
ICT Policy Practices and Options¹

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Abstract

Information and Communication Technology (ICT) policies are increasingly integrated into overall strategies for enhancing economic growth, employment and welfare in the countries. They have shifted from dealing with sector specific infrastructure issues towards the formulation of long-term strategies on how ICTs, the Internet and other types of networks can enable information societies to achieve wider socio-economic objectives. ICT policies are no longer concern the ICT sector alone, but increasingly target ICT-related developments in other sectors. The aim of this paper is to describe and analyse ICT related policies on the European, national and regional level. In the paper we have focused on policy contexts, current ICT policies, policies and knowledge dynamics, and policy scoping. In the paper we have involved the ICT related regional case studies of Bratislava (Slovakia), Slovenia, Midi-Pyrénées and Grenoble (France).

Key words: Information and communication technology, ICT sector, ICT policy, knowledge, knowledge dynamics

JEL Classification: R38

1 Introduction

Information and communication technologies (ICT) has become an important part of life in perhaps all economically developed countries. Governments in these countries can facilitate spread of the ICT with public investments in the human as well as physical infrastructure. They have the possibilities how to motivate workers, firms and consumers and lower the cost of adopting ICT. The use of ICT, not only its production, is what will matter for economic development.

The main objective of this paper was to describe and analyse ICT policy practices and options. We have focused on policy contexts, current ICT policies, policies and knowledge dynamics.

In our paper we have included some outputs from selected regional case studies with ICT related activities: Bratislava/Slovakia, Slovenia, Midi-Pyrénées and Grenoble/France.

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2 Policy contexts

Generally international experiences and theoretical studies have shown that the ICT sector exerts positive effects on economic growth both on the supply (ICT production) and demand sides (application of ICT tools and services): the countries that grow faster have either significant ICT sectors and/or high penetration rates.

ICT constitute one of the key factors in recent organizational changes in the firm. They help the firms to cope with uncertainties through introducing flexibility into production and organizational processes.

As well as in research – intensive industries, ICTs have strong influence on the traditional industries. The main influence of ICT on knowledge diffusion is their aptitude for codifying the knowledge for transfer and for making it available and adaptable for a specific purpose. ICT have given the opportunity to codify, systematize and store some of what was previously tacit but potentially codifiable knowledge (mainly more routine skills) for further use and development. This feature of ICTs has contributed to the reorganization of some traditional industries. ICTs facilitate the knowledge transfer and improve communication skills within network [1].

In order to help guide national and international policies, there is a great need for robust evidence as to the value of IT investment. At one level, there is the question as to whether IT pays off at all. The second question is this: even IT is a good investment for countries, which have well-developed physical infrastructures and educated workers, is it good investment for other countries, or should they concentrate on more basic needs first? Finally, if IT investment does have the potential for promoting economic development, what factors determine whether or not those benefits will actually be realized in a given country or region? These are complex issues, and require a combination of detailed data analysis as well a qualitative analysis of the process of economic growth and development and what role IT can play in that process [2].

The current ICT sector has evolved by the ongoing merger of IT and telecom technologies; consequently a range of new products, services applications, markets, policy and regulatory domains have emerged. This, in turn, enables new business models that are changing the organization of the ICT industry at large in a fundamental way. Network relations in the ICT sector are becoming very important. End-users are offered a variety of ICT solutions with varying interoperability, convergence capabilities and technical and operational security [3].

When analysing the impacts of ICT on economic development, it is common to break sectors down into those which *produce* ICT and those which *use* them. This distinction is not as hard-and-fast as it might first appear, not least because ICT producers are also ICT users. However it does provide a starting point for analysis. ICT using sectors are considerably more difficult to define than ICT producing ones. Sectors which are heavy users of information, such as banking, financial services and government are also heavy users of ICT but these technologies are used across all sectors of developed economies for a range of different activities. Some of these may be outsourced and therefore assigned to other sectors in the statistics [4].

The definition of the ICT sector (figure 2.1), which is used in this paper, follows the lines of the OECD definition (OECD 2000). Accordingly, the ICT sector consists of *ICT manufacturing*, *ICT services*, *telecommunications* and *content production*. In the field of content production, only the digital media is included to the ICT sector. Figure 2.1 below illustrates the definition of the ICT sector and it describes the products and services of each of these four subbranches [5].

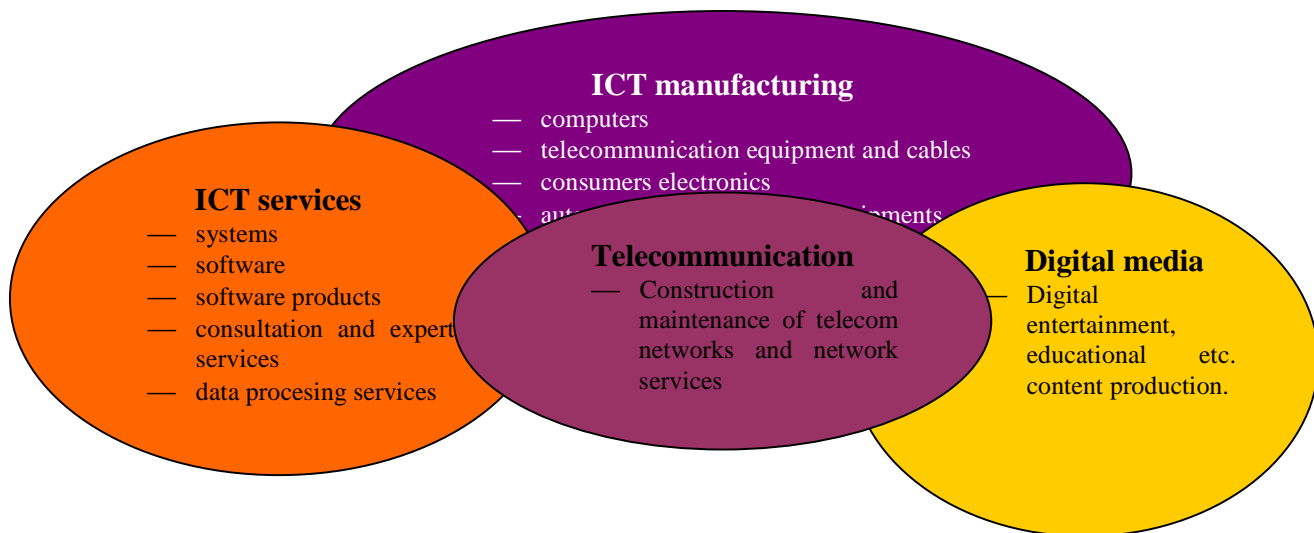


Figure 2.1: The definition of the ICT sector from the consumer's point of view

Source: [5].

ICT policies are increasingly integrated into overall strategies for enhancing economic growth, employment and welfare in the countries. They have shifted in the last decade from dealing with sector specific infrastructure issues towards the formulation of long-term strategies on how ICTs, the Internet and other types of networks can enable information societies to achieve wider socio-economic objectives

ICT policies are no longer narrow sectoral policies but mainstream economic policies with ancompass creativity, convergence and confidence. Moreover, ICT policies are no longer concern the ICT sector alone, but increasingly target ICT-related developments in other sectors, e.g. automotive and healthcare sectors [6].

There are two types of public ICT polities. On the one hand, dedicated infrastructure development of a generic type (*supply side*) is necessary to enable ICT use. On the other hand, there are policies that induce the use and adoption of ICT both in households, firms and the public sector itself (*demand side*). For instance, government adoption and use of different types of ICT are important ways of supporting the development of information and telecommunication infrastructure, to stimulate demand and to provide incentives to additional investments in the ICT sector. Other strategies for adoption may be found in education and training programs, through the facilitation of terminal equipment and so on. Singapore offers an example of a clearly targeted ICT public policy designed to attain economic growth through ICT-based strategies. Figure introduces the main factors and actors that affect public decision-makers' ICT policy

The *direct ICT policies* (i.e., policies in which the final policy goal addresses ICT, such as expanding the ICT infrastructure, regulating it or supplying services through ICT). Second type of public activities that also affect the actual public ICT policies: *indirect policies*. Indirect policies are defined as policies that are intended to achieve non-ICT goals via the use of ICT. Examples of this type of policy is the use of ICT to disseminate information to the public via the

Internet, to promote desired behavioural changes, such as public transport usage or usage of ICT in the planning process or adding computer classes to the curriculum of schools. Here, ICT is an instrument (in many cases, one of several) intended to accomplish pre-defined goals, in an indirect manner. In such cases, the indicators to evaluate the policy are non-ICT impacts. These policies will also affect the actual ICT policy, but its ‘making’ process is not solely ICT-oriented. [7].

Looking on the ICT sector, there are also benefits at the national level from local production of computer hardware, software and services. In fact the benefits from production are often more visible than those from use. The benefits from production include jobs ranking from unskilled assembly to highly skilled design and engineering [2].

Based on this information, we used following division of the ICT policy:

The key to benefiting from ICT is to focus on policies to foster its use and on building information infrastructure, rather than production of hardware [1].

As the policies are sponsored both within the region and from national/European level, and they are implemented by a wide range of bodies, a national ICT policy can contribute to the establishment, development and growth of ICT business by providing incentives and support to this sector. This can include giving consumers incentives to buy the products and services offered by the ICT industry [9].

ICT development is one of the top priorities of central and regional government within the broader context of the Knowledge Economy development.

3 Current ICT sector policies

Most national policies to promote computer production have focused on hardware, which is the most tangible segment of the industry. However, the fastest growing segments of the computer industry for over a decade have been software and services.

Effective national strategies to realize the benefits of IT need to cover three areas: promoting use, promoting production, and developing national capabilities. These policies are much more effective when they are closely coordinated and receive support from the highest levels of government as in the case in Singapore and Taiwan, rather than becoming the object of interagency struggles for power and resources, as in Japan, Korea etc. They will also be more effective when developed in close consultation with the private sector, including both local and multinational firms, and with domestic and foreign experts from academia and industry.

Promoting use

Any government policy that makes computers more expensive will discourage use and reduce possible benefits of IT. Lowering tariffs and taxes, eliminating other trade barriers, and encouraging competition in distribution channels will help promote use as much as any specific efforts to encourage use

Promoting production

Interaction between producers and users is critical to the development of certain types of software and information services. What types of policies can facilitate this interaction and provide resources needed by local companies to participate in these markets. Recommendations are:

- Promote small business IT use.
- Provide financial support.

- Encourage partnerships between local firms and multinationals [2].

Based on over mentioned ICT policy issues, we can divided current ICT policy initiatives into incentives targeting *ICT use* (*supply and demand side*) and policy initiatives targeting *ICT sector* (*manufacturing and services*).

4 ICT policies and knowledge dynamics

According to Cook (2005) ICT is less science driven (analytical knowledge) and more engineering driven (synthetic knowledge). Furthermore, in a complex and systematic view of knowledge dynamics, network relations in the ICT sector are becoming very important. End-users are offered a variety of ICT solutions with varying interoperability, convergence capabilities and technical and operational security. Knowledge utilized and developed is primarily synthetic but a considerable amount of resource investment is found in exploration, examination and exploitation activities roughly equally according to sub sector (e.g. software engineering is generally more synthetic than analytic; while telecom software is synthetic but more examination-focused than IT software). ICT is predominantly characterized by the existence of mass-manufactured personal computers and the use of an operating system and desktop applications predominance of the standardized technology [3].

Looking on the regional knowledge dynamics, in case of Slovakia, there are several national strategic documents in place (Strategy on the Information Society in Slovakia, National Strategy for Information Security in Slovakia, OP – Information Society) that structure the framework for the knowledge dynamics in the INFOSEC sector. Existing initiatives under eGovernment framework support the growth of demand for sophisticated solutions and services. There are also policy interventions at international level in place, such as guidelines issued by European Commission or OECD that form the “*security culture*” for information security issues in the society. Establishment of specialised national institutions such as National Security Office or Office for Protection of Personal Data followed by the introduction of several legal acts on information security issues (personal data protection, protection of secret facts, electronic signature), between 2002-2006 resulted in the increase of the regulatory pressure. Together with the awareness building of information security issues in the society resulted in the significant growth of demand for specialised services. On the other hand knowledge implicit policies such as tax reforms play decisive role for the attraction of new investments in the ICT sector. Foreign investors in ICT sector can receive several forms of investment stimulus.

In case of Slovenia there is no explicit policy oriented towards ICT Territorial Knowledge Dynamics (TKD). ICT strategy was not implemented. The key issue for enhancing ICT TKD is intensification of science-industry cooperation on domestic and international level. In case of Bratislava, for development of Firms Knowledge Dynamics (FKD) has important influence support policy in information security area, e.g. new strategic acts.

In case of Grenoble, we can observe the shift from cumulative knowledge toward composite knowledge within the ICT cluster. Knowledge based products within the ICT are very composite and require numerous skills. Regarding the knowledge value chain, over the last decade, knowledge became more mobile and Grenoble has started to be specified in analytical and mainly synthetic knowledge especially within the exploration phase. It underlines that within a region, the entire knowledge value chain does not exist anymore.

In case of Midi-Pyrénées, the knowledge dynamics identified in the Global Navigation Satellite Systems (GNSS) technological field is supported by policies at the three levels of governance: regional, national and European. Moreover, due to the historic and cumulative dynamics in spatial industry, Midi-Pyrénées is the European strategic place of the Galileo European Project Management.

The collaborative projects are all publicly funded or supported by a nested governance system. 18 projects are supported through the regional cluster policy, even if subsidies come from the national level. 3 projects are supported directly by the National Government, 8 projects are supported by the FP5 & 6 at the European level, mainly in the framework of the transport priority. Obviously, European projects in which regional companies are involved are the projects of the sample in which participants are the more numerous and the more dispersed in the European place. Whereas regional projects gather mainly regional companies and research units. The aggregation of all these collaborative projects clearly show that the Midi-Pyrenean cluster of GNSS is embedded in a European network of GNSS, in particular through some pipelines with big German, Spanish and Italian companies. This result is confirmed when we change our focus and concentrate our attention on the GNSS European knowledge dynamics as a whole. By aggregating all the European Projects of the FP5&6 dedicated to Navigation Satellite Systems, we observe the existence of 7 strongly cohesive network structures, including Midi-Pyrénées, that are located in very particular places at the level Nuts 2. When we look carefully on the geographical, cognitive, and structural properties of the European GNSS network, one can see that these main clusters are central in the exploration phases of the GNSS knowledge value chain, at the periphery of the whole network, whereas examination phases are at the core of the European network and structured through a set of pipelines between clusters [10].

5 Conclusion

When we summarize and evaluate the findings of the various sections of this paper, some general characteristics of knowledge dynamics in the ICT sector are:

- ICT services sector is characterized by spill-overs of technological knowledge base of ICT industry and knowledge base in the field of consultancy

Regarding the current ICT policies, these characteristics are particularly prominent:

- Sector policies play direct role.
- All activities in the ICT sector are influenced by government level directly by legislative documents or indirectly by state specific sector policy documents.
- ICT development is one of the top priorities of central and regional governments within the broader context of the Knowledge Economy development (national strategic documents, e.g. Strategy on the Information Society in Slovakia).
- Main aspects of the ICT policy priorities are defined at the European level in the key programming documents (eEurope 2005 action plan, Information society policies – “i2010” (European Information Society in 2010) as the framework programs for several subsequent national e-policies and programs.
- ICT sector are among priority sectors (e.g. in Slovakia, Slovenia, Poland) stimulated by the policy of national governments, with respect to the building of the knowledge economy.

- Knowledge implicit policies such as tax reforms play decisive role for the attraction of new investments in the ICT sector. Foreign investors in ICT sector can receive several forms of investment stimulus.

There is clearly evident, that policy attention is concentrated on synthetic knowledge. ICT sector is characterized by a synthetic knowledge base (e.g. software engineering is generally more synthetic than analytic; while telecom software is synthetic but more examination-focused than IT software). The ICT services are more complex, as they are incorporated also in other sectors, e.g. automotive, health care etc. That means that cross-sectoral view on this issue plays important role in policy support.

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