SMEs and ICTs adoption : a new challenge to Regional Policies

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Abstract

Information and Communication Technologies (ICTs) and their widespread have produced profound changes at economic and social levels. We are now in what is known as Information Society. The ways in which people, firms, institutions and governments deal with ICTs and understand their impacts is an important issue.

One of the main characteristics of Information Society is the growing competition between agents through innovation. By innovation we mean the capacity to manage creatively the knowledge as an answer to changes in social needs and in technology. Hence, innovation occurs as a means of competitive advantage.

The paper addresses this issue by highlighting the importance of innovation for Small and Medium Enterprises (SMEs), which are by far the most relevant actors in European Economy. It is argued that the access and use of information as well as the existence of interaction between agents are key factors for innovation. ICTs, if used in a correct and efficient matter, can play an important role by inducing and help SMEs to innovate.

In spite of helping firms overcoming a wide range of barriers, the adoption and the search for efficiency in ICTs use can however become a problem. This is even more significant concerning SMEs and particularly those located in peripheral regions. In fact, acknowledging the existence of a regional digital divide and a digital divide by company size, the European Commission is developing several actions in order to face and overcome these problems. The paper addresses several initiatives undertaken by the European Commission since the Lisbon summit at March 2000. More recently, the European regional policies have changed from simply getting SMEs connected to the Internet to the effective integration of ICTs into business processes.

As a conclusion, the authors argue that Digital Policies should take into account that ICT adoption and use by SMEs, cannot be regarded as a panacea to solve the problems of firms and regional development. Regional policies to help SMEs to adopt ICT must be integrated (in a coherent way) within broader regional strategies.

1. Introduction

Advances in Information and Communication Technologies, henceforth ICTs, are amid the major technological changes of the last century. The widespread fascination with personal computers, video games, interactive TV, cell phones, the Internet and a number of other ICTs, often focuses on the technical ingenuity of their designs and their potential capabilities (Dutton, 1998).

Though these innovatory dimensions can be appealing, a narrow focus on technical advances overlooks the ways in which ICTs are also redefining the social world. General apperceptions associated to the Information Society usually tend to emphasise only the increasing centrality of ICTs to society, failing to provide insights about the role of ICTs in social change (Dutton, 1998).

Ever since the 80's, Information Society has been one of the key terms used to describe today's world. It has been employed variously as a social, cultural, economic and technical concept (Sarrocco, 2002). Whether welcome or unwanted, the Information Society is here, hence being important to clearly mention its implications.

It is commonly accepted that to be in the Information Society is to have the means to accede information. Moreover, when referring to its implication, there is usually a trend to make a distinction between on-line of off-line areas, as if this is the main and only point. Despite physical existence of infrastructure is essential, it is not sufficient for development of the Information Society. Factors of level of education and literacy, income and even language are all decisive elements of ICTs utilisation and access within countries (Sorroco, 2002).

When addressing the socio-economic implications of the Information Society, one of the key questions usually raised relates to its consequences to firms. One pervasive paradox consists on the fact that, although the development of ICTs allowed a substantial growth of technical means available to firms, both in quantity and quality, at the same time markets became significantly more competitive and demanding. In addition to the external challenge focused on the relationship between firm and market, changes inside firms also appear.

Starting from a theoretical approach to understand how ICTs can induce innovation, this paper provides an attempt to assess the impact of ICTs on firms, namely Small and Medium Enterprises, henceforth SMEs, which are by far the most relevant actor in European economy,

thanks to their contribution to the employment and value added generation (Project BEEP, 2001). Can ICTs uptake *per si* improve SMEs performance or, on the other hand, can the ICT impact lead to greater disparities between firms located in more favoured regions and firms located in less favoured regions?

The paper begins with a brief comment on the role of ICTs in Information Society. As one of the main characteristics of Information Society is the growing competition between agents through innovation, the importance of ICTs in the process of innovation is hereafter developed. As firms are the main sources of innovation, the importance of SMEs in the creation and diffusion of new goods and services is addressed. This theoretical background leads us to the fourth section, in which the impacts of ICTs on SMEs and the problems arising from firms located in less favoured regions are outlined. This section concludes that albeit ICTs can help SMEs to foster their productivity, the simple existence of the technical means is not sufficient to overcome barriers associated to peripherality and lagging development. In this way, ICTs must be integrated within broader strategies that address problems of uneven regional development and opportunity. In section five are presented the policies actions that the European Commission has developed in order to address the problems mentioned above. It is argued whether these policies are sufficient or not to foster SMEs development and encourage the adoption of ICTs. Finally some conclusions are drawn.

2. ICTs and Information Society

The major scientific and technological development occurred since mid last century caused the appearance of new technical means of support to productive activities. It is in the 70's that the two major technological lines are assembled - informatics and telecommunications – originating what we nowadays call as Information and Communication Technologies.

In order to understand the concept of ICTs it is first necessary to express what our understanding of technology is. In brief terms, technology may be considered as a set of useful technical means for a certain economic activity and the knowledge needed for its efficient use. In other words, technology assembles *software*, *hardware* and *knoware*. This concept deflects from the common trend of linking technology only to technical means, putting aside the skills and knowledge needed to use them.

According to Castells (1996), ICTs assemble a set of technologies within the areas of microelectronics, informatics (software and hardware), telecommunications and optoelectronics.

Taking into account the rational behind the definition of technology, ICTs are not just the tools and its application. They are processes of development, as knowledge to apply the tools is essential for its correct and efficient use.

The recent evolution of ICTs, its fast development and its widespread use changed the way people, firms and institutions live and act. Most importantly, ICTs shape access to information, services, technical means and people (Dutton, 1998). Information, as ICTs not only change the way people get information, but also alter the whole corpus of knowledge and information availability at any given time and place. Regarding services, ICTs do more than simply change the way we consume products and services; they also influence what products and services we consume and whom we purchase them from; ICTs can render obsolete a local business or an entire industry, but also create a new business or industry. Access to particular technical means – equipment, know-how and techniques – shapes access to other technical means as ICTs interconnect and depend on one another in many ways (e.g.: to access the Internet it is necessary to have a computer and a telephone line or cable connection). Finally, ICTs shape access to people in a way that, not only provide new ways to communicate with others, but also influence and are influenced by the existence of social networks.

ICTs represent to today's world what industrial machines represented during the industrial revolution. Several authors (see, for example, Castells, 1996, and Amaral, 2000) refer that, due to its socio-economic consequences, the emergence of ICTs has shaped a new society: we are now in what is known as Information Society.

The concept of the Information Society can be seen as an attempt to extend the notion of the information economy or post-industrial society, formulated by Bell (1973) and Touraine (1971). The concept is somewhat dated and has been superseded or at least rolled-into more recent concepts such as the Knowledge Society or the New Economy, despite its continued frequent use. Since the mid-1990s commentators have moved away from a focus on technology towards the central importance of knowledge and learning and have emphasised the importance of policies related to the development of human capital and so on, rather than infrastructure, and on the importance of human networks rather than electronic networks (see, for example, CEC 1996, Castells, 1996). This change of emphasis has been apparent in EU policy, for example, in the eAction Plans which embrace a number of policy areas and not just technology (ESPON Project 1.2.2, 2003).

One of the main characteristics of Information society is the growing competition between agents through innovation. By innovation we mean the capacity to manage creatively the

knowledge as an answer to changes in social needs and in technology (OECD, 1999). Innovation is therefore crucial as a means to promote socio-economic development. In this way, Information Society is also Innovation Society.

3. The Process of Innovation

It is generally accepted that the world is undergoing profound changes in the relationships through which it is organised. In particular, it is argued that at present a globalised economy is emerging, as the economic structure is characterised by an increasingly interconnected world economy. Following the definition of Wilson *et al.* (2001), by globalisation we mean a multidisciplinary process in which a new geography and new technologies imply changes in activity and behaviour. It is a process in which the constraints of geography on economic, political, social and cultural activity and behaviour change, becoming less territorialised and more trans- or multi- territorial. Using this broad definition it is evident to see how recent developments take on the appearance of a globalised economy: i) financial capital flows freely around the world's money markets; ii) trans-national organisations such as IMF, WTO and the World Bank have a direct impact on the lives of billions of people; iii) improvements in communications and transport connections have shrunk the world. To this extent the age of globalisation and the borderless world has arrived.

Within this context of globalisation, innovation plays an important role in economic efficiency (Cantwell, 1999). New ideas, new methods and new products, in addition to technological developments, are key drivers to long term economic growth and prosperity (Caraça et al., 1997; Moreno, 1999; Archibugi et al., 1999). In essence, innovation is the ability to manage knowledge creatively in response to market-articulated demands and other social needs (OECD, 1999).

Firms are the main source of innovation. Their performance depends on incentives provided by the economic and regulatory environment, their access to critical inputs and their internal capacity to seize market and technological opportunities (OECD, 1999). Moreover, Small and Medium sized Enterprises (SMEs) have a crucial role concerning innovation. Beyond their direct contribution to the creation and diffusion of new goods and services, SMEs, especially new technology-based firms, help imbue a culture of innovation, encourage investments in skills and improve economy-wide dynamic allocative efficiency (OECD, 1999).

In the present context of major competitiveness, innovation occurs as a means of competitive advantage for firms, which arises from the ability to do something which competitors cannot do and which is valued by the market (Butler et *al.*, 1996). There are two main sources of competitive advantages. The first is the minimisation of costs either through the use of cheap productive factors or through the exploitation of economies of scale or other factors of static efficiency. The other source of competitive advantage is the capacity to be as close as possible to the technological frontier. In this case, firms must try to innovate and, at the same time, they must try to eliminate the comparative advantages acquired by other firms, both through benchmarking and through the acquisition of the best product and process technologies available in the market (Castro & Rodrigues, 1999). Since SMEs cannot, in general, specialise on mass production and mass distribution techniques, the remaining alternative is the acquisition of competitive advantages based on technological capacity (Castro & Rodrigues, 1999).

4. ICTs and SMEs

The competitive advantages of SME's are becoming increasingly dependent upon their ability to screen market needs, to adapt their products to the evolution of market needs, to acquire and use the process technology most adequate to production requirements and to show to the external world that the balance between price, quality and design of their products is excellent. In order to be able to enhance their competitive advantages, SMEs must become *creative users of technology* (Castro et *al.*, 1998). This means that firms must have a deep and updated knowledge of how demand evolutes, how products respond to new demand requirements and how technical means, raw materials and intermediate products provide the best productive solution. Furthermore, SMEs must also have a strong networking capacity as well as communication skills in order to both interact with every agent within the market chain and provide the necessary technical assistance.

ICTs, if used in a correct and efficient matter, can enhance firms to become creative users of technology by improving, not only their relationship with the market, but also their own internal organisation. Moreover, with the rapid development of technologies, the opportunities for SMEs to exploit ICTs are constantly increasing. Below are presented 10 examples of how ICTs assume a fundamental role in the competitiveness of firms:

i. Improve the quality of contacts;
ii. Increase the quantity of information exchanged between people inside the firm as well as between all agents within the market chain;

iii. Reduce the need of having some intermediaries in the exchange of information, both internal and external to the firm;
iv. Facilitate variety of contacts and reduce transaction costs;
v. Improve the process of exchanging information (with the help of some new ICTs it is possible for suppliers to show their products to clients as if they could actually see it and touch them);
vi. Allow the access to organised information;
vii. Rationalise the use of human resources;
viii. Diminish internal bureaucracy and reduce time of response;
ix. Improve production processes;
x. Improve marketing processes.

The use of ICTs is in deed an important challenge for SMEs: their efficient use can be an opportunity for developing new management methodologies, for improving new production processes and for accessing to new markets. Nevertheless, despite the widely accepted idea that an efficient supply of ICTs creates automatically its own demand, i.e. physical distance is no longer a barrier as any firm located in any place can exchange information at any time, there are reasons to believe that firms cannot use ICTs with the same efficiency everywhere (Castro & Santinha, 2002).

Albeit the development of ICTs favours bindings between different regions and different countries, the role of face-to-face contacts as well as the economic and social importance of being part of a community, still ensures that geography has a great influence on the implementation of interaction networks. Moreover, activities with high information and know-how content tend to be located in regions where knowledge and competence are produced (Castro & Rodrigues, 1999). One of the main reasons for this is that information with economic value is, by nature, tacit. This means that information is rarely codified and only exchanged between individuals or organisations that share the same knowledge base and know-how. Moreover, it involves interactive contacts between agents who rely on trust, personal knowledge and even friendship. Accordingly, the potential for interaction and exchange of rarely codified information is much higher in firms located in regions with a high density of population and high density of agents sharing similar or complementary activities.

Within this context, SMEs located in poorer and more peripheral regions face the generic problems of lack of human capital as well as poor institutional environment, thus making difficult the exchange of information and diffusion of innovation. As a consequence, these firms are less able to profit from ICTs, their willingness to utilise ICTs are lower and, thus, uptake is

slower than firms located in core regions. This leads to an increasing gap between peripheral and central regions (Castro & Rodrigues, 1999).

Hence, the availability of ICT networks is a necessary but not sufficient condition for a high intensity of use. Only when firms are connected to dense networks of social and economic interaction, does potential for use become a real consumption of ICTs (Castro & Rodrigues, 1999). SMEs, namely the ones located in less favoured regions, could gain many advantages provided by scale and scope economies by, on the one hand, focusing on the process of learning how to use ICTs and, on the other hand, pooling their informational resources on the basis of cooperation with other institutions or firms, without necessarily losing in competitive terms. Cooperative initiatives based on ICT networks could, for instance, improve the access to producer services, improve the market information as well as the access to wider markets and also increase efficiency in the market by acquiring technical means or processes from other similar firms.

To sum up, though Information Society, by allowing firms and regions to network with the use of ICTs, creates new possibilities for SMEs to become involved and for mutually beneficial linkages between SMEs and Multi National Enterprises (MNEs), it is necessary to reinforce that this is just an opportunity. ICTs do not by themselves overcome barriers associated to peripherality and lagging development. In this way, ICTs must be integrated within broader strategies that address problems of uneven regional development and opportunity that SMEs are facing.

5. Policy actions

The European Commission has been dealing with the role and specific problems of SMEs in implementing ICTs and the possibilities for public policy to support SMEs in their efforts to adapt to technological changes. While in the 80's and 90's most of the programs developed by the Commission were supply-oriented, recently more attention has been given to demand policies.

The initiative *eEurope*, aiming at the promotion of an Information Society for All, was adopted in order to help to achieve the European Union’s goal of becoming the world’s most competitive knowledge-based economy by 2010. The *eEurope Action Plan*, endorsed by EU Member States at the Feira European Council in June 2000, set specific targets to prepare SMEs to bring about *eEurope*. As a consequence, in 2001 the European Commission launched the Go

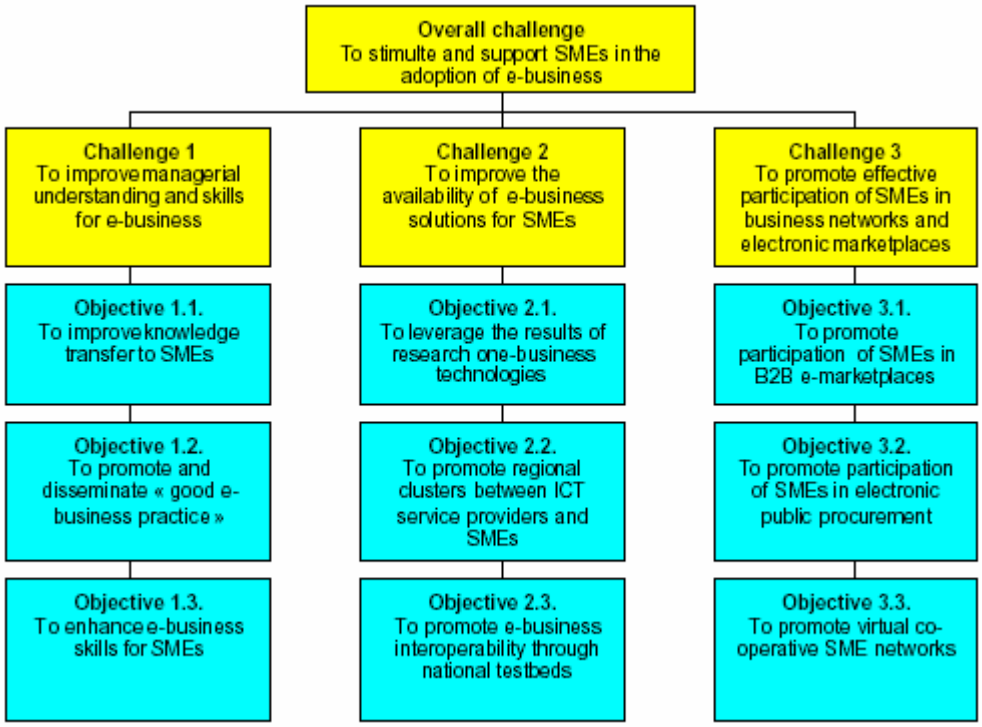
Digital initiative in order to help SMEs to better use the Internet as a business tool. The actions proposed were as follows (Go Digital Progress Report, 2002):

i. Identifying the main obstacles SMEs face as they engage in e-business;
ii. Proposing specific actions to help SMEs "Go Digital", in particular by building on existing policies and initiatives;
iii. Ensuring consistency among the various policies and initiatives to support SMEs going digital at the European, national, regional and local levels;
iv. Learning from practical experience and benchmarking various strategies to help SMEs to go digital.

According to the *Go Digital Progress Report*, the overall conclusion of this initiative was that by 2002 good progress had been made with respect to promoting the use of ICT by SMEs. Furthermore, at the economic perspective, the "Go Digital" initiative contributed to counterbalance the pessimism resulting from the economic slowdown occurred in the years 2000 and 2001.

Albeit the good results, in 2003 the main challenge has changed from getting SMEs connected to the Internet to the effective integration of ICTs into business processes. According to the *Communication from the Commission* (2003), SMEs are still lagging behind larges enterprises in eBusiness (which includes more operations than only buying and selling over the Internet), which could weaken their competitiveness and therefore slow down Europe's productivity growth. Furthermore, different rates of progress in eBusiness development can also still be noted between different places within the EU, both at national and regional levels. These facts are a matter of political concern and call for remedial action, as the same document states. E-Business policy challenges are thus identified by the Commission providing a policy framework for future actions (figure 1):

Figure 1: A framework for SME specific eBusiness policies – challenges and objectives



Source: Communication from the Commission, 353 D4 e-business policies, 2003

<u>Challenge 1:</u> to improve managerial understanding and workforce skills for eBusiness

The implementation of eBusiness within SMEs involves, not only the acquisition of the needed technical means, but mainly management efforts. Having an advantage over larger firms due to a higher flexibility in taking decisions and implementing them, SMEs need to: i) have a realistic understand of the economic impact of the integration of ICTs throughout the value chain and; ii) continuously update the skills of the employees. Three specific eBusiness policy actions were proposed to help SMEs achieve these two goals:

a) To improve knowledge transfer to SMEs through SME support networks, by:
   - establishing and maintaining a well defined SME support network, taking into account the sector-specific and regional needs of the SME fabric;
   - promoting networking and exchange of experience among eBusiness competence centres at regional, national and European level;
   - launching an eBusiness related vocational training programme within SME support networks for eBusiness instructors;
   - setting up a financial incentive mechanism
b) To promote and disseminate good eBusiness practices among SMEs;
c) To enhance the eBusiness skills of SMEs.

<u>Challenge 2:</u> to improve the availability of eBusiness solutions for SMEs

One of the main challenges for SMEs in the short run will be to incorporate eBusiness processes as an intrinsic part of the normal business processes. However, SMEs may face several problems, namely: i) the costs of implementing and maintaining the required technical means are considerable and; ii) specialised ICT services needed to help and stimulate SMEs to go digital may not be available in all regions at reasonable costs. To overcome these barriers, three eBusiness policy actions were proposed:

a) To better leverage the results of research on eBusiness technologies;
b) To promote regional clusters between ICT service providers and SMEs;
c) To promote eBusiness interoperability through national test-beds.

Challenge 3: to facilitate effective participation of SMEs in eBusiness networks

It is a fact that more and more transactions of goods and services are being conducted by electronic means. This is especially true when it comes to large enterprises and even public authorities. Though many SMEs are still a little sceptical to participate in eMarketplaces for businesses, they have to be prepared to take advantage of better electronic networking and thus being able to create on-line communities of buyers and sellers. SMEs policies can help by raising awareness and informing on how to use Internet tools in the most effective ways. Three specific policy actions were proposed to help SMEs achieve this goal:

a) To promote participation of SMEs in Business to Business (B2B) eMarketplaces;
b) To promote participation of SMEs in public electronic procurement;
c) To promote virtual collaborative SME networks.

The challenges referred to above address the need to re-orient policy actions in order to foster the implementation of ICTs in SMEs and overcome existing barriers. These policy challenges should be regarded as a further step to induce progress towards Lisbon objective of becoming, by the year 2010, the most dynamic and innovative knowledge-based economy of the world.

However, it was argued in the previous sections that the capacity of use of ICTs is highly dependent on the characteristics of the environment. If SMEs have little capacity to develop spatial division of labour strategies, and therefore are constrained by the environment they are located, policy actions that only look at SMEs as single units to be supported casewise can hardly be efficient, as most of barriers to a creative user of ICT are based in the economic, social and institutional conditions of the place they are located (Castro & Rodrigues, 1999). Hence, to attain the Lisbon objective and diminish the existing different rates of progress in eBusiness development amongst different places within the EU, other active measures must also be taken into account by all Member States to foster SMEs development and encourage the adoption of ICTs. For this matter, strengthening public-private partnerships and political and

social dialogue involving territorial and institutional actors would be important as a means for exchange of information, utilisation of knowledge and elaboration of policy. SMEs policy consistency should also be ensured with other regional and national policies or even international programmes.

As a final remark, despite all possible government measures to favour specific eBusiness initiatives for SMEs, the appropriate adoption, adaptation, transfer, and use of ICTs can only take place with informed choices and the development of user capabilities. This requires active involvement on the part of users, particularly workers and managers of the firms, in the identification of barriers to the selection, adoption, transfer, and use of ICTs and the definition of channels for overcoming policy challenges.

6. Conclusion

The key issue underlying this paper is the implication of ICTs in the economic development of SMEs. The paper mainly tried to address the following questions: will increasing use of ICTs by SMEs result automatically in stronger economic development regardless their location? Alternatively, will increasing use of ICTs result in a relative strengthening in the position of the stronger regions?

If we regard the problem of peripherality as basically geographical, involving remoteness in terms of physical distance from central regions, then the role of ICTs as a way to promote the spread of economic activity and removal of distance barriers is positive. Nonetheless, if we think that the problem of peripherality is instead based upon cultural and institutional backwardness, the conclusions are not that simple. In this case, the development of ICTs may in fact become a barrier for SMEs located in less favoured places. This is due to the fact that SMEs located in richer and more central regions usually have access to economic, social and cultural environments which more readily permit exploitation of these advantages. In turn, the gap between firms located in these regions and in less favoured ones may widen.

Acknowledging that SMEs play a significant role in the global economy, contributing to economic grow, the European Commission has launched a set of policy challenges in order to foster the implementation of ICTs in SMEs and overcome existing barriers to their use. Despite the importance of these policies, measures should go beyond the promotion of use of ICTs by individual SMEs and address in addition the importance of the communication capacity of the environment.

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