open access to payments markets and to increase consumer protection. Currently, each Member State has its own rules on payments, and the annual cost of making payments through these fragmented systems is as much as 2-3% of GDP. Payment service providers are effectively blocked from competing and offering their services throughout the EU. The Directive is expected to bring major benefits to all the users of payment services. It will also ensure that all Euro or domestic electronic payments (as well as certain other payments involving Euro currency exchange) are completed in a maximum of one day after the payment order is given. It provides the legal foundation for the launch of cross-border direct debit schemes, as well as the development of common financial instruments, standards, procedures, and infrastructure to enable economies of scale. It should also lead to lower prices and greater choice for users by fostering competition in the market and allowing non-banking institutions to enter the payment markets.⁶⁹

The PSD is as mentioned the foundation on which SEPA is implemented. From an ICT perspective, SEPA will be important in several ways as it establishes electronic payment instruments for credit transfers (SCT) in the European Economic Area and in European Free Trade Association countries. Moreover, a scheme for a pan-European direct debit (SDD) and a debit cards framework will be available in addition to national ones. The SCT is a cross-border non-urgent Euro payment scheme. It allows transfer payments to be made between any SEPA country, including Euro payments within member states. Once the bank receives the instruction from the payer, the person being paid will receive the amount within 3 working days. The SDD-scheme will enable Direct Debit originators to collect Euro payments on any of the SEPA countries, including their own domestic DD using a single Direct Debit Service rather than having to use the country specific Direct Debit Services that currently exist. The PSD also lays the foundation for a new type of competitor in payments – the so-called payment service providers (PSPs). These companies, who are dedicated to payments, will not only act as service providers to banks but will also compete directly with banks as they offer payment services directly to end users.⁷⁰

Payment habits in the EU has generally been far from best practice, as they often involve much paper-based work and cash transfers and lack efficient processes. Based on a very rough estimate, about 200-300 billion payments are made each year in the EU27 countries. If costs could be reduced by ten cents per transaction, 20-30 billion euros per year could be saved on transactions⁷¹.

⁶⁸ http://ec.europa.eu/internal_market/payments/framework/index_en.htm.

⁶⁹ "Payment Services Directive: Commission encourages swift and coherent implementation at national level" Press release of the European Commission, IP/07/1914, 12 December 2007.

⁷⁰ http://www.atkearney.com/shared_res/pdf/SEPAShake-Out.pdf

⁷¹ Interview with Harry Leinonen, Advisor to the Board, Bank of Finland, in Communications & Strategies, no 66, 2nd quarter 2007.

Payment cards issued by international card companies are well-suited for payments abroad. However, the payment systems must be better coordinated in order for the international payment systems to become more efficient. This is an important motivating force behind the efforts to create a single payment area in the EU⁷². SEPA aims to improve the efficiency of cross border payments and turn the national markets for Euro payments into a single domestic one, as it will enable customers to make cashless Euro payments to anyone located anywhere in the area using only a single bank account and a single set of payment instruments^{73 74}.

Enhancing economic productivity depends largely on the efficiency of the payment and securities settlement market. It has been argued that a significant part of Europe's productivity growth deficit versus the United States is due to inefficiencies in payment processing and securities clearing and settlement. A well-designed payment system enables commerce to flow efficiently, both within and between countries⁷⁵.

SEPA includes the development of common financial instruments, standards, procedures, and infrastructure to enable economies of scale. The relevance of the SEPA is reflected in the expected macro-economic benefits resulting from SEPA. SEPA is expected to reduce overall cost to the European economy of moving capital around in the region, which as previously mentioned today is estimated as 2%-3% of total GDP⁷⁶. The latest studies carried out by the EC on this topic show that the potential benefits from SEPA in payments markets alone could exceed €123 billion over the next six years, and a further €238 billion if SEPA can be used as a platform for electronic invoicing.⁷⁷

Based on the above, this study will focus on the impact of SEPA on the European Banking Industry, by addressing in particular the following research questions:

- What are the expected benefits and barriers to the implementation of SEPA?
- What effect may SEPA have on the operating climate of European banks?
- What are the main drivers behind the SEPA roll-out and how may governments support the adaptation of SEPA?

These questions are investigated starting from the following assumptions:

- SEPA will impact internal business processes of banks and change their service offerings.
- SEPA is facing challenges in gaining industry support for the initiative.

⁷² Norges Bank (2006): Annual Report on Payment Systems 2006, http://www.norges-bank.no/Templates/Report_66314.aspx

⁷³ www.ecb.int (Oct. 2007).

⁷⁴ Interview with Harry Leinonen, Advisor to the Board, Bank of Finland, in Communications & Strategies, no 66, 2nd quarter 2007.

⁷⁵ Technology Driven Efficiencies in Financial Markets, 2006, Payments industry and securities markets

⁷⁶ www.rte.ie (Oct. 2007).

⁷⁷ <http://www.ecb.int/press/pr/date/2008/html/pr080128.en.html>.

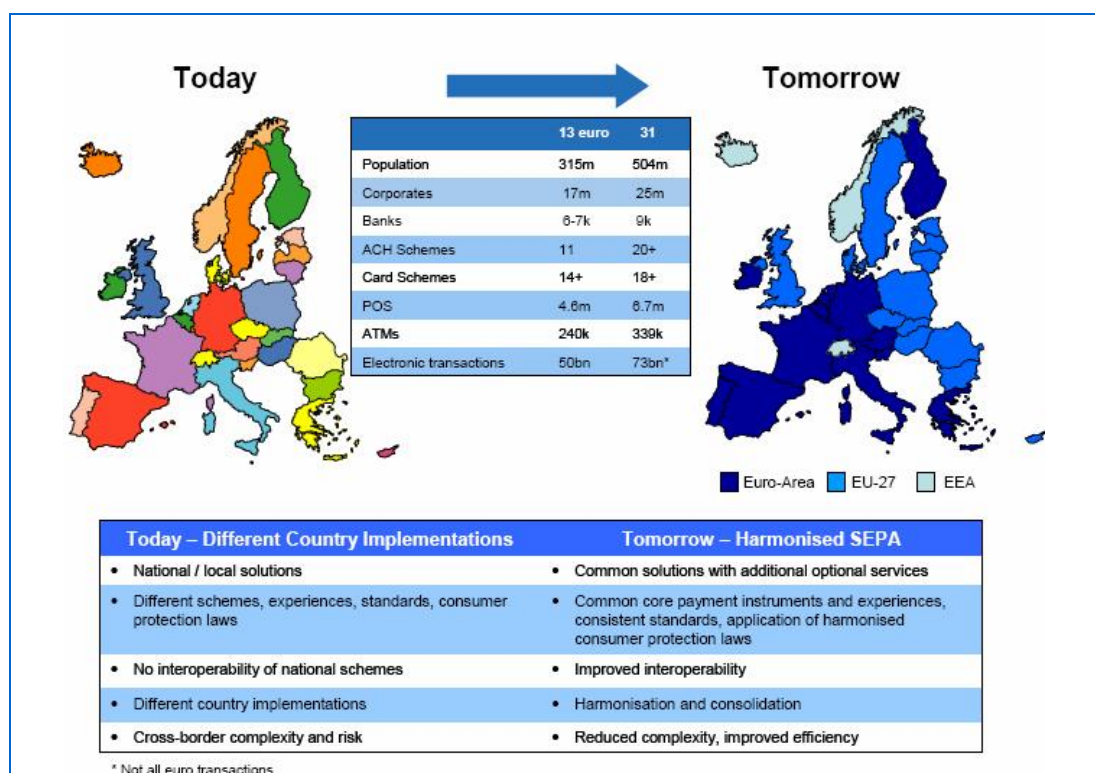
3.2.2 Potential benefits & barriers

SEPA is an innovative and ambitious programme. There are many challenges associated with making it a reality. Over time, the benefits of an integrated payment market are expected to evolve along the following lines:

- **More efficiency.** Europe will become more efficient thanks to the harmonisation of the payments involved in almost every economic transaction that takes place in society.
- **More opportunities.** Fewer barriers are expected to facilitate innovation and competition.
- **Support for the Euro as a currency.** Integrated payment systems will support the development of the Euro by promoting greater confidence and deeper economic relations throughout SEPA⁷⁸.

Overall, the situation before and after SEPA implementation is illustrated in Exhibit 3.2-1:

Exhibit 3.2-1: SEPA: Before and after the implementation



Source: Making SEPA a Reality, European Payments Council, EPC066-06. (April 2006), p. 11

The aim is to make the payments in the Euro area more efficient, but the work may also have impacts on the European Economic Area (EEA) countries and countries currently not a part of the EEA. Within the single European payment area, payments in Euro to the

⁷⁸ SEPA explained, European Payments Council, 2006

other countries may be executed from a bank account with a set of instruments and on the same terms and conditions as for domestic payments⁷⁹.

European enterprises engaging in cross-border financial transfers are expected to avoid the bureaucracy and costs related to for instance cross-border payments and liquidity management. In addition, the barriers to enter new markets are expected to become lower for smaller enterprises in particular, as payment routines will not take more effort than in the home country⁸⁰. It should also allow pan-European banks to centralise their payments back offices and liquidity management. Economies of scale and scope lead to sizeable cost reductions. Likewise, a proper referencing system would enable savings in accounts receivable and credit risk management for the non-financial business and public sectors⁸¹.

According to the European Commission, almost three quarters (74%) of the companies and 66% of the banks expect a positive business impact from the introduction of a pan-European payments infrastructure, while the majority (85%) of banks and two-thirds of companies expect to see processing efficiencies. In 2005, one in five companies and 8% of banks did not know what impact SEPA was expected to have on their business. Moreover, 70% of banks believed that a combination of self-regulation and market forces should be sufficient to make banks join the SEPA initiative. However, because of concerns over whether the industry as a whole will support SEPA, 73% of the banks expected in 2005 that the EC will eventually legislate to ensure compliance. Several banks believed that a formal SEPA certification process will be necessary to ensure a level playing field⁸².

Thus, there are barriers to a successful implementation of the SEPA initiative. First of all, it is argued by banking representatives that there has been an inadequate level of communication from the European Commission to the BI. According to recent surveys, only 54% of banks understood the SEPA requirements in detail. Numerous respondents believed that SEPA should be explained in more detail in a number of critical areas to avoid individual interpretations that may damage the programme's integrity⁸³.

Secondly, it is argued by the European Commission that some banks are currently focused on the costs of SEPA compliance, rather than the opportunities. Banks see little immediate benefit for consumers - and some even anticipate higher prices.⁸⁴

A third barrier to the long-term success of the SEPA initiative may arise from inadequate planning of product and market strategy beyond the first deadline in 2008. A recent study found that only 48% of the respondents (from 101 retail banks) were looking at product and market strategy after the 2008 SEPA deadline. The survey also revealed that less than 30% of the respondents have planned the migration of clients into a SEPA setup⁸⁵. This could indicate that the BI is not incorporating the SEPA features with the pace

⁷⁹ European Payments Council (2006): Annual Report on Payment Systems

⁸⁰ SEPA fact sheet, Nordea.

⁸¹ Technology Driven Efficiencies in Financial Markets, 2006, Payments industry and securities markets

⁸² SEPA to lop EUR29bn off payments revenue, Finextra, 2005.

⁸³ First Data International Study Reveals – SEPA Deadlines are a significant challenge, First Data, June 2006.

⁸⁴ First Data International Study Reveals – SEPA Deadlines are a significant challenge, First Data, June 2006.

⁸⁵ SEPA'S effect on the payments industry, Financial Services Technology, 2007.

expected and anticipated by the European Commission. This possible lack of SEPA compliance at this moment may be a barrier to the short-term success of SEPA. The slow implementation pace has led 73% of respondents to expect the EU to legislate to ensure compliance by the target date of 2010^{86 87}.

3.2.3 Business implications

As Europe moves to adopt the SEPA, banks will need to rethink the business processes that necessitate a vast majority of Business-to-Business and Business-to-Government payments, as cross-border payments within the Euro area now are to be as easy as national payments. When rethinking the business processes product and service innovation is expected to happen, and SEPA is expected to contribute significantly to the Lisbon Agenda, an effort to make Europe the most competitive and dynamic knowledge-based economy in the world by 2010⁸⁸. It is expected that banks will cooperate to implement SEPA at a technical level, but also that they will develop their own products and services based on the ICT-investments made to comply with SEPA. A critical mass of payments is expected to be switched over by 2010⁸⁹.

SEPA will have implications for businesses, banks and consumers. All electronic payments will be affected, and core credit transfers, direct debits and card payments are expected to be replaced with interoperable formats and processes. This is expected to greatly impact the European banking industry⁹⁰.

The BI is expected to see increased competition due to the consolidation of infrastructure. It is expected that SEPAs payment instruments will allow banks to expand their business and compete on a pan-European level, as any bank can offer its services to anyone in the Euro area, without additional cost or extra effort⁹¹. The European Payments Council argues that the payment sector suppliers will have an opportunity to develop new low-cost technology products and services, which will serve the single Euro market⁹².

SEPA is expected to impact the ICT and e-business approach in the BI. SEPA impacts both the work processes and the ICT requirements in the banks with which to process payments. Some banks may have the ICT resources (hardware, software and human) to develop SEPA-compliant ICT applications and work processes in-house, while other banks may be better off buying standard ICT systems for SEPA transactions than developing their own or buying national solutions. Smaller banks may consider outsourcing or pooling ICT-development due to the high acquisition and maintenance costs along with the need for highly skilled labour⁹³.

⁸⁶ SEPA'S effect on the payments industry, Financial Services Technology, 2007.

⁸⁷ Technology Driven Efficiencies in Financial Markets, 2006, Payments industry and securities markets.

⁸⁸ European Commission Informal Task Force on e-Invoicing (2007): European Electronic Invoicing Final Report, http://ec.europa.eu/information_society/eeurope/i2010/docs/studies/eei-3.2-e-invoicing_final_report.pdf

⁸⁹ SEPA explained, European Payments Council, 2006

⁹⁰ Making SEPA a Reality, European Payments Council, 2006

⁹¹ SEPA Brochure, European Commission, 2006.

⁹² Making SEPA a Reality, European Payments Council, 2006

⁹³ European Payments Council (2006): Annual Report on Payment Systems

Large, global banks see SEPA as an opportunity to introduce new value added services to the financial supply chain. These new services include among other things e-invoicing. Standardising e-invoicing is possible as banks with SEPA have to have similar IT-systems across borders⁹⁴. However, it is not only the large banks that see SEPA as an opportunity for introducing a larger product portfolio. According to the European Association of Craft, Small and Medium-sized Enterprises (UEAPME), one of the opportunities for small and medium-sized banks is the possibility of larger product offerings, e.g. in the area of e-invoicing⁹⁵. Nevertheless, UEAPME also points to the fact that in order for the small and medium-sized banks to comply with SEPA, a conversion of IT platforms and systems is required, which can prove to be especially costly for smaller banks with limited financial capabilities⁹⁶. Offering value-added services via product innovation and enhancement is one of the largest opportunities arising from the implementation of SEPA, and using ICT for product innovation seem obvious as the ICT systems are going to be adjusted anyway to meet the SEPA requirements. Hence, the challenge for smaller banks regarding the investment in ICT can be turned in to an opportunity in the long run, if the banks can manage to use the ICT to conduct new product innovations.

Impacts on the BI may thus very well be positive, if the opportunities of technology advancements are used. SEPA could then become the trigger for the migration of banks and their customers towards standardised solutions for direct and highly automated connectivity between their various systems. The charges to customers for these gateways or 'SEPA enablers' could be kept very low, and their quality and their enhanced access to bank services could be appealing. This would reduce the cost of migration for customers, accelerate the appetite for SEPA with any customer that processes payments electronically, accelerate the cost savings for banks but also significantly reduce the cost of rolling out value-adding services for any bank to a large customer base⁹⁷.

Enterprises acting as bank customers need to make their own ICT-preparations to be able to deal with the new business processes arising from SEPA⁹⁸. A change or update of the enterprises' work processes to match SEPA requirements is expected to be necessary, which can affect especially small businesses who have limited resources to do so⁹⁹.

⁹⁴ "SEPA GOES LIVE" - Official Launch of the Single Euro Payments Area, Press release of the European Commission, IP/08/66, 21 January 2008

⁹⁵ <http://www.ueapme.com/docs/various/2007/forumcoopbanks/Bartel.pdf>

⁹⁶ <http://www.ueapme.com/docs/various/2007/forumcoopbanks/Bartel.pdf>

⁹⁷ Buschman, Tom - Enabling global payment capabilities for new channels: Case study

⁹⁸ SEPA explained, European Payments Council, 2006

⁹⁹ Making SEPA a Reality, European Payments Council, 2006

3.2.4 Conclusions: SEPA

SEPA is expected to bring substantial benefits in the long term for end users, businesses and banks in Europe, as product innovation is expected to happen as a result of ICT-investments. However, in the short term the BI has to make significant ICT-investments in order to comply with SEPA, which can make the short-term benefits of SEPA harder to reap for the BI. SEPA has the potential to bring benefits to the customer through increased competition, improved integration and secure instruments. The speed of SEPA implementation among banks may due to the vast ICT-investment needed be rather slow and banks may be required to speed up the development of ICT solutions and work processes to secure SEPA success¹⁰⁰. In addition, it is argued that the end-users and authorities should take a greater role in the implementation process¹⁰¹.

Based on the assumptions made for this analysis of SEPA the following can be concluded:

- SEPA is expected to greatly impact the internal business processes of banks, as the payment processes must be redefined to meet SEPA standards. Service offerings are also expected to be impacted by SEPA, as product innovation is expected to be the long term result of the ICT-investments made, and a market for cross-border payments may arise.
- The BI is currently opting for minimum requirements in its implementation of SEPA, partly due to the rather heavy ICT-related investments needed. However, opportunities for ICT-product innovation are present for large, medium-sized as well as small banks.

¹⁰⁰ A Central Banks view on technology based efficiency and productivity in the financial markets, Technology Driven efficiencies in Financial Markets, 2006.

¹⁰¹ Interview with Harry Leinonen, Advisor to the Board, Bank of Finland, in Communications & Strategies, no 66, 2nd quarter 2007.

3.3 ICT as a driver of process efficiency

3.3.1 Introduction

The European services sector, and the bank sector in particular, has not brought about the same increase in productivity and ICT-enabled efficiency gains as that of the United States. The uptake of e-banking is a good indicator of this, and shows that the average European uptake (36%) is markedly below the US average (44%)¹⁰². The reasons for this may be the slightly lower investment in ICT, but also less competitive markets. When there is less competition, there is less pressure to innovate, and less pressure to increase efficiency¹⁰³. Especially retail banking and securities settlements are argued to possess unrealised potential for ICT-enabled process efficiency gains¹⁰⁴.

A recent survey illustrated that a small number of European banks combine superior IT management with focus on the benefits of business performance. The survey found that IT spending in the European BI varied widely, from 10% to 30% of operating costs¹⁰⁵. However, higher levels of IT spending did not increase the effectiveness or efficiency of the bank. According to the survey, the top performers achieved the greatest business efficiency and effectiveness, with a relatively low level of IT spending (8% of operating income, compared with an average of 12% for all other respondents). Of the 37 banks surveyed, 14 fell into this category¹⁰⁶. This finding is highly interesting in the discussion of increasing focus among banks on ICT development.

The BI is essentially an information intense industry, and the management in banks may face more demanding times now than in other industries since innovations are regular occurrences in the information age. As the case studies in Chapter 5 illustrate, European banks, large or small, niche or traditional, have increased their focus on ICT-oriented product and service development in recent years. For instance, the Finnish bank Tapiola Bank, which is primarily an Internet bank, was established as a direct result of the increasing use of ICT among its parent bank's customers. Also, the Internet-only bank Egg was acquired by Citibank due to its ICT-skills which could give Citibank a comparative advantage. If large ICT investments are happening on a regular basis, banks must develop a more focused investment-strategy to secure a competitive advantage from their ICT-enabled products and/or processes. This can imply a greater wave of mergers and acquisitions, or a closer cooperation between ICT service companies and banks. If the number of mergers and acquisition increase in the BI, ICT can in this connection actually enable these to be smoother, as previously discussed in Chapter 2.2. This is further illustrated in Irish NIB, who merged with Danish Danske Bank. Here, the IT-systems of Danske Bank were immediately implemented in NIB, thus making the merger smoother and removing the "us and them" feeling in the new company.

¹⁰² Deutsche Bank Research, Online banking: What we learn from the differences in Europe.

¹⁰³ A Central Banks view on technology based efficiency and productivity in the financial markets, Technology Driven efficiencies in Financial Markets, 2006

¹⁰⁴ A Central Banks view on technology based efficiency and productivity in the financial markets, Technology Driven efficiencies in Financial Markets, 2006

¹⁰⁵ See the case study on Danske Bank for a large bank using about 15% of their operating costs on ICT, Chapter 5.

¹⁰⁶ Editors, Concluding Remarks, Technology Driven efficiencies in Financial Markets, 2006

It is evident that ICT plays a significant role in the further development of efficient processes in a modern bank. This section analyses the impact of ICT on process efficiency, focusing on the following research questions:

- What are the benefits of ICT for increasing process efficiency in banking, and what are the major barriers experienced?
- What is the role of ICT outsourcing in this context?

The questions are investigated starting from the following assumptions:

- ICT has a positive impact on process efficiency, because processes can be partly or fully automated, errors eliminated or significantly reduced, etc.
- Modern bank-related ICT may be costly both in terms of acquisition, maintenance and development costs, because of their increasingly complex nature and critical importance to practically all processes in the company.
- Small and medium-sized banks may have a greater challenge in developing ICT due to a relatively smaller access to capital and human resources.

3.3.2 Potential benefits & barriers

Banks have created new sources of income by offering more sophisticated products and services which would not have been possible without the use of ICT. Examples of services offered online are online stock trading, e-invoicing and Internet banking. The whole banking landscape is changing, as Internet-based business models are changing traditional brick-and-mortar banking by offering services online, which are traditionally performed by tellers. In general, there exists a strong normative pressure in the BI for banks to remain up-to-date with ICT developments. The benefits, however, also provide strong incentives for banks to keep up with developments as the expenditures in terms of ICT tend to reap long-term savings. ICT-enabled developments may impact the banks in a variety of ways including savings in personnel and time from automated processes, reduced costs from streamlined and automated process flows, reduced costs from fewer errors, and identification and utilisation of economies of scale from lower unit processing costs¹⁰⁷. The case study on Tapiola Bank shows how ICT may be utilised as a means to facilitate process efficiency and hereby streamline work-processes and reduce staff costs. The bank has an automated credit application facility, which speeds up the process and reduces spending in terms of processing costs. Another example of ICT as an enabler of process efficiency can be seen in Hansabank, where the Internet bank reduces private customers' accounting costs and work time by optimising several accounting transactions (e.g. pre-defined payments). The development of the Internet bank has also had an impact on the internal business processes of Hansabank, as an online transaction is about 20 times less costly than the equivalent transaction conducted in a branch due to automatization.

Also the Greek Eurobank has used ICT in the sense of BPM to optimise its processes and thus gain process efficiency. The interviewee stated that Eurobank had saved money on implementing BPM albeit it was too early to put numbers on.

¹⁰⁷ A Central Banks view on technology based efficiency and productivity in the financial markets, Technology Driven efficiencies in Financial Markets, 2006.

In theory, the implementation of ICT allows banks to achieve four main objectives¹⁰⁸. First of all, banks can expect to reduce costs, especially in the area of labour expenditures. There is a shift from labour intensive (55% of the operational cost is personnel) to capital intensive investments. This is supported by the econometric analysis. As can be seen from the econometric analysis in Chapter 4, productivity growth rose in the EU from the year 2000 onwards. Very high average sustained annual labour productivity growth is however only observed in few countries like Portugal and Denmark, with average annual rates above 5% for the whole time period 1980-2004. However, average working hours per employee were according to the econometric analysis decreasing in most countries. Hence, it is likely that productivity growth in most countries could be related to a decrease in the number of employees in the BI as well as decreasing working hours per employee. According to the econometric analysis, ICT capital investments are largely substituting labour, particularly in retail banking. This is done by standardising ordinary financial services and having customers perform basic financial services online, thus rendering the tellers superfluous. Hence, it is expected in the coming years that the standardisation and harmonisation will continue, thus contributing to decreasing employment and increased investments in ICT. Another interesting aspect from the econometric analysis that high-skilled financial analysts face increasing employment opportunities, which indicates that while the basic financial services are increasingly standardised and performed online by the customers, there is an increased demand for more complicated financial services which can bring value-added to the bank along with the ICT-investments.

The case studies provide a less clear picture. The majority of the banks working with ICT as a process efficiency enabler agree that ICT have changed the role of the tellers, as they are no longer performing basic financial services. However, most banks state that they have upgraded the teller's skills so that they are now able to perform more complicated financial services and have thus not dismissed any tellers. Thus, for the interviewed banks, it seems that the efficiency gains are most likely to happen in the long run when the former tellers have been introduced properly to their new assignments. This finding from the case studies should however probably be taken with a grain of salt as very few banks are interested in stating that they actually had to cut down on personnel as a result of the introduction of ICT, as this would picture the bank as substituting personnel with ICT. Hence, the actual picture might be a bit different.

Second, ICT allows for tailor-made services with high added value, such as e-banking combined with the option of face-to-face advisory meetings to a level that satisfies the customers. This concept of dual-banking has been witnessed to a great extent in the case studies, where Tapiola Bank, Egg/Citibank and Glitnir Bank all combine the best from both worlds. Third, it allows banks to meet customers' needs faster and leads to a better flow of information and communication. The improved flow of information and communication was experienced by the Irish bank NIB, when it was merged with Danske Bank and overtook the ICT-system of the Danish bank. Lastly, ICT enlarges the portfolio of financial products and services that can be offered, which again can lead to higher customer satisfaction.¹⁰⁹ The last statement is what is expected to be fuelled by the introduction of SEPA, where the ICT-investments needed to comply with SEPA are expected to encourage banks to further develop its ICT-based products and services, such as e-Invoicing.

¹⁰⁸ ICT practitioners skills and training, Cedefop Panorama Series 95

¹⁰⁹ ICT practitioners skills and training, Cedefop Panorama Series 95

The introduction of ICT to increase efficiency may also encounter certain barriers. First of all, ICT implementation and exploitation often require substantial investments. As previously mentioned, this can especially be burdensome for smaller banks which do not have the financial opportunity to invest as heavily as larger banks. As mentioned in the econometric analysis, ICT is in many banks increasingly replacing personnel as the largest expenditure. The explanation to this is twofold. Old systems are increasingly outdated, as over 80% of ICT expenditure goes into maintenance of these systems according to a recent survey. This means that new investment is required, and these are challenging projects. The second explanation is that traditional brick and mortar banks are increasingly investing in ICT (or acquiring Internet-only banks, as is the case with Egg/Citibank) in order to gain or maintain a competitive advantage. In Europe, it seems that the banking industry is very prudent regarding new investments. This may partly reflect caution due to overinvestment in the past (e.g. for Y2K), or that there are not enough incentives – such as competition. The effect that SEPA will have on ICT expenditure is yet to be seen, and so is its effect on competition in the European BI in general.¹¹⁰

Another barrier to implementing of ICT for efficiency gains is the common fear among employees that ICT is primarily introduced to save personnel cost and to limit errors. The impact of internal resistance against innovation is especially strong for lower qualified employees, such as tellers in the case of the BI¹¹¹. The fear may be justified, as the human factor is increasingly being removed and the future role of the teller in a modern bank is questionable. This can as previously mentioned be seen in the econometric analysis, where labour productivity growth in most countries is related to a decrease in the number of employees and decreasing working hours per employee. Moreover, it was also seen in the analysis that ICT capital investments are largely substituting labour. Tellers might however be re-trained as was seen in the case study of the National Irish Bank, where new ICT digitalised many tasks formerly performed by tellers. The tellers in Citibank also had their skills improved when Citibank acquired Egg and thus changed the bank's business processes, so that they could perform more advanced financial tasks.

The trend of re-training tellers to perform more sophisticated financial tasks is supported by the findings of the econometric analysis. The empirical results from the econometric analysis indicate that medium-skilled labour is the most important labour source associated with an increased ICT-capital intensity in financial services. This supports the abovementioned relationship between ICT and labour skills, that once ICT is introduced and renders the tellers superfluous, these are retrained to become medium-skilled labour.

In line with the abovementioned and as discussed in Section 3.4, the branch renewal process has increased pressure on labour-intensive banking services such as payments and account balancing. More and more traditional banking operations are increasingly being performed online. In the case studies, it is argued that the automation of simple transactions enables staff to focus on added value services, and this pressure on labour-intensive banking services is thus seen as an opportunity rather than a barrier, as it enables redundant staff to be re-trained to being bank advisors instead of tellers. In several case studies, among others the NIB, the staff was initially reluctant to embrace the new ICT-processes and their new role, but increasingly grew accustomed to it and is

¹¹⁰ A Central Banks view on technology based efficiency and productivity in the financial markets, Technology Driven efficiencies in Financial Markets, 2006

¹¹¹ Henrik Schneider, Employee Knowledge Obsolescence and Update in the Mobile and Telecommunications Industry.

now very satisfied with it. In the acquisition of Egg by Citibank, both companies managed to keep key personnel albeit major restructurings are coming up. The branch renewal aspect is discussed in more detail in Section 3.4.

3.3.3 Business implications

The increased use of ICT for process efficiency has implications. Banks need to put resources into securing intuitive ICT software and hardware. Otherwise the costs especially in terms of educational and re-schooling will outgrow the benefits from ICT-enabled processes and may lead to dissatisfaction among employees. It is important to eliminate the need for manual "work-rounds" or excessive retraining¹¹².

In this regard it should also be noted that e-banking increases banks' dependence on ICT, thereby increasing the technical complexity of many operational and security issues and furthering a trend towards partnerships, alliances and outsourcing arrangements with third parties¹¹³. On the positive side, the econometric analysis show that ICT-capital in all EU-countries contributed positively to overall output growth. In contrast, non-ICT-capital contributed much less or even negatively to the financial intermediation service industry growth. This means that banks can expect to reap productivity growth by investing in ICT, which could very well exceed the costs associated with the investment. The econometric analysis further state that the key drivers to industry growth come from ICT-capital investments and labour quality changes, which indicates that ICT is worth investing in.

The implications for large and small banks are however not the same. Due to the capital intensive nature of ICT investments, large banks may be better equipped for in-house ICT developments, while small banks may be better off with outsourcing or buying off-the-shelf. Large banks may be able to use information technology to better personalise their high-volume retail products. Moreover, highly detailed information from consumer databases may allow large banks to better target customer segments and create an illusion of personalised service that softens their one-size-fits-all commodity driven strategy. Large banks can also invest in broad networks of ATMs and Internet banking kiosks to offer greater location convenience for their customers¹¹⁴.

Small banks interested in reaping the efficiency benefits from ICT may, however, find the acquisition and maintenance costs too high. However, after interest expenses (which is largely a variable cost), labour is the biggest expense item for small banks (and is more likely to be a fixed cost). Many information technology applications – like ATMs and on-line banking – substitute for expensive labour inputs and have proven to be economically efficient at relatively small scale. The trick for small banks is to implement innovations like these without reducing the quality of the bank-customer personal relationships. Small banks may consider outsourcing or pooling ICT-development due to the high acquisition and maintenance costs along with the need for highly skilled labour¹¹⁵.

Exhibit 3.3-1 below illustrates some of the options small (and large banks for that matter) may have to outsource ICT.

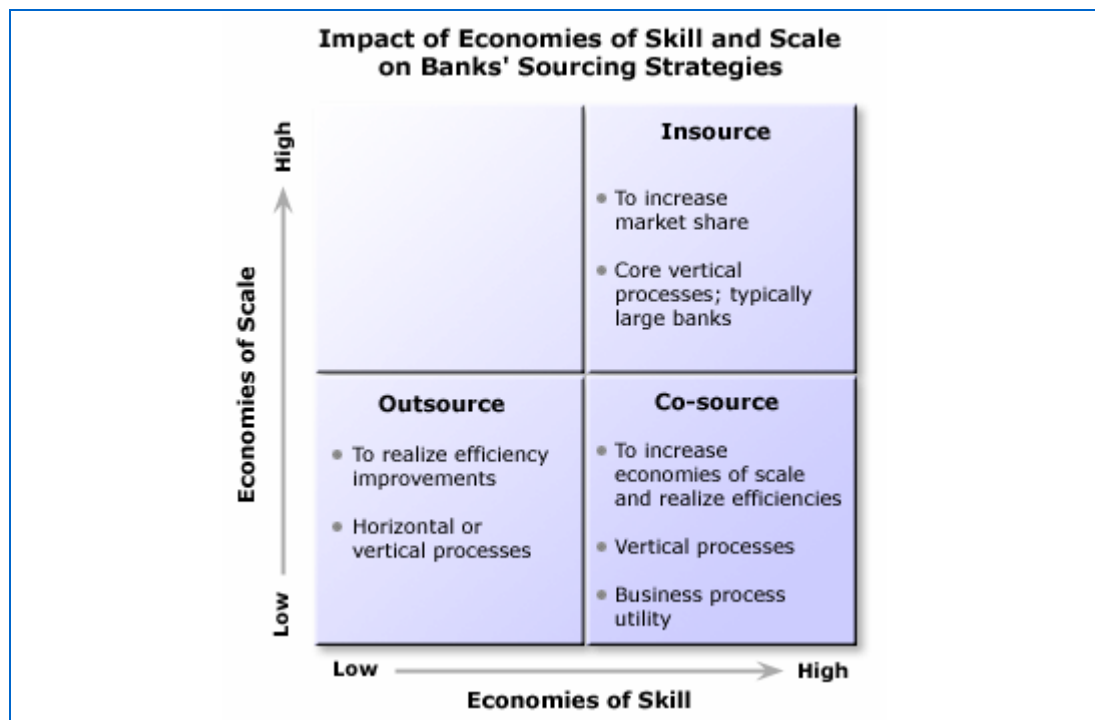
¹¹² The new efficiency alignment, ABA Banking Journal, May 2006

¹¹³ E-banking: Status, trends, challenges and policy issues, CBRC Seminar, The World Banks, 2003

¹¹⁴ IT-outsourcing as a strategic choice, Technology Driven efficiencies in Financial Markets, 2006

¹¹⁵ The limits of information technology: how much will the banking industry change?, Technology Driven efficiencies in Financial Markets, 2006

Exhibit 3.3-1: Various forms of ICT sourcing



Source: www.celent.com (February 2008)

ICT operations in the BI involve the continuous maintenance and development of ICT-systems, and have traditionally been an insource/in-house activity. Insourcing is in this respect observable in banks where all ICT-related processes are in the bank, as they wish to maintain control of critical processes or competencies. Hence, large banks may due to readily available financial and human resources select the insourcing model. This is the case for the case studies on NIB/Danske Bank and Eurobank. The case studies on Tapiola Bank and Glitnir bank are examples of the co-sourcing approach where the bank still has some control of the ICT being developed but the actual development is left in the hands of someone else. It could also be expected that smaller banks increasingly will chose this option in the future, as small and medium-sized banks may chose to depend on outsourcing in order to keep ICT operations efficient and current. The banks may chose between various ICT-sourcing strategies, with co-sourcing (outsourcing of specific ICT-driven business processes) the most common. None of the banks in the case studies have chosen the outsourcing model where the entire ICT-process is laid out to subcontractors, which probably have to do with the fact that most banks prefer a customised version of an ICT-system and thereby wish to have a certain amount of control over the process. However, standardised products or services could easily be purchased using this option, If SEPA opens up for increased harmonisation this option could be increasingly common in the nearby future.

Sourcing is prevailing in the BI, as many banks are assessing which elements of the banking value chain form their basis of competition in the market and are making sourcing decisions accordingly. The Tapiola Bank has determined that payments and ICT operations are critical processes along the value chain and chosen to outsource development and transaction processing to third parties. Other banks, such as NIB (Danske Bank) and Eurobank, who possess the necessary economies of skill and scale, are instead opting to in-source processes. The increasing complexity and costs of ICT is also an issue, as several of the case studies show, which could make outsourcing an

attractive possibility for many medium-sized banks. The possibility of outsourcing ICT and business processes provides the banks to achieve large scale advantages, by utilising the ICT specific specialisation of partners or service-providers, which have the skills and scale that are otherwise not available for many banks.

The development of ICT-enabled banking processes has also impacted the business *customers*. Due to economies of scale and the increased number of transactions the business customers are now able to benefit from lower cost of finance, increased convenience, time saving and operational efficiency. However, to gain full benefits the customer enterprises are required to invest in ICT solutions that are able to communicate electronically with the ICT systems of the bank (Enterprise Resource Planning systems or the like). Especially for SMEs these systems may be costly and out of reach. It is however still argued that the continuous development of ICT-enabled banking systems supports the SME customers and makes the financial administration easier and more transparent¹¹⁶.

3.3.4 Conclusions: ICT and process efficiency

In sum, the increased focus on advanced ICT-enabled systems may prove difficult for especially small and medium-sized banks due to the resource intensive development of new ICT and work processes. However, benefits in the form of product and service innovation are to be reaped if the smaller banks invest in ICT. Another option is outsourcing of ICT, which may be a way forward for small and medium-sized banks without the financial and human resources to develop ICT solutions. ICT outsourcing is thus a way for smaller banks to take advantage of ICT-enabled process efficiency gains.

Large banks also benefit from ICT sourcing, but they often have the financial and human resources to opt for the in-house model, while smaller banks tend to outsource parts of the ICT development. This enables larger banks to have some control over the ICT-developments and thus the ability to customise these.

In sum, the banks need to invest in ICT one way or another, if they are to reap the full process efficiency gains. As mentioned, the survey shows, not surprisingly, that smaller banks are less capable of this than larger banks.

¹¹⁶ Convergence of the business processes of corporate customers and banks, Technology Driven efficiencies in Financial Markets, 2006

3.4 The impact of ICT and e-banking on branch renewal

3.4.1 Introduction

The introduction of ICT in the European BI has had a significant impact on banks operating with physical branches. A new distribution channel, the Internet, and mobile terminals along with ATM and payment card networks, have made it possible to reduce the amount of bank branches and achieve savings in operating costs. For example, one Finnish bank has managed to cut its distribution costs by 25% and its unit production costs for payments by 68% over a three year period. This was achieved by implementing multi-channel ICT applications¹¹⁷. This process of improving profitability among European banks and adapting to customer needs has, in association with the increased use of e-banking, put pressure on bank branches to renew their service offerings and to redefine their role in a modern financial intermediation institution.

It can furthermore be seen from the econometric analysis that ICT diffusion is positively correlated with firm restructuring, suggesting that ICT use is positively correlated with firm restructuring activities. Thus, ICT enables companies to re-define the boundaries of their organisations and possibly gain a competitive advantage.

Previous analysis indicates that Internet-only banks have been less profitable. They generate lower business volumes and any savings generated by lower physical overheads appear to be offset by other types of non-interest expenditures, notably marketing, to attract new customers^{118 119}. One view is that Internet-only banks can succeed if they are thoroughly integrated within the existing banking infrastructure, which should combine e-banking with physical branches due to the importance of public trust in banks, the value of an established brand name, and customer's needs for physical interaction with bank personnel. In this connection the Internet is regarded simply as another distribution channel as a complement to physical branches, phone banking and ATM networks¹²⁰. This finding is supported in the Egg/Citibank case study, where Egg struggled to remain profitable due to the Northern Rock case, which prompted customers to look towards larger, established banks. Egg thus needed to cooperate with a large physical bank in order to (re)gain customer trust and obtain an established bank name. On the other hand, as can be seen from the case studies, Internet-only banks are often more innovative than traditional brick and mortar banks, which makes them an attractive acquisition target.

This section serves to discuss the impacts of ICT and e-banking on bank branch renewal in the light of the trends and tendencies presented above to answer the following research questions:

- What are the drivers for branch renewal and what role does ICT and e-banking play in this process?

¹¹⁷ A Central Banks view on technology based efficiency and productivity in the financial markets, Technology Driven efficiencies in Financial Markets, 2006

¹¹⁸ E-banking: Status, trends, challenges and policy issues, CBRC Seminar, The World Banks, 2003

¹¹⁹ Please be aware that the analysis is conducted in 2003 where the uptake and wide-spread of e-banking was in its infant stages.

¹²⁰ E-banking: Status, trends, challenges and policy issues, CBRC Seminar, The World Banks, 2003

- What is the impact of e-banking and ICT on traditional branch-based banks and how may they react to the new competitive situation with the emergence of Internet-only banks?

3.4.2 Potential benefits & barriers

A branch renewal process may be a costly operation to conduct. The case study on National Irish Bank presented in Chapter 5 is a good example of this, as NIB practices were radically altered and harmonised with the rest of Danske Bank A/S. This involved changes in standard operating procedures and changes in services offered, radical brand renewal initiatives such as the replacement of NIB artefacts, and discarding NIB's outdated ICT-systems and replacing these by the Danske Bank A/S ICT-platform (both hardware and software). The process and specific content of a branch renewal process must hence be carefully thought through. The cost structures of a traditional branch office are heavily affected by large operational costs deriving primarily from salary cost to tellers and the like. Since the role of the teller is reduced or eliminated in the modern branch bank by ATMs and e-banking, the service offering of the bank and its staff must be focused on something else. The role of the teller is replaced by the role of bank advisers/consultants.

One of the benefits of branch renewal is the possibility of changing the services of branch offices from traditional labour-intensive accounts work to more high-value services. Hence, the traditional manual banking services can now be performed online while the more sophisticated banking services are still performed in the branch bank, thus taking advantage of the low-cost nature of e-banking and the face-to-face advisory services of the branch bank. e-Banking is thus being viewed as the new ICT-enabled efficiency increaser¹²¹.

This combination of the two types of banking has been successful especially in Scandinavia, as exemplified by Nordea Bank and Danske Bank. The success of the combination banks in Scandinavia is also attributed to a well-developed payment system that has for a long time been based on computerised and centrally cleared account transfers¹²². However, also the Finnish Tapiola Bank and the UK-based Citibank have successfully combined the two types of banking, Tapiola Bank by launching an Internet-only bank and Citibank by acquiring Egg, an Internet-only bank.

The process of branch renewal may however encounter some barriers. Especially the change in human resource profile of the individual branch banks and often the reduction of the number of branches may lead to issues with existing staff. Staff re-education and skills development is essential to a successful transformation of a traditional teller-intensive branch office towards an advisory-based branch bank network. In the case studies, it is also very rare that employees welcomed the branch renewal process but, with time, most banks experienced that the employees grew accustomed to the new structure or even liked the new structure better. Few banks have experienced problems with key personnel leaving as a result of branch renewal.

¹²¹ E-banking: Status, trends, challenges and policy issues, CBRC Seminar, The World Banks, 2003

¹²² E-banking in the Nordic Countries – Its emergence and Perspective, INSEAD, 2001

3.4.3 Business implications

ICT and e-banking are both the reasons for a branch renewal process and, at the same time, what makes a branch renewal process possible. The ICT systems developed for automated bank processes enable banks to relocate resources to different areas of service in the branch banks.

The traditional branch-based banks try to adopt elements of the Internet-only banks' business model which is based on a production function quite different from that used by more traditional branching banks. The Egg/Citibank case represents a good example hereof, as Citibank acquired Egg in order to reap the benefits of its cost structure as well as the innovative business model found in the Internet-only bank Egg. Obviously, Internet-only banks do not operate branches, and proponents of this model argue that this results in lower overhead costs. These cost savings can be passed along to customers as higher deposit rates and/or lower loan rates. On the one hand, this results in tight interest-rate margins; on the other hand, these banks will arguably grow fast because the lower loan rates and general banking fees attract customers from traditional branch-based banks with higher operational costs. SkandiaBanken provides a good example of this as it had the possibility - through its first mover advantage - of positioning itself as a low-cost alternative to traditional retail banks. Growth is essential in the Internet-only bank model: with narrow interest-rate margins, a large volume of business is needed in order to be profitable. It is argued that in the long run the Internet-only banking segment is limited, because Internet-only banks will not be able to provide customers with relationship banking products or in-person service. Thus, banks that use this business model will need to focus on making consumer transaction type loans such as auto loans, credit card loans, and mortgage loans¹²³. SkandiaBanken however contradicts this view as it has invested many resources into monitoring customer needs and requirements. SkandiaBanken works with several feedback-channels, ensuring that changes in customer behaviour are registered and taken into consideration. This customer-focused approach is employed due to SkandiaBankens future strategy of meeting customer needs even better.

Based on the above it can be argued that ICT has given the traditional branch-based banks both the need (due to the rise of e-banking) and the means (due to developments in ICT) to transform branch offices into advisory "centres" for customers that normally conduct their day-to-day banking business via the banks' online application. The impact for the banking industry is considerable and the role of the bank branches has, due to e-banking and ICT developments, changed quite drastically. In the case of Glitnir Bank, customers use online transactions for routine banking, whereas branches are increasingly being regarded as financial advisory centres. Moving towards a higher degree of ICT-driven self-service has in this regard meant that the role of branches has been redefined, and so has the primary purpose of Glitnir branch personnel.

A new type of banks offering both e-banking and a branch network (dual combination banks) has emerged, an example of this being Tapiola Bank which has combined an Internet-only banking concept with a low-cost approach to offering branch-based advisory services.

¹²³ The limits of information technology: how much will the banking industry change?, Technology Driven efficiencies in Financial Markets, 2006

It is even argued by some that this “combination” bank with both e-banking and branches is more suited to the current needs of customers because the business model of Internet-only banks is too narrow to be a complete bank concept, and Internet-only banks have failed to address the areas that create value for customers. This may give the traditional branch banks more time to change their business model to encompass online banking services¹²⁴. The Egg/Citibank case shows that Internet-only banks and traditional branch banks can greatly benefit from each other; the internet-only bank can gain customer confidence by being part of a well-known branch network, and the branch bank can learn from the Internet-only banks’ innovative ways of conducting business.

3.4.4 Conclusions: e-banking and branch renewal

e-Banking and ICT have caused the traditional branch-based banks to change the service offerings in their branches. A bank business model is emerging, namely the dual-banking model covering both e-banking and branch banks. The Internet-only banks, despite a lower cost structure than branch banks, are faced with challenges in terms of customer confidence. On the other hand, many traditional branch banks need the innovation present in the Internet-only banks. The dual-banking model can give traditional branch banks the opportunity to adjust their branch network towards advisory functions and away from traditional teller services, thus adding value to their customers from direct and customised bank advisory services.

3.5 Summary: ICT and e-business deployment

Chapter 3 has presented and analysed the current state of play in the European BI including an analysis of the impacts of three selected themes. This section will briefly sum up the main points brought forward in Chapter 3.

As illustrated in Section 3.1, the European BI is quite advanced when it comes to uptake of ICT. Both in terms of usage among employees and implementation of rather advanced ICT applications, the BI is up to speed compared with other sectors.

The SEPA initiative opens up for new possibilities for the European BI, for instance for standardising e-invoicing as well, but the implementation and adaptation of SEPA-related instruments is currently slow. It should however be noted that SEPA has just been introduced, in January 2008, and measures for implementation can still be expected but, as of now, not much has been done. In the short run, the BI is expected to make significant ICT-investments in order to comply with SEPA, which can make the short-term benefits of SEPA harder to reap for the BI. It was also argued that the end-users and authorities should take a greater role in the implementation process.

The increasing focus on ICT as a driver for efficiency has meant that more and more banks understand the importance of investments in ICT. ICT outsourcing is thus a way for smaller banks to take advantage of ICT-enabled process efficiency gains.

¹²⁴ Self-Service Banking: Value Creation Models and Information Exchange, Informing Science Volume 4 No 3

Large banks also benefit from ICT sourcing, but they often have the financial and human resources to select the in-house model, while smaller banks tend to outsource parts of the ICT development. This enables the larger banks to have some control over the ICT-development and thus the ability to customise these.

The increased focus on advanced ICT-enabled systems may prove difficult for especially small and medium-sized banks due to the resource intensive development of new ICT and work processes. However, benefits in the form of product and service innovation are also to be reaped if the smaller banks invest in ICT. Another option is outsourcing of ICT, which may be a way forward for small and medium-sized banks without the financial and human resources to develop ICT solutions.

e-Banking and ICT have led the traditional branch-based banks to change their service offerings. The emergence of a bank business model covering both e-banking and branch banks is emerging. The case study on National Irish Bank, Tapiola Bank, and Egg/Citibank are best practice examples of such a model (Chapter 5). The dual-banking model can give traditional branch banks the opportunity to adjust their branch network towards advisory functions and away from traditional teller services, thus adding value to their customers from direct and customised bank advisory services

- **Advanced industry:** The European BI is among the most advanced industries in Europe in terms of ICT uptake and usage.
- **Large impact from SEPA.** The SEPA is expected to greatly impact the European BI and give new opportunities but also increased competition among European banks, because of the decrease in barriers. There will be more room for innovation across borders, but also increased competition
- **Increased focus on ICT as a driver for process efficiency impacts and ICT outsourcing.** European banks are increasingly implementing advanced ICT-enabled systems and specifically SME banks may benefit from outsourcing ICT.
- **e-Banking puts pressure on branch renewal.** The emergence of e-banking has put increased pressure on the branch renewal process among traditional branch-based banks and a new business model has emerged.

4 ICT and e-business impact

Chapter 3 presented a descriptive assessment of the state-of-play in e-business in the banking industry. It focused on the trends in the BI with respect to ICT as well as the diffusion of ICT-based applications and how they are used by companies, both for internal processes and for exchanges with other organisations or consumers. This Chapter adds an analytical perspective on the **drivers and impact of ICT** adoption, based on econometric analysis. The section is organised as follows: First, it introduces the conceptual framework used to assess the economic drivers and impacts of the ICT adoption. Second, it presents results of the econometric analysis on the relationship between ICT and the following business dimensions: productivity, employment, innovation, market structure and value chain characteristics. For each of these dimensions, some hypotheses are proposed and analysed in the context of the BI.

For the analyses of the first two issues (productivity and employment), EU KLEMS data is used. The analysis of the other dimensions is also based on data from sources such as Zephyr and European Restructuring Monitor, which were matched with EU KLEMS indicators. The section concludes with a summary of the main results.

The "structure-conduct-performance" paradigm

Economic literature suggests that the ongoing diffusion of ICT and e-business technologies and services among firms in the economy at large is a striking example of the possible dynamics of technological change and economic development (see, for example Breshnahan and Trajtenberg, 1995, Helpman, 1998a and 1998b). The adoption and diffusion of new technologies can be spurred by many different drivers and can have far-reaching consequences. Virtually all economic spheres can be affected by technologically induced changes, including innovation dynamics, productivity and growth, the development of market structures, firm performance, and the composition of the demand for labour.

As a conceptual framework for the analysis of the interplay between these characteristics, ICT diffusion and innovation, an extended **Structure – Conduct – Performance (SCP)** paradigm is adopted.¹²⁵ Developed by Mason (1939) and Bain (1951), the paradigm states that firm and industry performance is determined by the conduct of buyers and sellers, which is a function of the market structure.

The term **structure** is used here meaning "industry structure" which includes but goes beyond market structure characteristics of the original concept. The primary features of an industry's structure are related to market structure in the conventional sense: the number and size of supplying firms as well as the number and preferences of customers and their size in case of businesses. An important aspect of market structure dynamics is the level of ease of market entry. Further industry structure characteristics are related to products, production and production factors: the degree of product differentiation, the degree of vertical integration of production, i.e. value chain characteristic, the technologies available to the firms, the firms' cost structure (i.e. the relative importance of

¹²⁵ Following the discussion with Advisory Board members, the SCP paradigm was chosen over other alternatives because it constitutes a comprehensive framework that allows to capture and study the interdependencies between sector characteristics and firms' behaviour.

costs for items such as production facilities, energy, personnel), and finally the workforce composition and the demand for labour, most importantly with regard to knowledge and skills. All these characteristics determine the level of competition in the industry.

These industry structure components influence a firm's **conduct**. The conduct aspects most important here are production strategies, particularly with regard to inter-firm collaboration, as well as investments in ICT and in ICT-enabled innovation.

Finally, a firm's **performance** is assumed to be the outcome of its conduct. Successful innovations improve firm performance by, for example, reducing production cost, increasing productivity, improving product quality or enabling it to enter new markets. This may eventually lead to increased sales, turnover and market shares.

Extending the SCP paradigm: feedback effects

In contrast to the standard SCP paradigm, the flow of causality is in fact not one-directional (Fauchart and Keilbach, 2002 and Nepelski, 2003). As an example of feedback between performance and industry structure, successful and innovative companies are more likely to grow and increase their market share at the expense of less progressive firms, which transforms the market structure. There may also be feedbacks between conduct and industry structure: For example, depending on the innovation type – i.e. product or process innovation, ICT-enabled or not –, innovations influence the choice of products manufactured and a firm's cost structure. Innovations may also change the incentives to perform activities in-house versus outsourcing them and, consequently, may influence the demand for labour and its composition. It may also further shape the relationships with suppliers and customers, for example with regard to collaboration intensity. Thus, in the following discussion it is assumed that firm performance may have a feedback effect on both firm conduct and industry structure, and conduct may have a feedback on structure. This conceptualisation allows for an enhanced economic approach that studies the drivers and impacts of ICT and ICT-enabled innovations at the firm and sector level.

Exhibit 3.5-1: Conceptual framework for the analysis of drivers and impact of ICT adoption

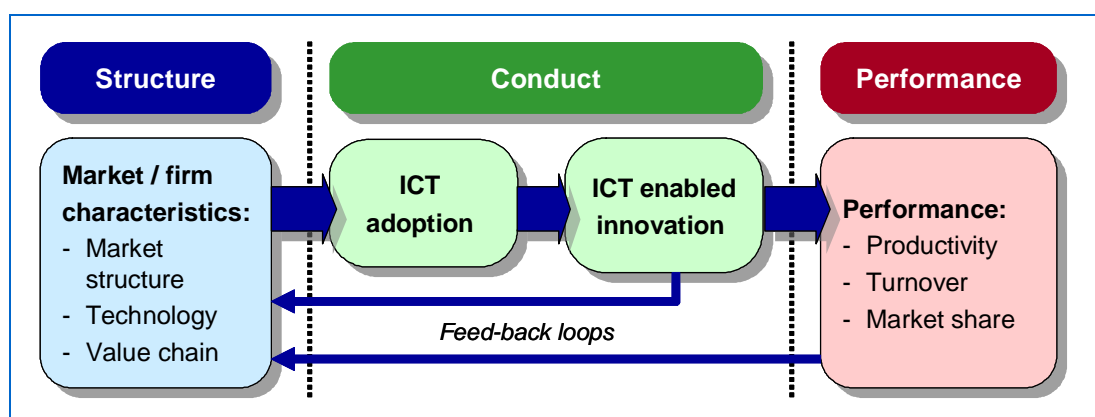


Exhibit 3.5-1 illustrates the SCP paradigm together with the causality relationships of the elements studied in this sector report. The extended SCP paradigm defines the two dimensions of the forthcoming analysis. First, the extended SCP paradigm identifies market structure and firm characteristics that **drive** the diffusion of ICT and the process of turning ICT use into marketable products and production processes, i.e. ICT-enabled innovations. Second, the paradigm seeks to identify the feedback effects of firms' innovative activity on these characteristics and firm performance.

Applying the SCP paradigm to an analysis of ICT drivers and impacts

The SCP paradigm allows one to identify firm and industry dimensions that can be considered as relevant for the diffusion of ICT and its impact on these dimensions. Consequently, the following elements of market and firm structure were identified as ICT drivers: market rivalry, supplier-buyer relations and workforce composition. The impact of ICT adoption and ICT enabled innovation is studied through productivity and employment as proxies for firm performance. This construct enables the understanding of not only uni-directional causal relationships but recognises the presence of firm performance impacting upon the drivers of ICT adoption.

The following analysis is based on a set of hypotheses which focus on the critical role of ICT for innovation. The hypotheses allow for an economic approach to study the drivers and impacts of ICT at the firm level for the following business dimensions: **productivity** (Section 4.1), **innovation dynamics** (Section 4.2), **market structure** (Section 4.3), and **value chain characteristics** (Section 4.4).

4.1 ICT and productivity

4.1.1 Background and hypotheses

ICT has productivity increasing effects in both the user sectors and in the ICT producing sectors (Oliner and Sichel, 2000). In particular, ICT was found to have positive effects on labour productivity and total factor productivity (Pilat, 2005). An important finding is that ICT-induced productivity effects vary significantly between sectors and among countries (Nordhaus, 2002). For example, the largest productivity growth effect occurs in the ICT-producing sectors themselves, and in selected service industry sectors like banking, wholesale, retailing, and telecommunication (Jorgenson, Ho, Samuels, Stiroh, 2007, Jorgenson, Ho, Stiroh, 2007, Inklaar, Timmer, van Ark, 2007).

Only a few countries have seen a significant upsurge in productivity growth in those sectors of the economy that have invested most in ICT. The sectors include banking, wholesale, retailing, and business services. This might be due to unequal timings of innovation in different countries as well as innovation J-curves (Erber, 2005). This leads to inefficiencies in the implementation periods, which only later pay off in terms of higher efficiencies measured by higher labour as well as total factor productivity (David, 1990).

European industries are said to have experienced much slower productivity growth, compared to the US, although they have invested heavily in ICT (see e.g. O'Mahony, M. and B. van Ark, eds. 2003; Ark, B. van, R. Inklaar and R.H. McGuckin 2003). This is primarily attributed to differences in statistical measurement like hedonic-price indices¹²⁶

¹²⁶ Hedonic price indices are a method for incorporating the impacts of technological change into the deflation of goods and services over time. Computers or other ICT-equipment cannot be replaced after some years by the same ICT-equipment because it is replaced by more powerful one. Therefore comparing e.g. a standard PC of the vintage year 2000 with one in the year 2005 embody a significant amount of increased performance like higher processing speed, larger hard disk capacity and so on. If one compares prices of such products between the years 2000 and 2005 one should therefore adjust the changes in prices by the enhanced product quality. By estimating regressions of price equations including these changes in product quality

and/or chain indices, as the differences did not vanish after introducing such methods in the European statistical system (OECD, 2004, Schreyer, 2002 especially table 5, von der Lippe, 2001). One reason could instead be that many European countries have no significant domestic ICT industries producing hardware anymore and thus import most of their ICT equipment from abroad. Currently, China has become world market leader in exports of ICT equipment. Only in countries with large ICT-producing industries like the US, Japan, South Korea or Finland, hedonic price measurements change productivity growth significantly (see Schreyer, 2002 especially table 1). Also, the offshoring of IT-services has a significant impact on productivity growth and has been more pronounced in the US than in Europe (Mann, 2003).

Studies of the impact of ICT on firm-level productivity have shown that only if ICT investment is combined with complementary investment in working practices, human capital, and firm restructuring it will have an impact on performance (Brynjolfsson and Hitt, 2000). Because these complementary investments and organisational changes are highly firm-specific, returns to ICT investments vary strongly across organisations (Pilat, 2005). In addition, outsourcing and offshore outsourcing have become organisational innovations, which changes firm-level productivity (Erber, Sayed-Ahmed, 2005). However, economy-wide impacts have not been found in a couple of studies using firm-level data in European countries such as Sweden or Denmark (Hagsten, Karpaty, Svanberg, 2006, Ørberg Jensen, Funk Kirkegaard, Søndergaard Laugesen, 2006).

ICT-capital investment and total factor productivity growth

For the study of ICT impacts on firm-level productivity, two considerations are essential. First, as depicted in the conceptual framework (see above), ICT investment does not lead to productivity growth at firm-level by itself. It depends on how the technology is actually used in business processes, i.e. on a company's ability to innovate its work processes and business routines with support of ICT. Thus, only if ICT investment is combined with complementary investment in working practices, human capital, and firm restructuring will it have an impact on performance (cf. Brynjolfsson and Hitt, 2000). These complementary investments and organisational changes are highly sector- and firm-specific; therefore, returns to ICT investments vary strongly across organisations (Pilat, 2005). The need for complementary investments is commonly confirmed in the case studies (see Chapter 5), and the organisational implications for banks are discussed in Section 3.4 (the impact of ICT and e-banking on branch renewal). Second, it has to be considered that outsourcing is an organisational innovation which can change firm-level productivity (Erber, Sayed-Ahmed, 2005).

The first step of the analysis is to assess the contribution of ICT-capital investment to productivity growth (see Hypothesis P.1).

Hypothesis P.1: ICT-capital investment has become a key element in productivity growth in the banking industry, while other capital inputs summarised as non-ICT-capital have diminished in their respective importance.

The second step is to consider the apparent need for companies to not only invest into ICT but also into complementary items in order to increase productivity. A certain part of

leads to the so called hedonic price indices. In general the prices tend to decrease more rapidly as before when one neglected these quality improvements. (see e.g. Triplett 2004)

such complementary investment is linked with total factor productivity (TFP). TFP represents output growth not caused by input growth. The attribute “total” refers to the unknown complete set of influencing factors. TFP effects may be caused by numerous factors, e.g. organisational changes in the company such as outsourcing that lead to improved workflows and increased productivity.¹²⁷ Thus one can assume that ICT capital investment has become a key driver of total factor productivity (TFP) growth. This will be tested as a second hypothesis:

Hypothesis P.2: TFP-growth in the banking industry has accelerated together with increased investment in ICT-capital.

Another important factor that may influence on the extent to which ICT enables productivity growth is the complementarity between ICT capital and **skills**. A large body of literature on the “**skill-bias**” of innovation supports the finding that technical change is biased towards skilled workers, reducing demand for unskilled labour, while increasing wage inequality and polarisation (Acemoglu, 2002). The impact is clearly visible in today's advanced economies. This issue is relevant for the banking industry (see Section 3.1.3, demand and supply of ICT skills). The case study on National Irish Bank is a good example of the change in workforce composition deriving from ICT development. The branch renewal process in National Irish Bank is primarily driven by ICT, which renders the teller superfluous by automating the traditional labour intensive settling of accounts. This development however implies that the tellers can be re-trained as bank advisors to perform more advanced financial services (see Chapter 5). The following hypothesis addresses this issue.

Hypothesis P.3: ICT has together with high- and medium-skilled labour a positive impact on labour productivity growth in the banking industry.¹²⁸

The analysis to confirm or reject these hypotheses has been conducted in the following steps:

1. [Section 4.1.2](#) looks at the overall development of **value added growth** in the banking industry and analyses the **contribution of different factors** including ICT-capital and non-ICT-capital, working hours and labour quality by means of growth accounting.
2. [Section 4.1.3](#) looks at the overall development of **labour productivity growth** in the banking industry (from 1985-2004) and analyses the **impact of ICT-capital**

¹²⁷ In terms of calculation, TFP is a residual between growth of an output indicator, like gross value added or gross production value, minus an aggregate index of factor inputs such as labour and capital, weighted by their respective factor shares. TFP is also named ‘Solow residual’, because Robert Solow (1957) was one of the first economists who pointed out the significance of disembodied technical change for economic growth opposite to the classical view that in particular capital accumulation, i.e. embodied technical change, is the key driver of growth.

¹²⁸ The hypothesis has been tested on the basis of data from the EU-KLEMS project, using a number of variables such as:

- Contribution of labour composition change to value added growth (percentage points)
- Hours worked by high-skilled persons engaged (share in total hours)
- Hours worked by medium-skilled persons engaged (share in total hours)
- Hours worked by low-skilled persons engaged (share in total hours)

investment on labour productivity growth, estimating a stochastic possibility frontier (SPF).

3. Finally, on the basis of the results, it is assessed whether the initial **hypotheses** can be confirmed or not and initial policy conclusions are drawn (Section 4.1.4).

4.1.2 ICT impact on value added growth

Gross value added growth in the banking industry

Since the EU KLEMS database published by the Groningen Growth and Development Centre (GGDC) in March 2007 has insufficient information¹²⁹ to obtain the necessary data needed on the BI alone, focus is on the broader sector “financial intermediation¹³⁰” in the econometric analysis. The currently available best sub-sample has thus been used at a slightly higher aggregation level as a starting point for our econometric analysis. The analysis is based on estimating a stochastic possibility frontier.

An additional argument for studying the financial intermediation sector is the ongoing convergence between banking and insurance industries. More and more banks try to extend the financial services by offering insurance contracts as well. Conversely, insurance companies have started to acquire banks, like e.g. Allianz and the Dresdner Bank in Germany, enabling the insurance companies to use banks as distribution platforms for their insurance service products. This trend is further supported by the case study on Tapiola Bank, where the insurance and banking company Tapiola Group decided to open an Internet-only bank in order to respond to the increasing use of ICT among customers. This cross-marketing of financial service products by commercial banks and insurance companies represents a general global trend of merging insurance and banking services.

With the increasing use of standardised products in banking and insurance services based on electronic risk ratings of customers, the banking and insurance industry increasingly utilises computers and telecommunication equipment connected to the Internet as the ordinary distribution channel of their services. Ranging from online brokerage and home banking to electronic insurance contracts by companies like CosmosDirect¹³¹, the information and communications technologies have changed the financial service industry significantly over the past decade. While automatic teller machines and credit cards were the early enablers to reduce the need for front-desk service workers like cashiers etc., the Internet now offers the possibility of offering and using ubiquitous financial services from virtually everywhere. A particularly attractive option is to perform financial transactions via mobile communication devices. The transformation from doing banking in physical branches to doing it over the Internet has not yet been completed, so labour-saving processes are still expected to be reaped, an

¹²⁹ An update of the EU KLEMS database, which might include a more detailed breakdown of the data, is expected for June 2008

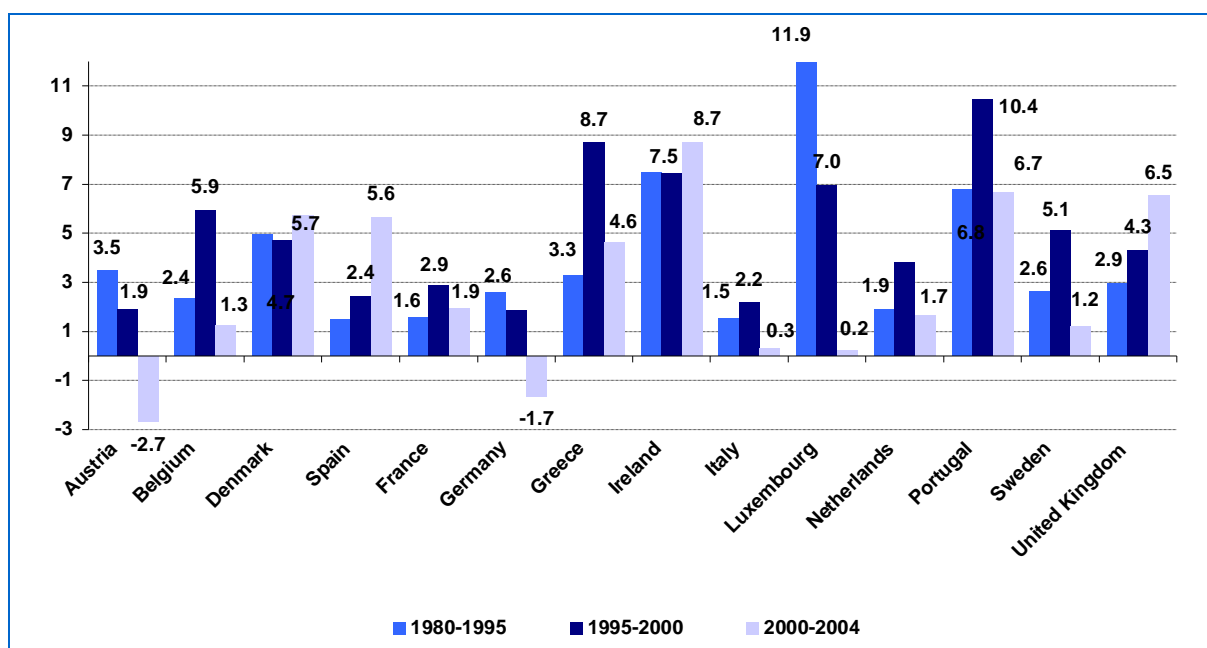
¹³⁰ The financial intermediation sector, as defined by NACE 1.1, (classification code J) includes, apart from banking services, also insurance and pension funding as well as activities related to financial intermediation.

¹³¹ CosmosDirect is one leading insurance company which exclusively offers insurance contracts directly bypassing insurance brokers. One distribution key channel is the internet.

impact that could last well into the near and mid-term future. However, only by innovating in terms of new financial services, the financial service industry will be able to grow steadily in the future. The SEPA is as previously mentioned a good facilitator for this, as the ICT-investments needed in order to comply with SEPA can potentially be used to create new ICT-intensive product innovations such as the development of e-Invoicing.

Looking at the different countries' growth performance –and using their respective real gross value-added as an indicator– it is observed that nearly all countries until 2004 experienced fairly high growth in financial services (see Exhibit 4.1-1). The only exceptions in the period 1995 to 2000 are Austria with -2.7% and Germany with -1.7%. However, only some countries could maintain their steady growth pattern after the burst of the new economy bubble in 2000. Denmark, Spain, Ireland, Greece, Portugal and the UK were the only countries where the financial services did not face a slow growth period after 2000. The financing of real estate, especially in the housing market in these countries, may have contributed to this development. However, afterwards this led - or might lead - to sub-prime and real estate financial crisis in these countries. In some of the countries this has already begun in the years 2006/2007, and it remains to be seen if the trend will prevail in these countries well into the coming future.

Exhibit 4.1-1: Growth of gross value added in financial intermediation services, 1980 – 2004



Source: EUKLEMS data base, GGDC; own calculation.

Growth accounting of gross value added

Growth accounting is a familiar approach to study the contribution of different factor inputs on overall output growth. Using standard techniques (see e.g. Jorgenson, Gollop, Fraumeni 1987) we obtain the following decomposition of the real gross value added for nine EU-member countries (see Exhibits 4.1-2 and 4.1-3). The strongest overall growth in value added in the period 1995-2004 can be observed in the UK (5%), Denmark (4.2%), Spain (3.5%) and the Netherlands (3%). France, Belgium and Italy experienced a lower growth; Germany and Austria lag behind the other countries. The most prevalent reason for these differences relate to the total factor productivity growth differentials between the

EU member states. While Denmark experienced 2.4% TFP-growth over the nine years, Austria had to face a 2.0% decline. Interestingly, ICT-capital in all EU-countries contributed positively to overall output growth ranging from 2.7% for Denmark to as low as 0.6% for Italy. In contrast to this, non-ICT-capital contributed much less or even negatively to the financial intermediation service industry growth. These results lend support to the hypothesis that ICT-capital investments contributed most to positive output growth in all countries.

Exhibit 4.1-2: Decomposition of gross value added growth by different factor inputs

Countries	gross value added	contribution of labour inputs	contribution of total working hours	contribution of labour quality change	contribution of capital	contribution of ICT capital	contribution of Non-ICT capital	contribution total factor productivity
	(1)=(2)+(5)+(8)	(2)=(3)+(4)	(3)	(4)	(5)=(6)+(7)	(6)	(7)	(8)
average annual growth rates, in %								
1980-1995								
Austria	2.9	0.9	0.5	0.4	1.8	0.7	1.1	0.1
Belgium	1.3	0.3	0.0	0.3	1.4	1.3	0.1	-0.4
Denmark	3.6	-0.1	-0.6	0.5	1.0	1.4	-0.3	3.4
Spain	0.3	1.3	1.0	0.3	2.9	1.8	1.1	-3.0
France	0.1	0.4	-0.1	0.4	1.4	1.2	0.2	-1.4
Germany	3.3	1.0	0.8	0.2	1.0	0.7	0.2	1.6
Italy	2.2	0.7	0.6	0.1	0.8	0.4	0.4	0.9
Netherlands	1.1	1.0	0.5	0.4	3.2	1.8	1.5	-3.0
United Kingdom	3.8	1.1	0.8	0.3	2.5	1.7	0.8	0.0
1995-2004								
Austria	0.2	0.4	0.05	0.34	1.8	1.1	0.7	-2.0
Belgium	1.0	-0.3	-0.5	0.2	1.6	1.2	0.3	-0.2
Denmark	4.2	0.1	-0.2	0.3	1.6	2.7	-1.1	2.4
Spain	3.5	0.8	0.6	0.2	1.1	1.3	-0.2	1.6
France	1.9	0.4	-0.1	0.5	1.5	1.0	0.5	0.0
Germany	0.0	-0.1	-0.3	0.2	1.1	0.9	0.2	-1.0
Italy	0.7	0.2	0.1	0.1	0.1	0.6	-0.5	0.4
Netherlands	3.0	1.1	0.6	0.4	2.0	2.0	0.0	0.0
United Kingdom	5.0	0.7	0.1	0.7	2.2	1.6	0.6	2.1

Source: DIW Berlin, developed from EU-KLEMS data

Exhibit 4.1-3: Decomposition of gross value added growth by components of labour input

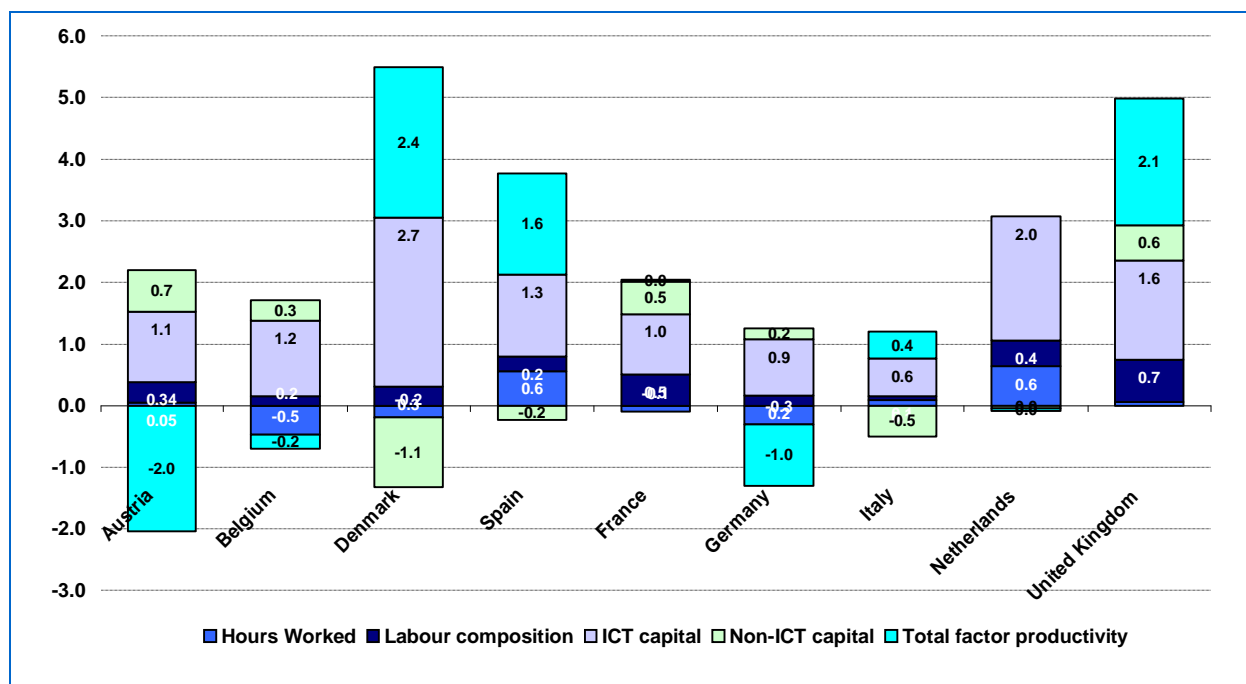
Countries	Gross Value Added	Gross value added per hours worked	Total hours worked	Total persons engaged	Average working hours per person
	(1)=(2)+(3)	(2)	(3)=(4)+(5)	(4)	(5)
average annual growth rates, in %					
1980-1995					
Austria	3.5	2.6	0.8	1.3	-0.5
Belgium	2.4	2.1	0.3	0.5	-0.2
Denmark	4.9	5.3	-0.4	0.4	-0.7
Spain	1.5	1.0	0.4	1.1	-0.6
France	1.6	1.5	0.1	0.5	-0.4
Germany	2.6	1.6	1.0	1.8	-0.8
Greece	3.3	-2.2	5.5	5.5	0.0
Ireland	7.5	3.6	3.8	4.4	-0.6
Italy	1.5	-0.5	2.0	1.9	0.1
Luxembourg	11.9	7.4	4.6	4.6	0.0
Netherlands	1.9	1.5	0.4	1.0	-0.6
Portugal	6.8	6.4	0.4	0.8	-0.4
Sweden	2.6	1.2	1.4	1.1	0.3
United Kingdom	2.9	1.4	1.6	1.4	0.2
1995-2000					
Austria	1.9	1.8	0.1	0.3	-0.2
Belgium	5.9	5.8	0.2	0.1	0.1
Denmark	4.7	5.6	-0.9	-0.4	-0.5
Spain	2.4	1.7	0.7	0.7	0.1
France	2.9	3.8	-0.9	-0.2	-0.7
Germany	1.9	1.5	0.3	0.3	0.0
Greece	8.7	5.8	2.8	2.5	0.3
Ireland	7.4	0.8	6.7	7.0	-0.4
Italy	2.2	1.6	0.6	-0.4	1.0
Luxembourg	7.0	0.6	6.4	5.8	0.6
Netherlands	3.8	0.3	3.5	4.1	-0.6
Portugal	10.4	12.2	-1.8	-1.0	-0.7
Sweden	5.1	3.6	1.5	2.0	-0.5
United Kingdom	4.3	4.0	0.4	0.4	-0.1
2000-2004					
Austria	-2.7	-2.9	0.2	-0.1	0.2
Belgium	1.3	3.5	-2.2	-1.5	-0.7
Denmark	5.7	5.6	0.1	0.9	-0.8
Spain	5.6	3.3	2.3	2.0	0.3
France	1.9	1.0	0.9	1.2	-0.3
Germany	-1.7	-0.6	-1.0	-0.5	-0.6
Greece	4.6	3.0	1.6	1.4	0.2
Ireland	8.7	4.2	4.5	4.7	-0.1
Italy	0.3	0.5	-0.2	0.4	-0.6
Luxembourg	0.2	-2.0	2.3	2.6	-0.4
Netherlands	1.7	3.2	-1.5	-0.7	-0.8
Portugal	6.7	6.2	0.5	0.6	-0.1
Sweden	1.2	4.1	-2.9	-1.3	-1.6
United Kingdom	6.5	6.2	0.3	0.7	-0.4

Source: DIW Berlin, developed from EU-KLEMS data

Looking at the impacts of **labour compositional change**, one observes that the labour quality change component from low-skilled towards medium- and high-skilled labour gave positive growth impacts for all countries (see Exhibit 4.1-4). This confirms that there is a skill-biased technological change taking place, with ICT capital as a complementary factor for increasing growth in the financial service industry. In contrast, the change in total working hours provides a mixed picture for the different countries.

It can be concluded that the key drivers to industry growth come from ICT-capital investments plus labour quality changes. The stronger both of them are the stronger even TFP-growth becomes. The UK financial service industry shows this most dramatically. With the strongest ICT-capital growth, the strongest labour quality changes, and the highest TFP-growth, the UK industry outperformed the financial service industries of the other countries. If total factor productivity accounts implicitly for soft factors like organizational changes¹³² it is striking that Austria and Germany had the worst performance there. The ongoing restructuring of the financial service industries in these countries towards a more efficient digital organisation seem to be the most significant reason for inefficiencies.

Exhibit 4.1-4: Growth accounts for gross value added for 1995-2004 (financial intermediation services in selected EU member countries, contributions in percentage points)



Source: EUKLEMS data base, GGDC; own calculation.

¹³² See e.g. the remarks of Brynjolfsson (2005) p.1 on this issue: "The key to IT productivity lies outside the CIO's office. Our most recent research suggests that whether IT improves productivity depends primarily on the complementary organizational investments that companies make in addition to their IT investments. That is, innovation in IT alone is insufficient. Companies also need innovation in organizational practices to reap the promised boost in productivity growth. Considering that up to 70% of the work done in large companies can be classified as information-processing work, it would be remarkable if the effective use of IT didn't require changes in the organization of production. Indeed, we found that the costs and benefits of IT-enabled organizational capital is typically many times larger than the direct IT investments themselves."

4.1.3 ICT impact on labour productivity growth

Labour productivity growth in the banking industry

Based on the EU-KLEMS-Database a decomposition of annual labour productivity growth rates for 14 EU-member countries¹³³ for the time period 1980-2004 give the following picture of the development process. There is a significant heterogeneity present with regard to average annual growth rates. By dividing the whole observation period into three sub periods 1980-1995, 1995-2000 and 2000-2004 (see Exhibit 4.1-3), which represent the main phases discussed in the literature concerning the labour productivity resurgence for the US at the aggregate level.¹³⁴ The dataset of EU-KLEMS published in March 2007 contains no more recent data when the analysis was conducted. Furthermore, financial intermediation services are currently not offering sufficient data to analyse banking and insurance services separately.

Furthermore, financial intermediation services have been identified in the literature as a key sector in which intensifying ICT-capital usage contributed significantly to aggregate labour productivity growth acceleration in the US (see van Ark, Inklaar, McGuckin 2002). Therefore, this study analyses the particular developments and factors which in the selected sub-sample of EU Member States led to fairly different overall outcomes than expected when the Lisbon Agenda was introduced in 2000. At this time, a resurgence of productivity growth due to ICT investments, similar to that witnessed in the US since the mid-1990s, was considered to take place in Europe. Europe was then expected to catch up with the US, which had been a leader in productivity growth from the year 2000 onwards.

However, very high average sustained annual labour productivity growth is observed in very few countries like Portugal and Denmark, which experience average annual rates above 5% for the whole time period 1980-2004 and the respective sub-periods (see Exhibit 4.1-3). There is significant heterogeneity in the labour productivity performance in the different countries. While some like the UK, Sweden, Spain and Denmark experienced a significant acceleration, others like Austria, Germany and Luxembourg experienced the opposite. In between we find numerous countries like Belgium, France, Greece or Portugal where labour productivity growth fluctuates, i.e. first increases from a lower growth rate in the second sub-period and decreases afterwards. It is hence clear that with respect to the dynamics across countries, no common pattern is detected. According to literature focusing on the US experience, a more common pattern was to be expected. This gives some evidence that an insufficient rapid convergence in the financial intermediation industries in the EU and Eurozone prevails even after introducing the common currency.

Labour productivity growth based on working hours can be decomposed in the two components of employment change and changes in average working hours per employee. As Exhibit 4.1-6 shows, only a few countries, namely Ireland, Luxembourg,

¹³³ All included in EU15

¹³⁴ One observation in the literature on this subject is that the resurgence of productivity growth in the US economy did not last beyond the year 2000 or is not directly related to actual ICT investments (see e.g. Jorgenson, Mun, Samuels, Stiroh 2007, Gordon 2004). However, Europe did not show any acceleration in productivity growth even similar to that in the US in the second half of the 1990s (van Ark, Timmer, Ypma 2003).

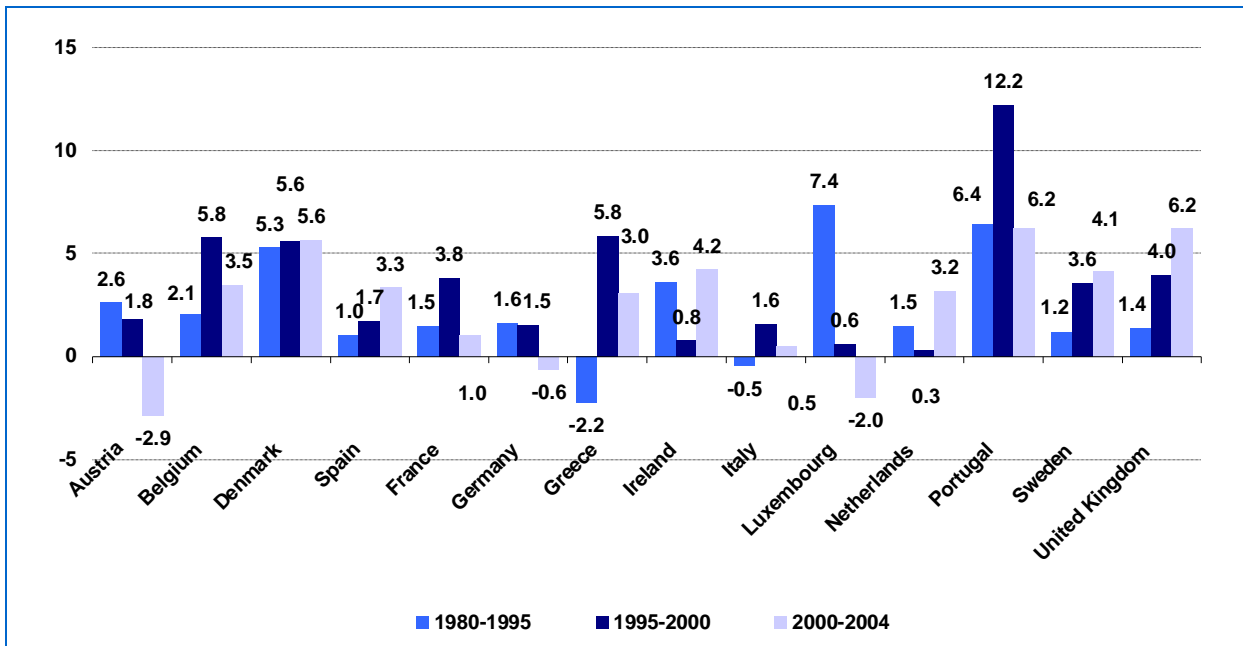
Spain and the UK, experienced positive employment growth over the whole period from 1980 to 2004. This might be due to the increasing importance of Ireland, Luxembourg and the UK as international financial service centres during the period. In Spain, the growth might be related to the significant construction boom in real estate financing following the introduction of the Euro and the associated equalisation of interest rates in the entire Eurozone.

In the same period, average working hours per employee decreased, with few exceptions in most countries. Only Italy and Luxembourg experienced a significant increase in working hours per employee during the period 1995-2000. Labour productivity growth was therefore in most countries associated with labour shake out and decreasing working hours per employee. Only in countries where international financial centres existed or were developed, such as Ireland, Luxembourg and the UK, labour productivity and employment growth were positively correlated. In most other countries without such major international financial hubs the correlation between employment growth and labour productivity growth tends to be negative in the short or long run. ICT capital investments are increasingly substituting labour in the branch banking system, particular in retail banking. However, high-skilled financial analysts working e.g. in the international financial centres in some EU-member states face increasing employment opportunities.

There is a quite moderate trend that average working hours per employee are diminishing. Only in Sweden, a significant restructuring in the financial service industry reduced employment and average working hours at the same time during the period 2000-2004, with average rates of -1.3% and -1.6% respectively. ICT offers huge opportunities for banks and insurance companies to increase productivity through increasing returns to scale and positive network effects. This can especially be done by expanding cross border activities in the emerging common financial market of the Eurozone and EU-member countries by developing highly standardised electronic financial services, especially in retail banking.

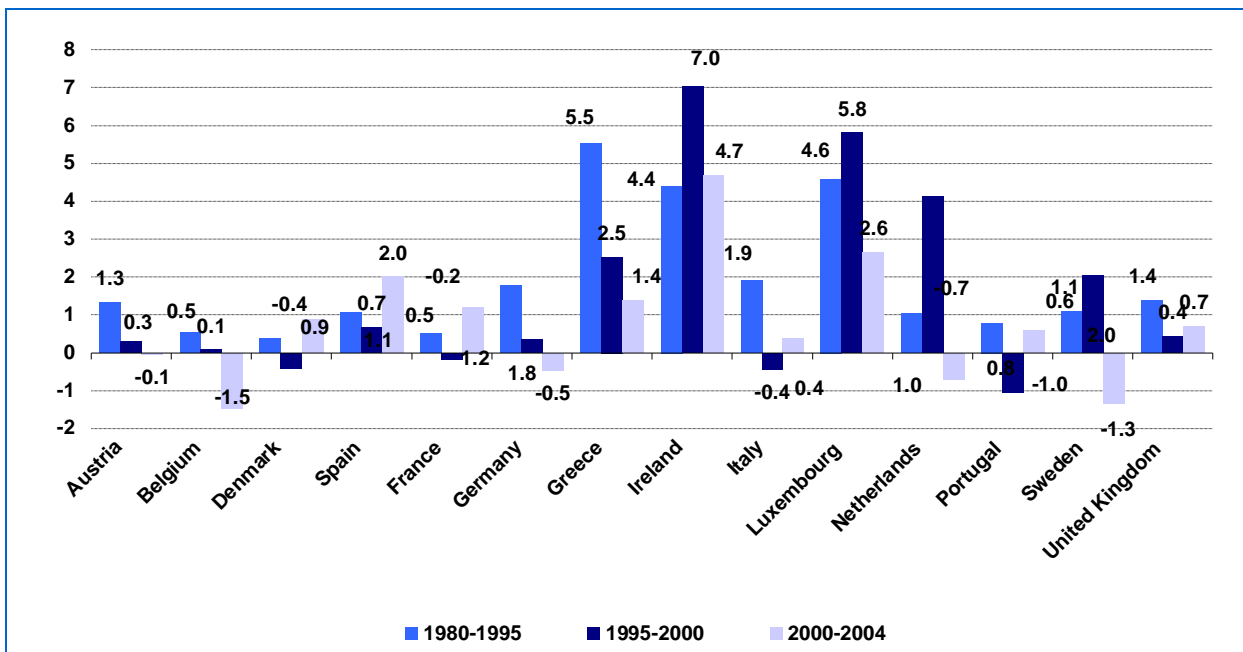
Taking the above-mentioned into consideration, one could expect that in the coming years, the process of regional concentration of high value-added financial services in the financial centres will continue. At the same time, the standardisation and harmonisation of ordinary financial services in retail banking will contribute to shrinking employment and increased spending in ICT-capital. The case studies do not provide information on the concentration of financial centres, but do confirm the increased spending in ICT-capital due to the increased use of online banking for traditional financial services. However, as previously mentioned, it can be seen from the case studies that the tellers are retrained to perform other financial services rather than being laid off. Nevertheless, this could in the long run lead to reduced demand for banking personnel as the tellers are gradually becoming superfluous, thus leading to a decrease in the workforce in the BI.

Exhibit 4.1-5: Labour productivity growth in financial intermediation services, 1980 – 2004 (annual average growth rates)



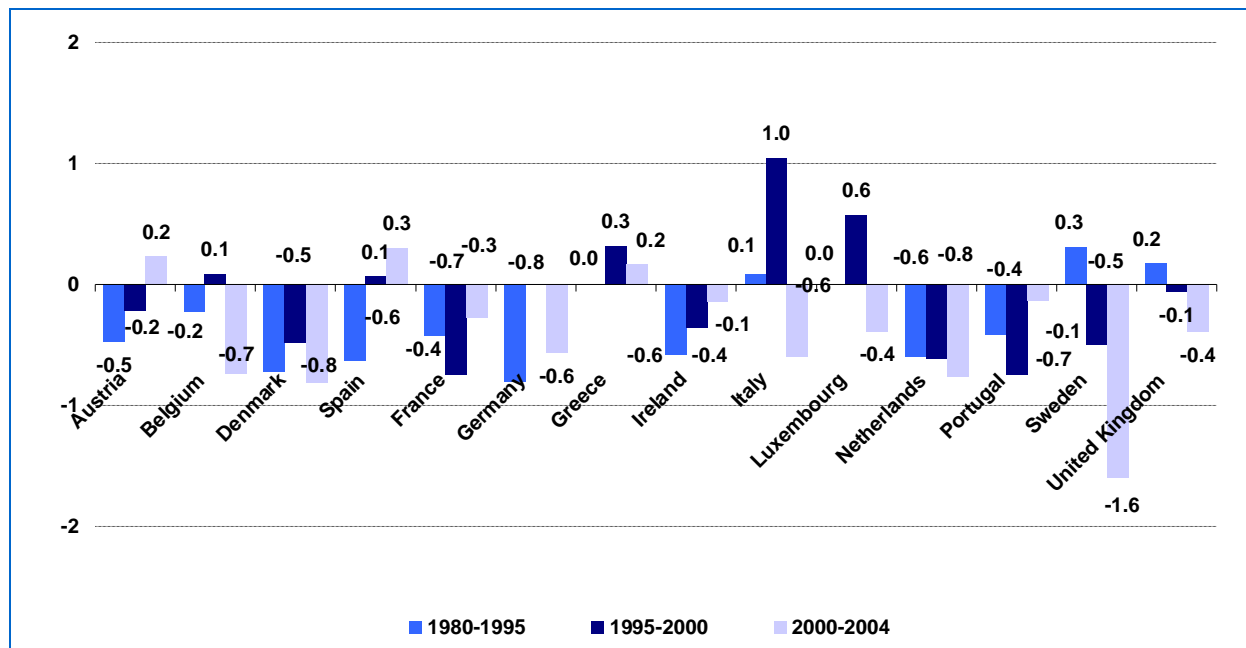
Source: EUKLEMS data base, GGDC; own calculation.

Exhibit 4.1-6: Employment growth in financial intermediation services, 1980 – 2004 (annual average growth rates)



Source: EUKLEMS data base, GGDC; own calculation.

Exhibit 4.1-7: Average working hours per employee in financial intermediation services, 1980 – 2004 (annual average growth rates)



Source: EUKLEMS data base, GGDC; own calculation.

The impact of ICT on labour productivity growth

Less than half of the current 27 EU member states supply a complete dataset from the time period 1995 to 2004. EU KLEMS is generally based on annual data only. The countries which have a consistent dataset at least for this decade in EU KLEMS are: Austria, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Netherlands, Spain, Sweden, and the UK. They will be denoted as “EU-12” in the following text.

Data are available for gross production value, total intermediate inputs, total working hours, ICT-capital stock and non-ICT capital stock input plus total working hours. The latter are broken down into working hours for three separate skill categories (high, medium, low skills).

Based on the secondary intermediate inputs and the two primary input factors (capital broken down into two different types of capital) and labour measured by working hours (broken down into three different skill-types), a stochastic possibility frontier (SPF) was estimated using a panel data set for the EU-12. As a particular specification, we used the error component model of Battese and Coelli (1992), which allows for estimating average efficiency levels by country (i.e. 100 is equal to full-scale efficiency, values below measure the percentage points below the overall efficiency level of an industry production possibility frontier at a certain time period). To guarantee constant returns to scale for the possibility frontier, the output and input variables were normalised by the total working hours. This led to an accordingly restricted stochastic possibility frontier where the real gross production value per working hour is explained by six factor-intensities using total working hours as the denominator. As an additional variable, a time trend beside the constant term was included to measure the autonomous technical change. For the

econometric estimation, the Frontiers 4.1 software program was used (Coelli, 1996). The estimation results using a Cobb-Douglas production function, which is summarised in Exhibit 4.1-8.

Exhibit 4.1-8: Parameter estimates of a stochastic possibility frontier (SPF) for financial intermediation industries, error component model, 1995 - 2004

Gross Production Value per Total Working Hours based on EU-12 ¹ Multi-Country-Panel			
Explanatory variables	parameter	standard-error	t-value
Constant	0.553	0.085	6.533
Intermediate Input per TWH ²	0.271	0.072	3.750
ICT-Capital Stock per TWH ²	0.056	0.038	1.464
Non-ICT Capital Stock per TWH ²	0.175	0.044	4.013
High-Skilled-WH per TWH ²	0.153	0.027	5.679
Medium-Skilled-WH per TWH ²	0.320	0.055	5.792
Low-Skilled-WH per TWH ²	0.032	0.010	3.132
Time	0.022	0.007	3.266
sigma square	0.043	0.022	1.984
gamma	0.935	0.035	26.780
eta	-0.079	0.022	-0.352
Log-Likelihood	163.4		
No. of iterations	28		

¹ EU-12 - Austria, Czechia, Denmark, Finland, France, Germany, Hungary, Italy, Netherlands, Spain, Sweden, UK
² TWH - total working hours

Source: EUKLEMS database of GGDC, own calculations. DIW Berlin 2008

The parameter estimates obtained are measures for the respective output elasticity of the respective input factor, i.e. an increase of one unit in the respective input factor increases the output variable by the respective output units. Looking at the six plus one parameter values we notice that with the exception of the ICT-capital intensity, all parameters differ statistically significantly from zero at the 5% significance level.¹³⁵

Looking at the individual values, it is observed that the least significant output elasticity has to be attributed to the ICT-capital stock intensity. This is somewhat surprising to the previous empirical findings published by Jorgenson, Gordon, Stiroh and Sichel (2000). These researchers usually found - as was done here in the previous section for EU-member states - a high impact in their growth accounting studies with U.S. data on labour productivity growth. In such growth accounting analysis, however, the labour inputs had been included in a very different way, as total working hours were not broken down into different skill classes as it is done here. Furthermore, in most studies based on aggregate or sectoral data, an approach based on gross value added (excluding intermediate inputs) and the respective primary input factors only was used. Therefore, a specific skill-bias of technological progress could not explicitly be analysed. Instead, only a compositional change indicator for the compositional changes in the labour force was used as a proxy variable for the changes in the skill-structure of the labour force. This might have led to an important specification bias, where too much emphasis was put on physical capital inputs and much less so on human capital inputs.

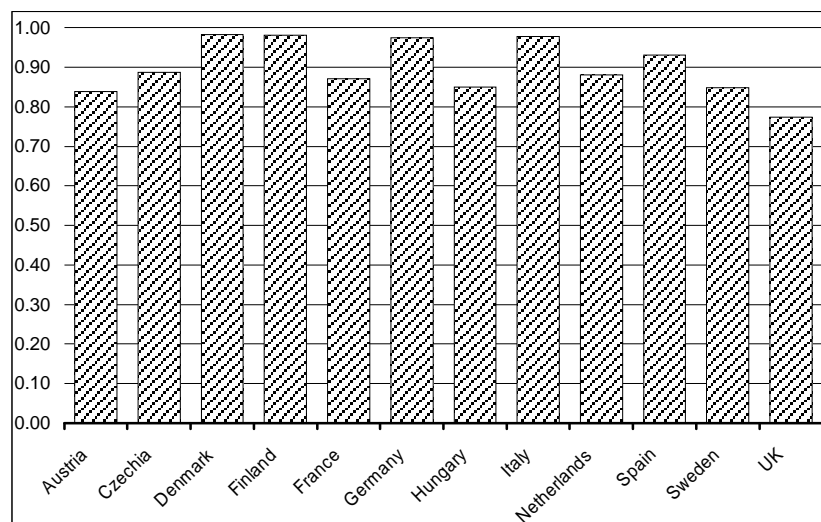
The results obtained from the SPF-analysis point into a different direction to those attributing a high impact on physical ICT-capital investment using growth accounting methods. In contrast to the latter, we find a high significance in the increasing high- and

¹³⁵ *t*-values above 2 assure by a rule of thumb this 5%-significance threshold of the test.

medium-skill using bias while low-skilled labour inputs have little to contribute to enhancing output productivity. The strongest impact on output productivity per working hour is found for medium-skilled labour intensity with 0.32, followed by intermediate input intensity with 0.271. The latter high value might be attributable to the productivity stemming from outsourcing of activities in the financial service industry. Core competencies and outsourcing acted as financial intermediators in countries lacking comparative advantages, meaning that the make-or-buy decision according to Coase's theory of transaction costs (Coase 1937) can contribute significantly to the productivity growth of the industry. The third- and fourth-strongest impacts on productivity per working hour are non-ICT capital and high-skilled labour intensity, with output elasticities of 0.175 and 0.153, respectively. Finally, an average annual rate of technical progress of about 2.2% for the common possibility frontier is identified (see a description of the approach in Annex II) in the financial service industry.

Concerning the parameters σ , γ and η related to the efficiency estimates of the SPF, we observe the following findings: The first two estimates are statistically significant at the 5% level of significance, while the latter is not. h is a parameter determining the autoregressive trajectory of the inefficiency random variable. If h is statistically insignificant, that there is no statistically significant autocorrelation in the observable inefficiency random variables. The actual parameter value would show a mild negative autocorrelation. Because of this outcome, we omitted this parameter later on when estimating the average technical efficiencies by country. Technical efficiency is measure to determine the relative distance of a countries industry from the stochastic possibility frontier (for more details see Annex II). The results are summarised in Exhibit 4.1-9.

Exhibit 4.1-9: Average technical efficiencies, financial intermediation services, EU-12* (average values)



¹ EU-12 - Austria, Czechia, Denmark, Finland, France, Germany, Hungary, Italy, Netherlands, Spain, Sweden, UK

Source: EUKLEMS data of GGDC, own calculations.

DIW Berlin 2008

The range of average efficiency estimates by country varies between 0.98 for Denmark and 0.77 for the UK. All other countries are showing average efficiency levels in between. Denmark, Finland, Germany and Italy are very close to each other, with values ranging

from 0.98 to 0.97. Spain, the Netherlands, Czech Republic and France are 5 to 10 percentage points behind those four, with values between 0.93 and 0.87. The group of least efficient countries in the financial service industry includes Austria, Hungary, Sweden and the UK, with average efficiencies between 0.85 and 0.77.¹³⁶

The fairly invariant efficiency ranking by the 12 EU member countries obtained in the analysis might be attributable to the fact that we could utilise data ranging only over a ten-year time span. It is noteworthy that new EU-member countries are doing quite well in comparison with some of the older ones. The shock of the transition period and the complete overhaul of the financial service industry in the former socialist countries have had a significant efficiency-enhancing impact, as they did not have to gradually dismiss a defunct legacy. Starting from scratch they could quickly realise quite reasonable efficiency levels.

Another aspect which should be taken into account in this industry is that with financial market integration in particular in the Eurozone, the efficiency measures by country might be less and less relevant. Due to the concentration of financial services in a few locations such as London, Paris, Frankfurt, Luxembourg, and Dublin, the industry is developing a more locally concentrated structure. The industry is supplying its financial services from these few locations to the entire European community and well as globally.¹³⁷ Therefore, the scale and scope effects of such financial centres in contrast to the mass market for local branch offices for the ordinary customers would be an interesting context in which to study the changing efficiency and productivity development. Innovations in complex financial services on the one hand, and the efficient supply of highly standardised mass at local offices of banks and insurance companies on the other hand, provide very different paths for the diffusion of new ICT.

Overall, the financial service sector in the EU-12 member countries lacks a strong divergence in efficiency. Furthermore, efficiency and productivity development depend much more significantly on human capital than on pure physical capital investment. This indicates that there must have been a significant overinvestment in ICT capital in this industry in the years 1995-2000 during the new economy boom.¹³⁸ Only by developing complementary organisational changes and employing higher-skilled human capital, the ICT evolution progressed in a much more gradual fashion. This would explain as well why labour productivity growth is more strongly related to human skills than to the pure ICT capital investment. Learning-by-doing and learning-by-using are to a much larger extent determining the productivity growth trend than a pure ICT investment boom. This has left both employees and managers overwhelmed by the complexity and needs for structural adjustments in the (re-)organisation of their companies. Only by solving these problems and overcoming the obstacles the true long-term benefits of the ICT revolution can be harvested by increased labour productivity growth.

¹³⁶ These results fit well into the range of studies which have been evaluated in a survey by Berger, Humphrey (1997, p. 188 in particular).

¹³⁷ For more literature on this issue of new economic geography see e.g. Krugman, Venables (1995), Aiginger, Pfaffermayr (2004), Brühlhart, Traeger (2004) and Barrios, Strobel (2004).

¹³⁸ See e.g. various issues the tables of World ICT Market Growth Trends of the EITO Observatory 1998, p. 321, 2001, p.452, 2004, p.262 and 2007, p. 190. Double digit ICT market growth in the US and more moderate but high growth rates shrank to less than half even after a recovery period following the New Economy bust.

4.1.4 Summary and policy implications

Discussion of hypotheses

With regard to hypotheses P.1 and P.2 concerning the role of ICT-capital, a twofold outcome has been obtained. On the one hand, the growth accounting exercise confirms that overall ICT-capital played an important role for all countries. On the other, the analysis based on the econometric common stochastic possibility frontier revealed that the direct positive link between ICT-capital investments and labour productivity growth is probably much weaker. The second finding is based on a more detailed structure of the labour inputs decomposed on skill-classes and the inclusion of intermediate inputs. Results suggest that human capital inputs, organisational changes incorporated in the total factor productivity growth, and outsourcing of non-core activities included in the intermediate inputs all play a predominant role in labour productivity growth alongside pure ICT-capital growth.

Additionally, there is preliminary evidence concerning the time structure when TFP-growth accelerates. In the standard approach in the growth accounting literature, TFP-growth instantaneously increases with increased investments in ICT-capital. From anecdotic evidence, it is not surprising that this view raises caveats concerning the time structure of the impact on TFP-growth, as there traditionally are significant delays associated with the introduction of new technologies and organisational changes. Therefore, as the analysis on the J-curve of innovation (Erber 2005, Aral, Brynjolfsson, Wu 2006) revealed, one should expect that ICT-impacts on total factor productivity growth happen at a later state than when the initial investments took place. An example of this is a case study from Scientific Atlanta (quoted in Aral, Brynjolfsson, Wu 2006, p.4), which shows an eleven-year time span from the first decision to introduce ERP in 1992 until it became fully operational in 2003. The time between buying and getting the system fully operational was nine years. This might explain the mixed results found in the EU-KLEMS-database when comparing the changes between ICT-capital stock growth and TFP-growth across the sample of EU-member countries for the two time periods 1980-1995 and 1995-2004 (see Exhibit 4.1-2). Therefore, the hypothesis that there is an instantaneous impact of ICT-capital investments on total factor productivity growth cannot be supported in the empirical analysis.

Hypothesis P.3 was largely confirmed (see Section 4.1.3). The analysis indicates a skill-biased technological change with ICT-capital as a complementary factor. However, it was found that efficiency and productivity development depend more significantly on human capital than on pure physical (ICT) capital investment.

Policy implications

The policy implications from the analysis are quite clear-cut. In a knowledge economy driven by rapid technical change, the ability to empower the work force by appropriate investments in training and skill-formation is much more important than investment in information and communications technology. ICT is an enabler, but without sufficient capabilities of the human workforce to use it efficiently, the costly investments become ineffective. The focus of managers making investment decisions should therefore be much more on the implications of a new technology related to changing needs in skill formation and consequences in the organisation of business processes than on pure technical equipment. A computer or a broadband Internet terminal device is a general

purpose instrument, and the intelligence of their users and the adjustments of the organisational structures is the predominant factor for the success or failure of ICT-investments in the financial intermediation services.

This implication is largely supported by the Eurobank case study, in which a BPM-project is being introduced in the company. Here, great focus has been put on educating the workforce in order for BPM to become an integrated part of the company's daily routines. Further, in the case of The National Irish Bank (NIB), the bank acknowledged the need for training the employees while introducing a new IT-system. When the Danske Bank ICT-system was implemented in NIB, Danish super users were flown to Ireland to teach their new Irish colleagues how to use the system, and Irish employees went to Denmark to see how the system worked in practice.

4.2 ICT and innovation

The following section analyses the impact of ICT diffusion on innovation in the BI.¹³⁹ It focuses on the relationship between the diffusion of this GPT and innovative activity, proxied by the number of initial public offerings (IPO).

A technological change such as the massive diffusion of ICT represents an interesting case for an analysis with respect to firms' innovation strategies. For example, it is said that industry leaders often reject important inventions and fail to bring them to the market (Arend, 1999, Christensen, 1997). Entrepreneurial companies are more likely to exploit these opportunities. Entrants frequently introduce products or production processes based on a new technology, which can challenge incumbents or even drive them out of the market. An example of such a newcomer in the BI is PayPal, an ICT-enabled payment service provider, which recently obtained a banking licence (Computerworld UK, 2007). In the case studies, examples include the two internet-only banks SkandiaBanken and Egg, which both were able to attract customers with their, at the time, innovative concept of low-cost banking.

One way to measure entrepreneurial activity and innovation, triggered by the introduction of GPT, is the amount of new listings on the stock exchange, i.e. IPO (Helpman and Trajtenberg 1998a and 1998b). It has been shown that a surge in IPO is strongly correlated with the introduction and diffusion of GPT. In other words, new firms without the burden of old capital are able to deploy new GPT and turn them into commercial innovations. Summing up, there seems to be a positive relationship between ICT diffusion and a surge in entrepreneurial/innovative activity. In order to validate this, the following hypothesis is formulated:

Hypothesis 3.1: The number of IPO is positively correlated with the diffusion of ICT.

Data and methodology

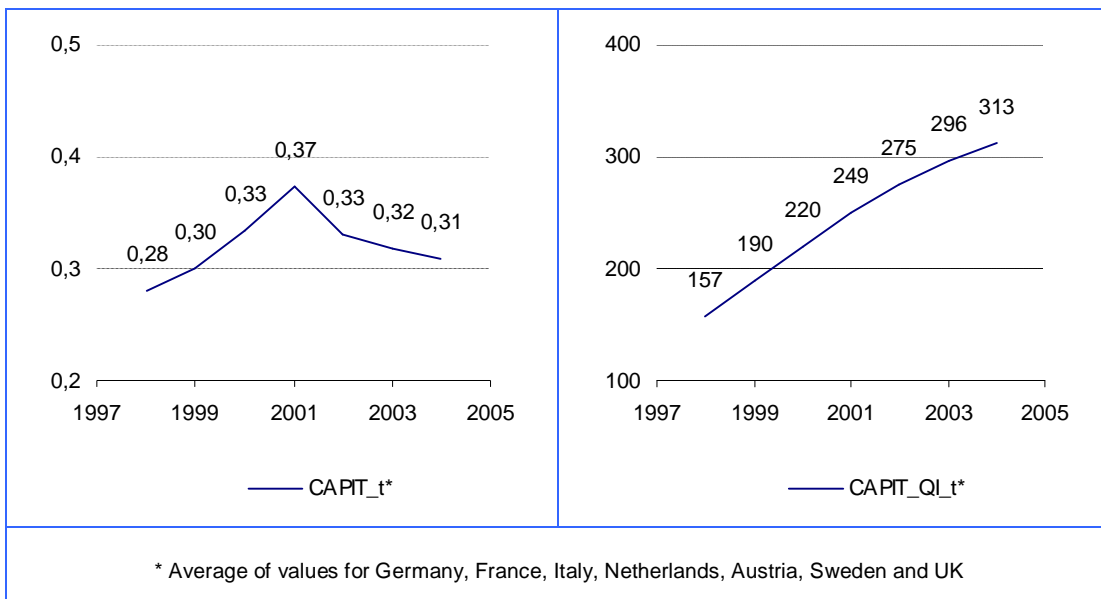
Data from two sources is matched in order to analyse the hypothesised relationship. The first one, the Zephyr database, provides data on IPO in selected EU countries.¹⁴⁰ The second one, EU KLEMS, serves as a source for ICT capital share compensation and ICT capital service index (see Appendix). Selected variables from both databases were matched in order to create a panel including observations from 7 EU countries between 1998 and 2004. However, due to a structural break-down in 2001, the following analysis focuses only on the period between 1998 and 2001.

Exhibit 4.-1 depicts average values of ICT capital compensation (CAPIT_t) and ICT capital services index (CAPIT_QI_t) in 7 EU countries between 1998 and 2004. From 1998 until 2001, the average share of ICT in total capital investments increased at a rapid rate. In 2001, there was a structural break in the development of ICT investments, known as the New Economy burst. Interestingly, despite the fact that ICT capital investments were hit by structural changes, the volume of ICT capital services index continued to grow at a relatively steady rate.

¹³⁹ For the purpose of this study, the BI is defined as specified in the division 65 of the NACE Rev. 1 classification.

¹⁴⁰ Germany, France, Italy, Netherlands, Austria, Sweden and UK.

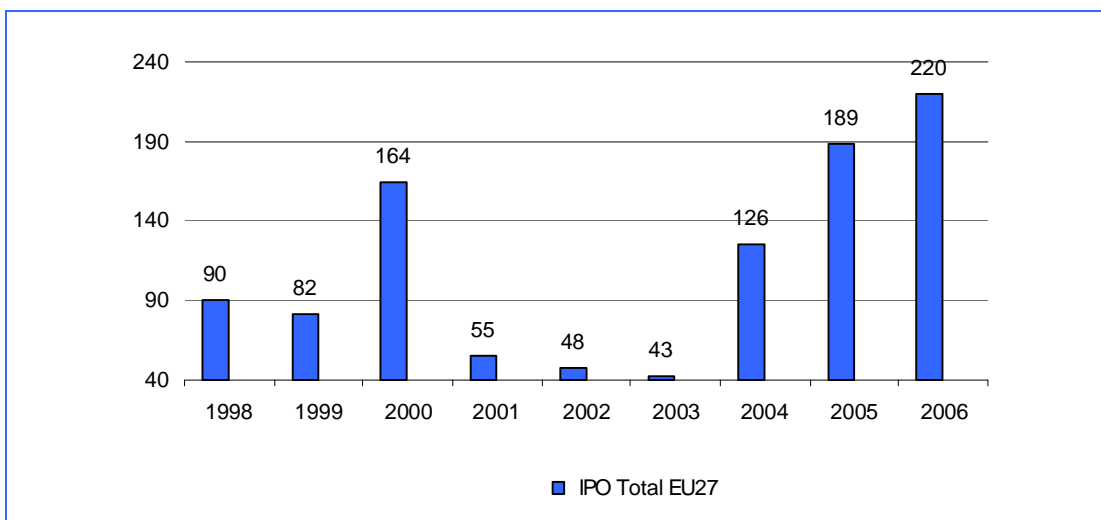
Exhibit 4.2-1: ICT share in total capital compensation and ICT capital services volume index (1995 = 100), 1998-2004



Source: EU KLEMS, DIW Berlin (2008)

Exhibit 4.2-2 depicts the total number of IPOs in the 7 EU countries in the BI. The IPO trend clearly follows the pattern observed in the development of the Internet economy. The peak was observed in 2000 and was followed by a drastic drop in the number of IPOs. The stagnation ended in 2004. From 2004 on, a continuous increase in the number of IPOs can be observed.

Exhibit 4.2-2: Number of IPO in the BI (EU 27), 1998-2006



Source: ZEPHYR, DIW Berlin (2008)

It is obvious that, besides ICT endowment, other factors influence firms' innovative activity and consequently their chances of being listed on a stock exchange. Thus, in order to identify the relationship between ICT and firm innovation performance, proxied here by the IPO intensity, one needs to control for alternative factors that influence the dependent variable. However, the lack of appropriate data poses considerable limits on

the current analysis. Consequently, all results should be interpreted with caution and the analysis should serve only for illustrative purposes.

In order to partially deal with the challenge of this study, i.e. not all factors that could play a role are actually observable in the data, a fixed-effects regression model is introduced. It assumes that there are significant differences among the countries included in the panel that remain fixed over time. Thus, by using the panel data described above the following relationship is estimated:

$$IPO_{i,t} = a + CAP_IT_{i,t} + CAPIT_QI_{i,t} + e_{i,t} + v_i,$$

where $IPO_{i,t}$ is the number of IPO in a country i in time t . ICT endowment in the BI in each country is measured by $CAP_IT_{i,t}$ (value of ICT capital compensation) and $CAPIT_QI_{i,t}$ (ICT capital services index). $e_{i,t}$ represents the error term and v_i is country-specific time-constant unobserved heterogeneity.

Results

Exhibit 4.2-3 presents the regression results for the effect of ICT endowment on IPO intensity. According to the results, the only variable that has a positive and significant impact on the number of IPOs is the one that controls for the share of ICT in total capital compensation. The ICT capital services index variable is statistically insignificant. This means that the increased number of IPOs in the BI can largely be attributed to the diffusion of ICT in the BI.

Exhibit 4.2-3: Fixed effects regression results on IPO intensity

Dependent variable	Coefficient	T	P> t
CAP_IT	204.29 (67.55)	3.02	0.01
CAPIT_QI	.033 (.09)	0.37	0.72
Constant	-54.01 (18.82)	-2.87	0.01
Model diagnostics			
Number of obs = 21	Prob > F = 0.01	R-squared = 0.86	
Note: Standard errors in parentheses.			
Notes:			
A dependent variable is the one observed to change in response to the independent variable(s), which are deliberately manipulated to invoke a change in the dependent variables			
The coefficient is a constant multiplicative factor of a certain object			
A standard error is the estimated standard deviation or error of a series of measurements			
R-squared refers to the coefficient for determination and is the proportion of variability in a data set that is accounted for by a statistical model.			

Source: Sectoral e-Business Watch, DIW Berlin (2008)

Overall, these results yield support for the hypothesis specified above and are consistent with previous findings (Helpman and Trajtenberg 1998a and 1998b). In other words, the exogenous technological change in the BI catalysed entrepreneurial activity and lead to the emergence of innovative business concepts, products and services. As discussed above, it is plausible to assume that in many cases, new companies commercialised these innovations. This can also be seen in the case studies, where e.g. Egg was one of the most innovative UK banks in terms of ICT when it was launched. Moreover, Egg's innovativeness in terms of ICT was one of the main reasons why Citibank became

interested in the bank and eventually acquired it. Also SkandiaBanken was very innovative with respect to its internet-only concept when it was launched. In conclusion, the impact of ICT on IPOs explains the sudden increase of the number of start-ups and IPOs that followed the ICT diffusion, and provides evidence for the general hypothesis that ICT enables innovation. However, due to considerable data constraints, the results should be interpreted with caution and are meant only as an illustration of the subject under study.

4.3 ICT and market structure

Innovations enabled by ICT change the cost structure of companies. Hence, these innovations thereby have a significant impact on the market structure in which these companies operate. One of the effects presented in economic literature is an increased rate of asset reallocation (Gort, 1969). Thus, the question here is whether there has been any relation between the diffusion of ICT in the European BI and asset reallocation measured in terms of mergers and acquisitions (M&A).¹⁴¹

Radical changes in technology traditionally lead to an emergence of new products or change the production processes of existing products. In either case, companies face a large degree of uncertainty regarding future demand or production cost. As a result, discrepancies in valuation for income-producing assets arise from differences in expectations about future income flow and the risk associated with it. Economic disturbances, such as the diffusion of GPT, generate inconsistencies in companies' valuation, which can trigger merger waves (Gort, 1969).

Furthermore, during times of technological change, mergers reflect the process of assets reallocation toward more efficient firms (Jovanovic and Rousseau, 2005). Technological change forces firms to adopt new modes of production and, consequently, to reorganise its assets. If a company fails to reorganise internally, it will probably disappear from the industry and its assets will be reorganised externally. New technology spreads faster if such asset reallocation works smoothly. All in all, there seems to be a positive relationship between ICT diffusion and asset re-allocation. In order to validate this, the following hypothesis is formulated:

Hypothesis 4.1: The number of mergers and acquisitions is positively correlated with the diffusion of ICT.

Data and methodology

Data from two sources is matched in order to analyse the hypothesised relationship. The first one, the Zephyr database, provides data on M&A in selected EU countries.¹⁴² The second one, EU KLEMS, serves as a source for ICT capital share compensation and ICT capital service index (see Appendix). Selected variables from both databases were matched in order to create a panel including observations from 7 EU countries between

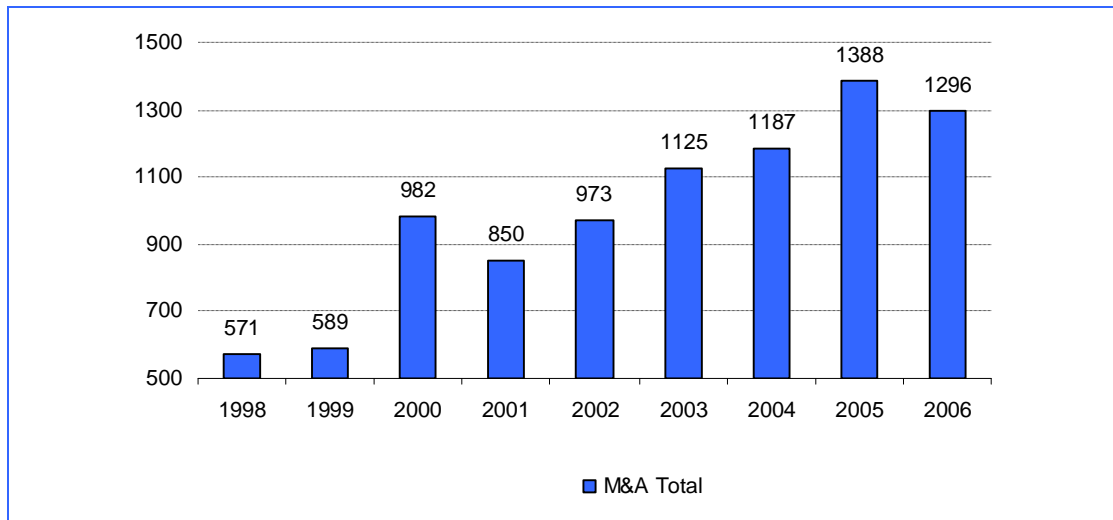
¹⁴¹ For the purpose of this study, the BI is defined as specified in the division 65 of the NACE Rev. 1 classification.

¹⁴² Germany, France, Italy, Netherlands, Austria, Sweden and UK.

1998 and 2004. However, due to a structural break-down in 2001, the following analysis focuses only on the period between 1998 and 2001.

Exhibit 4.3-1 depicts the total number of M&As in the 7 EU countries in the BI. Over the analysed time period, the BI experienced a clear rise of M&A activity. A sharp increase was observed in 2000, followed by a slight drop in the number of M&As in 2001. From 2002, the total number of M&As has continued to grow.

Exhibit 4.3-1: Number of M&A in the BI (EU 27), 1998-2006



Source: ZEPHYR, DIW Berlin (2008)

As was the case with ICT and innovation, other factors besides ICT influence firms' cost structure, their market share and ultimately the structure of the market in which they operate. Thus, in order to identify the relationship between ICT and its impact on market structure, proxied here by the number of mergers and acquisitions, one needs to control for other factors that could possibly influence the dependent variable. However, the lack of appropriate data poses considerable limits on the current analysis, and the results should be interpreted with caution. The analysis should serve only for illustrative purposes.

In order to partially deal with the challenge of this study, i.e. that not all factors that could play a role are actually observable in the data, a fixed-effects regression model is introduced. It assumes that there are significant differences among the countries included in the panel that remain fixed over time. Thus, by using the panel data described above the following relationship is estimated:

$$MA_{i,t} = a + CAP_IT_{i,t} + CAPIT_QI_{i,t} + e_{i,t} + v_i,$$

where $MA_{i,t}$ is the number of mergers and acquisitions in country i in time t , ICT endowment in the BI in each country is measured by $CAP_IT_{i,t}$ (value of ICT capital compensation) and $CAPIT_QI_{i,t}$ (ICT capital services index). $e_{i,t}$ represents the error term and v_i is country-specific time-constant unobserved heterogeneity.

Results

Exhibit 4.3-2 illustrates the regression results for the effect of ICT endowment on the number of M&As in the BI. According to the results, the only variable that has a positive and significant impact on the number of M&As is the one that controls for the share of ICT in total capital compensation. The ICT capital services index variable is statistically insignificant.

Exhibit 4.3-2: Fixed effects regression results on M&A activity

Dependent variable	Coefficient (SE)	t	P> t
CAP_IT	387.03 (157.31)	2.46	0.03
CAPIT_QI	.21 (0.21)	1.01	0.33
Constant	-84.59 (43.83)	-1.93	0.08
Model diagnostics			
Number of obs = 21	Prob > F = 0.01	R-squared = 0.93	
Note: Standard errors in parentheses.			
Notes:			
A dependent variable is the one observed to change in response to the independent variable(s), which are deliberately manipulated to invoke a change in the dependent variables			
The coefficient is a constant multiplicative factor of a certain object			
A standard error is the estimated standard deviation or error of a series of measurements			
R-squared refers to the coefficient for determination and is the proportion of variability in a data set that is accounted for by a statistical model.			

Source: Sectoral e-Business Watch, DIW Berlin (2008)

Overall, these results yield support for the hypothesis that the number of M&As are positively correlated with the diffusion of ICT, and are consistent with previous findings (Jovanovic and Rousseau, 2005). The results confirm that investors and companies react to the introduction of new technologies, as changes in technology lead either to new products or to new processes of production. As the demand for these products is difficult to predict, future prices and outputs are unpredictable as well. Consequently, the variance in the valuations of investors rises and the frequency of mergers increases. This in turn has impacts on market structure and the resulting competition of the relevant industry. It is generally assumed that mergers are likely to reduce the competition and, consequently, reduce the consumer surplus and total welfare (Motta, 2004).

However, the answer to the question on the increased merger activity is more complicated. For example, if a merger increases efficiency and, consequently, leads to lower prices, the net effect on welfare can be positive. However, due to considerable data constraints, the results do not allow for more precise conclusions regarding the effects of an increased M&A activity on the competition in the analysed sector and should be interpreted with caution. It can be only concluded that the rapid diffusion of ICT was accompanied by an increase in the M&A activity and resultant changes in the market structure and competition. The case studies can however provide explanations to the correlation between the diffusion of ICT and the increased M&A activity. First of all, as can be seen in the Egg/Citibank case study, ICT allows for new ways of banking that are especially taken up by the new banks in the industry (as previously shown in the econometric analysis as well). This implies that the new banks quickly gain a certain share of the market, which makes these companies attractive acquisition objects for

larger, traditional banks. Secondly, the increase in M&As can be explained by the fact that ICT enables M&As to be smoother, as the NIB case study provides a good example of. Here, Danske Banks' IT-system was implemented in NIB shortly after the merger, thus ensuring consistency across the new company.

4.4 ICT and the sector value chain

Empirical findings suggest that some of the main effects of ICT diffusion are organisational changes and the redefining of organisational boundaries (e.g. Brynjolfsson et al., 1994). Thus, it is relevant to assess if the diffusion of ICT in the BI had any impact on the restructuring process.¹⁴³

Transaction cost theory states that decreasing search costs, evaluation and monitoring of suppliers should change markets into a form of organising economic activity (Coase 1937, and Williamson, 1985). Consequently, the expectations regarding the potential of ICT as technologies, introducing innovative ways of doing business, re-shaping firm boundaries and changing the constellations of value chains were enormous (see, for example, Johnston et al., 1988, Milgrom et al., 1990, Fulk et al., 1995). The availability of powerful and cheap ICT was said to increase the attractiveness of markets (Malone et al., 1987 and Lucking-Reiley et al., 2001). Authors of the *'move to the market'* paradigm argued that due to ICT, companies would reduce their dependency on hierarchies and outsource business activities.

It is proven that *'move to the market'* decisions are driven by ICT diffusion (Brynjolfsson et al., 1994). Effects of firms' decisions to buy instead of make have been visible in the form of a restructuring wave that shook nearly every industry in the last twenty years. The aim of a restructuring process was to transform a company to match the new technological frontier with the purpose of making it more efficient. In most cases it involved the selling off company's divisions and/or outsourcing some activities to other firms. Thus, parallel to the ICT diffusion, companies pursued a strategy of becoming smaller, leaner and more specialised (Gornig and Görzig, 2007).

Concluding, there seems to be a positive relationship between ICT diffusion and changes along the value chain. In particular, ICT-savvy companies tend to re-define the boundaries of their organisations and outsource business activities. In order to validate this, the following hypothesis is formulated:

Hypothesis 5.1: ICT diffusion is positively correlated with firm restructuring.

Data and methodology

Data from two sources were matched in order to analyse the relationship between ICT endowment and restructuring activities of companies in the BI. The first source, the European Restructuring Monitor (ERM) database, provides data on restructuring activities

¹⁴³ For the purpose of this study, the BI is defined as specified in the division 65 of the NACE Rev. 1 classification.

in 27 EU countries and Norway.¹⁴⁴ The second one, the EU KLEMS database, serves a source for ICT capital share compensation in the BIs in relevant countries (see Appendix). Each observation from the ERM database was matched with the value of ICT share in capital compensation variable, lagged by two years derived from the EU KLEMS dataset for the industry and country in which the company was active. The aim of using lagged values of the ICT variable was to account for the fact that investments into ICT do not have immediate results on a company's structure.

All observations from the ERM database were grouped into the following categories:

- Asset discarding. This group covers examples of restructuring like bankruptcy, closure, off-shoring, delocalisation, relocation and outsourcing. It is assumed that in these cases firms entirely or partially gave up on performing some activities in the current location and, consequently, discarded assets necessary to perform them.
- Asset restructuring. This group covers examples of restructuring like internal restructuring, merger and acquisition. Here, it is assumed that capital reallocation and mergers go together with the introduction of new production mode or technology and efforts to implement it.
- Business expansion.

Using cluster analysis, companies were grouped into three clusters based on their ICT endowment level, i.e. clusters with low, medium and high average ICT shares in capital compensation. In order to shed some light on the relationship between ICT diffusion and the reorganisation of the value chain and employment, the three clusters were analysed with respect to the intensity of different restructuring activities and their net effect on employment in these companies. By using the T-test procedure, the average values of variables were tested to see whether they significantly differ from the total sample means.

Results

Exhibit 4.4-1 shows the mean values of variables controlling for restructuring activities in the three clusters and the average impact on employment. The symbol below each mean value indicates whether they differ relatively to the entire sample.

The clusters differ substantially in the number of firms. The first cluster, with the lowest ICT endowment level, represents 17% of the total sample. The largest cluster, representing 13% of the sample, is the one with the highest ICT share in total capital compensation, i.e. 60% on average. The cluster with a medium ICT share in total capital compensation is the largest one.

An analysis of the mean values of the variables controlling for various restructuring activities provides some interesting insights:

- The likelihood of discarding assets increases with the ICT endowment level. Consequently, companies belonging to the cluster with the highest ICT shares in capital compensation are the most likely to have outsourced, relocated or off-shored some of their activities.
- Similarly, the likelihood of asset restructuring is the highest in the cluster with the highest ICT endowment level.

¹⁴⁴ Germany, France, Italy, Netherlands, Austria, Sweden and UK.

- The highest negative impact on employment is observed in the high level ICT cluster, as well. This confirms the finding of the previous analysis that ICT capital tends to substitute labour in the BI.

Concluding, the current analysis provides support for the hypothesis that ICT diffusion is positively correlated with firm restructuring, suggesting that ICT use is positively correlated with firm restructuring activities. This is also consistent with the previous empirical findings discussed above. Thus, ICT enables companies to re-define the boundaries of their organisations and outsource business activities. Furthermore, as this process is accompanied by the reduction of the workforce, companies become smaller and leaner as well.

Exhibit 4.4-1: Restructuring activities in three clusters in the BI

	Total*	ICT Low*	ICT Medium*	ICT High*
ICT capital share**	0.35	0.21	0.33	0.60
		-	-	+
Asset discarding	0.13	0.02	0.15	0.17
		-	=	+
Asset restructuring	0.74	0.74	0.73	0.83
		=	=	+
Business expansion	0.12	0.24	0.12	0.00
		+	=	-
Net employment effect	-735	-600	-713	-1038
		=	=	-
N	274	46 (17%)	193 (70%)	35 (13%)
* Mean values. ** Lagged by 2 years " +" above sample average, "=" close to sample average and "-" below sample average (significant at 95% confidence)				

Source: Sectoral e-Business Watch, DIW Berlin (2008)

The case studies also present evidence that ICT has been used in the restructuring of firms such as branch renewal. In numerous cases, such as Tapiola Bank and Glitnir Bank, ICT has been used to restructure the banks to be able to provide both online banking and financial advisory in branches. In the NIB case, ICT was used to smoothly restructure the processes in NIB so that these matched the ones in the parent company Danske Bank. Finally, Eurobank has initiated a BPM-project aiming at streamlining processes within the bank, thus making the bank more competitive.

4.5 Summary of the impact analysis

The current econometric analysis has confirmed that the diffusion of ICT drives the innovation process in the BI. The following points summarise the effects of the ICT-enabled innovation process in the banking industry:

The analysis of the impact of ICT capital on labour and total factor productivity growth confirms to some extent that ICT capital has a moderate impact on productivity. The full exploitation of total factor productivity growth is however only found when high- and medium-skilled labour is combined with organisational changes. However, if intermediate inputs are included in the analysis of productivity growth, the technical efficiency estimates show a slightly different result. Countries like the UK, who excel in labour productivity growth on a value added basis, do much less so if intermediate inputs are taken into account. Furthermore, there is significant heterogeneity across countries, which makes it unlikely that all countries follow the same trajectory of productivity growth even in the long run. This suggests that there are different specialisation patterns across Europe in the financial service industry.

The impact of ICT capital on the employment perspectives in the EU Member States shows that overall employment in the financial service industry tend to decline in most Member States, especially since the beginning of the new millennium. However, some countries are benefiting from the concentration of international financial services in their locations, with Ireland and Luxembourg as prime examples. With regard to average working hours, ICT investments tend to have a diminishing impact on these in the Member States, albeit significant differences between countries prevail.

With regard to compositional changes according to three different skill-classes, the empirical results from our econometric analysis indicate that medium-skills are the most important labour source associated with an increased ICT-capital intensity in financial services. High-skilled labour inputs by working hours rank second while low-skilled labour is more or less stagnant. These findings confirm that ICT usage in financial services have a significant skill-bias, however, more towards more intensive use of medium-skills compared to high-skills. This finding relates very well to the findings from the case studies, where tellers are increasingly being retrained to perform financial services in the banks, thus moving the tellers from the low-level skill class to the medium-level skill class, but not all the way to the high-level skill class. However, if the development in ICT continues with more sophisticated systems, even medium-skilled labour becomes substitutable by ICT equipment in the long run. However, this development remains yet to be seen.

The analysis of the relationship between the ICT diffusion and the number of IPOs confirmed the innovation-enabling role of ICT. It can be seen that entrepreneurial companies without legacy capital are able to deploy new ICT, turn it into commercial innovations and challenge the existing way of doing business. The case studies confirm this, especially when the concept of Internet-only banks was introduced in the BI, as both SkandiaBanken, Tapiola Bank and Egg were able to gain a relatively large portion of the banking market in a relatively short period of time.

According to the analysis of the effects of ICT on the intensity of M&A activity, the adoption of new modes of production that results from the ongoing technological change forces firms to reorganise their assets. This might have further consequences for the market structure and competition in the sector. Unfortunately, due to data constraints, the

results do not allow for precise conclusions regarding the effects of ICT on the competition in the analysed sector. The case studies can however provide explanations for the correlation between the diffusion of ICT and the increased M&A activity. First of all, ICT allows for new ways of banking that are especially grasped by the new banks in the industry (as previously shown in the econometric analysis as well), which makes the new banks interesting acquisition targets for traditional banks (Egg/Citibank case). Secondly, ICT enables M&As to be smoother, as the NIB case study provides a good example of. This could mean that ICT has made it easier to conduct M&As.

The analysis of the impacts of ICT on the value chain revealed that ICT enables firms to review their make-or-buy decisions and drives the process of outsourcing business activities and company restructuring. This has been true in several case studies, as ICT has enabled the banks to restructure their business processes. Furthermore, as this process is accompanied by the reduction of the workforce, companies become smaller and leaner as well. Thus, the process of re-shaping firm boundaries and changing the constellations of value chains is another sign of the potential of ICT as technologies enabling innovative ways of doing business.

5 Case studies

The 10 case studies conducted for this study are intended to give additional insight into the topics analysed in Chapter 3 (the Single Euro Payments Area, ICT as a driver of process efficiency, the impact of ICT and e-banking on branch renewal) and to help validate the results of the economic analysis of ICT impact (Chapter 4). They illustrate how banks use ICT and e-business, the challenges they encounter in this context, and how ICT have changed the way of doing business in this industry. Cases have been selected accordingly. Other important criteria when selecting case studies included organisational size (because ICT is used differently in banks depending on their size), and the country of origin (in order to ensure broad coverage across Europe).

Exhibit: Case studies and business examples presented in this report

Case	Company / project	Country	Topic(s)
1	ICA Banken	Sweden	The impact of e-banking and CRM
2	Hansabank	Estonia	ICT as a driver of process efficiency
3	Tapiola Bank Ltd.	Finland	The impact of ICT and e-banking on branch renewal
4	National Irish Bank	Ireland	The impact of ICT and e-banking on branch renewal
5	Nova Ljubljanska Banka	Slovenia	The impact of ICT and e-banking on branch renewal
6	SkandiaBanken AB	Norway	The Impact of e-banking and CRM
7	Egg/Citibank UK	United Kingdom	The impact of e-banking and CRM
8	Eurobank	Greece	ICT as a driver of process efficiency
9	Glitnir Bank	Iceland	The impact of ICT and e-banking on branch renewal
10	Société Générale	France	ICT as a driver of process efficiency

Source: Sectoral e-Business Watch (2007)

The case studies are each relevant to the research questions directing this analysis of ICT in the BI since they, in addition to the aforementioned thematic priorities, also illustrate how ICT impacts on bank productivity, growth, competitive advantage, innovation and workflow. Moreover, they permit us to make conclusions about the current state-of-play concerning ICT uptake and usage, highlight barriers for uptake of ICT and means to overcome these, and finally illustrate new ICT-driven organisational structures and constellations. A brief introduction to what each case study offers in this regard is listed below for the benefit of the reader.

- **ICA Banken** illustrates how banking may be used in untraditional settings such as supermarkets, where banking and grocery shopping can be done simultaneously. In ICA Banken ICT provides the foundation for the financial services offered to ICA supermarket customers, with online banking and privilege/payment cards used for in providing customers with inexpensive and flexible banking services. ICT driven banking allows the ICA supermarket chain to offer a wide portfolio of services, and create a bond of loyalty between them and their customers, which ensures repeat business.
- The case of **Hansabank** provides insights into both the advantages and the barriers related to being first mover in a market not yet fully prepared for high-speed internet

banking. In the early stages, difficulties were met because the uptake of broadband in the country was not yet widespread. On the other hand, by being the first mover and continuously adapting to changes in customer requirements, Hansabank now has a leading position in the Baltic online banking market.

- **Tapiola Bank** is interesting in a SeBW perspective because the case study illustrates how an ICT-driven dual-banking concept is viable in a competitive banking market, where ICT may be used to automate processes, and through online self-service allow banks to maintain profitability by providing a favourable cost-structure.
- **National Irish Bank (NIB)** allows us to observe how ICT can improve efficiency throughout the entire brick-and-mortar network, hereby strengthening the competitiveness of the bank, as well as having an impact on HR by automating repetitious tasks.
- **Nova Ljubljanska Banka** is a good example of how banks can reap significant first-mover benefits from introducing relatively sophisticated ICT solutions to markets where these are not yet in common use. It is also the only example among the case studies of a bank significantly reducing the number of bank staff while expanding the customer base due to efficiency gains from the introduction of ICT.
- **SkandiaBanken** serves to illustrate how ICT when used in a pure online setting may benefit banks by allowing a lower-cost structure vis-à-vis brick-and-mortar banks, hereby providing SkandiaBanken with a competitive advantage. Moreover, it is an example of how banks seek to bridge the divide between customer and online banks by using remote means for Customer Relationship Management (CRM).
- The case study on **Egg/Citibank UK** helps demonstrate several of the aspects dealt with elsewhere in this report. This concerns how ICT is used to ensure organisational flexibility, performance and innovation. Moreover, the case is illustrative of trends such as personalisation of services and the focus on customers' online experience. Finally, It provides us with insight into the founding ICT application of the bank – Egg's Service Oriented Architecture (SoA).
- **Eurobank EFG** is a case of how ICT may impact on overall productivity, competitive advantage, by applying concepts such as Business Process Management (BPM) to services. Furthermore, the study exemplifies some common HR challenges when implementing ICT.
- **Glitnir Bank** demonstrates how a high structural availability of Internet may be influential in migrating customers to an online setting when conducting day-to-day banking. ICT are in this case a facilitator of reduced overhead costs, branch renewal, and changed workflow and task composition for employees.
- **Société Générale** has achieved improved process efficiency and improved their competitive position in the corporate and investment banking market through a series of new ICT applications. The case study also illustrates how a large bank utilises a mixed approach to ICT development, favouring in-house development but occasionally entering into development in collaboration with other banks and using external contractors for acquiring new IT systems.

5.1 ICA Banken – Making banking more convenient

Abstract



Swedish Bank ICA Banken, a part of the Swedish retail company ICA Group, has established itself on the Swedish banking market by taking advantage of both ICT and supermarket branches.

ICA Banken was established with the purpose of offering low-cost financial products as a loyalty add-on to customers, and is an example of an increasingly popular banking concept: the supermarket bank, which offers customers the possibility of combining banking with everyday shopping. The customer's ICA loyalty card are used for banking services as well, which means that ICT has enabled the bank to offer low-cost lending, insurance, stock-trading and much more online. Moreover, the combination of online banking and familiarity of the ICA Brand and supermarket branches has been of great advantage in attracting customers. The concept has so far induced 400.000 customers to take advantage of ICA Banken services.

Case study fact sheet

■ Full name of the company:	ICA Banken AB
■ Location (HQ / main branches):	Stockholm, Sweden
■ Main business activity:	Internet and telephone Banking
■ Year of foundation:	2001
■ Number of employees:	196
■ Turnover in last financial year:	54.9m. EUR
■ Primary customers:	Online customers
■ Most significant geographic market:	Sweden
■ Main e-business applications studied:	Internet & Supermarket Banking

5.1.1 Background and objectives

In 2001, the Swedish retail company ICA launched a bank service for their customers, ICA Banken, with the purpose of offering low-cost, self-service, financial products as a loyalty add-on. This is done by using the customer's ICA loyalty card-scheme for banking purposes as well providing a large portfolio of e-banking possibilities. The bank is an example of an increasingly popular banking concept, where banking is combined with everyday shopping. Providing financial services to ICA customers was intended to boost customer loyalty and cutting transaction costs incurred by customers in ICA stores and ICA AB in connection to payments.

ICA Banken offers a variety of core banking services which meets basic customer requirements, including current accounts and various forms of bank cards. ICA Banken also offers unsecured loans, mortgage, as well as accident, life and disability insurance. In cooperation with Nordnet¹⁴⁵, it offers stock and options trading, savings products,

¹⁴⁵ A Nordic company aiming at improve and simplify private savings in shares, mutual funds and pension plans (<http://org.nordnet.se/Engelska/undersidor/om-nordnet/om-nordnet.html>)

equities, funds and individual pension's savings. ICA Banken has 3.1 million active customers, 1.4 million of whom use their bank card for payment purposes, while the rest simply earn bonus points on their purchases. Approximately 400,000 of ICA Banken customers use the extended portfolio of bank services.

The Swedish banking market is dominated by four banks (SEB, Swedbank, Nordea and Handelsbanken), which have a combined market share of more than 80%. Smaller banks such as ICA Banken have however established themselves as a competitive force, which in part is due to their strategy of providing supermarket banking, thus seeking to establish a niche on the market.

5.1.2 e-Business activity

The idea of combining supermarket retailing and banking is not an unfamiliar concept in the European Banking Industry, as it has been successfully introduced in other European countries (e.g. Germany and the UK) as a supplementary service to supermarket customers. The founders of ICA Banken initially intended that the financial services should be restricted to a payment scheme to facilitate easier payments by use of the ICA loyalty cards. Upgrading the ICA shopping card to a payment card was to be done with the help of external payment providers, which however turned out to be more difficult than expected. Thus, in the development process, the more ambitious plan of developing in-house financial services under the existing ICA brand was initiated, as this could be added onto the original plan at a cost which was expected to be compensated for in terms of the expected benefits. ICA Banken opened in 2002.

The concept of ICA Banken consists in offering low-cost, self-service banking to existing ICA customers, by providing them with the possibility of upgrading their loyalty cards to an ICA credit card (ICA Bankkort Plus). The basic idea is to market the benefits of a single card membership to customers, with customers using just one card for all their daily purchases and financial operations. Being a customer in both ICA Banken and ICA stores gives the customer a number of benefits, such as credit and debit facilities and bonuses on all purchases. Moreover, ICA Banken wished to focus on self-service and lowered fixed costs, in terms of expenses on branches and personnel. Also, a lean-focus is applied across the entire organisation and organisational efficiency is a high priority for management. This was at the time a very different strategy from the other players in the Swedish banking industry.

In the development of ICA Banken, the most important factor was the introduction of the loyalty card scheme in ICA. The proprietary loyalty card was launched in the early 90's, offering a number of advantages associated with retail purchases in ICA stores. The loyalty card was further developed in 1998 where a bonus system was added to the card, which offered a 1% discount on purchases in ICA stores to holders. ICA Banken built on the existing portfolio of customers and their use of loyalty cards, as the credit/debit functionality was added to the loyalty card. This was a great opportunity, as the client base of ICA retail in Sweden consisted of more than 3.6 million loyalty cardholders (more than a third of the Swedish population). A customer base of this size was instrumental in allowing the bank to grow from zero to approximately 45.000 customers in the first six months. The customer base of the bank continues to grow, with 400.000 active customers registered in 2007. In 2007 alone, 65.000 customers upgraded their loyalty cards to ICA Banken credit cards and the full portfolio of banking services.

ICA Banken operates without the use of a full-service branch network for customer service. Hence, ICT was instrumental in the creation of the bank. Their business model relies on customer self-service, with the level of contact between customers and ICA personnel restricted to advisory services delivered via call-centres and the Internet and telephone banking. This approach to banking means that ICA Banken customers has no access – and probably no need - for on-location advisory services in ICA retail branches. Moreover, the customers are able and willing to use online banking for the majority of their banking needs. ICA Banken's business model is hence dependent on the combination of ICT-driven online banking and ICA loyalty credit cards. Providing banking services to customers without the use of ICT (online banking), would include a setup with regular bank branches and personnel at retail stores. Instead, the online setup allows the bank to operate with a competitive cost structure, which coupled with the familiarity of the ICA brand has given the bank a niche in the Swedish market for financial services.

Customers of ICA Banken may use ICA supermarkets for deposits and withdrawals. However, the online bank is used for most financial operations, including tasks such as invoicing, applying for loans, mortgages and insurances. Recently, stock and bond trading has become another online service for ICA Banken's customers as the bank has partnered with online broker Nordnet, whose trading platform has been integrated with ICA Banken's online bank. This partnership allows ICA Banken to take advantage of Nordnet's online capabilities, hereby avoiding conducting costly ICT in-house development.

The underlying ICT infrastructure is a flexible platform, which connects ICA Banken's online bank with the customer call centre and the supermarket branch channels (ATM's and loyalty card terminals). The infrastructure consists in a number of ICT-facilities which have been acquired from outside contractors, such as Microsoft and Financial Objects. The latter provided them with the ActiveBank application. ActiveBank is on a Windows-based core banking system. Connecting the ActiveBank and Windows systems with the proprietary customer database was used to secure a smooth start-up of ICA Banken. The ICT setup used in ICA Banken has provided the bank with a multi-functioned banking environment, built on reusable software components and based on industry standards. This means that the system allows the bank to operate 24-7, and to support multiple channels (online bank, phone bank, ATM's and store terminals), which customers can choose between when conducting their banking. Moreover, ICT provides the bank with the ability to process high volumes of data, and to support its core processing needs in both back- and front-office operations, which are integrated with the purpose of improving organisational effectiveness.

5.1.3 Impact

ICA Banken is not a traditional example of a bank which has improved its processes after introducing ICT, but rather an example of how ICT drives new approaches to banking such as supermarket banking. ICA Banken's entry into the Swedish banking market is interesting for a number of reasons. First, and foremost, ICA Banken had the possibility to take advantage of the existing customer-base in ICA retail, their brand, the wide uptake of ICT in Sweden and the relative low entry barriers to online banking. Secondly, ICA stores could be used to promote the bank, and the loyalty card was used for banking purposes as well. Hence, ICA Banken created a link between grocery shopping and banking, bundling of two core-tasks for customers into one. ICA has hereby simplified banking and

made it convenient for customers, who visit ICA supermarkets on multiple occasions during the week. The fact that the bank in this manner becomes an integrated part of everyday life (as opposed to the more rare visits at brick-and-mortar banks), puts them in a position strengthen loyalty and use effective marketing and CRM. Taking care of banking online or at the retail store is in this respect something which can be done at the convenience of the customer.

The ability to offer customers competitive interest rates and lending rates are to a large extent only possible because of the advantages offered by modern ICT. Using ICT in the ICA Banken setup enables the bank to offer customers nominal fees, high interest rates, and low lending rates. This does not necessarily differ much from other Internet banks, but ICA Banken moreover has the possibility of taking advantage of its joint actions with ICA retail and can offer a purchase based bonus system, which helps to secure the continuing loyalty of customers. Combining the advantages of the ICA retail business with ICT has proven to be fruitful for ICA Banken.

Low operating costs are important in this connection, as the advantages of low fixed costs associated with Internet banking enables the bank to work with an economical cost structure. Hence, the margin of profit needed in ICA Banken is less than that of banks whose point of sale goes through branches. Also, the fact that the bank does not only perform in-house development of ICT, but focuses on establishing partnerships with outside providers, is a contributing factor in keeping down costs and risk. Working with partners enables the bank to chose between a series of best practices in their respective fields of finance, and integrate these ICT-driven services into a single platform for the benefit of ICA Banken customers.

Although the bank has become popular among customers, it is still difficult to convince customers to use ICA Banken for the all banking operations. Most customers still prefer brick-and-mortar banks ahead of online based such as ICA. Only 7 billion of the Swedish household savings are actually placed in ICA bank accounts, which is not much as the Swedish household accounts amount to 800 billion in total.¹⁴⁶ The challenges experienced by ICA Banken in positioning themselves as the main provider of bank services to ICA retail customers (incl. depositing of household savings and sales of high-margin financial products), could be explained by the conservativeness of customers. Issues such as online security, the perceived switching costs associated with changing banks and the possibility to receive face-to-face advice at brick-and-mortar branches remain important to customers in this day and age. These are just some of the barriers ICA has to take into consideration when designing their financial services and delivery channels.

5.1.4 Lessons learned

In the context of the study on ICT in the Banking Industry, the case on ICA Banken illustrates several current and future tendencies, which is likely to impact on the financial sector in the near future. ICA Banken's approach of combining Internet banking with grocery shopping is novel in the sense that it bundles two core needs into one. Combining retail with financial service offerings is for the customer an easy and convenient service, as banking and shopping can now be conducted using the same

¹⁴⁶ <http://www.dn.se/DNet/jsp/polopoly.jsp?d=678&a=712515>

card. In addition, ICA Banken offers competitive interest rate on the customer's savings accounts, due to its profile which is mainly based on Internet and telephone banking.

Customers, however, remain suspicious of such new approaches to banking, as many retail customers still prefer one of the large banks in Sweden. This despite the fact that online banks such as ICA Banken offer competitive interest rates as well as banking products similar to the ones of the large banks. Reasons for this may be the perceived switching costs connected to changing banks; a process, which according to ICA Banken, is much simpler than commonly believed. However, despite this conservative stance among customers towards ICA Banken, the bank has shown initial success, and expects increasing growth once customers become more aware of the benefits associated with combining grocery shopping with banking and taking advantage of the competitive interest rates offered due to the bank's self-service profile. The concept of convenience banking (shopping for groceries and bank products at the supermarket) has mass-appeal, and might increasingly threaten traditional bank concepts, as customers become more adjusted to unconventional approaches to managing their personal finance.

The question of why Swedish bank customers chose to remain customers of banks that might offer them less competitive rates than ICA Banken is in this respect highly relevant. The answer could very well be that the need for face-to-face advisory services remains important to customers, and online banking perceived as appropriate to low-margin financial services. ICA Banken might either need to devise an acceptable alternative for customers involving means to compensate for the lack of such face-to-face advisory services. This is especially relevant for customers who rely heavily on personnel advice when it comes to banking and purchases of high margin financial products. Another solution could be that the bank only aims at IT-skilled customers.

The role of ICT in ICA Banken is of course highly critical, as all financial products are based on IT, and so is also the very existence of the bank. Using ICT has enabled ICA Banken to gain entry to the Swedish banking market, by offering customers a cheap and convenient banking online and through their supermarket branches.

ICT is also an important instrument in the CRM aspect of ICA Banken's operations. Using electronic means to segment customers enables a more focused approach to marketing products and services. This kind of personalised approach to marketing improves the effectiveness of advertisement by securing that customers gain access to products suited to their needs. Hence, the effective use of CRM to create customer loyalty, coupled with the presence in the ICA retail branches, puts ICA Banken in a position to strengthen their position in the Swedish Banking Industry.

5.1.5 References

Research for this case study was conducted by Benita Kidmose Rytz, Rambøll Management on behalf of the Sectoral e-Business Watch. Sources and references:

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5.2 Hansabank – Development of an e-banking product for private customers

Abstract



Hansabank is a successful Estonian full-service bank (and a member of the Swedish Swedbank Group) offering a wide array of financial services to business, private customers and public authorities in the 3 Baltic countries: Estonia, Latvia and Lithuania. The development of an Internet bank for the bank's private customers was a milestone in the development of online banking services in the Baltic region and is now the preferred online banking tool for over 2 million customers in the three Baltic countries. Today, Hansabank is in the process of launching a new generation Internet bank that is about to become a fully functioning and unified transaction, information and marketing channel.

The main drivers behind the success of Hansabank's Internet bank have been the continuous focus on development of the functionalities and products offered through the channel and an extensive use of marketing. The continuous add-on of essential banking operations into the Internet bank has secured the systems match with customer needs and has generated a competitive advantage for Hansabank.

Case study fact sheet

■ Full name of the company:	Hansabank
■ Location (HQ / main branches):	Estonia, Latvia, Lithuania
■ Main business activity:	Financial intermediation
■ Year of foundation:	1991
■ Number of employees:	~ 9,000 (3,400 in Estonia)
■ Turnover in last financial year (2006):	525,4 million EUR
■ Primary customers:	Consumers and businesses
■ Most significant geographic market:	The Baltic countries
■ Main e-business applications studied:	Internet bank for private customers

5.2.1 Background and objectives

Hansabank is a bank operating in Estonia, Latvia, and Lithuania. It is owned by the Swedish bank Swedbank. Hansabank has close to 3 million active customers and over 9,000 employees. Hansabank has the largest network of branches (278) and ATMs (1,022) in the Baltic countries. Approximately 600 of Hansabank's more than 9,000 employees are IT specialists (equivalent to app. 7% of the total workforce).

The scope of activities at Hansabank is:

- Retail banking;
- Corporate banking;
- Asset management;
- Investment management;
- Leasing.

Hansabank is a specialist in offering banking services through electronic bank channels, with Internet banks for retail customers (hanza.net), corporate customers (telehansa.net), offline information and payment system for companies (telehansa) and a special payment system for large corporate clients (Hansa Gateway). Hansabank started offering online banking services in the mid-1990s with the intention of enabling banking operations from any computer connected to the Internet. Special attention has been given to enabling clients to easily and comfortably do their everyday banking actions (payments, information requests etc), but also to introduce more sophisticated transactions and services in the area of loans, leasing, investment and insurance.

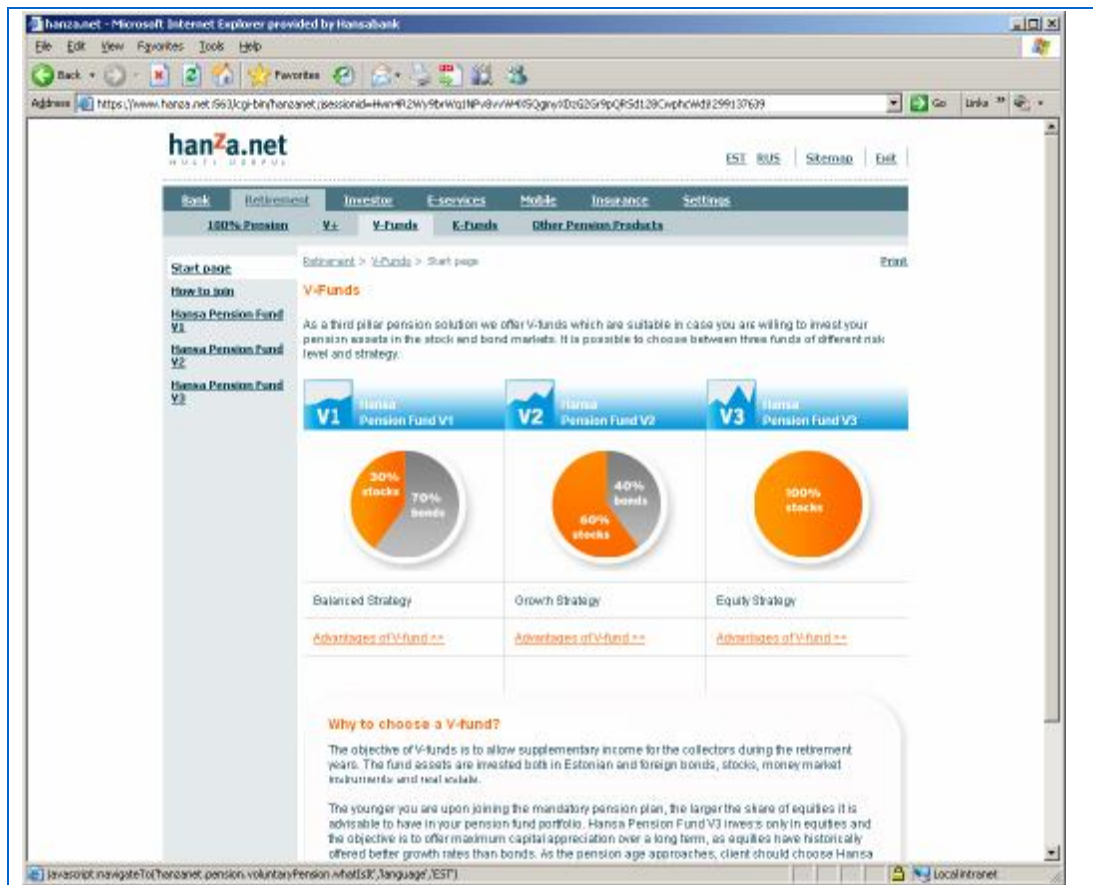
Hansabank's Internet bank for retail customers has the largest client base among the internet banks in the Baltic countries, with SEB in second place and Sampo in third place. Hansabank's exact market share, in terms of the share of active Internet bank clients, is hard to estimate due to different measurement methods in the banks. However, based on information from The Estonia National Tax Board around 70% of Estonian online tax declarations (and an example of Estonian e-government) in 2007 were performed through Hansabank's Internet bank, and around 30% through SEB Internet bank. This goes to illustrate the high share of active Internet bank customers in Hansabank and that Hansabank is comparatively well positioned in terms of uptake of online banking among clients. It furthermore illustrates the multi-functional character of Hansabank's online banking.

5.2.2 e-Business activity

Hansabank's online bank for private customers has more than 2 million customers (as of December 2007) in the three Baltic countries. Some of the products/services available in Hansabank's Internet bank for private customers are:

- Make payments, e.g. pay for public utilities or a magazine you have subscribed for.
- Make payments to other banks, incl. abroad.
- Convert currencies.
- View information on your earlier transactions and check your account balance.
- Keep yourself posted with all the deposit agreements, direct debit agreements and standing order agreements you may have signed earlier.
- Apply for loans and credit cards under favourable conditions.
- Start investing in the pension fund and pension insurance.
- Conclude standing order, direct debit and motor third party liability agreements.
- Exchange messages with the bank.
- See your data in the databases of the Health Insurance Fund and Tax Board.
- Take advantage of special offers envisaged only for the customers of hanza.net.

Exhibit 5.2-1: Hanza.net Screenshot



Source: <http://www.hanza.net>

Timing of the activities

The first development phase of private customers' Internet bank was initiated in 1997, where preliminary steps were taken towards establishing a simple Internet bank for domestic payments, account balance and account statements within Estonia. This basic Internet bank and the related services formed the basis for the development of the next generation Internet bank for private customers that was launched in 1999 under the brand name Hanza.net.

Hanza.net was launched in the second phase (1999-2001), where the additional traditional financial intermediation services of Hansabank were migrated into an online environment. During this phase, special attention was paid to developing online solutions for debt management and loan application procedures. An online approach to these two areas was expected to bring large administrative reductions for customers.

The third phase, which has just been completed (2002-2007), focused on the integration of investment products like 'stock and contracts for differences' (CFDs) trading and bond trading. These investment products had gained favour among private customers in recent years and did not require very challenging changes in the ICT system.

In the new and latest generation, Internet bank clients are offered a constantly widening range of online services, as well as a continuously upgraded user-interface, with the purpose of making the system as a whole even more client-friendly. The most significant

change in the new Internet banking generation is the development of a fully-functioning transaction, information and marketing channel, where clients can get everything they need from one integrated online platform.

The latest development, which is an example of the increasingly digitalised nature of banking, concerns the implementation of the digital signing of payments, which will be followed by the digital signing of loan (and other) contracts in the near future. In addition, Hansabank has sought to integrate its online sales – showing customers individualised pre-calculated offers about various banking services they have yet to subscribe to.

Security and authentication

There are four ways for users to authenticate themselves when using Internet banking:

- ID-card - The ID card or identity card is a public document with which you can identify yourself for instance in shops, public authorities and the Internet (including signing your operations and documents digitally);
- Mobile-ID – Mobile-ID enables you to log on to the Internet bank with your mobile phone. Mobile-ID is just as secure and approved an authentication option as the ID-card. However, unlike the ID card, customers do not need any special accessories to use mobile-ID;
- Pin-calculator;
- Password card.

Development costs and SEPA compliance

The costs of developing the Internet bank have been rather high in terms of man-hours. When developing the first basic online bank, no more than a few dedicated employees were assigned to the project. In the following updates and developments of the internet bank, the magnitude and volume of the project grew and additional man-power was allocated for longer periods of time. Along with the development of the online bank, there has been a continuous focus on aligning this process with actual requirements from users (both clients and employees). For this reason, much focus has been put on examining such requirements before and during implementation of the online bank. Hansabank is also trying to keep up with worldwide trends in online banking regarding the services and products offered in Internet banking.

Like most other banks, Hansabank is also working on complying with the SEPA requirements for the deadline of January 1st 2008, but does not expect any problems in terms of SEPA compliance. The new possibilities introduced together with the SEPA will enable Hansabank clients to make Euro transfers to other banks, who conform to the requirements of the SEPA. Hansabank does not expect that any major alterations to their online bank will be needed as a consequence of the introduction of the SEPA. As complying with SEPA is a matter of adding new fields to the foreign payment form, no significant changes are expected for clients.

5.2.3 Impact

The implementation of the private clients' online banking solution has had an impact on the working processes of customers, the sales of Hansabank and the cost effectiveness of internal business processes of Hansabank concerning private customers in Hansabank.

The introduction of the Internet bank has greatly impacted the customer's interaction with the bank. Today, 97% of all payments are conducted electronically, of which 59% of the payments are made in the Internet bank and 33% automatically via direct debit. The Internet bank reduces private customers' accounting costs and work time because several accounting transactions have been optimised in the programme (e.g. pre-defined payments). Today, Hansabank is the largest player in Estonia within online banking, mainly due to the large client base as well as the ratio of online transactions compared to branch-based.

The development of the Internet bank has also had an impact on the internal business processes of Hansabank. An online transaction is about 20 times less costly than the equivalent transaction conducted in a branch. This difference stems primarily from automation. As a result of migrating from physical to online payments less human resources are required for conducting basic everyday operations in the branches. There is also a qualitative shift toward value-added work: staff in the bank branches has been freed from handling payments and can now be allocated to sales activities and advisory functions of higher margin value. When Hansabank and Hoiupank (another Estonian bank) merged in 1998, 48% of the payments in the new bank were done online. 2 years later, the figure was ~90%.

5.2.4 Lessons learned

Many (if not all) of the traditional financial intermediation services are fit for online use and the efficiency gains for both customers and banks are quite obvious. The success of ICT usage is, however, rooted in a continuous development of the features and functionalities along with a focus on bringing more of the every-day interfaces between customers and bank into an online setting. According to Hansabank, however, successful usage of ICT is not only a matter of using the right software and hardware. Attention should also be given to the organisational implications of ICT and the changes in market conditions that may change the direction of customers' needs and desires.

Hansabank did, however, also experience some difficulties during the development of the Internet bank solution. One of these related to the initial speed of the application, where the Internet banks' volume 1 was simply too slow. The development team had overestimated the availability and usage of high speed Internet connections; many clients were still using dial-up connections when the online bank was launched in 2000 instead of e.g. broadband. Hence, despite Hansabank's effort to clarify technical specifications and requirements (e.g. Internet connection speed, browsers and operating systems), the Internet bank encountered problems when launched and had to be developed further. Hansabank has learned that performing extensive ex ante market research is crucial as it provides developers with a more detailed requirements specification. Being ahead of both customers and competitors is, however, also an advantage, as the rapid increase of Internet usage and personal banking-related technologies witnessed in recent years were less of an obstacle to Hansabank than it was for less ICT-advanced competitors.

When asked about the challenges of ICT in the future banking industry, Hansabank singles out online security as an issue of growing importance. In their view, broadening the scope and quality of online services with integrated and more advanced security mechanisms is one of the major opportunities and current restraints of Internet banking. As already pointed out, a lack of perceived security is considered one of the major obstacles to the improved uptake of online banking among customers. Taking concrete measures to improve security, hereby easing customer concerns, should in this respect be at the top of the agenda for banks, in order to facilitate an increased usage of online banking.

Another aspect is the continuous development of the user interface. With the growing amount of information and transactions, the development of Internet technologies (web 2.0 etc) and increasing experience of users, the simplicity and logic of the Internet banking environment needs continuous updating and overlooking to ensure that the offered solution is as client-friendly as possible. Therefore, the main driver for innovation is the mindset of continuous improvement within the technological, market and organisational changes.

5.2.5 References

Research for this case study was conducted by Anders Pennerup Gantzhorn, Rambøll Management on behalf of the Sectoral e-Business Watch. Sources and references:

- Interview with Mr. Karla Agan, 6 September 2007
- Hansabank Annual Report 2006
- Estonian Banking Association, www.pangaliit.ee/eng/ (September 2007)
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- www.hanza.net

5.3 Tapiola Bank – Dual-combination banking

Abstract



Tapiola bank is part of Tapiola Group, a customer-owned institution consisting of several operating companies providing insurance, pension, investment management and banking services. The Tapiola Bank division was established in 2004 to provide consumer banking services via the internet and through 50 insurance branch offices nationwide, and was directly related to the increasing use of ICT among customers. In its first year of operation, Tapiola Bank won nearly 25,000 new customers, and is currently winning more than 30,000 additional customers each year.

The success is largely attributed to the synergies of combining online banking with on-location advisory services. The synergy effects were created by successfully using the Tapiola insurance branch infrastructure for face-to-face meetings – which purely internet-based banks cannot provide - and building an ICT-driven bank on this foundation. This kind of dual-combination banking concept encompasses the possibility to successfully combine the benefits of branch banking with the cost-structure of a purely ICT-driven bank.

Case study fact sheet

■ Full name of the company:	Tapiola Bank Ltd.
■ Location (HQ / main branches):	Espoo, Finland.
■ Main business activity:	Retail Banking (and asset management as subsidiary)
■ Year of foundation:	2002
■ Number of employees:	290
■ Turnover in last 12 months:	49.8m euros (Assets under management 6,300m euros)
■ Primary customers:	Private customers (investors)
■ Most significant geographic market:	Finland
■ Main e-business applications studied:	The impact of e-banking on branch renewal

5.3.1 Background and objectives

Tapiola bank is part of mutual company¹⁴⁷ Tapiola Group, which is a customer-owned institution consisting of several different operating companies that provide insurance, pension, investment management and banking services. With about 1.2 million customers, the Tapiola Group is one of Finland's largest insurance and financial service providers. The Tapiola Bank division was established in 2004 to provide consumer banking services via the Internet and through 50 insurance branch offices nationwide. In its first year of operation, Tapiola Bank got nearly 25,000 new customers, and is presently getting more than 30,000 additional customers each year.

¹⁴⁷ A company whose profits are distributed in proportion to the amount of business each participant does with the company

The establishment of Tapiola Bank is directly related to the increasing use of ICT among customers. The idea of establishing an internet-based bank was initially discarded by parent company Tapiola Group in the early 1990s as the entry barriers to the e-banking market were considered too high. However, in 2000, new calculations and market studies performed by Tapiola Group showed that a new market for e-banking was growing, and that the advantages of this technology had yet to be fully reaped. This prompted the Tapiola Group to initiate the development of Tapiola Bank, basing it on a universal banking concept of first and foremost delivering internet-based financial services.

Tapiola Bank has since its opening in 2004 been expanding its client base at an average annual rate of 60%. This is explained by Tapiola Bank as a result of their focus on customer needs in the design of online banking services. Tapiola Bank, like many other banks, is aware of the need to provide financial products which are reasonably priced, but also befitting the needs of the individual customer. Tapiola is able to do this because their banking operations are almost completely internet-based, and because they are experienced in providing fast and flexible services to its customers over the internet. The bank distinguishes itself from national competitors by not having a brick-and-mortar branch network, which has been an advantage to the bank as this enables them to offer cost effective services due to lower fixed expenditure.

The driving forces behind establishing Tapiola Bank were first of all to enable the Tapiola Group to offer an alternative to existing retail banks in Finland to their customers, who are also their owners as they are a mutual company. Consequently, customer needs were to a large extent the justification for the Tapiola Group to establish their own bank. Secondly, Tapiola Group were working on a new business development strategy, as add-on services for customers were intended to improve Tapiola's competitive edge towards other insurance carriers. So far it seems that Tapiola Bank has been successful in this effort, as the Tapiola brand, according to user satisfaction ratings, is very strong in the perception of the clients.

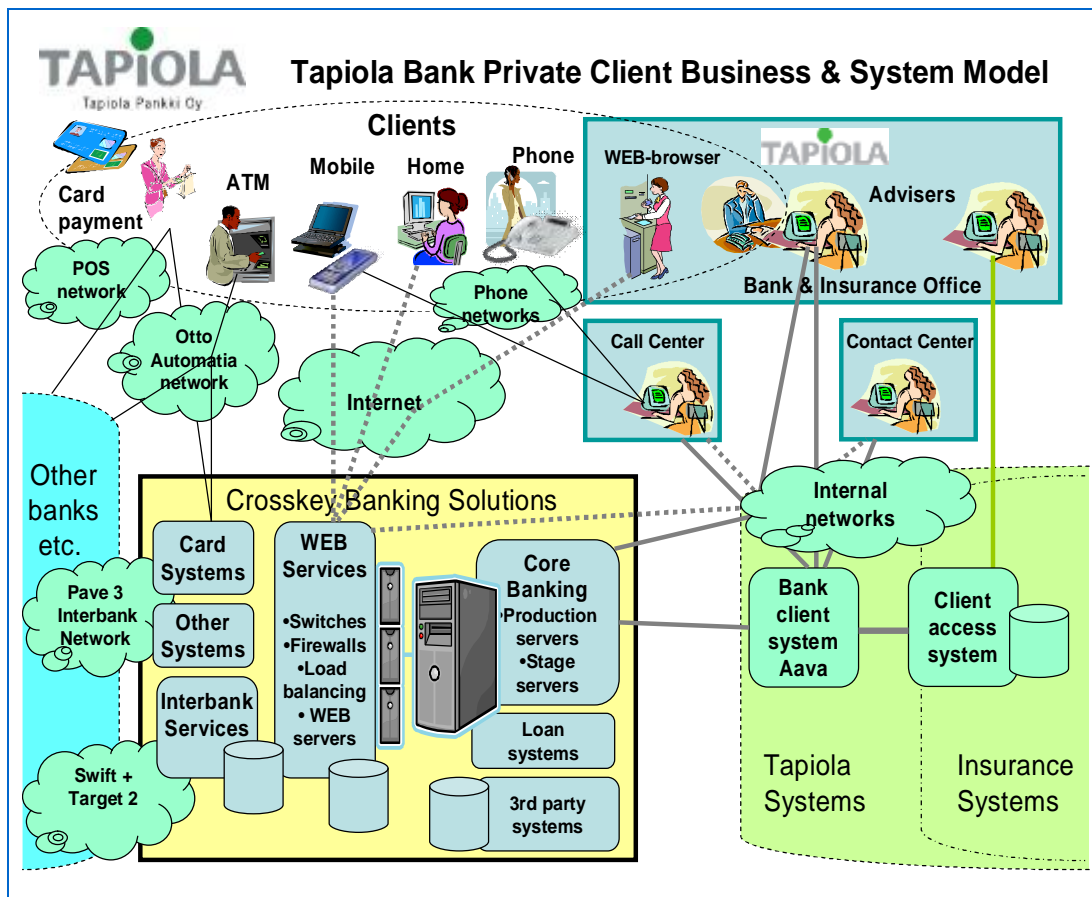
5.3.2 e-Business activity

In 2002 the Tapiola Group decided to develop a bank which was mainly to operate online and to a large extent be based on self-service. The creators of Tapiola Bank uncovered a need among existing customers for services which had yet to be met by the Tapiola Group and existing banks in the Finnish banking market. This was supplemented by a survey among Tapiola customers in order to clarify the needs and requirements which they associated with banking. These customer requirements were carefully examined and compiled into a list, with implications for Tapiola Bank's competitive strategy and corporate goals. The results of this survey were influential in formulating the overall principles of Tapiola Bank's e-banking strategy. These were above all to offer customers reliable, efficient and secure e-services, good interest rates and the possibility of personal service by means of multiple channels in connection with loans and investments.

The project was completed 14 months after being initiated, and according to schedule. The project plan, which had been developed prior to start-up, was instrumental in keeping the project on track. During the development and implementation phase of the project, it was seen as crucial that no unnecessary changes were made to the plan, especially if such changes meant that the project would become delayed. This is seen by Tapiola as the recipe for the success of their ICT project, as it not only meant that the project was completed within schedule, but also that costs did not escalate. The costs of the project

have been estimated at 19 million euros, which among other things included spending on human resources, as 130 Tapiola employees and specialists were involved in the development process.

Tapiola Bank is above all a bank which operates online via Tapiola Bank's e-banking software and Tapiola Group's customer handling system AAVA. However, many services have been integrated into the existing insurance carrier branch network of the Tapiola Group, so that customers can still receive personal advice and consultancy if needed. Integrating Tapiola Bank services with the insurance carrier enables the bank to offer competitive price/quality services to their customers, while still offering them the possibility of professional personal banking assistance (by appointment) at the Tapiola insurance branches. This is a dual combination approach to banking, not unfamiliar to the banking industry as many brick-and-mortar banks also offer online banking. Tapiola does, however, emphasise the online concept in their approach, and use branch based advisory services as a supplementary service – as opposed to brick-and-mortar banks, where internet banking is regarded as the supplementary service.



As for the technology used in Tapiola Bank, it was decided to purchase their e-banking platform externally instead of initiating in-house development. They chose a system developed by a subsidiary of Ålandsbanken, with whom Tapiola Bank also cooperates in developing international credit cards and preparing for the SEPA. Crosskey, a subsidiary of Ålandsbanken, was chosen because they offered an e-banking system that emphasised self-service banking, and allowed greater personalisation of banking services than other offers. The choice of system was to a large extent based on Tapiola's customer survey which had uncovered which design and service functionalities were desired by Tapiola Group customers. Ålandsbanken delivered the e-banking platform, but

Tapiola Bank chose to maintain the “client access system” (AAVA), which was used in the Tapiola Group.

The AAVA is a Tapiola Group portal, which allows new customers to access the entire portfolio of both insurance and banking services, once they sign up and receive their password. New customers and loan requests are handled through the AAVA, a process which can either be performed from home or at one of the insurance branch offices. AAVA is furthermore perceived by customers to be easy to use and hence allows new customers to quickly sign up and fill in electronic forms online. This construction should be seen in the light of the corporate strategy of supplying the best but still cost-effective services to their customers/owners.

Another core business area relates to lending. In Tapiola Bank, the process of applying for a loan has been decentralised, meaning that the customers may apply for loans either online or at one of the branch offices. Because personal contact is seen as important to the customer when it comes to loans, it was imperative for Tapiola to ensure that e-business applications were supplemented by on-location account officers. Potential borrowers can therefore choose to either get personal assistance at a Tapiola Group branch office or apply for financial products online or by telephone. Customers who are looking to secure a loan online will at this point fill in an electronic loan application, which is subsequently sent to a centralised credit department. Applicants are examined for their ability to meet the repayment plan and final decisions on loans and other financial services are made. When the application has been processed, an answer is sent directly to the customer or insurance branch account officer. The entire process may be completed in 15 minutes, or at latest be finalised within 24-hours.

5.3.3 Impact

The e-Business side of Tapiola Bank’s business processes plays an important role in the banks’ strategic considerations. Equally important is, however, the role of parent company Tapiola Group, as the success behind Tapiola Bank to a large extent may be attributed to the synergies created by combining online banking with on-location advisory services. The synergy effects were created by successfully using the Tapiola insurance branch infrastructure for providing multiple channels (face-to-face meetings – which otherwise do not exist in purely internet-based banks), and building an ICT-driven bank on this foundation. This kind of dual-combination banking concept encompasses the possibility to successfully combine the benefits of branch banking with the cost-structure of a purely ICT-driven bank. The fact that Tapiola was meant to function as an add-on service to Tapiola insurance customers furthermore guaranteed that a client base was present prior to launching the bank. Using the possibility of cross-selling insurance and banking products, and providing benefits to customers who utilise services from the entire group, furthermore meant that insurance customers could be induced to opening Tapiola Bank accounts. New Tapiola Bank customers can in a similar fashion be induced to becoming insurance customers in Tapiola Group. This relates to the Tapiola benefit system, which implies that the amount of additional benefits earned is dependent on the amount of products/services you subscribe to in the Group. In practical terms this means that Tapiola Group offers free accounts, cards and e-banking to its insurance policy holders who have two or more insurances in Tapiola. Hence, it is possible to maximise market effects by inducing insurance customers to add the bank service to their portfolio, and vice versa.

Furthermore, since the bank is mainly internet based, they have several advantages vis-à-vis their competitors who in addition to e-banking work with a brick and mortar branch network. Such networks are of course beneficial in terms of delivering personal contact to customers, but are also a financial liability. Hence, due to their low fixed costs Tapiola Bank is able to differentiate themselves from competitors by delivering a high quality product at a relatively low cost to their customers. Moreover, Tapiola Bank has chosen to make the hidden costs associated with everyday banking transactions and loans fully visible to the customers. This, combined with their high interest rates has improved the brand of the entire Tapiola Group, and made the bank a more attractive choice for bank and insurance customers. The popularity of Tapiola among existing customers is thus great, and an internal customer opinion poll showed that 90% would recommend Tapiola Bank to others. The poll showed that the customers especially appreciated the Tapiola e-banking concept as it suited their modern lifestyle. This would of course not have been possible, if it had not been for the ICT which drives the Tapiola Bank concept.

e-Business is the strategic foundation of the bank, and Tapiola is thus an example of a bank which has recognised the many advantages of digitalising banking business processes. Digitalisation is illustrated in the manner in which all critical services are ICT-driven (e.g. payments, loan applications and customer sign-up). Digitalisation has transferred all information-intensive production and distribution to information networks, which has meant that customers receive their products and services more quickly, at less expense and with a greater degree of environmental friendliness than through the traditional distribution methods. Service automation based on digitalisation has in this manner split information-intensive work into self-service performed by the customers, fully automatic tasks handled by servers and terminal devices, the maintenance of systems, and background work associated with support. Compared to other banks, Tapiola has been a first-mover in utilising the digitalisation for optimising processes and achieving greater efficiency by means of ICT. An example of this might be how the digitalisation of correspondence between customers and the bank has increased efficiency in terms of both time and costs. The monthly account statements are distributed to the customers in electronic form to a 'customer web-library', where they are stored for 18 months instead of being mailed in paper format. This saves both money and paper waste of about 1.2 million letters annually. Simultaneously, about 70% of all agreements between customers and the bank are in electronic form and stored in customer web-libraries. The fact that Tapiola Bank has grown at such a rate without extensive use of branch service, but digitalising most services, while retaining the possibility of personal advice, serves to further illustrate what e-banking might offer many banks in terms of becoming more competitive by applying ICT to business processes.

5.3.4 Lessons learned

The case study on Tapiola Bank serves to exemplify how it is possible to effectively exploit synergies between complementary sectors such as insurance and banking. Being an insurance carrier first and foremost, Tapiola Group initially established the bank as a means to offer add-on services for their existing customers. It has, however, since shown itself to appeal to customers in general and has become popular among both current and new customers. What makes Tapiola interesting to this analysis is how they have successfully combined the internet-only bank concept with branch-based advisory services, hereby maintaining the cost-structure which enables them to deliver low-cost services and comparatively higher interest rates than their competitors. The dual-

combination concept has in this manner provided Tapiola Bank in particular, and the Tapiola Group in general, with a competitive advantage towards other financial and insurance carriers. The possibility of cross-selling and ICT-driven efficiencies offer customers attractive terms on pricing and allows the bank to combine financial products. From a SeBW-thematic perspective on branch renewal, this is an interesting business model. In Tapiola the ICT-driven low cost structure and branch based advisory services represent a novel phenomenon, where online banks offer on-demand personal advice. The on-location services are not as wide-ranging as the ones of normal retail banks, but none the less provide customers with the possibility of person-to-person advice. Limiting the advisory services to appointment only allows the bank to maintain the cost-structure of an online only bank, while still making the bank attractive to customers who prefer such services, in particular when high-margin banking products are to be acquired.

ICT enabled the Tapiola dual-combination model. However, to attribute the success of Tapiola Bank exclusively to new ICT (the online banking system) would be wrong, as the other factors present when establishing the bank were conducive to the accomplishments of Tapiola Bank. The legacy ICT systems (AVAA) and tacit knowledge of Tapiola Group employees, as well as the network of insurance branches and the existing portfolio of customers, were factors which benefited the bank greatly in the start-up, as it provided premises for further growth.

Hence, ICT can be of great benefit to banks wishing to renew branches or achieve greater efficiency in business operations. Tapiola is an illustration of both these tendencies, as it exemplifies how it is possible to effectively implement ICT-driven banking.

A lesson learned by the bank itself has been the long-term planning required for introducing an ICT-based bank to the group. Crucial to the progress of the Tapiola Bank project has been the manner in which every step in the process towards market launch was planned in advance. Prior experience was in this context important, as the Managing Director's familiarity with building up new banking operations in Finland and the project leader's familiarity with related projects meant that several obstacles were avoided and the correct measures taken in risk management and strategic planning. Hence, an experienced project leader supplemented by skilled management and able human resources were important for the project.

5.3.5 References

Research for this case study was conducted by Anders Gantzhorn, Rambøll Management, on behalf of e-Business Watch. Sources and references used:

- Interview with Harri Lauslahti, MD, Tapiola Bank Ltd., September 3rd 2007.
- Website: <http://www.tapiola.fi/wwweng/Briefly>.

5.4 National Irish Bank – The impact of ICT on post-merger branch renewal

Abstract



The merger of the National Irish Bank (NIB) with the Danish financial institution Danske Bank A/S in 2005 meant the start of a radical renewal of the Irish bank. NIB has since then experienced wide-ranging changes to its brand and ICT infrastructure, giving a competitive advantage over less technologically advanced competitors. This has allowed NIB to expand its market share and increase its revenue. The primary success of NIB after the branch renewal process can be attributed to the implementation of a state-of-the-art ICT-platform which, like the organisational design and portfolio of financial products, has been provided by the new parent company Danske Bank.

After the merger, NIB had to implement the IT infrastructure used in Danske Bank. Achieving full alignment with Danske Bank A/S standards took about 18 months, although the most radical changes were done in the very early stages of the branch renewal project. During the Easter holidays of 2006, the old NIB ICT systems went offline. When the staff returned four days later, the old systems had been replaced by new IT infrastructure and work flow processes. 4,000 employees were deployed to ensure a smooth transition of the 1.1 million customer accounts to the new platform, as well as establishing broadband connections at 180 locations, and replacing 3,000 PC work-stations. Furthermore, 55,000 tests were performed as a part of this organisational transformation, in order to avoid costly errors after the ICT-platform had been fully implemented.

Renewing NIB virtually overnight was a major task which had been planned to the smallest detail. The challenges and costs of training employees in how to use the new technology were considerable, with 450 Irish employees going through basic training in Danish branches. Moreover, Danske Bank used e-learning and temporarily brought in 300 skilled Danske Bank employees to provide on-location guidance on how to use the new IT-platform and the new portfolio of financial products. Within the first two weeks of the ICT transition, Danske Bank sent staff to each NIB branch to provide ICT support. It eased the transition considerably that each branch had an ICT-capable resource readily available.

Case study fact sheet

■ Full name of the company:	National Irish Bank (NIB)
■ Location (HQ / main branches):	Dublin, Ireland
■ Main business activity:	Retail banking
■ Year of foundation:	1986
■ Number of employees:	670
■ Turnover in last financial year:	1.118m DKK (App. 150m euro)
■ Primary customers:	Private and corporate customers
■ Most significant geographic market:	The Republic of Ireland
■ Main e-business applications studied:	Impact of ICT on post-merger branch renewal

5.4.1 Background and objectives

National Irish Bank (NIB) was together with Northern Bank (NB) (in N. Ireland) acquired by the Danish Danske Bank A/S on 1st March 2005 for a price of £967m. NIB completed its integration into Danske Bank A/S when it was re-launched as a subsidiary on 18th April 2006. Since the merger with Danske Bank, NIB has again become a competitive player in the Irish banking market, due to its ability to deliver a mix of modern technology with ordinary retail banking. The implementation of a new ICT infrastructure has enabled NIB to deliver its banking services to its customers in a more efficient manner. The efficiency gains experienced by customers are mainly related to the possibility of remote banking and digitalisation of banking records. In addition to serving regular private and business customers, the bank provides services such as investments and portfolio management. NIB has 64 branches and 13 business centres located throughout Ireland, with plans to add additional branches from 2007 onwards. NIB operates within 4 regions in Ireland (Dublin, Midlands, North West and South), each headed by a Regional General Manager who is responsible for strategic and operational management of all aspects of the Bank's retail and business units.

The parent company Danske Bank is the largest bank in Denmark. It is also a leading player in the Scandinavian financial markets, where the bank serves 3.5 million retail customers and a significant part of the corporate, public and institutional sectors. It also has a number of international corporate clients, particularly in the northern European markets. Some 850,000 customers use the Bank's online services. Since the merger, NIB has been renewed in a number of ways - one of these being the implementation of the state-of-the-art ICT infrastructure of Danske Bank, which replaced prior existing NIB systems. NIB has gone from being a traditional branch-oriented bank to being a modern bank with an up-to-date e-banking solution. NIB currently has a 4% share of the Irish banking market, a percentage which has been growing since the merger in 2005.

5.4.2 e-Business activity

Subsequent to the merger in 2005, NIB was faced with the task of renewing itself in order to meet the standards of new owner Danske Bank. The most pressing challenge involved the implementation of the IT infrastructure used in Danske Bank. The reason for implementing the Danske Bank IT infrastructure relates to the company philosophy of "one group, one platform", which implies that all brands and subsidiaries work on the same IT platform, harmonising systems and products across different national markets. This means that the best practice ICT solutions and banking products are transferable across markets. The idea of "one group, one platform" is a central component of the business model used by Danske Bank, as IT services are the very foundation of all financial processes in Danske Bank. The "one platform" concept is furthermore meant to enable synergy effects between Danske Bank and its subsidiaries, because of the scale advantages achieved through common ICT development and shared standards and work-processes.

Mergers are often a complicated affair, and the merger of Danske Bank and NIB contains several good practices on how to cope with such complexity. Because the Danske Bank Group had extensive prior experience with mergers and acquisitions in the banking industry, they were able to avoid several of the typical pitfalls. An extensive pre-analysis of NIB clearly uncovered which issues needed to be considered, which among other things involved setting up preliminary test-runs of the migration of the Danske Bank IT-

platform into NIB. Avoiding problems in the implementation phase were seen as crucial, and this kind of risk management was a necessary investment, as any breakdown in IT-systems would be catastrophic for NIB at that stage of the renewal period. Another measure taken early on in the implementation period related to the alignment of the organisational processes and structures as early on as possible in the renewal period. This was done so as to make these more transparent to outsiders and seen as essential to the renewal of the bank. NIB was modelled along the same structures and processes applied in other subsidiaries of Danske Bank, ensuring that the collaborative systems were in place.

The specific e-Business activity examined in this case study is the post-merger project of renewing NIB, which involved a “big bang” process of radically altering NIB practices and harmonising these with the rest of Danske Bank. This involved changes in standard operating procedures and the kinds of services offered, as well as radical brand renewal initiatives such as the replacement of NIB artefacts. The process of changing NIB was particularly challenging in the area of ICT, where NIB’s outdated systems were discarded and replaced by the Danske Bank ICT-platform (both hardware and software). This enabled NIB to remove inefficiencies in the system, such the manual handling of payments and other banking tasks characterised by a high level of routine and repetitiousness, and streamline organisational processes. The digitalisation of customer accounts and merging these into one centralised network was especially important, as it meant that all branches in the NIB network were currently able to access account statements from other branches and thereby serve the individual customer throughout the entire branch network. The ability to provide banking services at multiple locations, with instant access to customer accounts and records, was in this respect an improvement in terms of flexibility and efficiency for customers and personnel alike.

Implementing Danske Banks’ ICT system in NIB was not an easy process, as it was costly both in terms of financial and human resources. The costs of implementing the new ICT platform is estimated at app. 1.2bn Danish Kroner (about 160 million euros). Danske Bank’s previous experience from similar projects had been compiled into a manual, which helped to specify measures needed to be taken in the renewal of NIB, and were for this reason crucial in the planning phase. The entire process towards becoming fully aligned with Danske Bank A/S standards lasted about 18 months, although the most radical changes were done in the very early stages of the branch renewal project. During the Easter holidays of 2006, the old NIB ICT systems went offline. When the staff returned four days later, the new brand had been implemented, and the old systems had been replaced by new IT infrastructure, work flow processes etc. 4000 employees were in this connection deployed to ensure a smooth transition of the 1.1 million customer accounts to the new platform, as well as establishing broad-band connections at 180 locations, and replacement of 3000 PC work-stations. Furthermore, 55.000 tests were performed as a part of this organisational transformation, in order to avoid costly errors after the ICT-platform had been fully implemented.

Renewing NIB virtually overnight was a considerable task which had been planned to the smallest detail as there was no room for mistakes. Although the overnight ICT shift was successful, the challenges - and costs - of training employees in how to use the new technology were considerable, with 450 Irish employees going through basic training in Danish branches. In the same manner, Danske Bank A/S tried to soften the transition by using e-learning, and by having 300 skilled Danske Bank employees temporarily brought in from Denmark and Sweden to provide on-location guidance on how to use the new IT-platform and the new portfolio of financial products in the days subsequent to the

implementation of the new IT-platform in NIB. Within the first 2 weeks of the ICT transition Danske Bank sent staff to each NIB branch to provide ICT support. It eased the transition considerably that each branch had an ICT-capable resource readily available. A steep learning curve did however mean that the first three months were hard work for NIB employees, as acquiring the necessary IT skills and getting familiar with the new organisational practices were time-consuming.

5.4.3 Impact

The renewal of NIB impacted on all operations in the bank. The organisational structure, the brand and the administrative functions (economy, product development, communications, HR) were all harmonised to meet Danske Bank A/S standards. The biggest impacts in NIB are however related to the introduction of the new ICT infrastructure. The new ICT system has primarily impacted the innovative capabilities and the efficiency in the following ways: The new platform means that NIB staff can now access a customer's full financial details in one view and can therefore handle most queries upon request. Branch based employees are in this manner empowered to make decisions locally, because of the standard ICT-enabled decision tools provided in the ICT system. NIB's online banking facility is now considered very advanced in terms of functionality and usability, with some of its features being unique in the Irish banking sector. It places control of customers' finances in their own hands with 24-hour access, exemplified by the new virtual product portfolio, which has enabled NIB to bring new, innovative and competitively priced products to market.

The task of implementing the new ICT platform was difficult, but popular among the Irish employees, as the reductions in administrative burdens were welcomed. Prior to the merger, the technological infrastructure of NIB was not nearly as advanced as the one of Danske Bank A/S, which meant that the introduction of superior technology increased process efficiency and reduced operating costs. Tasks which were formerly purely done through manual handling, consisting of repetitive routine tasks, were phased out as ICT enabled digitalisation of many such tasks. This made transaction processes faster, as payments increasingly became self-service. The increased uptake of e-banking among customers were in this respect a source of savings to the banks, as online transactions generally are more cost-effective than branch-based ones.

Another motivating factor in the acquisition of NIB by Danske Bank A/S concerns the expected synergy effects. The merger was in this respect meant to result in added value for Danske Bank, whose investments in ICT, re-branding and training of NIB employees were intended to enable future savings for NIB. The savings should initially come from exploiting the ICT scale advantages of Danske Bank, and the extra capacity created from cross-border cooperation between the banks. The initial synergy effects have been estimated at 350m Danish Kroner (app. 47m euros), and the purchase of NIB has so far been regarded as a good investment for Danske Bank. The acquisition of NIB is however a long-term investment for Danske Bank, meaning that many synergy effects have yet to manifest. This is, however, something which Danske Bank expects will happen within a limited number of years.

These expectations are based on the fact that NIB has been able to strengthen its position on the Irish banking market, with underlying profits for the year 2007 more than doubling to €79m, and total income increasing by 30%, ensuring a before tax profit of €28m compared to €4m in 2006.

5.4.4 Lessons learned

Several lessons may be learned in terms of applying ICT to banking in a context of organisational change. The study on NIB exemplifies how a traditional brick-and-mortar branch bank may achieve significant efficiency gains by introducing advanced ICT. The introduction of a functioning ICT-platform to NIB, which replaced out-dated legacy systems, were able to improve bank performance in several areas such as economic and competitive performance. The bank has also achieved improved organisational efficiency, as the introduction of ICT has enabled former time-consuming tasks to be digitalised, hereby allowing personnel to be reassigned to higher margin non-routine positions. The human resource impacts from the implementation are interesting, as the introduction of ICT was welcomed by employees. ICT is often looked upon with mistrust by employees as they fear becoming redundant. This was, however, not the case in NIB where the advantages of ICT were communicated clearly to the employees in order to ensure their cooperation.

Furthermore, ICT has greatly improved the competitive strength of NIB as the new ICT offers more cost-efficient and time-efficient opportunities to the bank and customers alike. Introducing advanced ICT not only impacted on banking processes, but also on user behaviour, as e-banking has increasingly been taken up by NIB customers. Offering an advanced online banking product to customers is in this manner beneficial to the bank in two ways. For one it provides a competitive advantage in the struggle to retain and attract new customers, but also serves as a means to reduce expenditures by allowing self-service banking at a low transaction cost. Furthermore, the transfer of a working ICT platform to the NIB has meant that costs associated with developing or acquiring ICT were avoided. NIB has in this sense outsourced ICT operations to Danske Bank A/S, as the only ICT cost born by NIB relates to maintenance expenses.

This relates well to the aforementioned trend of ICT development and IT operations increasingly being consolidated in larger and specialised enterprises. Furthermore, it is illustrative of the tendency in other case studies where in-house development of ICT is “outsourced” to partners or service-providers that have a comparative advantage in this area. Moreover, the hypothesis of ICT diffusion being positively correlated to mergers and acquisitions is illustrated in the NIB case study. The formerly low-tech NIB has in this respect experienced a drastic rise in the sophistication of their ICT operations since being acquired by Danske Bank A/S.

5.4.5 References

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5.5 Nova Ljubljanska Banka – Implementing Online Banking in a CEE-context

Abstract



Nova Ljubljanska Banka is the largest Slovenian bank offering a wide array of financial services to individual and corporate clients, as well as financial institutions. The development of an online banking system “Proklik NLB” for corporate clients was a milestone in the development of on-line banking in Slovenia. It is now used by over 80,000 corporate clients in 50 banks in 7 Central and South-Eastern European markets. Two drivers contributed to the success of the project: the abolishment of the Agency for payment traffic that held a monopoly over payment traffic of legal entities in Slovenia, which resulted in the transfer of their accounts to the banks and the successful marketing of the ICT solution developed for Nova Ljubljanska Banka to other Slovenian and foreign banks.

Case study fact sheet

■ Full name of the company:	Nova Ljubljanska Banka
■ Location (HQ / main branches):	Ljubljana (Slovenia)
■ Main business activity:	Retail and wholesale banking
■ Year of foundation:	1994
■ Number of employees:	3550
■ Turnover in last financial year:	373 million euros
■ Primary customers:	Individual and corporate clients
■ Most significant geographic market:	Slovenia
■ Main e-business applications studied:	NLB Proklik

5.5.1 Background and objectives

Nova Ljubljanska Banka (NLB) is the largest Slovenian bank, established in 1994. At the end of 2006, it held a 30% market share of the Slovenian banking sector, and remains a part of the conglomerate parent company NLB Group, which consists of 16 banks, 11 leasing companies, 12 companies for international trade financing, 5 insurance companies, a company in asset management and 16 other companies. NLB Group is present in 17 countries, but the main geographic market of NLB remains in Slovenia while the markets of Central and Eastern Europe (CEE) are considered to be strategically important because of their growth potential. Its main rivals on the Slovenian market are Nova Kreditna Banka Maribor (10.9% market share), Abanka Vipava (8.5% market share), SKB Banka (6.2% market share) and Unicredit Banka Slovenija (6.5% market share).

The introduction of on-line banking for corporate clients in NLB and generally in Slovenia has been closely connected with the abolishment of the Agency for payment traffic in 2002 (a heritage from the former socialist system in Slovenia). When abolished in 2002, banks needed to implement their own payment systems to meet customer demands.

Other driving forces include how foreign banks in the 1990's entered the Slovenian market, which increased competition between banks. New sources for differentiation and

process efficiency were needed to achieve competitive advantage, and ICT were in this connection introduced to NLB banking operations. Additional factors working in favour of on-line banking were the commercialisation of Internet in the 1990's and the growing strategic role of ICT in commerce. The strategic importance of ICT is growing, because of its potential to reduce the costs of banking services, bring them closer to users and consequently attract new clients.

A project named "e-Bank", launched by NLB together with the software company Halcom, therefore aimed to achieve the following main objectives:

- automation of all banking processes
- ensuring the safety of data (online security)
- guaranteeing full technical support to users

The aim of the project was to make all routine banking services available to corporate clients 24 hours per day, 7 days a week via the Internet or direct dial-up modem connection to the bank's server.

5.5.2 e-Business activity

The result of the e-Bank project was an on-line banking application named Proklik NLB. Proklik NLB enables corporate clients to conduct simple and secure domestic and international payment transactions, along with management of the cash in their associated domestic and foreign companies. Data may also be exchanged directly with accounting software. The development of Proklik NLB started in 1996, and was followed by the development of an on-line banking application for individual clients in 1998. In 2006, 16.5 million transactions were made with Proklik NLB, which represented approximately 80% of all payment transactions for NLB's corporate clients. In 2007, around 60% of all business accounts used on-line banking services provided by Proklik NLB.

Timing of the activities

The development of Proklik NLB was as follows:

1. **Milestone M1 (1996):** Halcom becomes a strategic partner of NLB. Together they prepare the first draft of the project which becomes the basis for the software solution developed by Halcom. The rights to this solution have since been protected by NLB under the trademark "Proklik NLB" and by Halcom under the trademark "Hal E-Bank".
2. **Milestone M2 (1997):** NLB offers the first trial version of Proklik NLB to 10 private entrepreneurs. At this stage, clients can only perform domestic payment transactions via dial-up modem connection to the telephone network and conduct on-line banking services. By the end of 1997, 100 private entrepreneurs are using the trial version of Proklik NLB. Their comments are fed back into the development process.
3. **Milestone M3 (1999):** NLB starts to provide Proklik NLB services commercially.
4. **Milestone M4 (2001):** International payment transactions are added to services provided by Proklik NLB.

At the same time NLB also launched another application for on-line banking with corporate clients - Proklik plus NLB. It was developed by Zaslon and enabled

corporate clients to access the bank's server via Internet. This was especially attractive for companies that had accounts in different banks and widely dispersed computer networks. This application was however abandoned in 2006, since Proklik NLB was also upgraded to enable Internet access. At the end of 2002, Proklik NLB had 21.000 users.

5. **Milestone M5 (2003):** Cash management is added to Proklik NLB. This enabled the following new services to corporate clients:
 - Viewing transactions and balances on domestic and international accounts;
 - Review of statements from domestic and international accounts for the previous day and historically;
 - Preparation and sending of orders from accounts opened with foreign banks.

6. **Milestone M6 (2008):** Proklik NLB is adapted to the SEPA. The adaptations of Proklik NLB included the development of a new payment order containing all the data required by SEPA.

NLB has further developments of NLB Proklik planned for 2008, such as enabling users to exchange e-invoices over NLB's secure communication channel. Recipients of e-invoices will therefore be able to prepare payment orders with just one click, while issuers of e-invoices will be able to automate reconciliation between payments and invoices due to accurate data.

Technology used

Users of Proklik NLB access NLB's server for on-line banking through their own entry point. The security of transactions is ensured by means of encryption and electronic signature; every message exchanged between the bank and the user is encrypted and electronically signed with a public key and a secret cryptographic key. The bank's networks are also protected by a firewall. User identification and electronic signature are based on smart card technology, which currently provides the highest level of protection in the area of commercial transactions. It is possible for clients who have opened accounts in several banks to use the Proklik NLB system without having to purchase a smart card for each bank – the single smart card works with all accounts in all banks that use the Proklik NLB system without additional costs.

Important requirements and conditions

One of the most important requirements for the success of Proklik NLB were the changes in legislation which enabled the transfer of payment traffic of corporate clients from the Agency of Payment Traffic to banks. In 2002, a new law regulating payment traffic was adopted, which was important both for banks and companies. It stated that the banks were to take over payment traffic of legal entities after 30th June 2002. This should ensure competition on tariffs which was completely absent in the time of the Agency of Payment Traffic. Consequently the companies had to close their accounts with the Agency of Payment Traffic and open new transaction accounts in banks. The Law also defined legal obligations and rights of banks and companies with regard to payment traffic.

After developing Proklik for Nova Ljubljanska Banka, Halcom has sold the solution to other Slovenian and foreign banks. As a consequence it is now being used by more than 50 banks in 7 Central and South-Eastern Europe markets (among them the majority of

Slovenian banks). This has considerably simplified e-banking for corporate clients that own many different accounts in different banks. Previously they had to have different hardware and software for every bank with which they were conducting e-banking.

5.5.3 Impact

The development of Proklik NLB positively influenced branch renewal in the following ways. First of all, banking services and processing of data have been automated. The data are entered only once by the clients themselves and are then automatically processed by the core banking system¹⁴⁸ of NLB. Secondly, the share of corporate clients that use Proklik NLB instead of traditional services is constantly rising because of lower tariffs for on-line banking services. Thirdly, on-line banking services are available 24 hours per day, 7 days a week, which has greatly increased the efficiency of corporate clients' business transactions. This has also had an effect on the banks' ability to attract new customers, as online banking now enables the bank to attract new corporate clients in areas where it is not physically represented. Fourthly, a great number of bank tellers have become redundant, since on-line banking reduced the pressure on counters. As a result they can devote more time to individual corporate clients, leading to a better understanding of the client's needs and better services. This further implies that instead of providing routine services, NLB branch offices are offering more sophisticated services, such as advisory services, which draw in higher revenues.

5.5.4 Lessons learned

NLB was a first mover in Slovenia in terms of introducing e-banking to its customers and was thus able to reap clear benefits from it. This case study clearly demonstrates that in some markets, ICT in the BI is not very developed, which means that introducing a relatively simple feature such as e-banking can give a bank a competitive advantage. This is interesting as it demonstrates that there are great differences within the EU as to how advanced the ICT in the BI is, a finding that was also presented in the econometric analysis in Chapter 4 of this report.

Slovenian banks are facing ever stronger competition from foreign banks and other financial companies (such as open-end investment funds), especially after the entry of Slovenia in the EU. According to NLB, on-line banking offers a solution to survive on the market, because it both attracts new clients while retaining existing clients. It is also a more efficient way of providing banking services. Most traditional financial intermediation services can be replaced by cheaper on-line services. As a consequence, NLB's offices are able to accommodate a large number of new corporate clients without increasing their staff. The number of NLB employees actually decreased from 3.953 in 2002 to 3.543 in 2006, while the number of users of NLB Proklik rose from 16,903 in 2002 to 33,242 in 2006, and the number of transactions rose from 9.7 million in 2002 to 16.6 million in 2006. The share of NLB corporate clients that use Proklik NLB has also been steadily rising: in 2005 Proklik NLB was used by 49%, in 2006 by 54% and in 2007 by approximately 60% of its corporate clients. In addition, the bank was able to reorganise its existing branch offices to provide more sophisticated banking services that cannot yet

¹⁴⁸ A suite of products designed to support multiple banking functions while maintaining centralised information.

be offered on-line. Hence, ICT have in this manner enabled NLB to reduce the number of employees, while still experiencing growth in terms of customers added. This is highly interesting as it supports the analysis in Chapter 4 of this report, which foresees this as a result of process efficiency facilitated by ICT, which again leads to a decrease in the number of employees (a development not seen, however, in any of the other case studies).

The difference between higher tariffs of traditional and lower tariffs of on-line banking services can be used as a means of persuasion to convince the users of traditional banking services to adopt on-line banking. Because of lower costs of on-line banking the bank has been able to introduce much lower tariffs for this kind of services. However, customer perception of security should be taken into account here, as the previously mentioned Deutsche Bank Research study showed that this can be a significant barrier to e-banking. Lower tariffs are generally not enough to persuade customers to use e-banking. However, as the case study shows this seems to be less of an issue in Slovenia than in many other EU-countries.

On-line banking also offers an opportunity for banks to supplement their banking services with other e-based services, especially since on-line banking already provides a secure communication channel for exchanging electronic messages. NLB therefore plans to upgrade NLB Proklik to enable its users to exchange e-invoices over its secure communication channel.

Another lesson concerns how Proklik NLB has been developed and adapted in close cooperation with its pilot users, which ensured a user-friendly platform from day one.

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 - Halcom, www.halcom.si
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5.6 SkandiaBanken – the role of ICT in the development of an Internet-only bank

Abstract



As one of the first Internet-only banks in Norway, SkandiaBanken has through its first-mover advantage been able to position itself as a strong player in the Norwegian banking market. Because of its business model, which is based on an ICT-driven differentiation strategy, the bank has successfully established itself as a low-cost alternative to traditional retail banks. Due to the banks' internet-only based business model, it does not have regular personal contact with its customers, and a lot of emphasis is hence put on monitoring customer needs and requirements. For this purpose, SkandiaBanken works with several feedback-channels – ensuring that changes in customer behaviour are registered and taken into consideration. This customer-focused approach is employed because the future strategy of SkandiaBanken is to meet current customer expectations more than developing innovative banking services that may “activate” customers' dormant needs.

Case study fact sheet

■ Full name of the company:	SkandiaBanken AB NUF
■ Location (HQ / main branches):	Norway: Bergen (HQ: Stockholm, Sweden)
■ Main business activity:	e-Banking
■ Year of foundation:	2000
■ Number of employees:	151
■ Turnover in last financial year:	2006 Result: NOK 158,1 mill (€ 20 mill)
■ Primary customers:	Private customers
■ Most significant geographic market:	Norway
■ Main e-business applications studied:	The impact of ICT, e-banking and CRM.

5.6.1 Background and objectives

When founded in 2000, SkandiaBanken was the first fully internet-based bank in Norway. The bank has since then become a popular choice due to its “zero-fees” strategy, and has since its opening been able to attract more than 300,000 Norwegian customers. Moreover, SkandiaBanken has been widely recognised as a good example of how e-banking can be a means of achieving competitive advantage vis-à-vis large retail banks, by utilising an ICT-driven low-cost structure. This, combined with an advanced marketing research system for customer relationship management (CRM), has been influential in ensuring the market position of SkandiaBanken. The bank is 100% owned by Swedish parent company SkandiaBanken AB and together they serve more than 1 million customers, making the bank a prominent player in the Scandinavian BI.

SkandiaBanken works with a business concept which stipulates that simplicity, availability and competitive terms for the customers are the keys to success. More specifically, SkandiaBanken has branded itself as a bank offering “best on market” standard banking packages at the lowest fees, which has made it attractive to more economically minded

consumers. The typical customer in SkandiaBanken is aged between 18 and 40 years and familiar with the use of ICT, which of course is a necessity for the internet-based bank. As a purely internet-based bank, SkandiaBanken differentiates itself from competitors by not having a brick-and-mortar branch network. This enables the bank to pursue its low-cost profile, which includes initiatives such as removing all fees on banking transactions. All business processes in SkandiaBanken are for this reason ICT-driven, but the bank does, however, realise that ICT does not guarantee success as the possibility for human support is key to many banking customers. The success of SkandiaBanken is to a large extent dependent on its ability to communicate the advantages of online banking to the customers, and overcome the fears which normally keep customers from performing online banking transactions. This has to a large extent been done by using a multi channel CRM approach, which consists in a variety of channels for communicating (support and feedback) with customers, such as call centres, secure live chat and other kinds of “internet experience technologies”. These are aimed at facilitating increased customer support and involvement. This has been crucial for the success of the bank, with customer-support being perceived as ever present by the customers.

5.6.2 e-Business activity

Having observed how the SkandiaBanken concept had become an enormous success in Sweden, a decision was made to start up a similar bank in Norway. Internet banking was at the time not unfamiliar to the Norwegian consumers, but none of the large retail banks had taken advantage of the technology to the same extent as SkandiaBanken. The bank was, because of its first-mover advantage, able to position itself in a niche in the banking market by attracting the young consumer segment (18-40 years) by focusing on a low-cost profile. Moreover, this profile also helped the bank in differentiating itself from competing banks in the industry. Other banks have since tried to establish themselves under the same concept as SkandiaBanken but without success. These competitors have not yet managed or wished to deliver the same low-cost services as SkandiaBanken, whose no-fee concept is still unique in Norway. New banks and concepts are however constantly introduced to the market, and to stay ahead SkandiaBanken has to develop its concept continuously, and repel competitors by maintaining its competitive advantage through constant product and process innovation, by offering customers a competitive price/quality ratio, and by focusing on customer satisfaction (and thus loyalty)..

As SkandiaBanken is a bank operating purely online, ICT is integral to their day-to-day business operations. However, there is a need to compensate for e.g. the lack of a branch network through effective CRM. State-of-the-art ICT is, according to SkandiaBanken, only truly valuable when customers feel that their needs are sufficiently met, resulting in a high level of loyalty towards the bank. The CRM aspect was for this reason important in the development of SkandiaBanken’s e-banking system. A customer-based approach was used in the design of the e-banking systems, resulting in the development of a sort of “internet experience infrastructure”. This consists of a user-friendly and functional e-banking system, which enables customers to perform self-service banking operations.

SkandiaBanken also put a lot of effort into ensuring that the perceived distance between the bank and customers (the lack of a brick-and-mortar branch network) was alleviated by the use of a variety of CRM mechanisms. A multi-channel approach to CRM was

designed, including call centres and a variety of online applications such as secure live chat, as well as mechanisms for collecting feedback and user satisfaction ratings. The ever-present possibility of getting remote personal assistance on demand is in this respect an important aspect of the CRM-initiatives taken by SkandiaBanken. The user experience management of e-banking is important to the bank, as it recognizes that while the advantages of e-banking are numerous, so are the disadvantages. This is a fact which they seek to alleviate by providing excellent customer support and feedback. Hence, SkandiaBanken's focus on user-designed e-banking and usage of multiple channels of communication may be regarded as a means to compensate for the disadvantages inherent in the internet-only banking concept vis-à-vis branch-based banks. Ensuring a closer match between customer needs and the service offerings of the bank are in this sense seen as essential to the competitiveness of online banks.

In SkandiaBanken there is great deal of focus on making banking transactions as easy as possible. This is exemplified in how SkandiaBanken was a first-mover in the introduction of the 'secure chat' functionality. This feature allows customers to discuss banking affairs online with bank officers. SkandiaBanken is currently considering introducing additional 'customer involvement' technology, aimed at improving user experience and customer satisfaction. SkandiaBanken does not regard the of lack face-to-face interaction with the individual customer as an obstacle to good CRM. Face-to-face interaction is, according to SkandiaBanken, an expensive service, which they believe most customers would gladly go without, if this meant that the cost of banking services would be lowered. SkandiaBanken has done this with great success, as it has been able to deliver best-practice online service which has resulted in satisfied customers, and serves to give the bank's confidence in remote assistance and self service further credit.

5.6.3 Impact

The concrete impact of e-banking on the Norwegian banking market is hard to estimate, but the success of SkandiaBanken is evidence of the importance of ICT to a new generation of banks working on an internet-only concept. Several lessons can be drawn from the case study on SkandiaBanken, relating to the importance of ICT in the formulation of a competitive concept and customer relationship management. The case study is illustrative of how brick-and-mortar concepts are in competition with low-cost online banks such as SkandiaBanken, which is putting margins under pressure. Because SkandiaBanken operates online and without a branch network, they are able to work with a staff of about only 1/10 of a traditional brick-and-mortar branch bank. This is of course a factor which contributes to keeping operating costs down in SkandiaBanken, allowing them to offer competitive interest rates and no-cost add-on services for customers. This would not have been possible without ICT, as the concept is completely dependent on the effectiveness of their e-banking system. The impact of ICT is in this sense total, as SkandiaBanken simply would not exist if the ICT had not been available. ICT technology is for this reason fundamental to SkandiaBanken, but still they cannot allow themselves to forget that the user/customer aspect is just as important in an online context. For this reason, the bank puts great emphasis on ensuring that ICT-driven business processes are backed by effective CRM tools.

Being successful in aligning customer needs with the service offerings of the bank ensures a high level of customer loyalty, which is essential in customer retention. As the uptake of broadband diffuses, consumers are generally more inclined to use online banks

such as SkandiaBanken. Combining this with rising awareness of differences in pricing of banking products, margins become squeezed. Having lower fixed costs is a great advantage and something which gives SkandiaBanken a competitive advantage vis-à-vis competing brick-and-mortar branches. Using ICT enabled SkandiaBanken to digitalise all business processes, such as financial control, product processing and customer service and management. ICT was in this regard influential in enabling the bank to achieve high level of process efficiency by aligning business operations and reducing overhead costs. ICT was furthermore used as a means for creating a smooth and efficient work flow in operations as well as to avoid costly operational errors.

5.6.4 Lessons learned

SkandiaBanken has managed to overcome the limitations of the internet-only banking concept and turn it into a viable business concept by combining effective ICT and CRM usage. Attaining a cost-effective profile but still offering a high level of customer support through CRM is in this respect SkandiaBanken's recipe for success.

Increased focus on ICT-driven CRM applications and reinforcing customer satisfaction should be an important strategic objective for most banks. SkandiaBanken was to large extent successful because they were able to attract customers, by use of competitive and aggressive pricing. Whether the bank would have been able to maintain the success is however unclear had it not applied CRM to their online banking concept. The number of contacts between the bank and customer increases with online banking, which may deepen the relationship as it offers ample opportunity to interact with the customer. A typical branch-based customer does not interact with his/her bank as frequently, which may however so some extent be compensated if personal assistance can enable an emotional connection to the bank. Using ICT to enable remote personal assistance is one of the key facilities of SkandiaBanken's business concept.

SkandiaBanken would not have existed without ICT and the internet, which of course means that the uptake of ICT among customers is critical to the viability of the bank. One of the main drivers for banking concepts such as that of SkandiaBanken is for this reason the extent to which broadband internet is available, and the extent to which customers are familiar with ICT. Statistics indicate that a banking concept such as SkandiaBanken's would be viable in most European countries where a high uptake of broadband is present. The effect of an increased entry of banks such as SkandiaBanken to the European banking market would most likely be a downward pressure on profit margins, which ultimately would serve to benefit customers and competition in general.

5.6.5 References

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5.7 Egg/Citibank UK – Acquiring Online Capabilities

Abstract



Online Bank Egg was one of the first to provide e-banking services to UK customers. Being an online bank, Egg puts great emphasis on maintaining a modern ICT platform, as this provides the flexibility needed to meet the changing requirements of the market. When being acquired by Citibank UK in 2007, the bank found a partner which supported this objective.

Egg was established in 1996 as an online-only alternative for technologically skilled customers, and is now the world's largest internet-only bank. Egg started out successfully and rapidly acquired about 7% of the credit card market. Service-oriented Architecture (SoA) is an important component of the banks' competitive edge, as SoA - and ICT in general - in Egg enable a user-centric instead of a product-centric focus in banking. SoA is tied closely to all business processes and enables Egg to give a "single view" of its products to the customers, reducing complexity for both customers and Egg itself.

Case study fact sheet

■ Full name of the company:	Egg Banking plc (part of Citi UK Consumer)
■ Location (HQ / main branches):	London, The United Kingdom
■ Main business activity:	Online Banking
■ Year of foundation:	1996
■ Number of employees:	N/A
■ Turnover in last financial year:	N/A
■ Primary customers:	Private
■ Most significant geographic market:	The United Kingdom
■ Main e-business applications studied:	Service Oriented Architecture (SoA)

5.7.1 Background and objectives

Egg was established in 1996 as an online-only alternative for technologically skilled customers, and is now the world's largest internet-only bank. Egg started out successfully and acquired about 7% of the credit card market in a relatively short span of time. Initial success was, however, hampered badly by the dot.com crash and an increasingly fierce competitive environment. In January 2007, Egg was purchased for £575 (EUR 761) million by Citigroup who saw Egg's core capabilities in online banking, their experience in online CRM and their Service Oriented Architecture (SoA) as valuable assets.

When the bank started in 1996, dial-up connections were standard, and technology in general primitive compared to the current level. This has however changed, and the widespread adoption of affordable broadband coupled with the rise of a new internet-savvy generation has been influential in pushing banks such as Egg (and now also Citibank UK) to remain innovative.

Being a pure online-only bank, before being acquired by Citigroup, means that ICT plays a fundamental role for Egg. Having an ICT infrastructure able to handle the business processes in a cost-efficient and effective manner is instrumental in the survival of online banks such as Egg. The SoA was just such a novelty, as it provided Egg with several advantages, which made them attractive to not only customers, but eventually also for multi-national banks such as Citigroup. The advantages discussed in this case study relates to how Egg use a SoA as the foundation for all business processes and how it provides the bank with flexibility, and the ability to process high volumes of cost-efficient and customer-friendly transactions.

Citibank UK (Citi UK Consumer) is part of the leading global financial services company Citigroup, which has some 200 million customer accounts and does business in more than 100 countries, providing consumers, corporations, governments and institutions with a broad range of financial products and services. Egg and Citibank UK combined have over four million customers, a significant share of the UK credit card market, and Egg's online platform, customer service and brand. Citibank UK has a network of five retail banking and 49 consumer finance branches, and offers current accounts, wealth management, offshore banking and mortgages, which complement Egg's online payment and account aggregation services, credit cards, personal loans, savings accounts, and insurance products. The acquisition of Egg by Citigroup was initiated to create synergies by combining the two different businesses and their respective brands, people, technology and customer service.

5.7.2 e-Business activity

The dot.com crash put many companies out of business, but Egg managed to pull through. An important explanation for this is, according to Egg, their service-oriented architecture (SoA)¹⁴⁹, which is the technological foundation of Egg and on which all their online operations are based.

SoA systems are generally introduced to banking in order to reconstruct and automate business processes to maximise efficiency. Furthermore, having a SoA can be instrumental in increasing the capability of banks to address new business requirements by reusing existing business logic, thus incurring only minimal costs. Moreover, SoA is essential to deliver the business agility and IT flexibility promised by web services such as Egg. The benefits from SoA, in terms of agility, relates to the long-term strategy for increasing the flexibility of IT architecture. Being flexible allows Egg to remain innovative and constantly develop their online platform, and ensure that it remains current, efficient and meet user needs. Great emphasis is put on ensuring that the business strategy is not hampered by an inflexible IT-system. SoA gave Egg this possibility, as the architecture of platforms and series of loosely coupled services enabled the bank to react quickly and take advantage of the changing market conditions.¹⁵⁰ In this respect, the SoA functions as the foundation for Egg's e-banking platform on which customers can obtain all service offerings. Core systems for banking products and credit cards are with SoA coupled

¹⁴⁹ A service-oriented architecture is essentially a collection of ICT driven services (A service is a function that is well-defined, self-contained, and does not depend on the context or state of other services). These services communicate with each other. The communication can involve either simple data passing or it could involve two or more services coordinating some activity. Some means of connecting services to each other is needed.

¹⁵⁰ <http://www.computing.co.uk/computing/analysis/2204420/case-study-egg>

together and put into the service layer (online e-banking platform), where the entire portfolio of service offerings for the customers are available. In this manner, SoA enables Egg to give a “single view” of products to the customers, hereby reducing complexity for not only Egg but also their customers. Furthermore, the SoA ensures that the technology used is future-proofed and suits integration of existing and future development platforms. This has proven especially important since Egg was acquired by Citibank UK, as it was not necessary to replace core systems and the acquisition became rather a question of system integration. Having a SoA in this online setup is a huge contributing factor to their low-cost profile, as it allows a high degree of automation of services.

In Egg, the SoA is tied closely to all business processes, and many company-specific capabilities. For this reason, maintaining Egg’s SoA legacy systems after becoming part of Citibank UK is regarded as important to Egg, as it represents an important component of the banks’ competitive edge. The competitive edge is in this respect related to how SoA and ICT in general in Egg enable a user-centric instead of a product-centric focus in banking. For Egg, the user aspect is crucial to their operations, and by taking advantage of their SoA system, Egg have set up a framework where continuous change is possible. By continuous design is meant how the design of the e-banking platform and composition and bundling of services may be subject to future modifications.

The competitive edge stemming from SoA is regarded as considerable because the usage of a SoA relates to many critical processes and systems, which are at the heart of the bank. The user-centric focus opposed to a product-centric focus, impacts greatly on Egg’s strategy, and consists of ensuring that all financial services and IT operations are aligned with customer needs. To ensure such a match, insight is gathered from in-house user experience and usability labs, where products and services are road-tested on real customers. This is coupled with “Technology Trend Assessments”, which seek to ensure the aforementioned alignment with today’s “digital” lifestyles.¹⁵¹ Examples of such innovation are e.g. the money manager online-application, which enables customers to retain overview of multiple online financial services from their Egg online account. Future developments involve focus on and implementation of trends such as mobile banking and person-to-person payments via social networking sites such as Facebook.

ICT and the Internet are in this respect the premises of Egg, as they combined permit the bank to offer low-cost banking to customers. The fact that Egg operates online also explains the competitiveness of Egg, as overhead costs are primarily related to the ICT infrastructure instead of a brick-and-mortar branch network. Egg is, however, continuously trying to improve operation efficiency, as it like most banks continuously needs to cut costs. The role of ICT in Egg is as mentioned above central, as ICT in Egg is an integrated part of the business model and not an add-on.

Within Citibank UK, Egg is considered as a strategic business unit, where novel and innovative ideas and concepts are developed. The new owners Citibank UK hence maintain the organic organisational culture characterised by quick and flexible thinking characteristic of a small company, which is different from the one characterising big established companies such as Citibank. The reason for Citibank UK to acquire Egg in the first place was Egg’s track record in introducing new online applications, their online market share and capability in online CRM. For Citibank UK, integrating Egg in their organisation means that these competences can be applied to the front-end of Citibank’s online operations. Citibank have in this respect not only purchased a bank but also a

¹⁵¹ <http://www.usfst.com/pastissue/article.asp?art=26926&issue=166>

great deal of know-how and human capital, with the purpose of gaining a stronger foothold on the English online banking market.

5.7.3 Impact

The ICT impacts of merging these two companies are primarily related to Egg's SoA platform. The SoA-platform, and the tacit knowledge of the key people involved in the development of this, provides Citibank with the opportunity to learn how online operations might be efficiently conducted by using what Egg characterises as "user-centric ICT". Furthermore, all operations in Egg are sought optimised in terms of their ability to create customer satisfaction. This also goes for SOA, where services are integrated with the e-banking system, with the purpose of providing a customer friendly platform, from where banking operations may easily be performed.

Considering the impact on process efficiency and branch renewal, the case on Egg and Citibank UK is relevant with respect to the two banks' ability to supplement each other. Being a pure online bank, Egg has previously not had the possibility of offering branch-based advisory services. This is on the one hand a competitive advantage, as the fixed costs of a branch network would inhibit the low-cost pricing of Egg's financial products. There is on the other hand a large customer segment which prefers the availability of personal service, which is why offering this possibility in Citibank UK branches is a welcome addition to many Egg customers. The online applications of Egg are in a similar fashion able to contribute to Citibank UK, as it allows them to learn from Egg's history of providing low-cost, time-effective, and satisfactory online banking to customers. Effective usage of online banking as done by Egg could potentially be of great value to branch-based banks as Citibank UK, as the increased uptake of e-banking among customers would allow a more cost-efficient profile for their retail operations. Moreover, acquiring online capabilities such as the ones of Egg who have a more than 10 years of experience in online banking, allows Citibank UK take a short cut in establishing an online presence on the English market.

The acquisition of Egg is also an impact, as it relates to the how the two banks chose to integrate their systems, not discarding legacy systems which could be important to the overall competitiveness of their banking offerings. The SOA is in this respect important, as the earlier mentioned flexibility of such systems allow integration of cross organisational information flows to exist, without one system replacing the other.

5.7.4 Lessons learned

One of the key lessons learned is that the continuous ICT innovation introduced to the group through the acquisition of Egg is necessary in order for Citibank UK to stay competitive. This is ensured by giving the former Egg room to be innovative in terms of ICT. Hence, in order to stay competitive, Citibank UK needed Egg's innovative profile. However, Egg also needed the Citibank UK volume to survive in the market. Egg being a part of the large, distinguished bank Citibank provided Egg's clients with a security that they otherwise may not feel being a client in a small bank. All in all, the acquisition has been a win-win situation, where Citibank UK has benefited from the innovative ICT-knowledge in Egg and Egg has in turn benefited from the scope of Citibank UK. It is in this connection interesting to note that the ICT innovation in Egg could not have continued without Egg becoming a part of Citibank UK.

The above statement is in line with the view discussed in the section on branch renewal, which states that Internet-only banks can benefit from a physical branch network. It has clearly been an advantage for Egg that they became part of the Citibank UK branch network, as they gained access to the capital needed for new ICT investments. Correspondingly, Citibank now has a very innovative unit that can contribute to giving them a competitive advantage. As a result of the acquisition, branches will in the future use the Citibank UK banking platform, but with Egg systems and expertise in front-desk operations. It is Citibank UK's strategy to get close to customers, which they will be using Egg's competences for in the future. However, the acquisition is still in its early phase and the effects of branch renewal are yet to be seen.

Another main lesson learned is that Egg became successful by using its ICT expertise to get as close as possible to the customer's needs. Customer focus is very important to Egg's success as they approach the market by focusing on the customers' needs and not the products. This is something that has to be integrated in Citibank UK as well. In order to ensure that customer needs are met while at the same time staying innovative, Egg has put great emphasis on ensuring that IT people are part of design phase. It has given Egg a competitive advantage that the ICT experience is introduced in the ideas process and great emphasis has been put on ensuring that technology is developed and used the right way. Hence, in the design process, aligning the bank's overall strategy and its ICT competences has to be an overall focus point.

The acquisition of Egg was due to the fact that Egg possessed ICT expertises that Citibank UK needed. This supports the hypothesis presented earlier that the number of mergers and acquisitions is positively correlated with the diffusion of ICT. Egg probably would not have been interesting for Citibank UK had they not had the unique combination of customer focus and innovative ICT solutions. In order to obtain the ICT knowledge in Egg Citibank UK had to acquire them. It is however important that the Egg knowledge remains in Citibank UK and that the innovative personnel in Egg stay innovative.

For Egg, the scope, scale and investment capital of Citibank represents a clear advantage, as it offers financial and competitive advantages not previously available. In an increasingly consolidated banking environment such as the European Banking Industry, small banks such as Egg are increasingly losing market shares. The connection to Citibank is thus seen as beneficial to Egg, as it serves to amplify their overall competitiveness, as well as boost the bank in terms of their attractiveness to customers. The Northern Rock affair (the English bank which was nationalised as a result of their failure to survive the credit crunch) meant that small and medium-sized banks are increasingly scrutinised by customers in terms of their financial stability and solvency. For this reason, having an large multinational bank as a parent company serves to ease customer concerns, as knowledge of the Citibank brand boosts customer trust in Egg by mere association.

5.7.5 References

Research for this case study was conducted by Benita Kidmose Rytz, Rambøll Management, on behalf of the Sectoral e-Business Watch. Sources and references:

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5.8 Eurobank EFG – ICT-facilitated Process Management

Abstract



In early 2006, Greece-based Eurobank started applying Business Process Management (BPM) to the business processes of its mortgage division, with full implementation 18 months later. The main objectives were to improve the internal business processes within the mortgage division, and to provide better service for customers.

Using one division as a testing organisation, Eurobank sought to achieve greater process efficiency by closer alignment between business processes and ICT. The test organisation would offer valuable lessons before applying BPM to the entire organisation. The project was more difficult than Eurobank initially expected, as the implementation of this ICT-concept was initially met with distrust among employees. Fully implemented, BPM has, however, allowed many routine tasks to be automated, making the new streamlined approach to banking popular among employees.

Case study fact sheet

■ Full name of the company:	Eurobank EFG
■ Location (HQ / main branches):	Athens, Greece
■ Main business activity:	Retail Banking
■ Year of foundation:	1990
■ Number of employees:	22.000
■ Turnover in last financial year:	€2,816m (total revenue)
■ Primary customers:	Private
■ Most significant geographic market:	Greece
■ Main e-business applications studied:	BPM driven Process Efficiency

5.8.1 Background and objectives

Greece-based Eurobank EFG, a member of EFG Bank European Financial Group headquartered in Geneva, was established in 1990. Eurobank EFG employs over 21,000 people and offers its products and services both through its network of 1,500 branches and points of sale and through alternative distribution channels such as the internet.

Initially only present on the Greek market, Eurobank EFG has since expanded to overseas markets, and have a presence in the wider area of South-Eastern and Central Europe. Eurobank EFG has an established presence particularly in Bulgaria, Romania, and Serbia, but has also entered the banking markets of Poland, Turkey, Ukraine and Cyprus. The expansion of Eurobank EFG is a result of a dynamic and organic growth, but the bank has also lately engaged in a series of mergers and acquisitions. Starting out as a small bank, Eurobank EFG has in the course of 10 years become one of the leading consumer banks in Greece, and a leader in retail banking, consumer lending, mutual fund management, equity brokerage, and life insurance. It is also the largest lender to small businesses in the country and among the largest lenders to large domestic corporations in the private sector. Retail branches are open 24 hours, and encompass services such

as mortgages, credit cards, and loans for small and medium enterprises, with this field covering 80% of Eurobank EFG operations. The main market remains within Greece, but the aggressive expansion strategy has the effect that an ever increasing proportion of revenue is generated in their subsidiary markets.

Eurobank EFG has most recently been working on applying ICT to business processes, in order to facilitate increased automation, hereby improving efficiency and customer satisfaction. The means for this has been by undergoing a 'Business Process Management'¹⁵² (BPM) change project, which implemented the BPM concepts, methods and techniques to the business processes of Eurobank EFG. An important detail relating to the project is how it was labelled an ICT-driven business project, which underlines the importance attached to the project from an overall strategic point of view. The existing SoA (service oriented architecture) functions in this respect as the foundation for the BPM project, as the formerly individual services of the SoA are integrated and automated by effective BPM. Although not yet applied to the entire organisation, the bank hopes to implement BPM across all divisions and branches of Eurobank EFG within the foreseeable future. Furthermore, the bank hopes that the application of BPM to business processes will enable them to achieve a competitive edge over other Greek banks that have yet to initiate similar projects.

5.8.2 e-Business activity

The Greek banking Industry is characterised by fierce competition, with incumbents seeking to differentiate and achieve competitive advantage against each other. ICT is one of the means used as leverage, recognising that the effective usage of ICT-driven business processes may be instrumental in gaining market shares and lowering costs. Hence, the two most important objectives prompting Eurobank EFG to initiate the BPM project were (i) to achieve a competitive advantage through improved efficiency and customer satisfaction, and (ii) to make the organisation more flexible, in particular with regard to the bank's ability to evolve its business processes on a continuous basis. The increasing demand from customers and the growing complexity of products were in this connection also important catalysts to implementing BPM, as it was thought to be a method for providing better customer service due to the improved quality of service created by the management of processes.

Many forces were in this manner influencing the Eurobank EFG to improve the integration and alignment of business processes. One of the best ways to do this was, according to Eurobank EFG, to close the gap between IT technology and the business aspect of their banking operations. This is why the bank decided to apply the BPM philosophy to business processes, with Eurobank EFG business professionals participating as key stakeholders in the development process on even terms with IT developers.

The existing SoA-platform was the foundation on which the BPM-project was undertaken, and having this was of great importance, as SoA and BPM are often intrinsically connected. The automation of business processes facilitated by BPM in Eurobank EFG would not have been possible to the same extent without the existing SoA platform. The

¹⁵² Business Process Management involves supporting the design, administration, configuration, enactment, and analysis of business processes. Business processes in this connection explicitly represented with their activities and execution constraints. Once defined business processes are subject to analysis, improvement, and enactment.

underlying technology, such as SoA with its inherent focus on structural flexibility and integration, needs to be tied together with effective process management for maximum potential to be reaped. Having a functioning SoA platform allowed Eurobank EFG to apply process models and pre-defined business rules and services to the ICT infrastructure, hereby allowing effective management of business processes. The project was initiated in the fall of 2006, with the mortgage division chosen as the entity that would initially be subject to the BPM-project. The project ended 18 months later, with BPM successfully implemented in the mortgage division of Eurobank EFG. The project went through several phases of implementation with a team of experts, consultants and key business and IT representatives from the Eurobank EFG organisation being part of the change team. Moreover, despite a wide variety of BPM tools available on the market, Eurobank EFG chose to design their own, as they wished the system to be designed uniquely for the bank, and did not wish to become dependent on an external supplier.

The first phases involved the design, analysis, identification and modelling of business processes. The required specifications were at this stage clarified, in order to enable an analysis of business processes. The required specifications were of course instrumental in the further analysis and implementation, as the change project would need to be driven by clear and unambiguous specifications. Other steps involved an analysis and identification of existing business practices in the bank, where existing rules, workflows, routines and practices were accounted for.

On this basis the Eurobank EFG undertook the formulation of formalised business rules¹⁵³, where the collaboration of business and IT employees was seen as crucial. According to Eurobank EFG, this was a crucial phase, as the change team needed to understand how to manage and define business rules in order for them to go through the next phase of implementation.

The implementation of the new efficient rules involved discarding old ones, with the mortgage division chosen as a test environment. In this phase, work consisted of writing the rules into the ICT system, hereby allowing the automated straight-through processing intended from applying BPM to the business processes. A subsequent evaluation was performed once the BPM had been implemented in the mortgage division, and served to clarify whether the specifications were met to a satisfactory degree. Potential shortcomings were at this point corrected and additional rules formulated if needed. Business rules will be developed on a continuous basis, as the project of implementing the BPM seeks to integrate a degree of flexibility to the IT operations of Eurobank EFG. Flexibility is in this respect identical to allowing room for the bank to change business processes to meet the needs of customers.

A project of this magnitude had an impact on the work processes of all employees in the mortgage division, as it radically changed organisational and technological practices and to some extent also the culture. Eurobank EFG realised that the introduction of ICT would be a hard sell to the employees. Many employees were suspicious of the new ICT-driven practices, and were not actively supporting the implementation of the project. The management were, however, committed to the project and despite the lack of support from staff, they managed to complete the BPM project. Employees have since been trained in the new practices, which served to ease their concerns about being replaced by

¹⁵³ A business rule functions as a mediator of information in computer systems for decision-makers such as managers, employees, and salespeople. The use of business rules has proven to enhance the effectiveness, flexibility, and efficiency of business systems.

ICT, and come to appreciate the manner in which the new ICT practices have automated many routine tasks. As for the costs, the project has been a multimillion investment with a change team of 25-30 highly skilled experts and consultants used in migrating to the business processes. The steering committee was however composed of in-house experts to assure adequate commitment to the project. Furthermore, in addition to man-hours, large investments were made in hardware and software updates, as well as application and management tools. These were supplied by external providers such as IBM, JBOSS and Documentum. Documentum e.g. supplied Eurobank EFG with the Documentum Process Suite, which was intended to streamline the mortgage division, allowing both external parties and internal business units to be integrated in the mortgage process.

5.8.3 Impact

The aim of the project was to allow increasing automation of business processes and for the bank to become more flexible in meeting the requirements of customers. For this to happen, the bank wished to introduce BPM to their operations, hereby changing the organisational focus from a product view to a process view. Eurobank EFG wanted to use BPM to advance their competitive edge vis-à-vis other banks, by helping the bank in closing the gap between customer and bank, but also by facilitating more efficient processes, which would allow costs to be lowered in terms of time and money. Early evidence shows that BPM has been successful in doing this, as the overall level of efficiency has risen since the introduction of BPM to Eurobank EFG. Streamlining processes has in this manner allowed the bank to automate many day-to-day routine tasks, hereby providing extra capacity in terms of lowered fixed expenditures and work-hours.

The impact of BPM will be felt by users in terms of the bank's increasingly sophisticated service offerings. Using BPM has enabled a degree of product bundling which was not possible before, due to the separate processes attached to each product. BPM has by tying processes together allowed Eurobank EFG to increase the overall value proposition for the customer, by e.g. automating data collection and approval procedures for credit approvals and credit card applications. Employing BPM enables many routine customer interactions to be automated, which enables the CRM function to provide a higher level of customer service in areas of a more complex and demanding nature. Furthermore, using BPM to set up business rules allows a degree of personalisation not possible before the implementation. Using business rules, it is possible to create a wide variety of products suitable to various segments of society, hereby allowing a cost and time efficient approach to the design of banking offerings.

According to Eurobank EFG, the introduction of BPM will ensure large efficiency gains across the entire banking organisation, as the BPM project is rolled out in the rest of the divisions and in branches. The preliminary result from the implementation in the mortgage division has been positive, both in terms of tangible benefits such as decreased processing times and general expenditure, but also the impacts on the human resources. Employees have since the introduction of the new business practices and the launch to the new business processes, become widely positive towards the manner in which ICT may influence their daily work. Moreover, having BPM will enable the bank to employ product differentiation as cross-selling of products and product bundling to a greater extent than before automating business processes.

The overall organisational change did, however, require a culture change among Eurobank EFG employees. This was a challenge, as the often indefinable obstacles to such a culture change require a great deal of patience and time for it to successfully root in the organisation. ICT can be a hard sell to employees, but the impact on Eurobank EFG mortgage staff has illustrated how once implemented, ICT may become appreciated and institutionalised. Using the Eurobank EFG mortgage division as a testing unit could in this respect be used for marketing the benefits of ICT, hereby easing implementation across the rest of the banking organisation.

5.8.4 Lessons learned

Eurobank EFG is an example of how ICT-driven organisational changes may be introduced in order to enhance performance in terms of process efficiency and ability in meeting customer needs. The case study is furthermore illustrative of what characterises a BPM change project, and the expected and realised benefits of applying a streamlining tool such as BPM to banking.

The case study on Eurobank EFG is illustrative of several of the sectoral tendencies and trends found in this report. The European-wide trend of consolidation in the BI and average bank-size growing is to some extent encapsulated by Eurobank EFG. The bank has become a top-3 bank in Greece in the time span of 10 years through organic growth and M&A's which has resulted in a drastic expansion of the Eurobank EFG organisation. This, however, as is often the case, is followed by typical operational inefficiencies due to the lack of coordination, alignment and standardisation of processes. The challenge is in this respect to enable a holistic system which allows streamlining of efficient and integrated business processes. This is what Eurobank EFG meant to do by applying the BPM concept to their ICT operations, with early indicators showing positive pay-offs.

Other lessons involve the reasoning behind introducing BPM to ICT operations. One of the primary drivers in the decision to apply BPM was the expected competitive advantage which the bank expected to get from such streamlining of business processes. Eurobank EFG is a first mover in introducing BPM to banking operations in Greece, which is believed to provide the bank with a competitive advantage as the nearest competitors have yet to achieve the same BPM-driven efficiencies. BPM is in this regard believed to offer Eurobank the possibility of providing increased product and price differentiation for their customers. Achieving a higher degree of market power is instrumental in a competitive market such as the Greek banking sector and thus illustrative of why ICT should be an integral aspect of company strategy. Furthermore, the flexibility derived from having a SoA and BPM-driven IT-infrastructure is regarded as instrumental in maintaining a 'continuous development' in Eurobank EFG. A continuous development should in this respect be understood as how the business processes and ICT have been tied together in a manner which allows tweaking and introduction of new business processes on a continuous basis.

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5.9 Glitnir Bank – Banking in an Online Society

Abstract



The case study on Glitnir Bank in Iceland shows how the role of branches is changing as e-banking becomes the norm for everyday transactions. With high uptake of ICT among the country's inhabitants, banks in Iceland are in a favourable position to market the advantages of self-service e-banking to customers. Migrating customer transactions to their online bank has provided Glitnir Bank with significant savings.

Since the bank was launched in 1996, it has been successful in moving a large number of transactions to its online e-banking platform, allowing a more efficient and cost-effective approach to banking. The reason, according to Glitnir Bank, is the generally high internet uptake among the Icelandic population (90% uptake).

Introducing e-banking has meant large savings for Glitnir Bank in reduced costs related to branch-based operations. Providing customers with the possibility of performing routine banking tasks online has reduced the need for branches and manual handling of transactions by employees. With 70-80% of customers using Glitnir Bank's e-banking portal on a regular basis, the nature of work conducted in the branches has changed. ICT (e-banking) allows branches to become advisory centres rather than service centres, which represents a radical change of focus for bank branches.

Case study fact sheet

■ Full name of the company:	Glitnir Bank (formerly Íslandsbanki hf)
■ Location (HQ / main branches):	Reykjavik, Iceland
■ Main business activity:	Commercial Banking
■ Year of foundation:	1904
■ Number of employees:	2248
■ Turnover in last financial year:	85.1 billion ISK (EUR 970 million)
■ Primary customers:	Corporate/Private
■ Most significant geographic market:	Iceland
■ Main e-business applications studied:	e-Banking & branch renewal

5.9.1 Background and objectives

Glitnir Bank is primarily located in Iceland, but has in recent years expanded operations to a number of overseas markets. The bank is now providing services to the Scandinavian markets, and to a more moderate degree to the UK, US, Indian, and Chinese markets. The bank offers all types of financial products, with corporate and retail banking being the dominating sources of income. The bank is one of the largest in Iceland as Glitnir Bank, together with competitors Kaupthink Bank and Landsbanki, have a combined 88% share of the Icelandic banking market. Retail operations are primarily offered on the Icelandic market, whereas its international banking is focused on providing financing to niche industries, especially SMEs within fields such as sustainable energy, seafood, and off-shore service vessels.

The bank has been applying ICT to banking for a number of years. Online banking is in this respect the prime example of how Glitnir Bank has benefited from ICT. Since the bank was launched in 1996, it has been successful in moving a large number of transactions to their online e-banking platform, hereby allowing for a more efficient and cost-effective approach to banking. The reason for this is according to the Glitnir Bank the general high Internet uptake in the Icelandic population (around a 90% uptake, and of these, around 70% of the population uses e-banking). Performing online transactions is becoming the norm for banking customers in Iceland, and partly for this reason Glitnir bank continuously seeks to update their online e-banking platform. Customer demands are in this respect the principal driving force, with the possibility of increasing high margin sales and raising the profit-margin as additional motivators.

5.9.2 e-Business activity

Glitnir Bank undertook the development of an Internet bank in 1996, with the online e-banking platform being updated over the years in order to satisfy the needs of the customers on a continuing basis. The current platform was created to meet the needs of different client groups such as retail and corporate customers, with a number of applications included to facilitate a more customer-friendly and effective banking experience. Customers may, however, also take advantage of other channels such as mobile banking. The uptake of e-banking among corporate and retail customers in Iceland is, according to Glitnir Bank, as high as 70-80%. Hence, many of the bank's transactions are performed online instead of via their brick-and-mortar branches.

Having customers using online transactions instead of branch-based ones is positive for Glitnir Bank as the handling costs of self-service banking is significantly lower compared to branch-based transactions. Encouraging private and corporate customers to carry out their transactions online is, however, fully dependent on the availability of a user-friendly and time-efficient e-banking platform. Glitnir's online bank was for this reason designed to allow customers easy and secure access. The bank has since the first launch of online banking in 1996 updated the platform several times, with a number of new concepts and applications added to the platform, such as the XY Banking Online for adolescents in 2000, the 'Onlinein' in 2001 which was designed to meet the needs of residents' associations and NGOs and Glitnir's Online 'Corporate bank solution' from 2002.

The corporate e-banking platform currently offers all common online banking services required by companies in their business operations. What Glitnir Bank developed was an integrated online bank where bank and corporate customer systems are interconnected. The corporate bank solution offers corporate clients a wide portfolio of ICT-driven financial tools, which they may use in their every-day operations such as Account statements, Credit Card statements, Transfers, Invoices, International transfers, bulk payments, Online Trading (e.g. OMX Iceland, OMX Nordic, Wallstreet). The uptake of e-banking is also high among retail customers, who are increasingly using Glitnir's online bank to perform routine banking transactions. Examples of this include accessing notifications and reports of account balance and movements, securities holdings, on-the-go banking transactions, as well as opening checking and savings accounts. Customers may also use Glitnir's e-banking platform to return tax statements and sign digital agreements in connection with car sales/purchases with third parties. Hence, the inherent flexibility of the system allows customers to perform a wide variety of services by the

means of ICT. This setup is partly why Glitnir Bank has been so successful in migrating customer transactions from branches to their online e-banking platform.

Glitnir's online banking strategy is very much aimed at encouraging the movement towards a more advanced and higher uptake of online banking. Having a user-friendly e-banking platform is in this respect important, as the usability issues of ICT are thought to be more important than technical complexity. The learning curve for user skills needed for successfully performing banking tasks should be as flat as possible. Glitnir Bank has sought to do this by taking measures to simplify e-banking operations, so as to persuade an increasing number of customers to take advantage of online banking. Furthermore, Glitnir Bank has provided customer training and promoted advantages of online banking to customers by use of multi-channel marketing.

Providing a growing number of services online is also important, as the possibility to substitute branches for online services would require the majority of financial services to be made available to the online customer. Glitnir Bank has for this reason chosen an aggressive strategy of ensuring that a large share of Glitnir Bank's product portfolio is available to the online customers, who have responded well to this by largely using e-banking.

Moving corporate and retail customers from branch banking to online banking is important to Glitnir Bank, who has set up key success criteria for the role that e-banking should play in future operations. These criteria include the continued substitution of branch transactions for self-service e-banking, which in turn should facilitate higher turnover and sales. This has in part already been done as customer migration to the e-banking platform, performing most of the routine tasks themselves, has enabled the bank to achieve a more profitable cost structure.

The migration of customers to an online environment must, however, not be at cost of the customer relationship, which is why focus is still dedicated to the Glitnir Bank branch network. Providing online services allows a cheap alternative to branches, but in the highly competitive Icelandic banking sector, customer retention is of the utmost importance. Maintaining a branch network allows the bank to offer the advice of qualified financial advisors, which cannot yet be obtained via e-banking. Furthermore, customers still tend to prefer face-to-face advisory services when acquiring complex and high-margin financial products.

Future developments in Glitnir Bank's e-banking platform are on the way, as the bank expects to launch a new platform in the near future. The new platform, which is being developed by a third party provider, will according to Glitnir Bank be even more user-friendly than the existing platform and will enable a speedier development of new features.

5.9.3 Impact

The impact of ICT to Glitnir Bank, in this case e-banking, is mainly related to the ICT-driven efficiency gains which have reduced expenditure in branches, and the effect it has had on customer banking patterns.

Introducing e-banking has in Glitnir Bank meant large savings in terms of reduced costs related to branch-based operations. Providing customers with the possibility of performing routine banking tasks online has reduced the need for branches and manual handling of transactions by Glitnir Bank employees. With 70-80% of customers using Glitnir Bank's e-

banking portal on a regular basis, the nature of work conducted in the branches has changed. ICT (e-banking) allows branches to become advisory centres rather than service centres, which represents a radical change of focus for bank branches. With many routine tasks performed online, personnel in branches are given the opportunity to focus on providing financial advice instead of handling routine work. This advice may increasingly be focused on selling high-margin financial products such as mortgages and loans, instead of low-margin standard payments.

The introduction of e-banking has in this respect also changed the banking patterns for customers, as many every-day banking tasks for retail and corporate customers may be conducted online instead of on location. This provides customers with a great deal of flexibility, as the possibility of conducting the majority of their banking tasks online facilitates increased efficiency in transactions.

As it can be seen from the above, Glitnir Bank has felt a definite impact from applying ICT to e-banking. The bank has been able to change the focus in its branch operations to advisory based services. This allows increased attention to customer service, as extra capacity has been created from the increased online self-service trend among customers. For Glitnir Bank, the combination of branch services with e-banking remains essential, as it will allow them to meet the requirements of different customer segments. The branch concept has along these lines been redefined, as the future Glitnir Bank brick-and-mortar branch will function as a competence centre and provider of financial advisory services, rather than a financial mediator. Employees of Glitnir Bank have furthermore been freed from routine tasks and are instead performing more challenging tasks – something which might contribute to higher job satisfaction among Glitnir Bank employees.

5.9.4 Lessons learned

The case study on Glitnir Bank is relevant to the findings of the SeBW in several respects. For one, it relates to how e-banking has had an effect on branch-based banking.

ICT is playing an increasingly important role in the BI, with e-banking (from a customer perspective) being the most obvious illustration of this. The high uptake and availability of Internet in Iceland (90% uptake and 70% using e-banking) may in this regard be seen as a favourable condition in terms of encouraging Glitnir Bank customers to use e-banking. On this basis, it can be argued that for e-banking to successfully spread to customers, the necessary ICT infrastructure needs to be available, which it is in the case of Glitnir Bank and Iceland.

Having a strong ICT infrastructure is an important facilitator for the diffusion of e-banking among banks and customers alike. Glitnir Bank is, however, not scaling down the presence of branches in Iceland. Glitnir Bank is, despite the common view of e-banking as being a substitution of retail banking, trying to maintain an adequate balance between branches and online banking. The bank seeks to promote the usage of e-banking to customers for them to perform routine tasks online, while still offering advisory services in branches for high-margin products. This may be regarded as a means to optimise customer service through both online banking and branch-based advisory services. The fact that many customers remain unwilling to subscribe to complex financial services online is, however, also likely to be one of the explanations behind this strategy.

The strength of providing branch-based services should not be underestimated as it allows for the use of e-banking and branches as an integrated approach to service delivery, thus offering customers a great variety of services. It may furthermore be a way to maintain personal customer relationships through face-to-face interaction, which is something online-only banks lack.

5.9.5 References

Research for this case study was conducted by Benita Kidmose Rytz, Rambøll Management on behalf of the Sectoral e-Business Watch. Sources and references:

- Interview with Vilhjálmur Alvar Halldórsson, Executive Director of eBusiness Marketing, Glitnir Bank, 27 February 2008
- Glitnir Bank annual report 2007.

5.10 Société Générale – Strategic Procurement of ICT

Abstract



This case study on Société Générale Corporate and Investment Banking (SGCIB) illustrates how a large multinational bank has undertaken several projects to improve their ICT capabilities to deal with the rising uptake of e-business among customers and thereby an increasingly competitive environment. SGCIB chose to implement a number of ICT measures in order to improve process efficiency and their ability to process large volumes of data-intensive transactions.

Since SGCIB has begun applying ICT to business processes, they have been able to attract new customers, cut costs and improve their competitive position in the corporate and investment banking market. Moreover, the case illustrates how a large bank like SGCIB may utilise a mixed approach to ICT development, with both in-house and external collaboration and contractors used when acquiring new ICT.

Case study fact sheet

■ Full name of the company:	Société Générale (Corporate & Investment Banking)
■ Location (HQ / main branches):	Paris, France
■ Main business activity:	Corporate & Investment Banking
■ Year of foundation:	1864
■ Number of employees:	~10.000
■ Turnover in last financial year:	Net banking income: 4.522 million EUR
■ Primary customers:	Corporate and financial institutions
■ Most significant geographic market:	France
■ Main e-business applications studied:	ICT driven process-efficiency

5.10.1 Background and objectives

Société Générale Group is one of the largest financial services providers in Europe and employs 151.000 people worldwide within their three main business areas: Retail Banking and Financial Services, Global Investment Management and Services, and Corporate and Investment Banking. This case study will deal mainly with the application of ICT to operations in the Corporate and Investment Banking division (SGCIB). The Corporate and Investment Banking part of the Société Générale Group offers value-added integrated financial services to corporates, financial institutions and investors. SGCIB has a market presence in over 45 countries across Europe, the Americas and Asia-Pacific, and employs around 10,000 staff worldwide (with more than 50% based outside France). The bank maintains a strong organisational focus on innovation geared towards customer satisfaction, and for this purpose pursues a growth strategy based on selective development of its core activities. This is to a large extent done through a combination of organic growth and acquisitions, with the aforementioned needs of innovation and customer satisfaction important criteria in guiding future developments-

This case study deals with how a large European bank, SGCIB, has benefited from applying ICT and e-Business to operations, with the purpose of improving organisational efficiency and improving customer satisfaction. Other driving forces were related to the external pressure from competitors and rising customer requirements in terms of meeting their needs by means of ICT. These were influential in increase the application of ICT to SGCIB's business processes. Hence, the need to remain competitive by respond to customer ICT needs is an instrumental part of SGCIB strategy.

5.10.2 e-Business activity

SGCIB has been using e-Business for a number of years, but the real effort in terms of applying ICT to business processes and offering comprehensive e-Business solutions was initiated in 2001. SGCIB has since then developed and purchased a number of ICT tools used in their everyday Foreign Exchange market (FX) operations and online service offerings. This has helped the bank to become more efficient and increasingly responsive to customer requirements. Other ICT-driven benefits relates to an increasingly cost-effective organisational performance, by means of automation and straight-through processing.

SGCIB has since 2001 put a lot of emphasis on maintaining full control of the development of ICT which are deemed critical to their core business processes. The bank has chosen to conduct most of their ICT development in-house, contrary to many other banks which choose to outsource ICT development. This is due to the fact that the perceived cost-advantages offered by in-house development is regarded as advantageous for a multi-national bank such as SGCIB, who has the needed skill and scope for such developments. While the overall concept is to develop business-critical ICT as much as possible in-house, tactical purchases of external solutions is however carried out when time-to-market requirements demand it.

The first generation of ICT systems used in SGCIB was their multi-bank platform 'Centradia', which SGCIB developed in a consortium with three other banks (IMI, Santander and RBS). The development project was an example of several banks cooperating in creating a joint venture with the purpose of developing otherwise costly ICT. The development of the platform was isolated in Centradia Ltd, an autonomous London-based company with independent staff and funding. The platform was, in line with the overall ICT-strategy, meant to attract new customers while improving the level of service for existing customers as well. The Centradia platform was launched in 2001 but phased out again 2005 as a new system was needed to meet customer needs and requirements. Though the system had been performing satisfactory while running, new developments had rendered it outdated, which was why the process of identifying a new system was initiated.

Though SGCIB possessed both the needed skill and scope to develop this next generation of ICT to be used in the bank, they chose to look for outside contractors. Market changes, time and costs of internal development meant that externally developed ICT systems were considered, as the need to offer updated and innovative ICT-driven services were important in maintaining the competitive edge. It was decided to purchase a system which had shown to be a reliable, time- and cost- efficient e-trading tool in order to provide existing Centradia clients with an ICT-solution as fast as possible.

A number of different ICT-solutions were therefore acquired, with one of many being parts of the Reuters e-trading platform. The reason for implementing parts of the Reuters

platform was that it provided the bank with a trading system dedicated to handling SGCIB's small- and medium-sized clients and internal clients. Only specific parts of the system were acquired, such as the graphical user interface of Reuters, because of its capacity to deliver time to market services, its functionalities as well as due to purely economic reasons. Moreover, the decision to acquire certain parts of a proven system instead of the normal in-house development was also made from a time to market calculation and competitive considerations. A multi-bank platform, Currenex, was implemented in a similar fashion, with only the best practice graphical user interface being implemented for daily usage. Currenex, like Reuters, have been plugged into SGCIB's own ITEC back-end architecture (negotiation orchestrator, pricing and authorisation servers), while still maintaining the main bulk of existing e-trading ICT (e.g. price, intelligence, RISK servers,). This is based on Java and Oracle, running on UNIX/Linux operating systems. This kind of customisation has allowed existing well performing ICT-practices to be integrated with the new e-trading ICT.

The choice to follow such an ICT-strategy, despite still favouring in-house development, was a consequence of the need to upgrade systems within the foreseeable future. This would only be possible with the assistance of a proven solution, with tradeoffs such as customised design being subservient to time-to-market considerations. SGCIB did however get the opportunity of a customised solution in some areas when implementing e.g. the Reuters and Currenex solutions. This is exemplified in the decision to only acquire specific parts of externally developed ICT, such as the trading applet and graphical user interface of Reuters and Currenex.

Once implemented, the Reuters system provided customers with a wide range of functionalities, offering 24-hour basis FX and MM (money market) products such as spots, swaps, forwards, loans and deposits. The Reuters and Currenex ICT has in this manner allowed SGCIB to strengthen their backend architecture, implementing improvements in areas such as auto-hedging, transaction-speed, and introducing new trading functionalities altogether.

In the future SGCIB aims to strengthen their electronic capabilities by launching their own internally developed user interface by 2009-10. Furthermore, the bank intends to move ahead with the trading of e-options and implement functionalities to allow cross-asset offerings

5.10.3 Impact

The project of implementing ICT and e-business in general to SGCIB operations has impacted the bank in several ways. One of the primary motivators for the bank to implement ICT and e-business was the expected competitive advantage this would provide vis-à-vis competitors. ICT has, according to the bank, been successful in doing this as it has enabled the bank to improve their organisational performance, as the volume of transactions and number of customers has risen since implementing ICT. A generally favourable economic climate has, however, also been pointed at as one of the reasons why SGCIB has been able to expand their market in the period subsequent to the full implementation of the abovementioned platform technologies.

ICT has mainly made processes more time-efficient. SGCIB has since the implementation of ICT systems such as the 'Reuters' and the 'Currenex' witnessed an improvement in their front- and back-office application performance, as ICT has increased volume and accelerated customer order flow, reducing processing time from

days or hours to minutes in some instances. Moreover, ICT has helped SGCIB in optimising their IT operations by eliminating former bottle-necks present in their IT systems. This has meant that the overall ability to service customers quickly has been greatly improved, which in turn has impacted positively on customer retention, and overall revenue. The growing ratio of deals executed by clients' financial departments through electronic channels in the FX market, has allowed SGCIB employees to dedicate themselves to performing and selling more value-added services and products to customers. The employees in SGCIB are generally very positive towards implementing new ICT, as it so far resulted in the automation of many routine tasks. This has allowed employees to focus on other areas of everyday operations, hereby rising the overall level of work satisfaction.

The increased usage of ICT has also impacted on the SGCIB organisation, as the growing uptake of ICT among employees and customers has caused the IT operations department to double in size from 2004-2007. ICT has in this respect not been a driver of organisational downsizings (reduction of full-time equivalents), but rather used to enable the bank to expand their market share. The bank has improved their performance in the FX field as a result of their application of ICT. This has meant that the total number of employees has risen, but has also meant that SGCIB finds it difficult to match their demand of qualified IT-skilled labour to the actual supply. This is, according to SGCIB, one of the major bottlenecks to ICT development and an increasing problem, as ICT is a major competitive parameter.

When the bank initially undertook the development of online systems and e-business, they did this in part to meet customer needs and requirements. Becoming more efficient and providing customers with competitive price while maintaining a high quality for banking services was seen as crucial in creating a high level of customer satisfaction. Maintaining a close customer relationship remains important to the bank, as automation and digitalisation of operations brings an inherent risk of becoming isolated from customers. SGCIB seeks to alleviate this by maintaining a constant focus on developing their ICT capacity in a manner which enables them to provide the best possible service to customers. One of the ways SGCIB tries to ensure an appropriate match between customer demands and bank service offerings is by applying monitoring of client banking actions. The monitoring furthermore allows the bank to react if a customer's bank account is compromised, and provide instant solutions.

5.10.4 Lessons learned

Seen in the overall context of this report this case study is an example of how ICT may be introduced to make banking processes more efficient, cost-effective and to achieve market growth. The SGCIB case shows how a bank may choose to implement ICT technology in order to deal with the increased competition and the need for efficiency in operations in general. The different ICT platforms and applications implemented in SGCIB were all chosen for their ability to improve the operational efficiency. Thus, the Reuters system and the Symphony platforms have allowed operations to become more cost-effective and reduce processing time. This has helped SGCIB improve their overall competitiveness, as the bank has been able to attract new customers and expand their market share due to such ICT solutions.

Another lesson learned relates to SGCIB's decision to focus on in-sourcing when developing new ICT, while maintaining open to the strategic purchases of external ICT

when deemed necessary. The possibility to conduct in-house development is feasible for SGCIB because the bank possesses the scale and scope in operations to do so. Time is, however, an issue which impacts heavily on the decision to develop or purchase ICT. SGCIB tries to balance out the benefits of in-house development, with the time-to-market requirements of new ICT. Purchasing strategically essential ICT from external providers can in this regard be necessary, but may be integrated with existing internally developed systems, in order for the bank to maintain its institutionalised, critical business processes and practices while developing new systems. This dual approach may in most cases not be possible to the same extent for small and medium-sized banks, which instead increasingly rely on outsourcing or standard systems. SGCIB on the other hand has been able to realise gains in efficiency and market share following the mixed approach, as the combination of in-house development and externally developed ICT has allowed the bank provide customers with up-to-date ICT, hereby meeting the requirements of both the competitive environment and customer expectations.

The introduction of ICT systems in SGCIB allows a reallocation of labour resources. The increased automation of business processes has helped the bank free employees from time-consuming and routine work, which in turn empowered employees and heightened overall motivation, as they got to work with more diverse and complex tasks.

5.10.5 References

Research for this case study was conducted by Janne Sylvest, Rambøll Management, on behalf of the Sectoral e-Business Watch. Sources and references:

- Interview with Reine Dossou, Head of e-business, Société Générale (Corporate & Investment Banking), 17 March 2008
- Société Générale annual report 2007
- <http://www.sgcib.com/>

5.11 Summary of case studies

The BI is one of the most advanced industries in terms of applying ICT to service offerings and business processes, compared to the other sectors studied. The increased consumer demand for bank services supported by ICT has inspired banks to create Internet-based banks or dual combination banks, which is a combination between e-banking and advisory branch banking. However, this is also to some extent a result of the fierce competition in this sector, which forces banks to use a significant amount of their total expenditure on ICT investments in order to stay competitive. The recent wave of mergers and acquisitions seen in the BI has called for an increased investment in ICT in order to integrate the different banking systems, as can be seen in the case of National Irish Bank. Mergers and acquisitions also happen as a result of ICT, when large branch banks acquire innovative Internet-only banks in order to obtain both a well-known brand from the traditional bank and innovative business model from the Internet-only bank. This was the case in the Egg/Citibank case. The case studies have illustrated several trends characterising the use and challenges of ICT in the BI. One of the key issues is process efficiency, which is illustrated in several cases such as Hansabank, NLB, Glitnir, and Société Générale. The banks have experienced increases in process efficiency after implementing new ICT platforms. In these cases the use of technology was an important means to making work processes more time-efficient, eliminating formerly paper-based tasks and making routine tasks performed by humans increasingly redundant. However, only the Slovenian NLB had seen a decrease in work force as a result of process efficiency. This can be due to the fact that employees are increasingly retrained to perform more advanced financial tasks, as both the case studies and the econometric analysis suggest, or that banks are reluctant to admit that they have had to lay off personnel as a result of introducing ICT.

The implementation of technology has in this sense meant that reduction of overhead costs as a justification for investments in ICT is losing its importance. Furthermore, the case study of National Irish Bank (NIB) indicated that employees themselves welcomed the introduction of advanced ICT, as routine and standard banking operations are increasingly being performed digitally, thus freeing employees to perform more complex and stimulating tasks.

Another significant trend is the aforementioned shift from traditional brick and mortar banks to either pure Internet banks, or dual combination banks where both e-banking and traditional personal advisory services are offered. This can be seen in the cases of SkandiaBanken, Tapiola Bank, Egg/Citibank, and Glitnir. The ability here to obtain the best from both worlds is seen as an increasing trend in the BI. Despite the introduction of e-banking, most banks in the European BI still find it important that selected banking services remain "personal". Personal in this context refers to the degree of custom design in terms of banking services. e-banking is seen by both banks and consumers as a technology that serves to ease transactions, which otherwise might be time-consuming and inefficient. However, in order to ensure that consumers feel secure and are capable of using the ICT services offered, it is increasingly observed that most banks give CRM and the availability of human assistance great attention. This is for instance seen in the case of Tapiola Bank, where e-banking is supplemented by the possibility of arranging personal on-location assistance, even though the bank does not have a dedicated branch network. SkandiaBanken has also tried to increase consumer's perception of safety and

confidence by establishing numerous channels for feedback and through consumer surveys.

- **Increased process efficiency:** Investments in ICT result in increased efficiency caused by the digitalisation of transactions previously carried out by tellers, making many routine jobs in the organisation redundant. Personnel are in most cases being retrained to perform more financially advanced tasks.
- **ICT as a means for competitive advantage:** By utilising ICT successfully, it is possible to offer standard banking services at low cost, with a minimum of fixed costs. However, dual-combination banking, where a bank both offers online banking and more advanced financial advice in branches, is an increasing trend in the BI. Differentiation vis-à-vis competitors might allow newcomers to enter the banking industry.
- **CRM:** Customer needs and wants are important to ICT-using banks, as the gap between customers' ICT knowledge and the services offered by the banks might otherwise affect the customers' willingness to use the ICT-services offered by the banks. Increased personalisation of e-banking is seen as a topic of the future, to ensure better B2C banking.

Because ICT is important to many banks, some banks outsource operations of IT-suppliers in order to keep up with developments. For instance, Tapiola bank decided to outsource the e-banking platform to Crosskey, a subsidiary of Ålandsbanken, with whom Tapiola Bank also cooperates in developing international credit cards and preparing for SEPA. Other factors which make outsourcing appealing to many small and medium banks include the increasingly complex technical requirements and the high costs of in-house development. In the other end of the spectrum the large Danish bank Danske Bank implements their ICT system in NIB. This gives NIB the possibility of acquiring the same technological functionalities as the banks in the Danske Bank consortium.

6 Conclusions: outlook and policy implications

6.1 Key findings

This section presents key findings of the analysis conducted in Chapters 3 and 4, along with conclusions on the basis of the best practice case studies from Chapter 5. The study has shown that banks are using ICT to obtain process efficiency, a finding that is reflected both in the case studies and in the econometric analysis. Moreover, the dual banking concept, where customers are performing standard banking procedures online while more sophisticated banking services are left to the branch banks, is a persistent trend. However, in most banks, neither the increased process efficiency nor branch renewal that emerged from increased use of ICT has resulted in cutting down the workforce. Instead, banking personnel has been retrained to perform more advanced banking services, a finding that is also supported by the econometric analysis. ICT has also had an impact on mergers and acquisitions. In one case, ICT has eased the merger by providing a common ICT-platform for the bank, and in another case, an acquisition took place because of a banks' competitive advantage of using ICT in banking. One of the barriers to e-banking that remains is that not all (off-line) customers perceive e-banking as safe, and that not all Member States are ready to provide e-banking. The latter might also have an impact on the level of harmonisation in the BI and the ability for the European BI to fully adopt SEPA.

6.1.1 The impact on stakeholders in overview

As mentioned, the current state-of-play in the BI represents the impact of ICT on process efficiency and branch renewal, as well as SEPA. The below figure provides an overview of the impacts on banks, customers, and industry, respectively, which will be analysed in more detail below.

	Process Efficiency	Branch Renewal	SEPA
Banks	<ul style="list-style-type: none"> • Lower operating costs as the result of increased automation of business processes • Higher productivity as a result of automation • Faster processing allows improved customer service 	<ul style="list-style-type: none"> • ICT allows re-allocation of branch based resources (HR, CRM) • Online-only concepts offer competitive cost-structures due to lower overhead costs. • Rise of banking concepts such as dual-combination banking. • Introduction of paperless branches 	<ul style="list-style-type: none"> • Further European integration and market efficiency will ensue as a result of SEPA. • Product innovation fostered by ICT enabled cross-border credit transfers • Banks will be able to expand their business and compete on EU level
Customers	<ul style="list-style-type: none"> • Increased personalisation of banking products • Faster service and response time in banking transactions 	<ul style="list-style-type: none"> • Availability of online self-service and online only concepts increase competition and lowers fees • Channel integration (branches/online banking) offers improved flexibility for customers • Improvement of remote CRM 	<ul style="list-style-type: none"> • Consumers will only need one European bank account • Use of payment cards will be more efficient across Europe • Banking services can be offered to consumers irrespective of national borders
Corporate	<ul style="list-style-type: none"> • Increased personalisation of banking products • Faster service and response time in banking transactions 	<ul style="list-style-type: none"> • Improved flexibility in day-to-day payments due to ICT-enabled remote banking. • Integrated ICT systems allow more efficient workflow 	<ul style="list-style-type: none"> • Clear choice of payments types for Euro cross border transactions • Value-added services, such as e-invoicing may optimise handling of payments • Payment process will be more efficient and more automated.

Process efficiency

Process efficiency was from the beginning of the report expected to reduce costs in the BI, an assumption that is supported by the econometric analysis. Productivity growth rose in the EU from the year 2000 onwards, while average working hours per employee were decreasing in most countries. Hence, it is likely that labour productivity growth in most countries could be related to a decrease in the number of employees in the BI as well as decreasing working hours per employee. ICT capital investments are largely substituting labour, particularly in retail banking. This is done by standardising ordinary financial services and having customers perform basic financial services online, thus rendering the tellers superfluous. The infrastructure in the banks' value chain is thus affected, as discussed in section 2.1. Another interesting aspect from the econometric analysis that high-skilled financial analysts face increasing employment opportunities, which indicates that while the basic financial services are increasingly standardised and performed online by the customers, there is an increased demand for more complicated financial services which can bring value-added to the bank along with the ICT-investments.

The case studies lend support to the process efficiency trend, as most banks are using ICT to make basic banking services available to the customers online. This means that both transactions (as customers are increasingly doing basic transactions themselves) as well as human resources in the bank value chain are affected. However, most banks have retrained the tellers so that they are now able to perform more complicated financial services and have thus not dismissed any tellers. Only one bank in the case studies confirmed to have let off personnel as a result of introducing ICT. That the personnel are retrained is actually also indicated in the econometric analysis, which shows that ICT has a significant skill-bias especially towards medium-skilled labour, which is what the tellers become once they are retrained. Moreover, as can be seen from the econometric

analysis, the ability to empower the work force by appropriate investments in training and skill-formation is very important. Without sufficient capabilities of the human workforce to use the ICT-investments efficiently, the costly investments become ineffective.

The analysis and the case studies developed for this report could not provide conclusive evidence regarding shortage of personnel with ICT skills. The econometric analysis however discuss that high-skilled labour is increasingly sought after, which could provide a shortage for these in the long run. The case studies pointed to the importance of access to highly skilled IT specialists to develop e-banking and ICT systems for process efficiency purposes. The statistical material analysed in Chapter 3, however, could not support this. The survey data indicated no gap between availability and demand for ICT-skilled labour, and only a limited number of banks stated that they needed to hire ICT-skilled labour and only a few of these found it difficult to hire employees with such skills. This can partly be explained by the labour dynamics presented above, as much low-skilled labour is retrained to become medium-skilled labour, which can perform the necessary services in the bank. Sourcing can be another explanation as banks are increasing outsourcing or co-sourcing large ICT-investments to ICT-firms, possibly because they recognise that ICT-development may not be their core competence.

Branch renewal

The introduction of ICT in the European BI has had a significant impact on banks operating with physical branches. Especially the Internet has made it possible for banks to cut cost by offering online banking at a lower cost. The econometric analysis show that ICT use is positively correlated with firm restructuring activities. Thus, ICT enables companies to redefine the boundaries of their organisations and possibly gain a competitive advantage.

A prevalent change in the branch structure in the BI is the dual combination banking. With dual-combination banking, traditional manual banking services can now be performed online while the more sophisticated banking services are still performed in the branch bank, thus taking advantage of the low-cost nature of e-banking and the face-to-face advisory services of the branch bank. Numerous case studies support this trend. This also implies that both the transaction structure, the human resources and the infrastructure within the banks are influenced by branch renewal.

The process of branch renewal may however encounter some barriers. When traditional banking services are performed online the role of the teller is diminishing, why staff re-education and skills development is essential to a successful transformation of a traditional teller-intensive branch office towards an advisory-based branch bank network. As mentioned, the econometric analysis and the case studies indicate that this largely take place. It should however be mentioned that in the beginning, it was very rare that employees welcomed the branch renewal process, but with time, most banks experienced that the employees grew accustomed to the new structure or even liked the new structure better.

SEPA

SEPA gives benefits to different elements of the banking value chain. The benefits for the industry, as seen from the point of view of the legislators, comes from increased transparency, less risk of money laundering, increased transactions across borders and access to new markets. It is however observable that the business case for SEPA, seen

from a bank's perspective, may not be as clear. Due to uncertainty about the actual role of SEPA, many banks are settling for minimum solutions that only implement the basic, required SEPA instruments but do not make full use of the embedded potential in SEPA.

The BI has as of yet taken only the minimum measures required to comply with SEPA. This has to do with the fact that in the short term the BI is expected to make significant ICT-investments in order to comply with SEPA, which can make the short-term benefits of SEPA harder to reap for the BI. However, SEPA is expected to bring substantial benefits in the long term for end users, businesses and banks in Europe, as product innovation such as the development of e-Invoicing is expected to happen as a result of ICT-investments.

As mentioned in section 2.1, both SEPA and other harmonisation initiatives such as e-invoicing have the potential to affect both transactions (as these become standardised and possibly easier to handle), the bank-to-bank relationship (as payments, e-invoicing can now be performed more smoothly due to increased harmonisation) and human resources (as less paperwork is associated with especially payments) in the bank value chain. However, banks will need to make the required ICT-investments in order for this to happen.

6.1.2 The impact of ICT on market structure

The market structure in the BI is changing as a result of mergers and acquisitions. The recent mergers and acquisitions seen in the BI have called for an increased investment in ICT in order to integrate the different banking systems, as can be seen in the case of the National Irish Bank. However, ICT also helps implementing the merger more smoothly, as the IT-system from Danske Bank could be implemented directly in NIB, thus providing a common ICT-ground for the employees from day one. Mergers and acquisitions also happen as a result of ICT, when large branch banks acquire innovative Internet-only banks in order to obtain both a well-known brand from the traditional bank and an innovative business model from the Internet-only bank. For instance, the UK-based Egg bank was acquired by Citibank because of its ICT-capabilities.

6.1.3 Customer and bank readiness for the use and provision of e-banking

e-Banking has now developed into an advanced ICT solution where most everyday banking can be conducted online. The statistics do, however, indicate that e-banking across Europe is still not widely implemented among both private and corporate customers. Basic understanding of and confidence in the Internet is required to adopt e-banking, and not all Member States may have reached a critical mass of behavioural change among customers. Moreover, not all banks are ready for e-banking either. The survey shows that the enterprises providing online financial services to customers via the Internet comprise 56% of the banks in the survey, and payment services are provided by only 46% of the banks in the survey.

The case studies suggest that the ICT uptake differs greatly across the Member States. In Slovenia, an Internet bank is a great achievement in itself, while in the UK Internet-only banks are acquired by traditional banks in order to provide innovation to the banks. Moreover, the Deutsche Bank Research study showed that offline customers still

perceive online banking to be unsafe, despite of the online banks being very secure. However, due to the significant differences in ICT-uptake across Member States, and in an effort to increase customer's perception of safety, a pan-European initiative to either increase safety to an equal level in all Member States or to promote the high security level towards customers could be beneficial.

6.2 Policy implications

This section presents the policy implications derived from the analysis in this report. The exhibit below provides an overview of the policy implications arising from e-business activity in the BI, along with possible initiators and degree of policy leverage, which should be understood as the level to which a policy change will be able to influence the issues mentioned. Some changes might immediately be brought forward by a policy change (for instance, a change in the legislation) while other initiative calls for the banks to engage in voluntary networks in order for the policy implications to become reality.

The below table presents an overview of the policy implications arising from this study:

Exhibit 6.2-1: Policy implications arising from e-business activity in the banking industry

	Policy issues	Possible initiators	Policy leverage
1	Reinforce standardisation and harmonisation to increase efficiency	European Commission Industry federations	~ ~
2	Increase customer's perception of safety	European Commission National Governments Industry federations	~ ~ ~
3	Support the skills development among bank personnel	European Commission Industry federations	~

Source: Sectoral e-Business Watch (2007)

Reinforce standardisation and harmonisation to increase efficiency

Increased e-business standardisation and harmonisation is expected to help obtain a more effective BI, as for instance payments will be carried out in the same way no matter which country in the European Union the banks and/or their customers are doing business with. SEPA is one of the recent initiatives in this area. As Europe is adopting the SEPA, a logical next step is to look at how the business processes that facilitate the majority of the B2B and B2G payments can be standardised as well. One of the areas that could be looked into could be e-Invoicing. According to a recent Commission report on European Electronic Invoicing, e-invoicing is expected to contribute substantially to Europe's competitiveness by reducing supply chain costs, help streamline business processes and drive innovation.

SEPA sets out to harmonise rules and requirements when making payments in other Euro area countries. The reason for introducing SEPA was that the cross-border payment structure in the EU is not well enough developed, and it involves much paper work. With SEPA, all electronic payments are to be considered domestic payments by the banks.

The expected gains from a well-functioning SEPA are numerous. Companies with substantial numbers of cross-border payments are expected to benefit from the standardised payments, and standardised payments can also lead to easier market

access for the companies in question. Banks are expected to gain from the easier work processes, as there will be less paper-based work related to the transactions, and if banks are able to take the SEPA principles and develop them further to include other business processes, such as e-invoicing, they might even gain a competitive advantage. As illustrated in Section 3.2, the overall success of the SEPA initiative rests on achieving critical mass in the number of transactions within a reasonable time frame.

Despite the benefits, banks still only opt for the minimum requirements in complying with SEPA. The case studies show that banks need to substantially invest in ICT in order to reap the benefits from SEPA, but the banks have difficulties in seeing that these ICT-investments can be compensated by the potential gains from SEPA.

In order for the BI – and Europe in general – to reap the potential benefits stemming from increased harmonisation, the European Commission could play a more active role along with industry federations to support and reinforce the implementation of standards, most prominently e-invoicing and SEPA.

The harmonisation work could be supported to a greater extent than today, by soft policy initiatives from the European Commission along with soft incentive-based initiatives from industry federations. For instance, the industry organisations could support ICT development projects in the BI by bringing banks together and helping the banks see full potential of SEPA or of standardising e-invoicing. Moreover, the industry organisations could facilitate a forum where banks could cooperate on developing the ICT systems needed for further harmonisation, and thereby share the costs. The European Commission could support the initiatives from the industry organisations with grant schemes, if needed. Moreover, it could be explained in greater detail to the BI that the substantial ICT-investments needed to fully comply with the SEPA could be used for further product innovation in the respective banks.

The following recommendations are therefore proposed:

- **Promote initiatives such as shared ICT development processes in the banks or facilitate a forum where banks could cooperate in developing ICT systems to support increased harmonisation, such as SEPA or possibly e-Invoicing standards**
- **Encourage the cooperation between banks in ICT development projects to implement SEPA work processes and e-invoicing standards. This should be facilitated by the industry organisations as banks may not be willing to cooperate on ICT development projects by themselves**

Increase customer's perception of safety

The general uptake and use of ICT in the BI is rather high compared with other sectors. For instance, 99% of the banks in the BI have access to the Internet and about 5 in 10 banks use a computer connected to the Internet every day. Hence, the preconditions for increased e-business in the BI are in place. But in order to conduct e-banking, the safety measures must also be in place.

The Eurostat Community Survey used in this report shows that the availability of basic security measures is gradually becoming standard in the BI. For instance, more than 9 in 10 financial institutions now have firewalls, and almost all banks are using virus checking or protection software. Although there is still room for improvement (for instance, only 8 in 10 companies in the BI uses secure servers), the general impression of the BI is that it

complies well with the measures needed in order to secure safe e-banking, a finding supported by a recent study on safety in the BI by Deutsche Bank Research¹⁵⁴.

Despite the measures taken by the BI to secure safe e-banking, the analysis shows that the customers currently *not* using e-banking (offline customers) are not entirely ready to embrace e-banking. While online customers' (customers already engaging in e-banking) perception of security is on the rise, the same cannot yet be said for offline customers. This obviously has to be seen in the light of the fact that e-banking is one of the most well-developed e-services, and that many customers are increasingly using e-banking as part of their everyday banking routines. Nevertheless, this study shows that it is still possible for the BI to improve consumer confidence for especially offline customers, a finding supported by the Deutsche Bank study referred to above.

There are two aspects of increasing consumer safety in the BI. The first is related to what banks can do and the latter is related to what customers can do. With respect to the first aspect - what banks can do - it seems from the survey and the analysis conducted in this study and referred to above that banks are in general doing what is needed in order to ensure safe e-banking. This finding is also supported in the study by Deutsche Bank Research, which states that comprehensive security guarantees from banks are not the way forward as they are presumed to open up for irresponsible customer behaviour on the Internet, thus making e-banking *less* safe. However, one way for the banks to enhance customer safety could be to establish clear audit trails (clear overview of the processes in all transactions, in order to ensure increased transparency), which could provide the customers with increased transparency. The Commission could support this by promoting the establishment of such audit trails in cooperation with the industry organisations, or make it mandatory for the banks to establish such trails. It should however be further investigated if this is the right way to go for the banks in increasing consumer confidence.

With respect to the second aspect, customers can take reasonable safety measures before engaging in e-banking, by for instance apply anti-virus software to their computers. The Commission could help facilitate responsible behaviour on the Internet and increase consumer knowledge on how to behave responsibly when engaging in e-banking by promoting a "Safety on the Internet"-campaign in all Member States. For instance, in the Netherlands a campaign called 3XKloppen was initiated, educating customers to "check for three things", namely if it is a secure connection/if the user's software is up to date, if the web site actually what it says it is and if the total amount or order is correct¹⁵⁵. This campaign could be looked further into and possibly be used for inspiration. National governments could also be responsible for this campaign; however, this would not help align customers' perception of safety across the Union.

It should be mentioned that as the global reach of the Internet implies that financial services are increasingly borderless and global, a pan-European initiative could increase customer confidence, as certainty for customers that all banks are equally well protected may increase the customer's perception of security. A pan-European initiative could be in the form of shared e-banking authentication schemes in the form of similar processes for e-signature across the European Union. Denmark has for some time been working successfully with e-signature, and the experiences here might be looked into. However, as we see it, the fastest way of increasing consumer confidence might be through a

¹⁵⁴ Deutsche Bank Research (2008): Secure online banking needs a little help from its users

¹⁵⁵ <http://www.3xkloppen.nl/over-3xkloppen/>

safety campaign, as the study shows that when the customers have taken the first step in engaging in e-banking, they do not feel unsafe anymore.

The recommendations are therefore as follows:

For the banks

- **Promote the establishment of clear audit trails for e-banking transactions, for instance through the industry organisations, or make it mandatory for the banks to establish clear audit trails**

For the customers

- **Initiate a pan-European (alternatively multi-national) campaign to increase bank customers' awareness and knowledge about safe behaviour on the Internet**
- **Promote a pan-European authentication scheme (in the form of similar processes for e-signature) for e-banking customers**

Support the skills development among bank personnel

e-Banking and ICT have caused the traditional branch-based banks to change the service offerings in their branches. The business model of dual-combination banking is emerging, which implies that customers are increasingly performing basic banking tasks such as withdrawing money, checking balance etc. online while relying on bank branches only for more sophisticated, advisory tasks. The dual-banking model can give traditional branch banks the opportunity to adjust their branch network towards advisory functions and away from traditional teller services, thus adding value to their customers from direct and customised bank advisory services.

This development however means that an increasing number of jobs are being changed from traditional tellers to branch advisor/counsellors. Bank staff is increasingly asked to provide highly qualified financial advice rather than perform labour intensive and comparatively simple teller functions. It could be feared that the current renewal process in the BI brought forward by technological advances would leave a group of staff unable to develop their skills accordingly. However, as both the econometric analysis and the case studies show, this has to a very limited extent been the case. From the econometric analysis it can be seen that medium-level skills are the most prominent labour source associated with an increased ICT capital intensity in financial services. This means that ICT usage in financial services have a significant skill-bias towards medium-skilled labour, which corresponds very well with the findings from the case studies, where it can be seen that tellers are increasingly being retrained to perform more advanced financial services in the banks, thus moving from the low-level skill class to the medium-level skill class, but not all the way to the high-level skill class.

Thus, restructuring of branches and using ICT to increase process efficiency may not necessarily result in a decrease of the work force. In the BI, it can be seen from the econometric analysis and the case studies that there is not a shortage of qualified staff, rather, it is a question of ensuring that the existing personnel in the banks are retrained so that their skills can be used to create high value for the banks. In order to maintain and reinforce this positive development, it is recommended that trade federations and industry associations play an active role in skills development among branch bank staff to prepare them for the new role of the branch banks. The industry organisations could arrange

training courses for the staff in risk of becoming redundant in order to ensure that they are able to perform the more sophisticated tasks which add value. It is believed to be vital that these training courses are arranged by the industry organisations, as it is not likely that banks would want to share their training courses with each other, as this would mean revealing to the competitors how they add value to their banks. However, it might be possible that the industry organisations could arrange forums where banks could meet and possibly exchange best practises to the benefit of the entire BI. In addition, training courses by the industry organisations will ensure that the positive trend of retraining redundant tellers continues. The European Commission could support these training courses, for instance in the form of grant schemes to develop the curricula, or facilitating exchange of best practise.

The recommendations are therefore as follows:

- **Industry organisations could support training and skills development among bank staff by arranging training courses or facilitate networks for exchange of best practise**
- **The European Commission could support these training courses or networks with grant schemes**

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Annex I: Glossary of Technical Terms

Term	Definition ¹⁵⁶
B2B	Business to Business. Electronic transactions between companies.
B2B e-marketplace	Electronic trading platforms on the internet where companies can sell and/or buy goods or services to/from other companies. They can be operated by a single buyer or seller or by a third party. Many marketplaces are industry-specific. Some marketplaces require registration and membership fees from companies that want to conduct trade on them.
B2C	Business to Consumer. Electronic transactions, between companies and consumers.
Bandwidth	The physical characteristic of a telecommunications system that indicates the speed at which information can be transferred. In analogue systems, it is measured in cycles per second (Hertz), and in digital systems in binary bits per second. (Bit/s).
Branch renewal	Refers to the how branch based banking is being redefined in terms of their purpose, primary tasks, and the external pressure on branches to stay tuned to customer needs.
Broadband	High bandwidth internet access. In <i>e-Business W@tch</i> reports, broadband is defined as the capacity to transfer data at rates of 2 Mbit/s (megabits per second) or greater.
Brick-and-mortar	Brick-and-mortar banks are those who have a physical presence (for example, branch-networks), which offer face-to-face consumer experiences.
Channel	In communications, a physical or logical path allowing the transmission of information; the path connecting a data source and a receiver.
CRM	Customer Relationship Management. Software systems that promise the ability to synthesize data on customers' behaviour and needs and thus to provide a universal view of the customer.
Dial-up	The process of establishing a temporary connection (to the internet) via the switched telephone network.
Digital signature	An electronic signature that can be used to authenticate the identity of the sender of a message or the signer of a document, and to ensure that the original content of the message or document that has been sent is unchanged. Digital signature usually refers specifically to a cryptographic signature, either on a document, or on a lower-level data structure.
DSL	Digital Subscriber Line. A family of technologies generically referred to as DSL, or xDSL, capable of transforming ordinary phone lines (also known as "twisted copper pairs") into high-speed digital lines, capable of supporting advanced services. ADSL (Asymmetric Digital Subscriber Line), HDSL (High data rate Digital Subscriber Line) and VDSL (Very high data rate Digital Subscriber Line) are all variants of xDSL
Dual-combination banking	Encompasses the banking concept of combining online and branch based banking. The concept applied involves taking advantage of low-cost online banking with supplementary branch based advisory services.
e-Business	Electronic business. The Sectoral e-Business Watch uses the term "e-business" in the broad sense, relating both to external and to company internal processes. This includes external communication and transaction functions, but also ICT supported flows of information within the company, for example, between departments and subsidiaries.
ebXML	Electronic business using XML. A proven framework and unified set of internationally agreed upon technical specifications and common XML semantics designed to facilitate global trade.
e-Commerce	Electronic commerce. As distinct from the broader concept of e-business, e-commerce refers to external transactions in goods and services between companies (B2B), between companies and consumers (B2C), or between companies and governments (B2G) and may therefore be seen as a subgroup or component of e-business activities.

¹⁵⁶ Some of the definitions in this glossary are derived from or based on definitions suggested by Whatis?com, a leading online ICT encyclopaedia and learning centre. See <http://whatis.techtarget.com>.

Term	Definition ¹⁵⁶
EDI	Electronic Data Interchange. A way for unaffiliated companies to use networks to link their businesses by using a common technical standard for exchanging business data. While electronic mail between companies is common, electronic data interchange passes bigger bundles that replace large paper documents such as bills and contracts.
EDIFACT	Electronic Data Interchange For Administration Commerce and Transport. See UN/EDIFACT
e-Invoicing	Electronic invoicing. A business-to-business transaction in which invoices are generated, delivered (and normally paid) electronically, replacing the equivalent traditional paper-based invoicing processes.
e-Learning	e-Learning means supporting training with learning material in electronic format, for example material that is available on the intranet or the internet. e-Learning applications can be used for ICT-related training, but also for sector-specific or even company-specific training content.
ERP	Enterprise Resource Planning. A software system that helps to integrate and cover all major business activities within a company, including product planning, parts purchasing, inventory management, order tracking, human resources and finance.
EU	European Union
Extranet	A network using internet protocols that allows external organisations (for example customers or suppliers) access to selected internal data. Essentially it is an Intranet which gives external users restricted access (often password protected) to information through the firewall.
Firewall	A firewall is a set of related programmes that protects the resources of a private network from users from other networks. The term also refers to the security policy that is used with the programmes.
ICT	Information and communication technology. ICT includes networks, computers, other data processing and transmitting equipment, and software. The application of ICT in business processes leads to e-business.
Internet	The world's largest computer communication system, with an estimated 700 million users worldwide. ¹⁵⁷ The internet is a loose confederation of principally academic and research computer networks. It is not a network but rather the interconnection of thousands of separate networks using a common language.
Interoperability	The technical features of a group of interconnected systems (includes equipment owned and operated by the customer which is attached to the public telecommunication network) which ensure end-to-end provision of a given service in a consistent and predictable way.
Intranet	An internal internet, that is an internal network running using TCP/IP, which makes information available within the company. Most Intranets are connected to the internet, and use firewalls to prevent unauthorised access.
IT	Information technology. IT includes hardware (computers, other data processing and transmitting equipment) and software.
LAN	Local Area Network. The most common way of connecting computers in a small area (typically inside a building or organisation) for sharing databases and communication facilities. The two most common versions are Ethernet and Token Ring. Implementation is based on coaxial cables or plain wires.
NACE	Nomenclature Générale des Activités Economiques dans les Communautés Européennes; Classification of Economic Activities in the European Community
Remote access	The ability of a company computer network's transmission points to gain access to a computer at a different location.
RFID	Radio Frequency Identification. A wireless technology which is used to uniquely identify an object, animal, or person. RFID is coming into increasing use in industry as an alternative to the bar code. The advantage of RFID is that it does not require direct contact or line-of-sight scanning.
SCM	Supply Chain Management. Software that helps businesses to match supply and demand through integrated and collaborative planning tools.

¹⁵⁷ Cf. Global Internet Statistics by Global Reach, www.greach.com

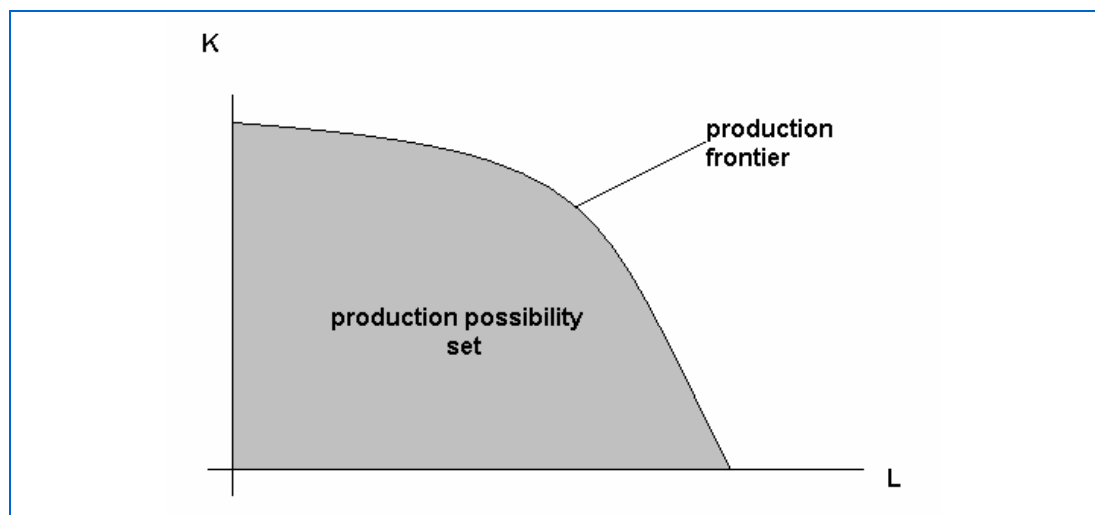
Term	Definition ¹⁵⁶
Sector	Sectors of the economy with comparable business activities. These constitute the main research unit of the <i>e-Business W@tch</i> . Aggregated information at the industry level is used to document the diffusion of activities within the industries as well as the overall importance of the observed phenomena for changes in the economy as a whole. The definition of sectors follows NACE Rev.1.1 classifications.
Secure server technology	Secure server technology means that data exchange between computers is based on certain technical standards or protocols, for example "Secure Sockets Layer" (SSL).
SME	Small and medium-sized enterprises with 0-249 employees. To be classified as an SME, an enterprise has to satisfy the criteria for the number of employees and one of the two financial criteria, i.e. either the turnover total or the balance sheet total. In addition, it must be independent, which means less than 25% owned by one enterprise (or jointly by several enterprises) falling outside the definition of an SME or a micro-enterprise, whichever may apply. The thresholds for the turnover and the balance sheet total will be adjusted regularly, to take account of changing economic circumstances in Europe.
SSL	Secure Sockets Layer. A commonly-used protocol for managing the security of a message transmission on the internet. SSL has recently been succeeded by Transport Layer Security (TLS), which is based on SSL.
Standard	A standard is a technical specification approved by a recognised standardisation body for repeated or continuous application, with which compliance is not compulsory.
Teller	A bank clerk who receives and pays out money. Furthermore, the teller is the employee of a bank who deals directly with most customers.
Transaction	Electronic transactions can be subdivided into several steps, each of which initiates a process. There are pre-sale (or pre-purchase) phases, sale and after-sale phases. Typically a transaction starts with information gathering, price and quality comparisons and possibly pre-sale negotiations. During the sale phase contracting and delivery are the core processes, and payment is the final stage of this phase. After-purchase transaction stages comprise customer service, the administration of credit payments and the handling of returns as well as marketing activities preparing for the next purchase.
UMTS	Universal Mobile Telecommunications Service. A third-generation (3G) digital standard for mobile communication, enabling packet-based transmission of voice, text and video at data rates up to 2 megabits per second (Mbps).
Value added	Gross output minus intermediate inputs. It is valued at producers' prices and includes all indirect taxes, but excludes VAT and subsidies.
VoIP	Voice over Internet Protocol (IP). The use of telephony services over internet networks, by means of digitised voice transfer technology.
VPN	Virtual Private Network. A way to use a public telecommunication infrastructure, such as the internet, to provide remote offices or individual users with secure access to their organisation's network.
W-LAN	Wireless Local Area Network. An implementation of a LAN with no physical wires, using wireless transmitters and receivers. It allows a mobile user to connect to a LAN or WAN through a wireless (radio) connection. A standard, IEEE 802.11, specifies the technologies for wireless LANs.
WWW	World Wide Web. The collection of pages in HTML format which reside on web-servers. Although WWW and the internet are different, the terms are increasingly becoming interchangeably used.
XML	Extensible Mark-up Language. A standard to describe the contents of a page or file. XML is a way to create common information formats and share both the format and the data on the World Wide Web, intranets, and elsewhere.

Annex II: Econometric Methodology

Common stochastic possibility frontiers approach

A production frontier indicates the maximum possible production in a given period of time, using a given amount of production factors. The frontier may for example refer to a particular country or industry. The production possibility frontier approach, in contrast to the more traditional production function approach, allows to disentangle the overall productivity growth¹⁵⁸ into two components: first, the rate of technological progress expanding the frontier, and second, the movements of decision-making units (e.g. firms and, on an aggregate level, industries and countries) towards the frontier, i.e. towards optimal usage of production factors (see Exhibit A2-1).

Exhibit A2-1 Production possibility set and frontier



If, given the factor input set, the produced output level stays below the potential maximum level, then the respective inefficient use of resources indicates indirectly that the whole production system or, at the micro level the single producer, faces an inability to match the best available practice. Farrell (1957) was the first to distinguish between technical and allocative efficiency. Technical efficiency reflects the ability of a firm to obtain maximal output from a given set of inputs. Allocative efficiency is used for the ability of a firm to use the inputs in optimal proportions, given their respective prices. The combination of both gives a measure of the total economic efficiency.

Assuming log-linear production function where i countries produce their output given the technological parameter b , the stochastic possibility frontier is now determined by two types of random errors. The always positive inefficiency random variable u_i , and the new random error term v_i , which has the usual properties of identical independent normally distributed errors with mean zero and constant variance, S_v^2 .

¹⁵⁸ Measured as changes in the ratio of total output produced over all inputs used in the production process.

$$\ln(y_i) = b_0 + \sum_{j=1}^m x_{ij} \cdot b_j + v_i - u_i \quad \text{for } i=1, \dots, N$$

The production frontier is therefore determined by the deterministic part plus a stochastic part consisting by a mixture of two probability distributions. One non-negative one, like e.g. a positive truncated normal distribution plus the usual normal distribution of the error term. Estimating a stochastic possibility frontier therefore has to estimated the parameters of the two probability distributions simultaneously.

The stochastic frontier function is therefore bounded from above by

$$\ln(y_i) = b_0 + \sum_{j=1}^m \ln x_{ij} \cdot b_j + v_i \quad \text{for } i=1, \dots, N .$$

The model equation can be estimated by using the standard maximum-likelihood-methods. However, there one has to make explicit assumptions about the underlying probability distributions of the two random variables. The estimation function, however, cannot be derived explicitly. One has to numerically optimise the ML¹⁵⁹-function. This is done in our paper by the Frontier 4.1 program (see Coelli, 1996). For the exact specification of the ML-function see Battese and Corra (1977). They showed that the ML-estimators are consistent and asymptotically efficient (Aigner, Lovell, Schmidt, 1977).

The model is not limited to a Cobb-Douglas function estimation but could be easily adjusted to a more flexible functional form of a translog production function.¹⁶⁰

$$\ln(y_i) = b_0 + \sum_{j=1}^m \ln x_{ij} \cdot b_j + \sum_{j=1}^m \sum_{k=1}^m b_{juk} \cdot \ln x_{ik} \cdot \ln x_{jk} + v_i - u_i \quad \text{for } i=1, \dots, N$$

Later on one-sided generalized likelihood-ratio-tests for such estimators where derived as well (Coelli, 1995).

In the current paper we use this stochastic possibility frontier approach to measure the degree of inefficiency between industries in different countries in the use of the factor inputs at the aggregate level and at the industry level as well. Since we do not estimate a single frontier for each countries industry separately but instead assume a common possibility frontiers, this approach has been named as common stochastic possibility frontiers approach (see e.g. Berger, Humphrey 1997). The possibility frontier approach, however, gives no explanation of the causes of such inefficiencies beyond the fact that a certain factor combination is used inefficiently. Organizational or institutional failures are not revealed they are not explicitly introduced in the estimation of the stochastic possibility frontiers.

In our analysis we will use a panel-data approach because we have an insufficient number of countries available and only if we would pool industry and country data in our

¹⁵⁹ ML - Maximum Likelihood.

¹⁶⁰ In our econometric analysis translog specification were estimated but the results are not included in this report due to limited space. They will be published separately in a forthcoming working paper. By incorporating the cross-terms of a translog function or other flexible functional form one is able to determine variable substitutions elasticities between the different factor inputs. Assuming a Cobb-Douglas specification one assumes constant unity substitution elasticities between all different factor inputs.

data set we could use the cross-section approach. However, there is ample room to look for more generalizations of the stochastic possibility frontier model which are beyond the scope of this paper.

To incorporate intermediate inputs in our analysis we use the gross production value, gpv of the respective industry instead of the gross value added, gva , as the output variable. This enables us to estimate the output elasticities¹⁶¹ for intermediate inputs.

$$\ln(gpv_i) = b_0 + \sum_{j=1}^m \ln x_{ij} \cdot b_j + v_i - u_i \quad \text{for } i = 1, \dots, 6$$

$$\text{with } x_j \in \{imi, ict, nict, hswh, mswh, lswh\}^{162}$$

Combining the industries possibility frontiers for each country to one common possibility frontier for an industry across all countries, we obtain a multi-country data panel with a common stochastic possibility frontier.

$$\ln(gpv_{j,i}) = b_0 + \sum_{j=1}^m \ln x_{ij} \cdot b_j + v_i - u_{j,i} \quad \text{for } i = 1, \dots, 6 \quad \text{and } j = 1, \dots, 12$$

To impose constant returns to scale we normalized the possibility frontier by subtracting the natural logarithm of total working hours from both sides of our equation. This normalized common possibility frontier has the gross production value labour productivity in working hours on the left hand side and the respective factor intensities, i.e. ICT-capital intensity, etc. on the right hand side.

$$\ln(gpv_{j,t}^*) = b^* + \sum_{j=1}^m \ln x_{ij,t}^* \cdot b_j^* + v_i - u_{j,i} \quad \text{for } i = 1, \dots, 6 \quad \text{and } j = 1, \dots, 12$$

To include Harrod-neutral technical change in the multi-country industry common possibility frontier a time trend variable is additionally included. The respective parameter value b_7 measures the average TFP-growth rate. Therefore the long-term rate of Harrod-neutral technological progress determines the outward shift attributed to a steady technical change of the common possibility frontier.

$$\ln(gpv_{j,t}^*) = b^* + \sum_{j=1}^m \ln x_{ij,t}^* \cdot b_j^* + b_7^* \cdot t + v_i - u_{j,i} \quad \text{for } i = 1, \dots, 6 \quad \text{and } j = 1, \dots, 12$$

¹⁶¹ An output elasticity is a dimensionless measure for the ratio of marginal percentage changes of output with regard to a particular input variable, i.e. a 1% increase in the input variable changes the output variable by x%.

$$e_{o,x} = \frac{\partial \ln o_t}{\partial \ln x_t} = \frac{\partial o_t}{o_t} \bigg/ \frac{\partial x_t}{x_t} = \lim_{\Delta \rightarrow 0} \frac{\Delta o_t}{o_t} \bigg/ \frac{\Delta x_t}{x_t}$$

¹⁶² the symbols denotes imi - intermediate inputs, ict – ICT-capital stock, nict – Non-ICT-capital stock, hswh – high-skilled total working hours, mswh – medium-skilled total working hours, lswh - low-skilled total working hours.

Annex III: Data sources for the economic analysis of ICT impact

The economic analysis of ICT impact (Chapter 4) used the following data sources:

Section	4.1	4.2	4.3	4.4
Topic	ICT and productivity	ICT and innovation	ICT and market structure	ICT and value chain
Data source	EU KLEMS	EU KLEMS / Zephyr**	EU KLEMS / Zephyr**	EU KLEMS / ERM
Links	http://www.euklems.net/	zephyr.bvdep.com/		(*)
	(*) http://www.eurofound.europa.eu/emcc/index.htm			

EU KLEMS database

The aim of the EU KLEMS research project is to create a database on measures of economic growth, productivity, employment creation, capital formation and technological change at the industry level for all European Union member states from 1970 onwards. The database includes measures of economic growth, productivity, employment creation, capital formation and technological change at the industry level, using a 63-industry breakdown for the major of the EU's 25 Member States as well as for the US, Japan and Canada, from 1970 onwards (1990 for the recently acceded Member States).

ZEPHYR

ZEPHYR is an information solution containing M&A, IPO and venture capital deals with links to detailed financial company information. There is no minimum deal value so you can analyse all deals in detail, irrespective of the transaction size. All deal information is translated into English. All deals are verified by a senior researcher before they are published on ZEPHYR to ensure consistently high quality information.

The database has five years of global coverage and includes deals involving European or American companies going back to 1997.

European Restructuring Monitor

The European Restructuring Monitor (ERM) provides up-to-date news and analysis on company restructuring in Europe. The ERM is a tool designed to provide a quick overview of restructuring activities in Europe and their employment consequences. It provides information on individual restructuring cases and allows for the compilation of statistics comparing countries, sectors and types of restructuring. All information is based on the analysis of daily newspapers and the business press in the EU27 and Norway.

The database covers restructuring activities from 2001. To date 6991 restructuring cases from most industry sectors have been collected.