A knowledge based economy, the socio-economic impact and the effects on regional growth

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Knowledge can be implemented through Human Capital and is the key for Economic and Social development. This paper attempts to examine the role and the impact of "knowledge and human-capital". Also, the paper attempts to investigate the way in which "knowledge" can be developed and disseminate and the particular effects on socio-economic effects on modernization, competitiveness and integration process.
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1 Introduction

The long-term growth and employment depend less on the short-term allocative efficiency measures, than on a set of long-term policies aimed at enhancing the knowledge base of the economies, through increased investment in the knowledge infrastructure, the knowledge distribution system, and the human knowledge component, human resources, education, training and organizational change.

While different terminology is used in each country (electronic highways in the United States information society in Europe) all the indicators point to a rapid increase in the knowledge base of the economy, closely associated with (electronic) networking.

One important aspect concerns the distributional aspects of innovation and technical change and also in some specific characteristics of information and communication technologies which "excluding" all those who are unconnected on information infrastructure.

During the 1980s most technology employment analysis focused on the complexity of the man interactions linking the introduction of new technologies. changes in work organization. skill mismatches and sectorial employment growth and displacement. Thus, to use Schumpeter's expression, the employment impact of technical change was associated with a process of "creative destruction", involving a process of job destruction in some of the older occupations, technologies, firms and industries. It could also involve changes in the international division of labor. Based on past experience, however, the job losses resulting from the application of new technologies always appeared to be more than compensated for by the parallel process of job creation in new occupations, technologies, firms, industries and services. Historically, in other words, a process of employment growth has always

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existed in industrialized countries, albeit accom-panied by a reduction in working hours. Ultimately, technical change has led to higher real incomes, greater employment opportunities and more leisure time. This paper attempts to investigate the way in which “knowledge” can be developed and disseminate and the particular effects on socio-economic effects on modernization, competitiveness and integration process.

2. Technological Policy and Economic Growth

It is difficult to record and to analyze the results from a research and technological policy. It is well known that the adoption and diffusion of new technologies affect the structure and the competitiveness level of the whole economy. The choice of technology depends upon a large number of factors. It depends upon the availability of technologies, the availability of information to the decision maker, the availability of resources, the availability of technology itself and its capacity for successful adoption to suit the particular needs and objectives. The advanced countries which among the leaders in technological change rely on well-functioning large economies have tended to put more emphasis on these policies that aim to encourage the development of research and technological activities.

New technologies imply some micro effects (such as firms, and organizations) and macro effects (such as industrial sectors) for the whole economy. New technologies play an important role to productivity and to competitiveness of a country. For instance, the faster the technological progress is, the faster should the factor productivity rise and the less "cost-push" should exert upward pressure on the price level. The principal effects for technological policy can be distinguished in demand and supply sides. The economic performance of the bulk of manufacturing industries and services that lie outside new technology sectors depends to a large extent on adopting ideas and products developed elsewhere. Since society benefits from research and technology efforts of firms, public policies should provide an environment which stimulates innovation while allowing maximum use of their products. A stable macro-economic environment that encourages investment in the creation and adoption of new technologies is an important prerequisite. More important however, are the micro-economic policies that induce firms to share information, develop absorptive capacity and increase rates of adoption of new technologies, either directly (through subsidies, and financial schemes) or indirectly through alteration of the institutional and regulatory environment.

Those countries that innovate slower will find hard to compete in the world markets where there are many successful innovators and these countries which innovate fast may also enjoy additional gains in productivity, growth, exports, even from licensing and patent fees, (Hall P, 1984). The government policies in new technologies and innovations aims exactly to this point: to reinforce the technological capabilities, in order to enhance the productivity, competitiveness and economic growth of their countries. The government support is usually taken under the form of "direct" and "indirect" measures, (as for instance, different grant, loans, tax concessions, and equity capital).

The importance of diffusion of technology for economic growth has been emphasized by several authors. Specifically, the term *dissemination of technology* is used to include both voluntary and involuntary spread of technology. The term of *technology transfer* is defined as the voluntary dissemination, while the involuntary dissemination is labeled *in* the literature on the diffusion process, there is considerable agreement about the time pattern of the diffusion which may be expected to follow the first introduction of a new technique (or innovation).

Figure 1 shows a simple model of national systems of innovations; in particular, we can see the information, communication, legal structures and cognitive frameworks which influence all activities in the above diagram. The "mechanisms" of technology and competition policies are usually complementary and both are aiming to increase the entrepreneur's creativity and to attribute the industrial and economic growth. It is important to harmonize the technology "mechanisms" with the competition policy.

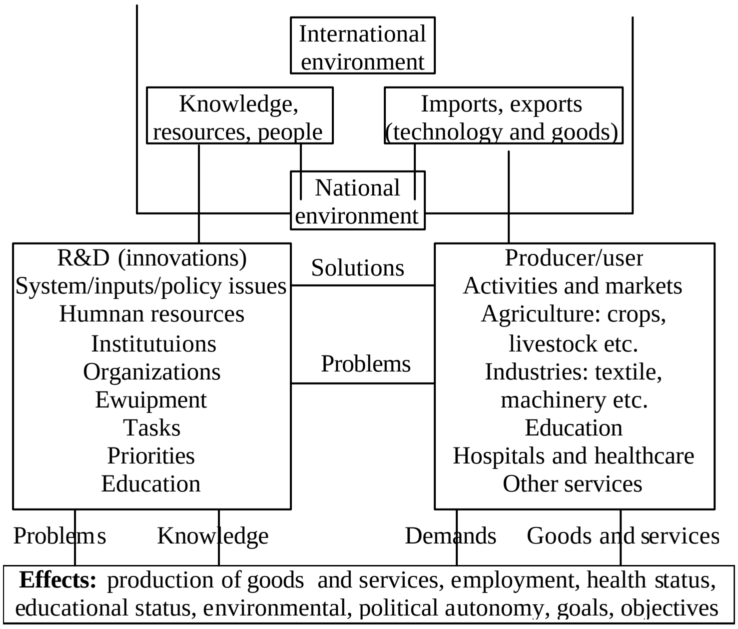

Fig.1. A simple model of national systems of innovation.

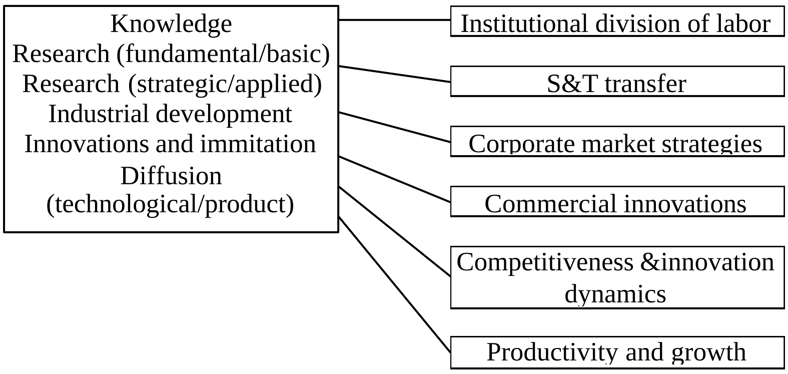

Fig.2. Stages of Technology-Knowledge and Research and Development.

The competition policy that are related to research and technological activities have also an important impact in the market structure. If there is a healthy competitive environment in the market for goods and services then the entrepreneurs have a greater incentive to develop new products and to invest in technologies and in research activities.

One important question is not only to examine the adequacy available in human resources, but also to examine the manner in which these resources are used. The role of universities and research institutes is an important source that can be substantial contribute to the radical change in technological opportunities and infrastructure. The educational institutions can contribute to the introduction and diffusion of new techniques in different sectors. For many future employees they provide the first contact with techniques they will employ in their workplace. The educational bodies and research institutions can often play a useful role in building up a core of expertise for a new industry before the industry becomes commercially viable. The industries that are based upon or associated with nuclear energy provide an example. Policies designed to alter the rate of economic growth directly tend to focus on enhancing the technological advances and the quality of labor force. The rate of technical change is affected by research expenditures and the rate of improvement of the quality of labor force is affected by investment in human capital (such as training, and education). The investment in human capital affects positively the rate of technical change. Figure 2, shows the various stages of technology and knowledge and also the steps of Research and Development.

3. A Knowledge-Based Economy

The increasing recognition by policy makers and academics of the importance of the emerging "knowledge-based economy" for future output and employment growth has yet to be reflected in any policy action.

Of course. these positive employment outcomes achieved with a “painful” process of structural adjustment. Thus, the simple comparison, popular in many policy circles in the I 980s, of the United States' impressive and Europe's poor, experience in employment creation in the l970s and l980s, is now being complemented by trends in employment growth by educational category and accompanying earnings. The evidence suggests that during the l980s all the OECD countries appear to be have been confronted with a reduction, and in some cases even a collapse in the demand for unskilled labor, partly as a result of technical change, partly as a result of their opening up to international trade. However, different countries appear to have responded in different ways. In the United States. labor market adjustment- has led to a substantial decline in real wages for the least-educated and least-skilled workers: in Europe it has led to much higher levels of unemployment in the unskilled labor force. In other countries, such as Canada. most of the adjustment has occurred through adjustments in labor time. Whether this decline in the demand for unskilled labor can be associated with technical change and ICT in particular. remains to be proved.

On the one hand, the move towards an information society is likely to lead to substantial changes in the demand for various sorts of educational and skill requirements. On the other hand, it is highly likely that large parts of the unskilled labor force will become excluded.

Income distribution and inequality issues are more than ever part of the technology employment debate: efficiency gains are closely linked to access to information networks and to the distribution of competence among agents. In the developed countries, there is a fear that the new technologies might undermine the social welfare fabric of some societies whereas, in the developing countries, there is a fear that they will remain or become excluded from the new opportunities.

Information has rather peculiar "commodity" characteristics, while knowledge is a much broader concept, including alongside "codified information", tacit knowledge crucially dependent on what can be best described as "accumulated knowledge", but in which learning through experience is the major critical variable.

As more and more knowledge becomes codifiable, the remaining non-codifiable part becomes even more crucial. Thus, the ability to codify relevant knowledge in creative way's acquires strategic value and will affect competitiveness at all levels. Network access, as well as the competence to sort out the relevant information and use it for economic purposes, are of critical importance to performance and income distribution.

Information infrastructures provide the foundations for the exchange of goods and services in the markets of the future. and generate "electronic commercial" opportunities that will affect all business practices.

The development, design and availability of these new instruments will shape social and economic life. Furthermore, as a result of increased globalization, information and communication technologies stimulate world-wide competition among firms. The rate of innovation accelerates in specific areas while the emergence of new families of technology and products may be slow due to weak aggregate demand raising macro- as well as microeconomic challenges closely associated with the need for de- and re-regulation of new product markets, particularly in the service sectors.
Intra-firm relationships are affected by the intensified competition and. the need for accelerating innovation and rapid adjustment to new market trends With respect to employment growth and decline, this raises questions about the employment creation capacities of SMEs. as well as the employment implications of organizational change.
The overall long-term tendency towards a more strongly knowledge-based economy, in terms of both input proportions and the nature of the output, is accelerating. At the firm level, this is reflected in the fact that the shift in the demand for skills is strongest in firms introducing information technology.
The dramatic decrease in the cost of obtaining data and information produces a shock effect, while the decline in the price or information is at the core of a new wave of productivity growth. This is especially true for organizations and institutions strongly involved in the production, use and distribution of knowledge (education, research, development, but also firms as learning organizations).
The measurement problem is probably as pervasive as information and communication technologies. Even individual firms' accounts are becoming increasingly unreliable. Not surprisingly the debate on trends in aggregate productivity is strongly influenced by questions about measurement, not least because the decline in aggregate total factor productivity seems to be concentrated in the service sector and in conventionally measured capital productivity.

4. Conclusions

With the rapid growth in information and communication technologies, one of the major new' conceptual challenges appears to relate to the question of whether knowledge is not becoming much more "codified". Insofar as it is an "information" technology, the essence of which consists of the increased memorization and storage, speed, manipulation and interpretation of data and information, Information and Communication Technologies (ICT) has made codified knowledge, data and information far more accessible to all those sectors and agents in the economy linked to information networks, or to those who know how to access such networks.
Knowledge. including economic knowledge is, to some extent. becoming "globally" available. For technologically leading countries or firms this implies the increasing erosion of monopoly rents associated with innovation and a shortening of product life cycles.
Most of the scenarios on national science and technological policies have been concentrated with the supply side of the science and technological system. Therefore, the governments have to examine the benefits and the cost from technological policy and related activities.
Usually, a main objective of technology policy is to increase and to enhance the use of new technologies. These technologies can be derived either from abroad or from domestic innovators and can be used domestically owned, or, in owned foreign firms. Although different countries can be choosing to develop the same kind of technologies, the policies that usually follow can differ considerably. Technological policies are based on the role of government's intervention and are the relevant chosen priorities (such as the financial support). The divergence of national policies emergence from differences between national systems and

varying views in relation to the role of the government. According to the different government's policies some countries give unfair advantage to their companies in the international competition affecting the development of research activities and the new technologies. The way in which priorities are combined and formulated in practice can vary according to the level of priority. For instance, a number of priorities that are not scientific and technological in a "strict sense" nonetheless have a considerable impact on the scale of science and technology. This is obviously in various priorities with economic and social aims (such as in defense, and industrial competitiveness).

Growth policy continues to be dominated by short-term macroeconomic (primarily monetary) considerations such as reducing officially measured inflation. In countries with high unemployment rates, employment policy; is dominated by labor market policies and in particular, by policies aimed at reducing some of the disincentives to finding work which are implicit-in the various benefit systems and active labor market policies. Science and technology policy is still dominated by traditional market failure arguments about the need for government support for fundamental research.

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