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Synthesis Report

Evaluation of i2i Information and
Communication Technology (ICT) Projects

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GLOSSARY

GLOSSARY OF TERMS AND ABBREVIATIONS

ADSL/ADSL2+	Asymmetric digital subscriber line/enhanced version
ARPU	Average revenue per user
ATM	Asynchronous Transfer Mode
Borrower	The legal persona with whom the Bank signs a loan agreement
CA	EIB's Board (q.v.) – the EIB Board of Directors, which has sole power to take decisions in respect of loans, guarantees and borrowings
COP	Corporate Operational Plan
DAC	Development Assistance Committee (a sub-committee of the OECD)
DSL	Digital subscriber line
DSLAM	Digital subscriber line access multiplexer
DTH	Direct to the home (satellite)
DTT	Digital terrestrial television
DVB-H	Digital Video Broadcasting (Handheld)
DVB-T	Digital Video Broadcasting (Terrestrial)
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EDGE	Enhanced data rates for GSM evolution
EIB	European Investment Bank
EIRR	Economic internal rate of return
EU	European Union
EV	EIB Operations Evaluation
i2i	Innovation 2000 Initiative (Innovation 2010 Initiative from March 2003)
FIRR	Financial internal rate of return
FSS	Fixed satellite service
GPRS	General Packet Radio System
GSM	Global System for Mobile
HDTV	High definition television
ICT	Information and communications technology
IFI	International financial institutions
IP	Internet Protocol
MHz	Megahertz
MPLS	Multi-protocol label switching
MSS	Mobile satellite service
NACE	Nomenclature générale des Activités économiques dans les Communautés Européennes – the European classification of economic activities, providing a reference framework for the production and the dissemination of statistics related to economic activities (the latest revision – Rev 2 – was adopted in 2006 for use throughout the EU, and the EIB uses a sector classification system based on NACE)
NGN	Next-generation network
LEO	Low earth orbit

Lisbon process	Throughout this report the expression 'Lisbon process' will be used to refer to the ongoing process launched at the Lisbon European Council in March 2000 that set a new strategic goal for the EU to become " <i>the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion</i> " (also referred to as the Lisbon Strategy and the Lisbon Agenda)
PSTN	Public switched telephone network
PCR	Project completion report
PJ	EIB Projects Directorate – responsible for ex-ante project techno-economic analyses, the preparation of the technical description, and the physical monitoring of implementation and completion.
PDH	Plesiochronous digital hierarchy
Project	A clearly defined investment, typically in physical assets, e.g. a specific section of road, a bridge, etc.
Ops A	EIB Directorate for Lending Operations – EU Members, Acceding, Accession and Candidate
RDI	Research, development and innovation – used throughout this report to refer to the EIB lending priority It refers to the whole process of generating new knowledge and turning it into productive economic activity and is slightly wider definition than R&D
R&D	Those activities which meet the accountancy/statistical definition of research and development, and which include much, but not all, of the innovation cycle
SDTV	Standard definition television
SDH	Synchronous digital hierarchy
TDM	Time division multiplexing
Transponder	Transmitter-responder (in this report : a Satellite channel)
UHF	Ultra-high frequency
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS terrestrial radio access network
WDM	Wavelength division multiplexing
xDSL	Generic term for the family of digital subscriber line technologies
2G	Second generation (mobile network)
3G	Third generation (mobile network)

EXECUTIVE SUMMARY

This ex-post evaluation concerns EIB financing in the field of Information and Communication Technology (ICT). ICT is understood following the sector definition as in the *Nomenclature générale des Activités économiques dans les Communautés Européennes* (NACE) and includes “manufacture of office machinery and computers”, “manufacture of radio, TV and communication equipment and apparatus”, “post and telecommunications”, “computer and related activities” and “recreational, cultural and sporting activities”, which include the sub-sectors “motion picture and video activities” and “radio and television activities”.

This evaluation considers ICT operations with loan contracts signed between 1 January 1996 and 31 December 2008. During this period, 155 projects in the area of ICT were signed (EU-27) for a total amount of EUR 31 bn. The burst of the dot.com bubble of 2001 is reflected in lower loan volumes as from 2002, reaching former levels as from 2005 only, both in absolute terms as in terms of average project size. Projects evaluated in-depth, related to “i2i”, were signed as from 2001 onwards, hence implemented in the aftermath of the dot.com bubble.

The focus of the evaluation is on the relevance and performance of the projects, as well as the EIB’s contribution and management of the project cycle. The evaluation has two primary functions. Firstly, it serves as a learning exercise to provide assistance to the Bank’s operational departments, thereby increasing the Bank’s value added in future operations. Secondly, it increases transparency to the EIB’s governing bodies and other stakeholders.

Policy context / relevance

The EIB has been funding investments in ICT for many years. Prior to 2000, ICT financing was eligible within the context of policies such as TENs (e.g. TEN-Telecoms) and regional development. This policy was further strengthened following the Lisbon summit held in March 2000, when a new EU strategy was launched to strengthen employment, economic reform and social cohesion as part of the emerging knowledge-based economy, and to let Europe become “the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion.” There was an agreement that the shift to a knowledge-based economy needed a high performance ICT infrastructure, which meant not only the existence of an appropriate regulatory environment on which the EC had been working since the middle of the 1980s, but also the implementation of appropriate investment projects, both quantitatively and qualitatively.

The Bank’s contribution to the Lisbon process was the “i2i” policy, which was identified as a Top Operational Priority in the EIB Corporate Operational Plan (COP) in its July 2000 update. It was specified in the i2i framework adopted by the EIB Board that “*the interventions of the Bank in the ICT area will rest on a balanced consideration of three basic elements: **innovation, competition and non-exclusion***”. For the period between 2002 and 2004, the COP foresaw an annual lending volume of EUR3.5 billion for ICT-related projects.

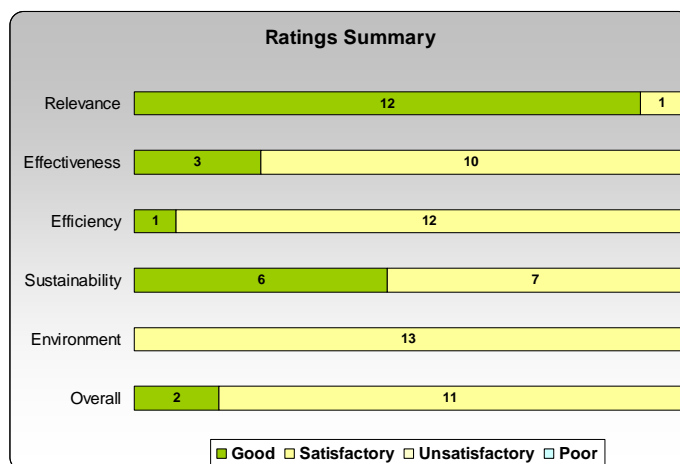
EIB policy on ICT investment has evolved over the last 10 years to accommodate the rapid rate of change that has occurred in the sector over this period, characterised by the modernisation of fixed telecommunications networks, roll-out of different generations of mobile telephony; new media and broadcasting technologies, in particular the switchover from analogue to digital terrestrial TV; as well as the rapid evolution of the semi-conductor sector in which Europe has an important research and innovation capacity. Several policy papers and statements have been made to confirm and support this strategy. These developments, in turn, constituted the technical basis for successive eEurope initiatives.

All projects evaluated are considered to have supported the relevant EU/EIB objectives. The majority of projects under evaluation were considered to support the objectives of the countries in which they were implemented, especially in terms of regional development.

Project performance

The 13 projects evaluated in-depth concerned the roll out of fixed (5) or mobile (2) telecommunications networks, 2 projects related to media (a digital TV broadcast network and a satellite respectively), whilst 4 projects were involved with semiconductors manufacturing (3) or research (1). Four loans were in excess of EUR 250m, 3 of which in fixed telecoms, the highest being EUR 700m.

Operations were evaluated on the basis of internationally accepted evaluation criteria of Relevance, Effectiveness, Efficiency and Sustainability. A summary of ratings is given below. These include a separate rating for Environment.



Effectiveness. The projects were generally complex in nature and undertaken in a dynamic commercial environment, characterised by rapidly moving technology implementation. Delays, occurring in about half of the projects, were in most of the cases related to changing market circumstances, irrespective of the sub-sector in which the project took place. Several projects had changes in scope, especially when market conditions became unfavourable or following a cost-cutting process in the industry due to tough competition. This sometimes led to lower project costs and de facto a higher EIB share, e.g. when project components were abandoned. Two cases (in fixed and mobile) were observed where, due to falling equipment prices or site sharing, unit costs could be reduced as compared to the initial plan. Projects were generally well managed as they were integrated into existing management structures. Employment effects were often neutral as in most of the cases the projects replaced legacy systems, sometimes even leading to less direct employment. This was not the case for the semi-conductor projects which led to increased employment opportunities, generally highly skilled jobs.

Efficiency. The telecoms projects were all concerned with mass-market applications and were therefore vulnerable to demand variations. The entry of effective competition into the mobile and fixed markets meant downward pressure on prices ensued. This resulted in revenue projections being missed in some cases, though conversely consumers benefited from better value, which is a major factor in improving the take-up of broadband services. The efficiency of the semiconductor projects is more difficult to measure given the fact that there was only one actual producer of semiconductor devices, the remaining Promoters being either makers of manufacturing equipment or research establishments.

Sustainability. In the case of fixed and mobile telecommunications projects, the infrastructure funded by the loans is highly sustainable and future proof, that is, it can be updated in line with future technical developments. For the media projects, the infrastructure is also sustainable. The infrastructure resulting from the semiconductor projects is also regarded as suitably future proof. The financial stability of the telecommunications related projects (fixed, mobile, broadcasting) is considered satisfactory. The sustainability of the semiconductor projects is subject to a number of caveats concerning the global market and the ability of the sector to economically continue with the current rate of development, i.e. the so-called Moore's Law.

EIB Role

EIB Contribution. On the one hand, EIB financial contribution was in general not judged very high: it appeared crucial for one project only. Most Promoters did however insist on the relatively long tenors of EIB loans, which are judged interesting as they can be brought in line with the economic life of each investment; such tenors were difficult to obtain from commercial banks for this type of projects during the period of concern. The catalytic effect of EIB funding was also mentioned, as well as the diversification of financing sources made possible by EIB funding, leading ultimately to lower costs for the borrower. On the other hand, even though EIB's non-financial contribution is overall judged moderate – i.e. EIB was not very actively involved in the projects – it was generally appreciated by

Promoters. Two issues were highlighted, i.e. the thorough project analysis, having a positive effect on attracting other financiers, and the ability to discuss legal matters efficiently.

EIB Project Cycle Management. For most projects, EIB management was deemed satisfactory. Furthermore, the Promoters considered that the EIB undertook the most exhaustive overall ex-ante project analysis when compared to other financial organisations. With regard to project implementation/financing arrangements, the process appeared to be unnecessarily slow in some cases, and the reasons for this, some of which were legitimate, were frequently not recorded. Hence, whereas the appraisals undertaken by the Bank were generally comprehensive and rigorous, monitoring was weak and the Bank appeared not always well informed of changes in scope or financing plans.

TABLE OF RECOMMENDATIONS

Recommendation	EIB response
1 ANTICIPATE CHANGES (MARKET, TECHNOLOGY) IN THE PROJECT CONTEXT	
<p>During the implementation of a project, the project environment (market, technological developments, etc.) sometimes changed to such an extent that it caused the Promoter to change its original plans. Such initiative should be viewed positively, and is to be encouraged, especially when technology development timescales are short as is the case in ICT. Appropriate mechanisms should be considered to encourage such behaviour by Promoters.</p>	<p><i>Resources for project process reporting should be increased to monitor project implementation and allow for proactive changes - especially in a fast moving business environment.</i></p>
2 IMPROVE APPRAISAL AND MONITORING	
<p>2a The scope of content present in the ex-ante documentation (appraisal reports), varied across projects. While Promoters are obliged to report on any technical changes that occurred when completing the PCR, they should maintain an ongoing record of when other types of changes are made. The EIB should develop more defined guidelines regarding the type of information to be monitored, i.e. that which is essential or optional.</p>	<p><i>Reporting requirements forming part of the Bank's documentation were introduced during the evaluation period to tackle the problem of promoter reporting obligations. A number of projects in the sample therefore do not have these monitoring provisions. The results only progressively noted the difficulty of enforcing discipline on promoters.</i></p>
<p>2b It often appeared difficult for the Promoter to provide information relating to an updated calculation of the FIRR for a project, either during project implementation or after its completion. This usually occurs because the Promoter's internal systems report across different organisational boundaries, or because the project itself was part of a scheme that extended across a larger geographical area. Any information that is considered key to an evaluation, and that the Promoter is expected to produce, should be emphasised at the outset and perhaps defined in the finance contract.</p>	<p><i>The EIB typically calculates FIRR on own assumptions, using primary information from promoter. The assumptions utilised are not always shared with the promoter, but should be spelt out in the annex of the appraisal report to facilitate ex post evaluation. There is also the constraint of no "extra" work imposed or requested from promoters.</i></p>
<p>2c In a minority of projects, there were some significant errors in the forecasts for unit costs that were used to estimate the total project budget. More careful consideration should be given to the likely evolution of unit prices beyond the appraisal period especially of components that make large contributions to the total project cost.</p>	<p><i>In sectors with high unit price volatility (often non-mature industries) acquisition of highly specialised data bases might be considered to better calibrate the variance in price contingencies.</i></p>

INTRODUCTION

This ex-post evaluation concerns EIB financing in the field of Information and Communication Technology (ICT) within the European Union. It considers ICT operations with loan contracts signed between 1 January 1996 and 31 December 2008, financed partly under the Innovation 2000 Initiative (i2i) and its successor the Innovation 2010 Initiative. The evaluation of EIB financing of ICT is part of the current EV programme of i2i evaluations, including evaluations of EIB financing of Education in 2006 and EIB financing of research, development and innovation (RDI) in 2007. The evaluation covers all member states (EU-27). A portfolio analysis shows that between 1 January 1996 and 31 December 2008, 155 projects in the area of ICT were signed for a total amount of EUR 31bn. From this initial group, projects were selected for individual evaluation, which a) were signed from 2001 onwards, b) have been completed, c) are not fully reimbursed and d) preferably have a project completion report (PCR) available. Global loan operations are not included, nor are EIF operations in support of ICT. The focus of the evaluation is on the relevance and performance of the projects, as well as EIB's contribution and performance.

The evaluation has two primary functions. Firstly, it serves as a learning exercise to provide assistance to the Bank's operational departments, thereby increasing the Bank's value added in future operations. Secondly, it increases transparency to the EIB's governing bodies and other stakeholders.

Information and Communication Technology – Thematic Scope of the Evaluation

Following the *Nomenclature générale des Activités économiques dans les Communautés Européennes* (NACE), ICT covers the following sectors:

- manufacture of office machinery and computers
- manufacture of radio, TV and communication equipment and apparatus
- post and telecommunications
- computer and related activities
- recreational, cultural and sporting activities, including the sub-sectors "motion picture and video activities" and "radio and television activities".

The Bank has been financing projects in these sectors under the ICT eligibility and the RDI eligibility since 2000, and, prior to the launch of the i2i initiative in 2000, under other eligibilities (e.g., e-TENS or regional development). The portfolio analysis conducted for this evaluation shows that over the 1996-2008 period, the Bank financed projects mainly in the following NACE sub-sectors: "fixed circuit switched networks" (42 projects) and "mobile communication networks" (34), and to a lesser extent "fixed broadband networks" (14), the "manufacture of electronic valves and tubes and other electronic components" (14) and "radio and television activities" (9). All other ICT sectors counted fewer projects.

This distribution reflects the fact that the Bank has accompanied several major evolutions within the ICT (in particular telecoms) sector in Europe: the modernisation of the traditional fixed telephone network (starting pre-2000), the roll-out of new broadband telecoms networks - both mobile and fixed as from the early 2000s; and, on R&D level, the development of semi-conductor technologies in order to keep in pace with the so-called "Moore's Law"¹. Although in principle all ICT sub-sectors are concerned in this evaluation, it will naturally concentrate on those sub-sectors which the EIB has financed most, i.e. fixed telecoms, mobile telecoms, media and semiconductors. Results will be presented accordingly.

Approach and methodology

The comparison of ex-post results with the expectations and objectives at appraisal is the main basis for the evaluation of the operations. In accordance with the Bank's evaluation procedures, individual projects were rated according to four categories: "Good", "Satisfactory", "Unsatisfactory" and "Poor"². The evaluation was carried out by an external consultant and internal EV staff, supervised by an EV Team Leader. The relevant operational departments (OPS-A, PJ and RM) were consulted at the various stages of the evaluation. The following steps are key elements for this evaluation:

¹ Which states that the number of transistors on a chip doubles about every 20 months, which has indeed been the case since the 1960s.

² "High", "Significant", "Moderate" and "Low" for EIB contribution.

A general review of EU, Member State and EIB policies and strategies, based on a literature review of work related to the evaluation.

A comprehensive portfolio review – analysing EIB financing trends, sector and country distributions for 155 ICT projects (EUR 31bn) signed during the period 1996-2008; an initial portfolio review (1996-2007) was used as input to the evaluation, notably to select projects for in-depth evaluation.

A desk review – of an initial sample of 20 projects eligible for in-depth evaluation was carried out, which formed the basis for the selection of the final project sample. On the basis of the desk review findings 13 projects were chosen for in-depth evaluation as representing a good selection in terms of country coverage, loan volume, promoter type, sector, size and type of operation.

The resulting project sample can be considered representative for the ICT financing of the Bank during the period 2001 to 2008. The following table summarises the main features of the selected projects, covering 7 EU Member States.

Table 1 Projects subjected to individual evaluation

<i>Project</i>	<i>Country</i>	<i>Loan size[*]</i>
Telecoms – Fixed		
Project A	Spain	Large
Project B	Germany	Large
Project C	Slovenia	Medium
Project D	Italy	Large
Project E	Spain	Medium
Telecoms – Mobile		
Project F	Portugal	Medium
Project G	Italy	Large
Telecoms – Media		
Project H	Italy	Medium
Project I	Spain	Medium
Semiconductors Manufacturing and R&D		
Project J	Germany	Medium
Project K	Germany	Medium
Project L	France	Medium
Project M	Belgium	Small

^{*} Loan size (actual disbursement)–small <EUR100 million, large >EUR250 million, otherwise medium.

In-depth evaluation: Detailed project analysis and field visits for all of the abovementioned projects have been conducted. Individual evaluations involved meetings with the organisations for project implementation, operation and policy, in particular the responsible company managers. Individual evaluation reports have been prepared and discussed with the operational staff associated with the project, and draft final reports have been provided to project promoters for (factual) comments. The information contained in these reports is of a confidential nature and availability is restricted to EIB staff.

Synthesis: During the last step, the findings from the individual reports were drawn together into the present synthesis report, highlighting common features and drawing overall conclusions and recommendations to feed into future EIB policy and practice.

1 BACKGROUND

1.1 EIB ICT Policy

The EIB has been funding investments in ICT for many years. Prior to 2000, ICT financing was eligible within the context of policies such as TENs (e.g. TEN-Telecoms) and regional development. This policy was further strengthened following a key output of the Lisbon summit held in March 2000, when a new EU strategy was launched to strengthen employment, economic reform and social cohesion as part of the emerging knowledge-based economy. The essence of this was a 10-year goal for the EU "... *to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion.*"

The Bank's contribution to the Lisbon process was the "i2i" policy, which was identified as a Top Operational Priority in the EIB Corporate Operational Plan (COP) in its July 2000 update. It was specified in the i2i framework adopted by the EIB Board that "*the interventions of the Bank in the ICT area will rest on a balanced consideration of three basic elements: **innovation, competition and non-exclusion.***"³ For the period between 2002 and 2004, the COP foresaw an annual lending volume of EUR 3.5 bn for ICT-related projects.

EIB policy on ICT investment has evolved over the last 10 years to accommodate the rapid rate of change that has occurred in the sector over this period, characterised by the modernisation of fixed telecommunications networks, roll-out of different generations of mobile telephony, new media and broadcasting technologies (e.g. digital TV) and the rapid evolution of the semi-conductor sector in which Europe has an important research and innovation capacity. An initial EIB policy paper published in April 2000 identified a number of key policy areas that would assist the EU in gaining the full benefit of the ICT revolution (discussed in more detail in Section 2.2), rapidly followed by a further policy paper (September 2002) providing a sector update, particularly in relation to projects that supported i2i. The timing of this report coincided with the aftermath of the dot.com bubble that had negatively affected a large proportion of the ICT sector. The original i2i initiative was further extended in March 2003 with the launch of the Innovation 2010 Initiative, which refined some of the original aims but broadly followed the same overall strategy.

1.2 Rapidly evolving ICT sectors

The various ICT sectors have rapidly evolved in recent years as the sector has become liberalised, the traditional state monopolies giving way to competitors. This section briefly describes the – very tightly related – market, technological and regulatory dynamics of ICT sub-sectors over the past decade. A short description for the semiconductor sector is also presented, which can be considered to be an enabling technology for the ICT industry and which is covered by the present evaluation.

1.2.1 Fixed telecommunications: from national monopolies to competition

Across the various EU nations, there is generally a telecoms incumbent,⁴ which, on a country-by-country basis, owns the public switched telephone network (PSTN) access infrastructure, which is a copper-based network originally designed and installed to deliver primarily voice services to end users. As the demand for data services increased, especially that of Internet access from the residential sector, around the year 2000, incumbents began to install xDSL systems to provide so-called 'broadband' services that offered a significant increase in data throughput compared to traditional PSTN modems. In practical terms, this involved the installation of a splitter and modem at the subscribers' premises, as well as digital subscriber line access multiplexers (DSLAMs) in the serving of local exchanges. Within the local exchange, the outgoing data traffic from a subscriber is first split off from the voice traffic, multiplexed up with data traffic from other subscribers, and then sent off to a data – usually asynchronous transfer mode (ATM) network.

³ Source: *Implementing i2i and the Telecoms Sector*, policy paper

⁴ The "telecoms incumbent" is the historical national telecommunications provider.

Around the same time as these technologies were being deployed by incumbent operators, the European industry regulators saw the opportunity to mandate access to the upgraded infrastructure for other operators. This involved measures such as the so-called ‘unbundling’ of the local loop, equipment, co-location, and the availability of wholesale services from the incumbent. This was considered the most effective way to introduce competition at the services level, which was desirable from both the regulators’ and the end users’ perspective. It is worth noting that four of the five fixed telecoms projects that were evaluated in-depth by the EIB were undertaken during the period between 2000 and 2001, which is when the initial stages of the above scenario were developing.

Today, in 2009, the key initiative of both incumbents and other operators is to deploy next-generation networks (NGNs), in response to an increasingly competitive marketplace, demand for high-speed services, and the availability of technologies that allow lower cost networks to be built. Such new plans do not make the investments made during the EIB-funded projects redundant, since they will have been used for the duration of the originally planned economic lifetime and, in many cases, can be incorporated into the NGN infrastructure. Many of the NGNs will involve collapsing a variety of existing separate network platforms, for example PSTN, Internet Protocol (IP), ATM, SDH, plesiochronous digital hierarchy (PDH) and leased-line platforms, into one single network running IP multi-protocol label switching (MPLS) over wavelength division multiplexing (WDM). The deployment of an NGN will allow operators to deliver innovative services and significantly reduce operating expenditure, hence providing better value to customers.

To date, two generations of asynchronous digital subscriber line (ADSL) technology have been deployed: ADSL and ADSL2 (including ADSL2+). However, the latter only delivers significant improvement over relatively short access lines, i.e. to a small proportion of the population of subscribers. Naturally, as more traffic is introduced onto the aforementioned access networks by end users, the core (or backbone) transmission networks must also be upgraded, i.e. their capacity must be increased, among other things. The main technologies in such transmission networks are:

- optical fibre and wavelength division multiplexing (WDM) – which provides mainly capacity
- synchronous digital hierarchy (SDH) – which multiplexes traffic from many sources onto relatively few routes to achieve cost-efficiency, and provides transmission flexibility through use of cross-connects and add-drop multiplexers
- ATM – where a network of ATM switches enables operators to set up ‘virtual’ paths through the network so that various services can be provided that offer different quality of service, as required by say voice or video.

The increase in capacity also allows the operator to increase the resilience of the network via several possible strategies

1.2.2 Mobile telecommunications: subsequent roll-outs of new technologies

The original GSM⁵ networks deployed in Europe operated around 900MHz, and were referred to as second generation (2G); this was followed by the allocation of a second spectrum block around 1800MHz that provided further capacity. GSM has been a huge success, largely because of the standards-based approach that has allowed compatible handsets to be mass produced, and the ability for users to roam seamlessly to other GSM networks as they travel between countries. GSM was launched in the late 1980s and was primarily designed for voice transmission; in order to introduce a capability for efficient transmission of data, existing networks were subsequently upgraded to General Packet Radio System (GPRS) and EDGE or 2.5G in the late 1990s. The majority of mobile operators in Europe began deploying GPRS/EDGE after the turn of the millennium. This allowed a far higher data throughput and an ‘always on’ capability that made more efficient use of network resources. This required adding an ‘overlay network’, where additional equipment was installed at existing GSM sites, i.e. GPRS uses the pre-installed GSM radio access network. Operators could then begin to offer data-based services to customers, thereby widening their service portfolios and generating extra revenue streams. This trend was common among European mobile operators.

The next generation of mobile networks after GPRS was Universal Mobile Telecommunications System (UMTS), or 3G, launched in 1999, with roll-outs starting in the early years of the millennium. UMTS delivers even higher data rates and supports multimedia services. However, rather than being another overlay network, as was the case for 2.5G GPRS, UMTS requires deployment of a new radio access network, known as UTRAN, and thus incurs significant capital expenditure to roll out. Also, the UMTS network uses a new set of frequencies, which were auctioned to mobile operators by governments. The large sums paid for this spectrum, the cost of installing the new networks, and the weaker-than-expected take-up of 3G-based services, has so far made the investment less attractive than anticipated. The cost of building new 3G networks also meant that their deployment was not as

⁵ Global System for Mobile communications – original acronym based on *Groupe Spéciale Mobile*

rapid and widespread throughout Europe as that of 2.5G networks. Furthermore, within a given country, the increased cost means that 3G coverage will be less than that for 2G/2.5G networks for the foreseeable future.

An interesting development has been the increasing use of 3G as a fixed broadband substitute. This has offered fixed users a broadband service where DSL is not available and, in some situations, a more economical solution.

As competition in mobile markets has become more firmly established, regulators gradually changed their approach to the sector. Intervention has occurred, in particular, on matters concerning call termination charges and roaming charges, where there is evidence of super profits being taken. The authorities are also keen to reduce the environmental impact of base station sites, and have enforced the sharing of sites where this is feasible to avoid the proliferation of multiple masts at one location.

1.2.3 Media

Broadcasting: from analogue to digital terrestrial TV

It is hard to overstate the importance and dominance of the broadcasting sector in today's world. The broadcasting industry consists of radio and television stations, and their associated networks, which acquire the right to broadcast. All types of information and services are increasingly moving from the analogue to the digital domain. This is true of various media for the encoding and storage of audio (e.g. from vinyl to compact disc), and video (e.g. from VHS to DVD).

Television has made a similar transition. The Digital Video Broadcasting (DVB) organisation, "*an industry-led consortium of over 300 broadcasters, manufacturers, network operators, software developers, regulatory bodies and others in over 35 countries, committed to designing global standards for the delivery of digital television and data services*"⁶ develops the leading technological standard for providing video services to fixed, as well as nomadic, devices (DVB-T and DVB-H). The current UHF spectrum base used for analogue TV is 470–862MHz. This band will be freed up after the digital switchover, but the broadcasting industry would like to keep this band for the development of its upcoming services, such as DVB-T, standard-definition television (SDTV) and high-definition TV (HDTV). This is commonly known as the "digital dividend".

Digital television was designed for audio and video but it also allows data to be broadcast. Digital TV can therewith provide additional information and interactive services. The range and depth of services available depend on a variety of factors. These include the transmission method (satellite, cable, etc.), the equipment used by the broadcaster and the capability of the set-top box.

Satellite: from TV to broader applications

The first artificial satellite was Sputnik 1, launched by the Soviet Union on 4 October 1957, and initiating the Soviet Sputnik programme, which in turn triggered the Space Race between the Soviet Union and the United States. Since then, the satellite industry has grown by leaps and bounds. Soon after the launch of Sputnik, the NASA built satellites such as the Echo and Telstar. Satellites are nowadays used to carry voice telephony, analogue or digital TV or data signals (such as voice over IP, Internet trunking/direct access and multimedia content) according to customer demand.

In the initial years, the industry concentrated on developing digital TV in Ku band, mobile bi-directional communication in L band and inter-continental communication in C band. Ku band is mainly used for direct-to-the-home (DTH) traffic and has the advantage of only requiring a modest dish size within the main coverage footprint that is acceptable for a domestic installation. The other applications for Ku band are distribution of corporate data and Internet access. C band can also be used for broadcast purposes, though it necessitates the use of much larger dishes, i.e. > 1.7m. The main use for C band is for international voice links (based on time division multiplexing or TDM), point-to-point leased circuits and TV broadcast distribution. Thereafter came a period where innovations such as fibre optics started replacing certain communications systems, such as point-to-point links.

⁶

<http://www.dvb.org>

However, the market regained its stability with the launch of services such as low earth orbit (LEO) satellites and earth monitoring services. This led to the development of important applications in the mobile, fixed and broadcasting segments, as well as the emergence of fixed service satellite (FSS) and mobile service satellite (MSS) industries. The FSS industry remains largely diversified and much larger than the MSS industry, and consists of two groups of operators: the large companies who have significant economies of scale and access to distribution channels, and the national operators.

1.2.4 Semiconductor manufacturing: keeping the pace with Moore's Law

The semiconductor industry encompasses all the companies and organisations that are involved in the design and fabrication of semiconductor devices, plus the associated technology required to facilitate the manufacturing process. The era of commercially produced semiconductor devices started in the 1960s and has grown to be a multi-billion-dollar industry since then. This global industry has to reinvest a sizable proportion of annual revenues in research and development to bring the next generation of device to production. The industry is a technology enabler and, hence, other than generating its own revenues, it also feeds into the wider electronics market, as semiconductors are used in a range of products, such as computers, telecoms systems, mobile phones, and DVD and CD players, to name but a few. The market can be broadly classified into four types: semiconductor equipment, semiconductor materials, semiconductor fabrication and semiconductor packaging. The industry today is dominated by the USA, Japan, Taiwan and Korea, but Europe has retained a modest manufacturing capability and certain specialist sub-systems that are required in the manufacturing process.

The main thrust of development across the industry concerns the ever-increasing 'miniaturisation' of semiconductor devices. A trend was predicted in the mid 1960s by Gordon Moore that the density of transistors on a chip would double every 20 months. Subsequently termed "Moore's Law," this prediction has held true to the present day, though there are now clear indications that the trend will slow due to the increasingly difficult technical challenges now being faced and the commercial viability of continuing to pursue this line of development.

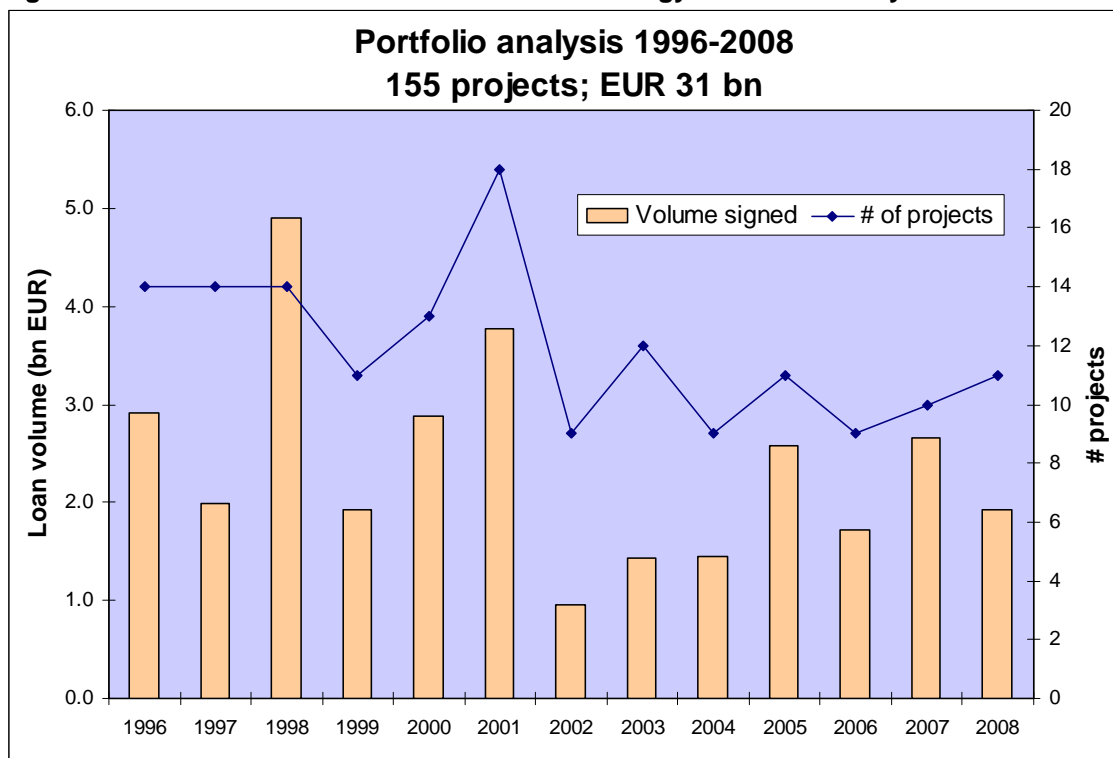
The major challenges faced by the semiconductor industry are market pressures: the product cycles are getting shorter and shorter with each new generation of wafer technology, as they reduce the selling price of the products. The process of building a semiconductor wafer is long and complex. This demands that the wafer manufacturing factories run 24 hours a day and seven days a week. For this reason, the industry is undergoing dynamic changes. The costs involved in research and development and manufacturing are becoming unaffordable for some companies and certain players are now focusing on just a part of the process, e.g. possibly outsourcing the fabrication process; the organisation then becomes what is termed a "fab-less" producer.

1.3 Presentation of the EIB ICT portfolio 1996-2008

To start the evaluation, a portfolio review was carried out covering ICT loans to all member states (EU-27), excluding global loans and EIF funding, over the period 1996-2007. For the synthesis report the review was updated with 2008 figures and the overall results are presented here. Between 1 January 1996 and 31 December 2008, a total of 155 ICT projects were signed for a total amount of EUR 31 bn, corresponding to 6.5% of total EIB signatures within the EU over that period. At 31 December 2008, 92% of the total loan volume had been disbursed (taking into account exchange rate fluctuations), 7.5% had been cancelled and about 0.5% remained to be disbursed. Of the 155 projects, 6 were cancelled after signature, 141 had been fully disbursed (of which 83 fully reimbursed), 6 were partially disbursed and 2, both signed end 2008, had not been disbursed.

The number of loans and the amounts involved varied considerably year on year (see Figure 1), with a marked dip, in particular, following the period after the dot.com bubble burst. Not only the absolute volume decreased, but also average project size about halved in 2002 (not shown in figure), getting back to previous levels in 2005 only.

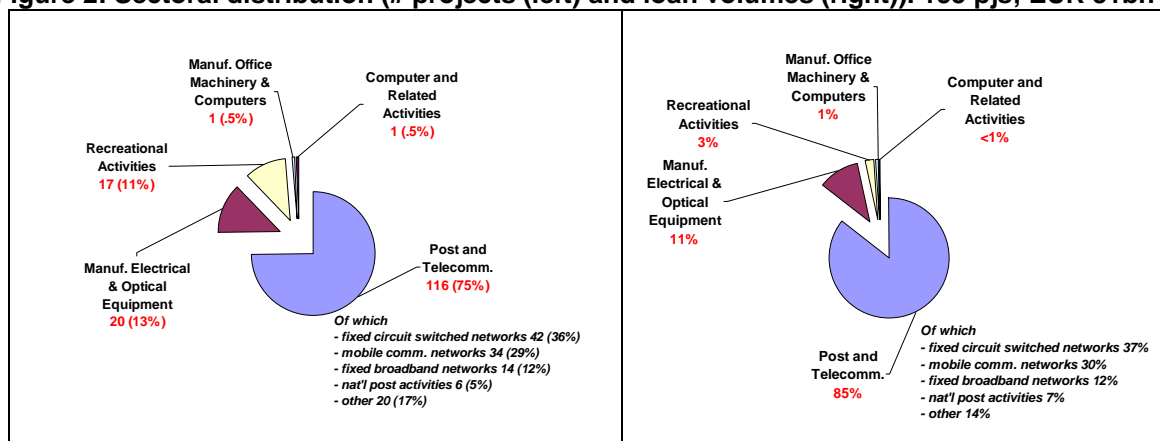
Figure 1: Information and Communication Technology – Portfolio analysis 1996-2008



Source: EV – EIB ICT Portfolio Review 2008

Analysis of the sector distribution over the same period shows the predominance of communications-based projects in the portfolio, with 116 projects accounting for 85% of the total signed loan volume (Figure 2).

Figure 2: Sectoral distribution (# projects (left) and loan volumes (right)). 155 pjs; EUR 31bn



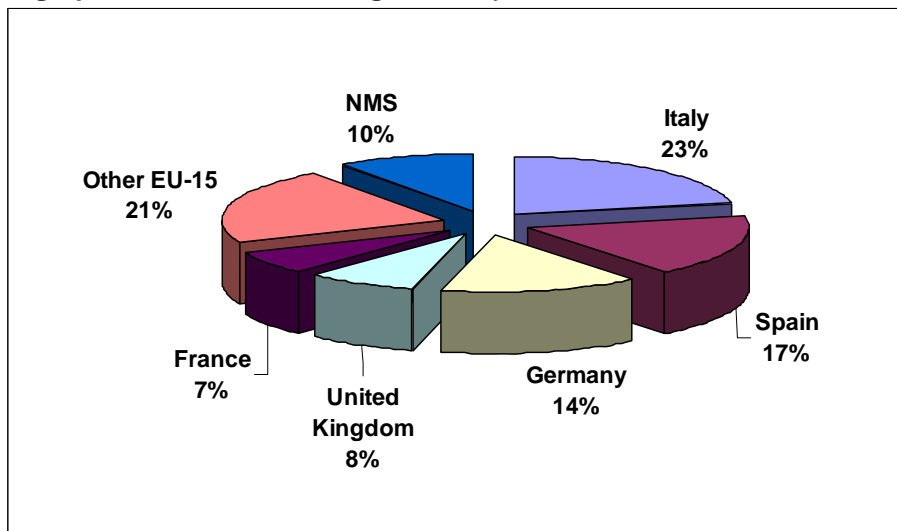
Source: EV – EIB ICT Portfolio Review 2008

The manufacture of electrical and optical equipment was the next largest category with 20 projects and 11% of the total loan value. The remaining categories – recreational-related activities, the manufacture of office machinery and computers and computer-related activities – accounted for 3%, 1% and less than 1% of the total loan sum respectively.

A more detailed analysis shows that the Bank predominantly financed projects in the following NACE sub-sectors: “fixed circuit switched networks” (42 projects) and “mobile communication networks” (34), and, to a lesser extent, “fixed broadband networks” (14), the “manufacture of electronic valves and tubes and other electronic components” (14) and “radio and television activities” (9). All other ICT sectors counted fewer projects.

Organisations in all EU states were eligible to apply for loans for ICT projects that met the Bank's selection criteria. In the period from 1996–2008, the Bank signed contracts relating to ICT projects with organisations in 23 countries of the EU-27 (none in Estonia, Ireland, Luxemburg and Malta). Of these, 90% (loan volume) were to the EU-15 group and the remaining 10% were with new member states. Two projects targeted different new member states simultaneously. Italy, Spain and Germany together accounted for 54% of signatures and for 58% of actual disbursements over the 1996-2008 period.

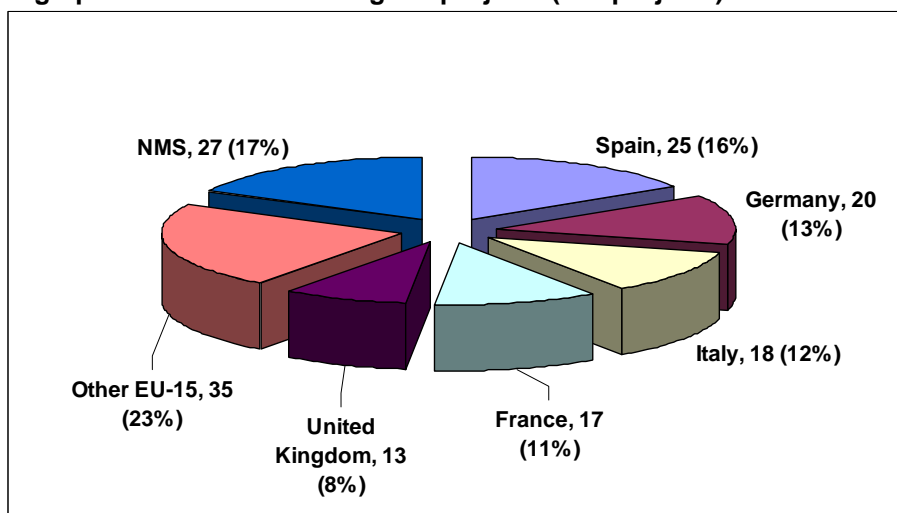
Figure 3: Geographical distribution of signatures (loan volumes; total = EUR 31bn)



Source: EV – EIB ICT Portfolio Review 2008

The distribution of signed projects per country placed Spain highest with 25 projects, followed by Germany (20), Italy (18), France (17) and the UK (13). The distribution of the projects evaluated in-depth over countries is as follows: Spain (3), Germany (3), Italy (3), France (1), Portugal (1), Slovenia (1) and Belgium (1). Most UK projects were either totally reimbursed or too recent to be evaluated, which explains their absence from the sample.

Figure 4: Geographical distribution of signed projects (155 projects)



2 POLICIES & STRATEGIES – RELEVANCE (1st pillar of value added)

RELEVANCE is the extent to which the project objectives are consistent with EU policies, the decisions of the EIB Governors, as well as the country policies. This chapter examines the key elements of these in turn before outlining the performance of the project sample.

2.1 EU Policies and Objectives

2.1.1 EU policies and priorities: Lisbon process and eEurope initiative

Within the area of ICT, EU legislation has notably focused on telecommunications. The regulatory framework of the EU was driven by the observation that the task of the policy maker consists in providing the best possible incentives for private investment to come forward and focusing the public sector on the tasks of setting the regulatory framework and avoiding market failures. Regulations have a fundamental importance in shaping the evolution of the market and the conditions of competition. In the past, regulation in the EU countries was the exclusive domain of the member states' governments and telecommunications operators were managed as administrative units of government. The establishment of an open and common market in telecommunications required regulations that were uniform across the EU member states. The EU Commission was the most appropriate body to set up a common regulatory framework. It was natural that a market-oriented framework should be adopted that blended liberalisation with harmonisation.

Although the regulatory process started in the mid-1980s, the European Council meeting in Lisbon in March 2000 provided a strong impetus to past efforts by defining an ambitious goal: *"The Union has today set itself a new strategic goal for the next decade: to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion."* There was an agreement that the shift to a knowledge-based economy needs a high performance ICT infrastructure, which meant not only the existence of an appropriate regulatory environment, but also the implementation of appropriate investment projects, both quantitatively and qualitatively.

Special attention was paid to the development of Internet. The eEurope initiative, which was launched before the Lisbon meeting, built on the existing policy framework and concentrated on diverse priority actions defined in annual action plans. The eEurope Action Plan 2002 (European Council meeting in Feira, June 2000) concentrated on three basic action lines, (I) a cheaper, faster and secure Internet, (II) investing in people and skills and (III) stimulating the use of Internet. These broad action lines comprised specific actions in each of these fields, with deadlines to be observed. Included in the eEurope Action Plan, the Commission also launched other key programmes to develop specific areas, such as the eLearning Programme sustaining long-life education, the eContent programme stressing the need to develop European digital content for global networks and the eGovernment initiative, which promotes interactive eGovernment applications in Europe at all levels of government (central, regional, local).

eEurope actions referring explicitly to the EIB:

- "Where necessary and without distorting competition, public financing instruments will give increased priority to supporting the development of information infrastructure and projects, notably in the less-favoured regions."
- "National research networks should be upgraded to ensure that researchers and students across Europe benefit from powerful networks, for example, using structural funds and EIB support."
- "High speed Internet access and intranets should be established in universities, for example, using structural funds and EIB support."

Source: eEurope Action Plan

Included in the eEurope Action Plan, the Commission also launched other key programmes to develop specific areas, such as the eLearning Programme sustaining long-life education, the eContent programme stressing the need to develop European digital content for global networks and the eGovernment initiative, which promotes interactive eGovernment applications in Europe at all levels of government (central, regional, local).

A new regulatory package was adopted at the end of 2001, which consolidated past achievements and set out new areas. The package entered into force in January 2002. It consisted of five proposed EP and Council directives under Article 95, one Commission directive to be adopted under Article 86 and one proposed Commission Decision on a regulatory framework for radio spectrum. Unbundling of the local loop of fixed lines was one of the cornerstones in the Commission's policy of providing competition, in particular for broadband (DSL) services. However, in spite of great efforts in promoting new entrants' market shares, progress on this front was slow. This may not be too surprising as competition studies undertaken on behalf of the Commission on countries with a longer experience in unbundling provisions (e.g. US, Hong Kong and Australia) showed that the market shares of new entrants remain tiny even after a long time.

2.1.2 EU regional development

Another important dimension in the development of a knowledge-based economy was its regional pattern. When European regional policy entered the new programming phase covering most of the period concerned by this evaluation (2000-2006) the information society was given a high priority. Structural funds could be used to a greater extent to accelerate the transition to the information society in the regions of Europe and combat the “digital divide”. Regional development funds were to be used more on the demand side, for example on the diffusion of applications.

The Lyon Conference (18-19 December 2000) organised by the Commission on “cohesion policy and the information society” concluded that: “All information society measures financed under the regional development should no longer be seen in isolation but within a framework of an integrated and single strategy on the information society.” This conference helped to catalyse ideas and to identify priority areas for the use of Structural funds. It also concluded that among its main indications is the development of regional strategies for the information society on the basis of the RISI initiative (Regional Information Society Initiative). Apart from facilitating the redirection of the funds by organising regional seminars on the information society for Objective 1 regions, the Commission intended to limit the financing of telecom infrastructures almost exclusively to cases of absence of commercial incentives to invest in infrastructures and networks, or when there is a lack of private initiative to fulfil specific social objectives (e.g. in rural or deprived urban areas).

2.1.3 Accession countries

As from the end of the 1990s, the Accession Countries rapidly moved towards liberalisation of the sector, trying to privatise, as much as possible, telecoms operators and adopting a regulatory framework consistent with that of the EU. In practical terms, this meant a gradual liberalisation which was completed by the year 2003.

Whereas in the early 2000s restructuring of the fixed network was coping with some constraints, (e.g. tariff rebalancing, skills mismatch of employees), mobile telecommunication networks were doing remarkably well. Most of the countries had adopted a competitive approach and foreign capital has been eager to enter this liberalised sector without many restrictions for operations. Consequently, in the early 2000s several accession countries had mobile penetration rates comparable to EU Member Countries, and several countries issued UMTS licenses.

At the European Ministerial Conference held in Warsaw on 11-12 May 2000, Central and Eastern European Countries decided to launch eEurope+, which mirrored the priority objectives and targets of eEurope, while providing for actions tackling the specific situation of the Candidate Countries. This Action Plan aimed to accelerate reform and modernisation of the economies in the candidate countries, encourage capacity and institution building and improve overall competitiveness by taking stock of the specific situation of the Candidate Countries.

2.2 EIB Policies and Mandates

Within the framework of broader EU policies relating to the ICT sector, catalysed by the Lisbon process and the subsequent “i2i” strategy (see Section 1.1), EIB policy on ICT investment was to accommodate the rapid changes occurring in ICT, both at the level of technology development and market deployment – the two being tightly linked. The April 2000 policy paper identified a number of key policy areas that would assist the EU in gaining the full benefit of the ICT revolution, namely:

- Encouraging effective competition in the communication sector, including the use of Commission powers as necessary. The unbundling of the local loop in particular was identified as a key enabler, combined with the obligation on incumbent providers to provide wholesale products.
- Increasing awareness of ICT to ensure the full benefits are accrued within the EU and ensuring that the learning institutions fulfil the needs of ICT professionals in businesses.
- Taking strong policy action to develop an inclusive information society and seek a more even distribution of the economic development benefits that IS delivers.
- Integrating ICT, as appropriate, into the formulation of all types of policy.
- Accelerating the adoption of ICT by the public sector and SMEs.

A further policy paper was published in September 2002 providing a sector update, particularly in relation to projects that supported i2i. The timing of this report coincided with the aftermath of the dot.com bubble that had negatively affected a large proportion of the ICT sector. The original i2i initiative was further extended in March 2003 with the launch of the Innovation 2010 Initiative, which refined some of the original aims but broadly followed the same overall strategy. Together with Education & Training and Research & Development, creation and dissemination of ICT (hardware, content and applications) became a priority theme within the new strategy. Special emphasis was to be placed on the following areas:

- Roll-out of fixed and mobile broadband networks with an emphasis on less developed areas and accession countries
- Broadband access networks
- Switchover from analogue to digital terrestrial TV
- ICT services for end-user communities
- Support for EC schemes, e.g. eEurope 2005, eEurope+
- Roll-out of European standards-based radio networks for emergency services (TETRA) and railway coverage (GSM-R)
- Innovative projects in the ICT component/hardware industry.

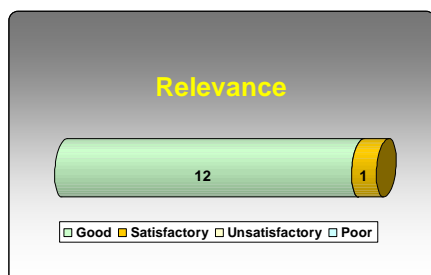
It was proposed to refer to i2i as a “common interest” eligibility under Art. 267 c) of the Treaty, whilst at the same time abandoning reference to “international competitiveness”.

Although it was not envisaged that the new i2i framework would involve a different risk profile from that registered with operations to date, the adaptation of existing instruments and further use of the Bank’s Structured Finance Facility (SFF) were anticipated.⁷

In sum, ICT projects for the EIB would on the one hand be concerned with the implementation of existing (albeit often quite recent) technologies to accompany the market evolutions in, notably, the telecommunications sectors. On the other hand it would finance projects with a strong RDI component, especially related to semi-conductor manufacturing.

⁷ The Structured Finance Facility (SFF) was established in 2001 to enable the EIB to generate high added-value by providing additional support to priority projects, using instruments with a higher risk profile than the standard normally assumed by the EIB and complementing the commercial banks and capital markets. The SFF allows the EIB to support – from its own resources and at its own risk – sub-investment grade priority projects and promoters through provisioning for the higher associated credit risks by setting aside part of the EIB’s surplus. The initial ICT portfolio review (1996-2007) showed 9 projects / EUR 234m signed under SFF, however none of the projects comprised in the sample for in-depth evaluation used SFF.

2.3 Project Relevance



Relevance is the “1st pillar” of EIB value added. The relevance of each project was judged by assessing its relative alignment with EIB and EU policies, the main categories being i2i and regional development. The rating was ‘satisfactory’ for meeting one criterion and ‘good’ when two were met. With regard to the EU/EIB objectives, the main frame of reference is the Innovation 2000 Initiative i2i and its successor launched in 2003, which were translations of the EU’s Lisbon and eEurope objectives. All of the projects under evaluation were considered to support the relevant EU/EIB objectives.

Moreover, all of the projects under evaluation were considered to support the objectives of the countries in which they were implemented, especially in terms of regional development, hence all of the projects were rated good for relevance, with the exception of a satellite project that was judged as satisfactory.

2.3.1 EU/EIB objectives – eligibility

All projects were eligible under one or more of the priority areas defined under the initial i2i initiative, and especially under its successor which was more precise on the different sub-sectors to promote (see above). In particular, the ICT projects were eligible under Article 267 point c) (projects of common interest) and – for project elements located in areas for regional development – point a).

More specifically, the *telecoms projects* were eligible under the theme of *roll-out of (fixed and mobile) broadband networks*. In the *media sector*, the broadcasting project supported the deployment of, and switch over to, terrestrial TV (DTT) platforms and the satellite project was deemed eligible under Article 267 c). The *semiconductor projects* were all deemed eligible under i2i as they were innovative projects in the ICT component industry, one of them even being a research project. Some semiconductor projects were located in designated development regions. One project was considered to play a major role in improving the performance of the European semiconductor industry by providing a collaborative development environment.

2.3.2 Country objectives and policies with regard to ICT sector development

The ICT sector is typically an area where country objectives and policies are difficult to analyse independently from technological and market developments, which themselves have been strongly influenced by EU policy and legislation over the past decades. At the technology end, ICT policies have accompanied the maintenance or construction of research capacity in various research areas and geographical regions (with some reputed European companies and research organisations related to the mobile telephone industry and to semiconductor manufacturing); at the market end, EU regulation aimed at liberalising information and communication services to the benefit of the final customer.

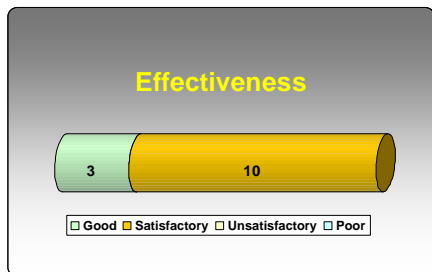
The Bank’s involvement in a large number of broadband projects across Europe is not only well aligned with i2i principles, but the high-quality infrastructures involved with telecommunications networks are generally considered to provide a platform for regional and national economic growth. Some of the EIB ICT projects financed were also explicitly contributing to a reduction of the “digital divide” between European countries or regions. The fixed and mobile telecommunications projects were all typical of the activity in the wider market and can be considered as essential for countries to maintain their positions in Europe in terms of offering a latest generation mobile phone service.

The semiconductor sub-sector, in contrast with telecoms, is very much a global market with the Far East dominating production. Europe does, however, retain some world-class specialist R&D facilities and a limited production capability, which have an important role at regional and national – sometimes cross-border – level. This area is directly associated with knowledge creation, research and higher education, and the generation of highly skilled jobs (see below). The EIB contribution to European semi-conductor manufacturing is therefore deemed highly relevant, not only from an EU but also from a national/regional perspective.

3 PERFORMANCE (2nd pillar of value added)

Project performance, relating to EIB's second pillar of value added, is assessed using three core evaluation criteria, namely Effectiveness, Efficiency and Sustainability, which are all rated individually. The Environmental performance of the project is rated separately for emphasis.

3.1 Effectiveness



The effectiveness of each project was rated by the extent to which the objectives of the project had been achieved, or were expected to be achieved. The evaluation criteria included success of implementation, completion of all the defined activities, timing, costs and procurement processes. The subsequent operation of the project, including management and organisation of project operations and its environmental performance, were also rated.

The projects were generally complex in nature and undertaken in a dynamic commercial environment, characterised by rapidly moving technology implementation. Delays, occurring in about half of the projects, were in most of the cases related to changing market circumstances, irrespective of the sub-sector in which the project took place. Several projects had changes in scope, especially when market conditions became unfavourable or following a cost-cutting process in the industry due to tough competition. This sometimes led to lower project costs and de facto a higher EIB share in the financing of total project cost, e.g. when project components were abandoned. Two cases (in fixed and mobile) were observed where, due to falling equipment prices or site sharing, unit costs could be reduced as compared to initial plans. Projects were generally well managed as they were integrated into existing management structures. Employment effects were often neutral as in most of the cases the projects replaced legacy systems, sometimes even leading to less employment. This was not the case for the semi-conductor projects which led to increased employment opportunities, generally highly skilled jobs.

In spite of those changes, projects overall reached their objectives. Therefore, most were rated “satisfactory” with regard to effectiveness, whilst 3 exceeded initial expectations.

3.1.1 Project Objectives

In looking at the extent to which individual projects achieved their objectives, the rating assessment concentrated on the physical and operational objectives of the project.

Physical implementation, schedule and procurement

All the projects evaluated were relatively complex in nature and undertaken in a dynamic commercial environment which, moreover, was characterised by rapidly moving technology implementation. This inevitably resulted on some occasions in changes to scope being made by the Promoter to the original plans considered at the ex-ante appraisal. The completion of some projects was delayed due either to unforeseen circumstances or deliberately by the Promoter if market conditions became unfavourable. Of the 13 projects evaluated in-depth, over half had no delays, whilst the others had delays between 6 and 12 months, and one project 2 years. 4 projects had changes in scope (only one in connection with a delay besides), three of which related to cancelling part of the project for market or technological reasons and one related to building *additional* infrastructure.

Delays in projects were explained by a variety of reasons, that is, no clear (e.g. sector-specific) pattern could be distinguished, **although the majority of changes appear to relate in one way or another to changing market circumstances, irrespective of the sub-sector.** Sometimes, the original roll-out schedule was too optimistic for the scale of operations involved or had to be changed on the basis of market developments; in the satellite project, its complexity and technical interdependencies were underestimated; in again another case the lengthy contract negotiations with suppliers were at stake. In the broadcasting project, the delay was due to the fact that the nationwide switchover from analogue to digital TV was postponed, which cannot be attributed to the project. A significant component of one of the semiconductor projects was cancelled after signature due to changes in the prevailing market conditions. A second semiconductor project was deliberately delayed some two years because of a market slowdown (burst of dot.com bubble); the remaining projects being completed within the specified timescales.

With regard to *procurement*, some Promoters used an OJEU Restricted tender approach, and there were no requirements for any support from the EIB in any of the projects. ICT projects were generally *exempt* from EU procurement rules and the Promoters were therefore all able to procure systems on the open market – in some cases ‘single sourcing’ from specialist suppliers because of their specific industry expertise e.g. construction of clean buildings.

Project cost and financing plan

At project appraisal, the anticipated EIB share in ICT projects was variable, ranging from 10% in one semiconductor project, to nearly 50% in a fixed telecommunications project. There were a number of substantial variations that occurred between the ex-ante and ex-post project costs and financing arrangements. The main reason for changes in project costs was generally when the project scope changed, leading, as indicated above, in some cases to abandonment of parts of projects (in such cases increasing the EIB share, without however exceeding the allowable limits), but in one case (fixed telecom) also to a larger amount of infrastructure being deployed, hence bringing down unit costs. Another case of lowered unit costs was identified for a mobile telecoms project which obtained efficiency gains through site-sharing after a corporate merger. One of the semi-conductor projects was under budget as equipment costs came down over time.

In one fixed telecommunications project evaluated (and several others not evaluated in-depth), a major cause of delays incurred in the pre-signature phase was due to a blocking by the EC in order to make sure that the country at stake complied with Regulation (EC) 2887/2000 on high speed direct access. The Commission also feared that privileged lending from EIB might further distort competitive conditions. The issue was solved by a MoU between the EIB and the EC, but the resulting 1.5 year delay, had, in turn, a negative impact on the timetable of the project, as in the meantime the Promoter took on bridge financing from other sources. Moreover, in the meantime, EIB’s internal regulations regarding maximum exposure limits were modified, and the Promoter exceeded the newly imposed limits, further compromising the disbursement schedule.

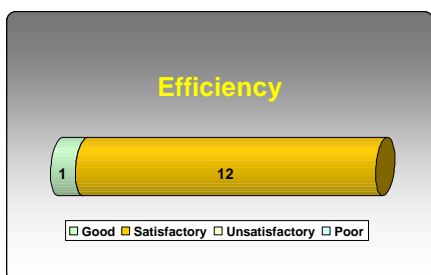
Irrespective of changes in project costs, financing plans were changed on a number of occasions where Promoters changed the original arrangements for funding. In one case this led a Promoter to draw down less than expected from the EIB (semiconductor project).

Operation – management, use and employment

All the projects appeared to be well *managed* after they entered the operational phase. This was normally a case of integrating the completed project into an existing management structure. The *use* of infrastructure after project completion was judged for fixed, mobile and broadcast networks by the take-up of services by customers. Ex-ante forecasts in these situations are subject to many externalities, e.g. competitor behaviour and regulatory intervention, however usage generally tracked forecasts, though timescales were often extended (e.g. for 3G) – in the case of the digital TV broadcast project, coverage obligations were reached ahead of schedule however. For the satellite project, the planned satellite coverage was achieved. For the semiconductor projects, closer to research and development, usage was more difficult to measure other than by observing outputs and revenues that were generally found to track ex-ante forecasts; all buildings and facilities financed under the semiconductor projects were utilised on completion.

Employment concerned with the telecoms and broadcast projects was frequently neutral (or even negative) because the existing workforce took on the new infrastructure that invariably required less manpower than the legacy systems they replaced. For the TV broadcaster, a team of circa 50 engineers now maintains and operates the two multiplexes, but for the satellite project, the operational overhead created by the new satellite had been absorbed into the workload of the existing team, and therefore no new jobs were created, even though anecdotal evidence suggests that demand for content will have increased to serve the additional number of channels available and this may have created jobs in the upstream content generation segment of the supply chain. In the case of semiconductors, employment opportunities were generally created as a result of the projects, and jobs were generally highly skilled.

3.2 Efficiency



Efficiency considers whether the project objectives are achieved in a manner that represents the efficient use of resources. This section therefore focuses on market and demand aspects and operations, tariffs and operating costs. In order to establish the efficiency of projects, the two main measures normally used by EV are the FIRR and the EIRR. These establish if the project is financially viable (FIRR) and if it generates any secondary economic benefits (EIRR).

In several cases the FIRR could not however be precisely established as the necessary information could not be provided by the Promoters. Estimates made on the basis of analyses of costs, revenues and financial structure, suggest that the FIRR is likely to have broadly met targets in the telecommunications projects, and the desired economic benefits are likely to have been realised in these cases. For the other types of projects a FIRR could be established more precisely and was satisfactory.

The telecoms projects all pertained to mass-market applications and were therefore vulnerable to demand variations. The entry of effective competition into the mobile and fixed markets meant downward pressure on prices ensued. This resulted in revenue projections being missed in some cases, though conversely consumers benefited from better value and this was a major factor in improving the take-up of broadband services.

The efficiency of the semiconductor projects was more difficult to measure given the fact there was only one actual producer of semiconductor devices, the remaining Promoters being either makers of manufacturing equipment or research establishments. In general terms, the market continues to grow, but the global nature of the supply side means that demand for commodity items, such as memory, fluctuates periodically due to over-supply.

On the basis of the analysis, for 12 of the projects evaluated in depth, efficiency was rated "satisfactory" whilst for the 13th project (a semiconductor project) it was rated "good".

3.2.1 Fixed telecoms projects

The appraisal forecasts for strong penetration in respect of DSL/cable modem broadband services at both the national or Promoter level were found to be in a range of fairly to very accurate. With one exception, all projects were part of initiatives that were fundamental to establishing unbundled access to suitable incumbent infrastructure by competitors. Based on an analysis of tariffs at the time of evaluation, it must be concluded that all projects concerning incumbent operators improved competition in local markets to the benefit of the customer. The correlation between the relative positioning of a country in terms of its tariffs for commodity services and the actual project was less obvious in this respect, as the results were mixed, with some countries lying near, and others above, the EU average. This can be attributed, in part, to the relative progress made on market regulation, and the introduction of effective competition. Data on operating costs for specific projects was more difficult to obtain as, for example, staff allocated to new projects also serviced other projects in the Promoter's business. As stated above, the introduction of effective competition into these markets provides an incentive for Promoters to reduce operating costs to maintain margins; this is demonstrated by falling employment levels across the sector.

Since the economic benefits from deploying these types of project are clear and well understood, it can be assumed (since the infrastructure and services have been, and continue to be, delivered) that the desired economic benefits have been realised.

3.2.2 Mobile telecoms projects

The appraisal forecasts for the mobile projects were reasonably accurate in terms of the growth in market penetration and increased use of data services. The general take-up of 3G services was initially lower than forecast. In line with industry trends, the percentage of revenue from non-voice services was noted to be rising year on year, and conversely the average revenue per user (ARPU) was falling. Both of these trends were forecast correctly at appraisal. Data on operating costs for specific projects was difficult to obtain, and was not generally available during the in-depth evaluation of projects. However, in one project a site-sharing agreement had been reached with another operator, reducing operating costs.

3.2.3 Media projects

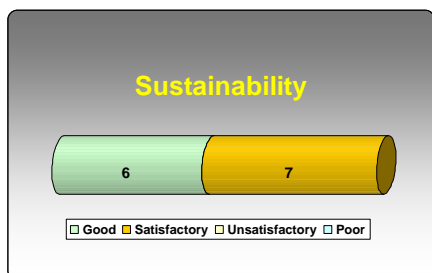
For the digital TV project, the main revenue streams that the Promoter anticipated were in being able to lease capacity to other content providers. Operating costs are mainly fixed in nature, and broadly in line with initial forecasts. The projected FIRR at appraisal was 8.1%, but it was deemed too early in the project life cycle to determine if this figure would be achieved.

For the satellite project, market issues such as over-capacity due to a fall-off in demand following the bursting of the dot.com bubble, were still evident in the sector, which, in turn, negatively affected transponder prices. However, the Promoter was confident that potential demand from a wide variety of market segments would steadily increase, and this trend was evident in the results to date. The operating costs for the satellite could not be precisely determined, but as the size of the Promoter's fleet increases, the economies of scale gained will improve the operational efficiency. Factors driving down the forecast FIRR of 10% included revenue forecasts not being met, reduction in satellite life and a weakening dollar-to-euro exchange rate. However, these were offset by lower capex, faster fill rate and economies of scale generated on operational activities. The Promoter did not continually recalculate the FIRR for individual satellites, so it was not possible to provide the exact FIRR figure achieved. However, the FIRR was estimated to be marginally lower than 10%. The Promoter also reported that the EBITDA achieved for 2008 was 85%, and the break-even point was passed three years after launch.

3.2.4 Semiconductor projects

The appraisal forecast for the semiconductor projects focused mainly on the macro market for the sector. Only one project involved the commercial manufacturing of semiconductor devices, the others concerning specialist sub-systems used in the manufacturing process and collaborative research. The market forecasts for the former were reasonably accurate and the turnover for the other projects was tracking forecasts within a reasonable tolerance. The semiconductor producer involved in the first project was operating profitably by producing devices for specialist systems (e.g. set-top boxes) and outsourcing production of other devices, sometimes referred to as a "fab-less" strategy, to companies in other parts of the world with lower operating costs. Of the three other Promoters, two compared their operating costs against peer organisation by periodic benchmarking of key performance indicators. As concerns the FIRR, for two of the Promoter organisations, operations are financed by contributions from partner organisations on a cost-plus basis, which means the FIRR is a hypothetical figure as it is effectively always a predefined value. The remaining Promoters did not generate an FIRR figure for specific projects, but an estimated FIRR figure of 15% was attributed to one project, and 20% to the other. The economic internal rate of return (EIRR) for the semiconductor projects was assumed to be higher than the FIRR, based on the benefits to local employment and the spin-off from research activities.

3.3 Sustainability



The sustainability criterion looks at the probability that the resources will be sufficient to maintain the outcome achieved over the economic life-time of the projects, and that any risks can be managed.

Like for the previous evaluation criteria, the sustainability has been analysed for each group of projects per sector. In the case of fixed and mobile telecoms projects, the infrastructure funded by the loans is highly sustainable and future proof (i.e. can be updated in line with technical developments in the market). For the media projects, the infrastructure is also

sustainable, although the life expectancy of the satellite has been reduced as it lost a propellant upon launching. The infrastructure resulting from the semiconductor projects is also regarded as suitably future proof. As concerns financial stability, the Promoters for the fixed telecoms projects were mainly incumbents with strong historical financial profiles, which were implementing strategies similar to other operators across the EU. Consequently, they are expected to be financially sustainable, as are the Promoters in the mobile and media sectors. The sustainability of the semiconductor projects is judged as reasonable, but with a number of caveats concerning the global market and the ability of the sector to economically continue with the current rate of development, i.e. Moore's Law, the future validity of which is put into question.

3.3.1 Fixed telecoms projects

All fixed telecoms projects are considered to be physically highly sustainable. The operation of such networks is both well understood and straightforward, and the economic lifetime of all the related assets is significant, i.e. greater than eight years. Furthermore, assets such as fibre-optic cables can be used for future applications, e.g. NGNs, by upgrading terminal equipment.

Financial sustainability is judged good as all of the Promoters, which are incumbents, displayed strong historical financial indicators, such as EBITDA and net profit. Furthermore, their future strategies are all rational and replicated across the EU by the various other incumbents. The growth of effective competition in EU markets also means that the market share of incumbents is being progressively eroded. For the project involving a relatively small regional operator, the situation is a little more fragile, however the Promoter is competing well in the prevailing market.

3.3.2 Mobile telecoms projects

Well-engineered GSM/UMTS networks can be considered as technically highly sustainable. The base station infrastructure represents circa 70% of the capital investment, of which buildings, towers, and power supplies represent a significant proportion. This means that networks can be progressively upgraded over time as new standards and technologies are developed, while still utilising a large proportion of the investment made in the earlier generations of equipment. The standards body for the European 3G standard UMTS, 3GPP, has a clear roadmap for technical development that allows operators to migrate to new standards with a minimum of both service disruption and stranded assets. Concerning financial sustainability, the picture was slightly different. For one of the two operators (operating in two different countries), the total annual revenues and return on sales were starting to fall slightly after 2004, although they were still at a relatively healthy level in 2006. The fall can be attributed to steadily falling ARPU (see above). However, the Promoter is refocusing its strategy and is reacting to the market trends in a rational manner and as such is expected to continue to be financially sustainable. For the second project, the financial performance of the Promoter has been steady and healthy over a number of years. Also, this particular company is emphasising innovation in the data services sector (which is a rational response to local market conditions), and therefore the Promoter should continue to be financially sustainable.

3.3.3 Media projects

The digital TV broadcasting project will have a long life expectancy given that the underlying technology is unlikely to change in the foreseeable future. Since the upgrades were installed, the platforms have been stable and no service outages have occurred. The project has not encountered problems so far in either installation or operation. The investment in transmission capacity has been sufficient enough to allow the Promoter to even resell capacity to others, and provide the necessary performance of links from content provider sites to the distribution network.

As the technology deployed will become the de facto terrestrial TV broadcasting standard for Europe, financial sustainability should be good given the long-term nature of contracts involved. Furthermore, the parent company of the Promoter is performing strongly, and this should ensure overall sustainability, though we noted that the Promoter may be sold, in which case this support cannot be assumed into the future.

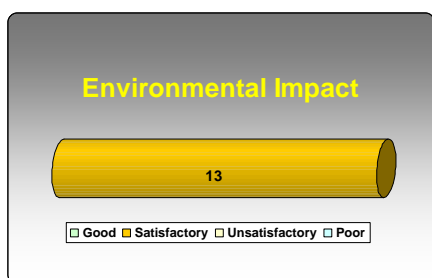
The issue is different for the satellite project: once launched, satellites generally need to be self-sustainable over their lifetime as there is no practical method of attempting repairs in orbit. In the present case, the satellite did have a reduced life expectancy from 15 to 10 years, due to the loss of a propellant at launch. The sustainability of this project is nevertheless highly rated, as the project Promoter has a proven track record in the industry and has continued to remain profitable even during periods of downturn; It led the market with a new IP-based multimedia platform and has recognised the new opportunities presented by growth in the HDTV market. After the project, it has continued to add further satellites to its fleet and has demonstrated consistent growth in its financial performance.

3.3.4 Semiconductor projects

The physical sustainability of the semiconductor projects was judged to be generally good where specialist buildings were constructed. The “clean room” environments will remain satisfactory for future generations of semiconductors. This is because special cassettes provide “micro environments” for wafer storage, and combined with the closed environments within the processing machines, this means there is no requirement to further improve the filtration systems in the clean rooms. Some of the specialist equipment used in the industry tends to have a much shorter life span, typically four years, because it is not capable of supporting the next generation of semiconductor device, usually because of the reduced size of the devices concerned. This is an inevitable consequence of the speed of technical developments in this sector. Operational sustainability should remain satisfactory: as all the projects are self-sustaining, the only threat is to the commercial viability of the operation from events in the global market.

As for financial sustainability, in contrast to the other projects that were evaluated, all the semiconductor projects operate within a highly competitive global market, with a history of cyclic performance swings and pressure from low-wage economies. The financial sustainability of the semiconductor industry in Europe is therefore relatively fragile. This was demonstrated by the fact that during the course of the evaluation, a partner of one Promoter went into liquidation. The sector is, however, adapting by concentrating more on the development of leading-edge technologies, rather than volume production, where companies in the Far East tend to dominate. The manufacturer amongst the project Promoters was adapting its strategy to enable it to compete effectively in the global market.

3.4 Environment



The environmental impact criterion assesses the project from an ecological point of view. This criterion examines the immediate impact of project implementation and operation, but also extends to the wider view of the project and its long term consequences on carbon emissions, energy efficiency, green spaces, involvement of local communities, transport, local employment, social cohesion, etc. where these are relevant.

Consideration of environmental factors is in principle already included within the evaluation criteria relevance, effectiveness, efficiency and sustainability. They are singled out here to emphasise the importance the EIB attaches to environmental and social matters, and to clearly distinguish environmental factors from those other considerations taken into account when rating relevance, effectiveness, efficiency and sustainability.

The environmental impact of each project was assessed for both the implementation and operational phases. All the Promoters were found to be very aware of the potential environmental impact that their specific projects – and their businesses in general – created. Many of the Promoters had existing company-wide schemes to monitor current impact and to improve this over time.

The environmental impact of all the projects was comprehensively analysed at the appraisal stage and all were assessed as satisfactory, with minor reservations on the satellite project. The ex-post evaluation did not reveal any evidence that environmental impact exceeded forecasts, with the exception of the satellite project, where a leakage of propellant occurred in the launch phase, though no measurable impact was recorded. This notwithstanding, all projects were rated “satisfactory,” and were considered to have delivered a low negative impact on the environment.

Environmental (and health) issues may arise in the mobile telecommunications sector (radiating emissions), the satellite project (fuel related risks) and the semiconductor projects, which does not produce large volumes of waste but does use chemicals. For the fixed telecoms projects, as well as for the digital TV broadcast project, no significant environmental impacts were noted over and above those originally identified at appraisal. The latter had to conform to international standards for radiating emissions, as well as ISO 9001 quality management (including associated environmental policies), which the Promoter complied with (this was a requirement conditional to EIB funding). The Promoter did not disclose whether there was any ‘positive’ public reaction to the reduction in transmitter sites/lower power emissions resulting from the migration to DTT, however, no adverse reaction was reported.

The network roll-out and operation of the mobile telecommunications networks followed best practice recommended by the international GSM Association. This consists of dialogue with authorities for selection of radio sites, site sharing among operators, certification of measurements of emissions, transparency on public information, and support to R&D projects related to the environment. The Promoters’ environmental management systems were ISO-certified, confirming that environmental issues were integrated into their corporate processes. The Promoters also have ISO-certified quality management systems.

For the satellite project, the predicted environmental consequences of the launch held true, i.e. fuel-burning, un-burnt fuel plus toxic chemicals falling back to earth, and ultimately the end-of-life satellite to be placed in a “graveyard orbit.” The expected loss of some propellant in the launch phase was the only additional environmental impact, though the impact of this could not be materially determined. While the negative environmental impact of the project cannot be denied, it is worth considering whether an alternative technology capable of delivering an equivalent service (i.e. a terrestrial TV broadcasting system in each country or a cable to each user) would have had any less impact.

For all of the semiconductor projects the necessary systems were in place to recycle or dispose of effluents, with suitable provision for containing accidental spillage. All the Promoters operated a variety of schemes to improve their environmental performance, e.g. reduction in CO₂ emissions. The recycling of waste materials was common practice.

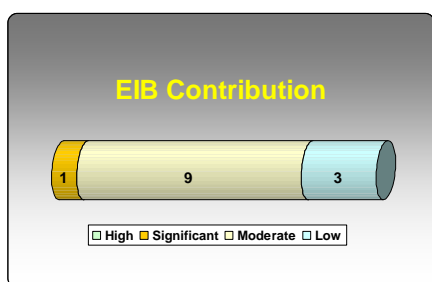
3.5 Overall Project Ratings

Ratings on relevance and project performance: As outlined in the introduction, the operations were evaluated on the basis of internationally accepted evaluation criteria of Relevance, Effectiveness, Efficiency and Sustainability. These individual ratings are considered together to produce an overall rating for the project. This is not an arithmetical exercise, and reflects the extent to which individual aspects contribute to the whole on a case by case basis. Environment is rated separately.



The overall ratings suggest that the Bank is financing projects that are performing well. Relative deficiencies linked to cost overruns and delays or partial non-achievement of initial objectives are counterbalanced by other positive aspects of the projects. It is reiterated that a “satisfactory” project has responded to its objectives. A “good” project has outlived expectations and performed better than project objectives.

4 EIB CONTRIBUTION (3rd pillar of value added)



The EIB’s contribution to each project was assessed individually. The Promoters’ views provided the main source for the ratings. In one project, the Promoter stated that the Bank’s involvement was crucial.

A common theme in the Promoter feedback related to the longer timescales experienced and additional paperwork involved in the handling of loan applications compared with commercial banks. The Bank’s attention to detail and professional input to the projects was seen as a positive contribution.

contribution.

Overall however, the EIB financial and non-financial contribution is rated moderate.

4.1 Financial Contribution

Financial contribution provided by the EIB was constituted by, notably, the tenors of the loans which were longer than those obtained from commercial banks, as well as the cost of money (no need for interbank guarantees). For all projects, the expected economic life of the assets financed equalled or slightly exceed loan tenors. When loans were shorter they often had a bullet structure, when they were of a longer duration they had a grace period.

Furthermore, not only the advantages of the EIB loan *per se* were cited, but an important feature was that the diversification of the banking base helped reducing the risk to existing lenders, making

borrowing overall less expensive. In addition, the EIB loan was cited once as having a catalytic effect for raising finance from other sources.

Attractive interest margins and repayment terms were each only cited once, by two different Promoters.

4.2 Other Contribution

The analysis of the individual evaluations shows that the EIB contribution other than financial is relatively marginal as, their positive appreciation by Promoters notwithstanding, it constitutes what should be considered as a baseline for the relationship between the EIB and its clients (see Insert). In most of the cases, the EIB had no active role (either directly or with the help of TA) in project definition, design, establishment or monitoring. In several cases (see next section) the EIB was not made aware of project changes. Concerns mainly related to delays, and negative points mentioned were the long elapsed period between submitting the initial application and receiving the questionnaire (launching the appraisal phase); the long time it takes to draft the agreement with the EIB; and the fact that completing the loan application documentation is quite onerous.

One Promoter (of a semiconductor project) suggested the EIB make funds available for projects considered to carry a higher risk, but which are of strategic importance on a national or EU basis. The EIB as a matter of fact proposed a follow-up loan under the RSFF (which eventually this Promoter did not take up).

**EIB non-financial contribution
Items mentioned by Promoters**

Process

- The EIB is seen as reliable in terms of handling the loan process.
- The Bank can be trusted to deliver funds on the agreed date.
- The Promoter gained credibility with other shareholders and lenders who consider the EIB's processes to be thorough and comprehensive.

Relationship with EIB / EIB involvement

- The EIB Loan Officer maintains regular contact with the Promoter, and Promoters feel that the EIB takes a genuine interest in what its organisation is doing. The Promoter also shares information with the EIB on new projects being planned for the future.
- It is viewed positively that promoters must adhere to relevant European regulatory, procurement and other requirements; to relevant quality standards and emissions radiation limits; and the EIB also encourages Promoters to work co-operatively with the regulator.

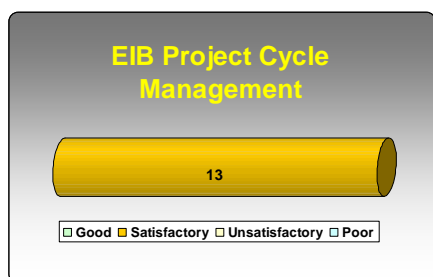
Legal

- The EIB legal team participates in meetings, and was found to be pragmatic in its handling of matters.
- The ability to discuss matters directly with the EIB lawyer was a substantial help in resolving issues quickly.
- The contract structure for loans is simple and consistent.

Project analysis

- The Bank encourages Promoters to consider projects on a financial/economic benefits basis as well as on a technical basis.
- The Promoter also felt that there was a positive signalling effect to other commercial investors because of the visibility/credibility arising from involvement with the EIB.

5 EIB PROJECT-CYCLE MANAGEMENT



EIB management of the project life cycle is assessed in terms of project identification, selection and pre-appraisal; appraisal; project implementation and financing arrangements; project follow-up and monitoring and co-operation/co-ordination with EU member states and international financial institutions (IFIs).

The EIB’s management of the project cycle was assessed for each project. The Bank’s processes are well defined, from initially identifying the project through to the completion of the PCR. There were some concerns over the period of elapsed time that occurred for the completion of certain activities, but it was often difficult to establish the exact reason for these delays. For most projects, the EIB’s management was satisfactory.

With regard to *project identification, selection and pre-appraisal*, the majority of projects arose through the relationships and communication channels that were previously in place between the Promoters (or the Promoters’ banks) and the EIB.

With regard to *project appraisal*, the EIB documents were found to be broad in scope, well structured and, in general, each section was completed with sufficient detail. There were some occasional weaknesses with regard to some specific projects, e.g. an options analysis that could have been added, or a risk analysis coverage that could have been stronger. However, the appraisals undertaken by the Bank were generally comprehensive and rigorous. Furthermore, the Promoters considered that the EIB undertook the most exhaustive overall ex-ante project analysis when compared to other financial organisations.

With regard to *project implementation/financing arrangements*, the process appeared to be unnecessarily slow in some cases, and the reasons for this, some of which were legitimate, were frequently not recorded. None of the Promoters stated that their projects had been negatively affected by the delays in funds being released.

With regard to *project follow-up/monitoring*, it was found that where project monitoring was mandated, there was virtually no evidence that it was actually completed, though Promoters stated they had met the Bank’s requirements. Some delays in the completion of PCRs were noted, though the reports were generally completed to a good standard, albeit with varying levels of detail.

With regard to *co-operation/co-ordination with EU member states and IFIs*, no other financial institution participated in the financing of any of the projects. As explained in Section 3.1.1, in one fixed telecommunications project evaluated (and several others not evaluated in-depth), a major cause of delays incurred in the pre-signature phase was due to a blocking by the EC in order to make sure that the country at stake complied with the relevant regulation; this issue was solved by a MoU between the EIB and the EC.

With regard to the *ongoing relationship between the EIB and the borrower*, around half of the Promoters have subsequently obtained further loans from the Bank, and the majority did not exclude turning to EIB again in the future, if appropriate.

EVALUATION PROCESS, CRITERIA AND METHODOLOGY

In accordance with EV's Terms of Reference, the objectives of this evaluation are:

- **to assess the quality of the operations** financed, which is assessed using generally accepted evaluation criteria, in particular those developed by the Evaluation Cooperation Group, which brings together the evaluation offices of the multilateral development banks. This assessment is then reflected in the overall rating of the operation. The criteria are:

a) **Relevance** (first pillar of value added): the extent to which the objectives of a project are consistent with EU policies, as defined by the Treaty, Directives, Council Decisions, Mandates, etc., the decisions of the EIB Governors, as well as the beneficiaries' requirements, country needs, global priorities and partners' policies. In the EU, reference is made to the relevant EU and EIB policies and specifically to the Article 267 of the Treaty that defines the mission of the Bank. Outside the Union, the main references are the policy objectives considered in the relevant mandates.

b) **Project performance** (second pillar), measured through **Effectiveness, Efficiency and Sustainability**.

Effectiveness relates to the extent to which the objectives of the project have been achieved, or are expected to be achieved, taking into account their relative importance, while recognising any change introduced in the project since loan approval.

Efficiency concerns the extent to which project benefits/outputs are commensurate with resources/inputs. At ex-ante appraisal, project efficiency is normally measured through the economic and financial rates of return. In public sector projects a financial rate of return is often not calculated ex-ante, in which case the efficiency of the project is estimated by a cost effectiveness analysis.

Sustainability is the likelihood of continued long-term benefits and the resilience to risk over the intended life of the project. The assessment of project sustainability varies substantially from case to case depending on circumstances, and takes into account the issues identified in the ex-ante due-diligence carried out by the Bank.

Environmental Impact of the projects evaluated and specifically considers two categories: (a) compliance with guidelines, including EU and/or national as well as Bank guidelines, and (b) environmental performance, including the relationship between ex ante expectations and ex post findings, and the extent to which residual impacts are broadly similar, worse or even better than anticipated.

Evaluations take due account of the analytical criteria used in the ex-ante project appraisal and the strategy, policies and procedures that relate to the operations evaluated. Changes in EIB policies or procedures following project appraisal, which are relevant to the assessment of the project, will also be taken into account.

- **to assess the EIB contribution (third pillar) and EIB's management of the project cycle:**

EIB Financial contribution identifies the financial contribution provided in relation to the alternatives available, including improvements on financial aspects as facilitating co-financing from other sources (catalytic effect).

Other EIB contribution (optional) relates to any significant non-financial contribution to the operation provided by the EIB; it may take the form of improvements of the technical, economic or other aspects of the project.

EIB Management of the project cycle rates the Bank's handling of the operation, from project identification and selection to post completion monitoring.

Rating scale for operations

- Individual assessments on project quality are rated in four categories: "Good", "Satisfactory", "Unsatisfactory" and "Poor". The overall assessment reflects the individual assessments within the same scale.
- Individual assessments on EIB contribution are rated in the following four categories: "High", "Significant", "Moderate" and "Low".
- Individual assessments on the EIB management of the project cycle are rated in the four categories: "Good", "Satisfactory", "Unsatisfactory" and "Poor".

LIST OF ICT SECTORS, ACCORDING TO NACE CODE CLASSIFICATION

NACE CODE	NAME OF SECTOR
30	Manufacture of office machinery and computers
30 00 00 00	Manufacture of office machinery and computers
30 01 00 00	Manufacture of office machinery
30 02 00 00	Manufacture of computers and other information processing equipment
32	Manuf. Of radio, TV and communic. Equipment and apparatus
32 10 00 00	Manuf. Of electronic valves and tubes and other electronic components
32 20 00 00	Manuf. Of TV, radio transmit., aparat. For line telephony and telegraphy
32 30 00 00	Manuf. Of TV, radio receivers, sound or video recording or reproducing apparatus and associated goods
33 40 00 00	Manufacture of optical instruments and photographic equipment
64	Post and Telecommunications
64 10 00 00	Post and courier activities
64 11 00 00	National post activities
64 12 00 00	Courier activities other than national post activities
64 20 00 00	Telecommunications
64 20 10 00	Telecommunication service companies
64 20 11 00	Advance information services
64 20 20 00	Telecommunication networks
64 20 20 10	PSTN (fixed circuit switched networks)
64 20 20 20	Mobile communication network
64 20 20 30	Transmission networks
64 20 20 40	Fixed broadband networks
64 20 20 50	Satellites and ground stations
64 20 20 60	Broadcasting networks
72	Computer and related activities
72 10 00 00	Hardware consultancy
72 20 00 00	Software consultancy and supply
72 30 00 00	Data processing
72 40 00 00	Database activities
72 50 00 00	Maintenance and repair of office, account. And computing machinery
72 60 00 00	Other computer related activities
92	Recreational, cultural and sporting activities
92 10 00 00	Motion picture and video activities
92 11 00 00	Motion picture and video production
92 12 00 00	Motion picture and video distribution
92 13 00 00	Motion picture projection
92 20 00 00	Radio and television activities

In 1995, Operations Evaluation (EV) was established with the aim of undertaking ex-post evaluations both inside and outside the Union.

Within EV, evaluation is carried out according to established international practice, and takes account of the generally accepted criteria of relevance, efficacy, efficiency and sustainability. EV makes recommendations based on its findings from ex-post evaluation. The lessons learned should improve operational performance, accountability and transparency.

Each evaluation involves an in-depth evaluation of selected investments, the findings of which are then summarized in a synthesis report.

The following thematic ex-post evaluations are published on the EIB Website:

1. Performance of a Sample of Nine Sewage Treatment Plants in European Union Member Countries (1996 - available in English, French and German)
2. Evaluation of 10 Operations in the Telecommunications Sector in EU Member States (1998 - available in English, French and German)
3. Contribution of Large Rail and Road Infrastructure to Regional Development (1998 - available in English, French and German)
4. Evaluation of Industrial Projects Financed by the European Investment Bank under the Objective of Regional Development (1998 - available in English, French and German)
5. An Evaluation Study of 17 Water Projects located around the Mediterranean (1999 - available in English, French, German, Italian and Spanish).
6. The impact of EIB Borrowing Operations on the Integration of New Capital Markets. (1999 – available in English, French and German).
7. EIB Contribution to Regional Development A synthesis report on the regional development impact of EIB funding on 17 projects in Portugal and Italy (2001 – available in English (original version), French, German, Italian and Portuguese (translations from the original version)).
8. Evaluation of the risk capital operations carried out by the EIB in four ACP countries 1989-1999 (2001 - available in English (original version), French and German (translations from the original version)).
9. EIB financing of energy projects in the European Union and Central and Eastern Europe (2001- available in English (original version), French and German (translations from the original version))
10. Review of the Current Portfolio Approach for SME Global Loans (2002 – available in English (original version), French and German (translations from the original version)).
11. EIB Financing of Solid Waste Management Projects (2002 – available in English (original version), French and German (translations from the original version)).
12. Evaluation of the impact of EIB financing on Regional Development in Greece (2003 – available in English (original version) and French (translation from the original version)).
13. Evaluation of Transport Projects in Central and Eastern Europe (2003 – available in English (original version).
14. EIB Financing of Urban Development Projects in the EU (2003 – available in English (original version), French and German (translations from the original version)).
15. Evaluation of the Projects Financed by the EIB under the Asia and Latin America Mandates (2004 – available in English (original version), French, German and Spanish).
16. Evaluation of EIB Financing of Airlines (2004 – available in English (original version) French and German)
17. Evaluation of EIB Financing of Air Infrastructure (2005 - available in English (original version) German and French)
18. EIB financing with own resources through global loans under Mediterranean mandates (2005 - available in English (original version) German and French.)

19. Evaluation of EIB Financing of Railway Projects in the European Union (2005 - available in English (original version) German and French.)
20. Evaluation of PPP projects financed by the EIB (2005 - available in English (original version) German and French).
21. Evaluation of SME Global Loans in the Enlarged Union (2005 - available in English (original version) and German and French.)
22. EIB financing with own resources through individual loans under Mediterranean mandates (2005 - available in English (original version) and German and French.)
23. Evaluation of EIB financing through individual loans under the Lomé IV Convention (2006 - available in English (original version) German and French.)
24. Evaluation of EIB financing through global loans under the Lomé IV Convention (2006 - available in English (original version) German and French.)
25. Evaluation of EIB Investments in Education and Training (2006 - available in English (original version) German and French.)
26. Evaluation of Cross-border TEN projects (2006 - available in English (original version) German and French).
27. FEMIP Trust Fund (2006 - available in English.)
28. Evaluation of Borrowing and Lending in Rand (2007 - available in English (original version) German and French).
29. Evaluation of EIB Financing of Health Projects (2007 - available in English (original version) German and French).
30. Economic and Social Cohesion - EIB financing of operations in Objective 1 and Objective 2 areas in Germany, Ireland and Spain (2007 - available in English. (original version) German and French)
31. Evaluation of EIB i2i Research, Development and Innovation (RDI) projects (2007 - available in English)
32. FEMIP Trust Fund - Evaluation of Activities at 30.09.2007 (2007 - available in English.)
33. Evaluation of Renewable Energy Projects in Europe (2008 - available in English (original version) German and French).
34. Evaluation of EIF funding of Venture Capital Funds – EIB/ETF Mandate (2008 - available in English.)
35. Evaluation of activities under the European Financing Partners (EFP) Agreement (2009 – available in English)
36. Evaluation of Lending in New Member States prior to Accession (2009 – available in English)
37. Evaluation of EIB financing of water and sanitation projects outside the European Union (2009 – available in English)
38. EIF Venture Capital Operations: ETF and RCM Mandates (2007 – available in English)
39. Portfolio and Strategy Review - EIB Activities in “2007 Partner Countries” from 2000 to 2008 (2009 – available in English)
40. Evaluation of EIB Financing in Candidate and Potential Candidate Countries between 2000 and 2008 (2009 – available in English)
41. Evaluation of Operations Financed by the EIB in Asia and Latin America 2000 and 2008 (2009 – available in English)
42. Evaluation of Operations Financed by the EIB in Neighbourhood and Partnership Countries between 2000 and 2008 (2009 – available in English)
43. Evaluation of i2i Information and Communication Technology (ICT) projects (2009- available in English)

These reports are available from the EIB website: <http://www.eib.org/publications/eval/>.

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