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* Universities in the learning society

Learning divides, social capital and the roles of universities

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Introduction

If and where a "learning society" is emerging, organisations and institutions related with learning understood in a wide sense should become of paramount importance for economic performance and for power relations in general.

The "knowledge-based and innovation-driven economy" (de la Mothe and Paquet, 1996) is deeply shaped by learning processes. Studying the "historical origins of the knowledge economy", Mokyr (2002: 14) says that to "distinguish the knowledge needed to invent and design a new technique from that needed to execute it, I shall refer to the latter as *competence*." So we are naturally led to studying "Learning, Innovation and Competence building Systems" (LICS).

This paper aims to analyse, in a very preliminary way, one aspect of such broad issues, namely the interactions between, on the one hand, the changing roles of universities and, on the other hand, learning processes in society at large.

Section I deals with the current great transformation in educational levels and related gaps; such transformation suggests a characterisation of the "learning society"; learning divides separating groups and regions appear as main social fractures. Inequality and efficiency issues are highly dependent on the qualitative and quantitative aspects of post-secondary lifelong educational activities. In our time, this is a fundamental set of activities. Universities are located at the core of such set. Their future will be intertwined.

Current changes in universities show some common general trends and, at the same time, highly context-dependent outcomes.

In section II differences in contexts are studied by means of the LICS framework, seen as an expanded version of the innovation systems conceptualisation. Scholars of technical change elaborated this conceptualisation in order to connect their subject with institutional aspects and with the interactions between different agents. Associational capabilities and related issues - "social capital" - are a main aspect of innovation processes and conflicts, including resistance to innovation. Different types of LICS are connected with differences in social capital and techno-economic traits.

Section III starts by considering academic changes in a historical perspective. Then some currents trends are highlighted. By combining different internal dynamics with differences in contexts, as characterised in section II, some different types of existing or emerging universities are sketched.

The conclusion refers to the potential role of universities in upgrading LICS in ways that may diminish learning divides.

I.- A truly great transformation

Higher education appeared in the dawn of civilisation. Writing, accounting, studying the skies and communicating with the gods were highly complex activities. Long time and

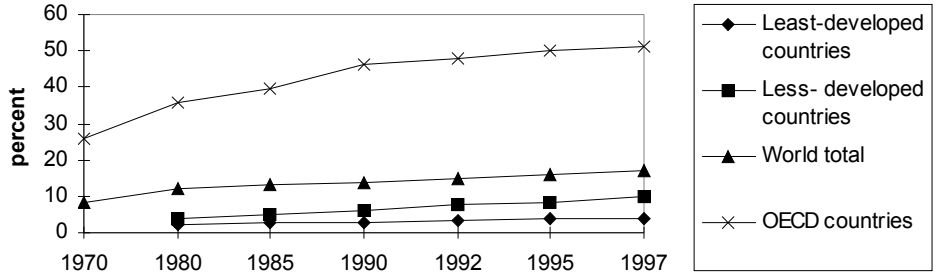
much effort was required to teach the corresponding "symbolic analysts". They were needed to cope with the terrestrial and celestial tasks of temples and palaces. Stable social divides that emerged with civilisation included the separation between intellectual work and manual work; greatly changed, that separation is nevertheless still with us.

The enrolment revolution

Since its distant origins, higher education has changed beyond recognition. But it kept a fundamental trait for thousands of years: it was reserved to minorities. Even in the most economically advanced countries, that was still true a few decades ago; but there it has changed quickly and deeply.

That great transformation is summarised by the following picture.

Gross Enrollment in Tertiary Education
1970-97
By income group



Source: World Bank (2002:46)

Nowadays, in the so-called "advanced capitalist societies" (Held et al, 1999), briefly the North, a majority of people between 19 and 24 years attend tertiary education. In a generation from now, a substantial majority of the population will have reached that educational level. Too many processes have been baptised as "revolutions", but if this one is not a revolution, what is a revolution?

Learning society and learning divides

What can be called the "enrolment revolution" in the North is a fundamental aspect in the emergence of a "learning society". But it does not define by itself such society. Very roughly speaking, we may say that the enrolment revolution is "one half" of a very brief characterisation of the learning society. The other half is related with the transformation of the occupational structure.

That process can be illustrated by a study of the Canadian case. Lavoie, Roy and Therrien (2003) have studied the growing trend toward knowledge occupations in Canada during the three last decades of the 20th century. A main finding is that "knowledge occupations are not primarily located in knowledge industries, but are scattered among all economic activities." (p. 832) Moreover: "there has indeed been a broadly-based shift in the Canadian economy toward a more intensive knowledge-based employment structure. The shift is, however, not primarily located in knowledge industries but scattered among all economic activities." (p.834) Consequently, "focusing the analysis of economies exclusively on 'knowledge industries' may, therefore, result in missing key aspects of the transition" (p.840). The transition goes well beyond the expansion of the S&T-based production or the role of ICTs: "An interesting finding of the study is that the social sciences and humanities group of occupations constitutes 50% of the knowledge group and exhibits a much stronger

average rate of growth than that of engineering and science. This suggests that there is probably much more to the trend towards knowledge than technological change and, in particular, ICTs. In particular, the increasing number and complexity of social and human transactions might be part of the answer." (p. 840)

Not only production activities need "knowledge occupations". A similar trend is seen in transaction and regulation activities, understood in a wide sense. Opportunities and risks, benefits and damages, co-operation, conflicts and manipulations: all of them are increasingly related with knowledge and demand advanced learning.

In OECD countries, "the proportion of employees with tertiary-level qualifications almost doubled between 1975 and 2000, rising from 22 to 41 percent." (World Bank, 2002: 26)

Summing up, we can speak of the emergence of a learning society in the North, meaning that an important and expanding fraction of the population is involved, in a way or another, in activities requiring an advanced education and a creative approach to knowledge. The process has two aspects, one related with *capabilities* and the other with *opportunities*; in fact, the emergence of the learning society means that (i) capabilities based on advanced learning grow quickly, and simultaneously (ii) opportunities for working in knowledge-demanding contexts, that foster permanent learning, also expand quickly.

Both aspects of that characterisation reappear in the *learning divides* between individuals and groups, because they refer not only to education and *capabilities* in general but also to *opportunities* to live and work in conditions that foster competence building. Such divides are at the roots of "social and regional polarisation" which are identified "as the major negative aspects of the learning economy" (Lundvall and Borras, 1997: 23; see also 36, 101).

Differences in *capabilities* between North and South are apparent in the figure "Gross enrolment ratios in tertiary education", taken from a document where it is said that: "Even though tertiary-level enrolments have grown significantly in virtually all countries in the developing world, the enrolment gap between the most advanced economies and developing countries has widened." (World Bank, 2002: 2).

Differences in *opportunities* are illustrated by the brain drain: "Advanced countries are opening recruitement offices in countries where, because of lack of opportunity and political instability, graduates are available." (World Bank, 2002: 17) "The global labour market for advanced human capital is an expanding reality that brings the circulation of skills and the related problem of 'brain drain' to the forefront of national concern, particularly in developing countries". (Idem) "The countries of Sub-Saharan Africa have an average tertiary enrolment rate of only 4 percent, compared with 81 percent in the United States, yet it is estimated that about 30.000 African holding Ph.D.s live outside Africa " (Idem: 17-18). The same document (Table, page 18) offers some eloquent figures about *emigrants with tertiary education* as share of total emigrants living in United States in 1990: Philippines, 50%; China, 50%; India, 75%; Korea, 53%; Sub-Saharan Africa, 75%; South America, about 50%.

Summing up, the "enrolment gap" and the "brain drain" give a clear picture of both aspects of the learning divides between North and South.

Such divides are also main sources of inequality in the North itself. Among several "fundamental common features" of occupational structures in advanced capitalist societies, Castells includes "the simultaneous increase of the upper and lower levels" and "the relative upgrading of the occupational structure over time, with an increasing share of those occupations that require higher skills and advanced education proportionally larger than the increase of the lower-level categories." Thus, the "prevailing model for labour […] is that of a *core labour force*, formed by information-based managers and by those whom Reich calls 'symbolic analysts', and a *disposable labour force* that can be automated and/or

hired/fired/offshored, depending upon market demand and labour costs." (Castells, 1999: vol I, 229, 272)

Tertiary lifelong educational systems

Words and facts, recommendations and actions, intentions and results, frequently diverge. Unexpected and unintended consequences of human initiatives permanently challenge policy makers and social scientists. Nevertheless, descriptions and prescriptions seem to be converging, albeit slowly and uneasily, towards the emergence in the North of a new "system". We refer to the set of organisations and activities related with "permanent" education at a tertiary level. Such set includes of course the tertiary level system of formal education, but it is quickly extending beyond the frontiers of that system.

The tertiary lifelong educational set of organisations and activities will eventually become a real "system", at least in those regions where it is true that the economy is based on knowledge and driven by innovation. Wherever a "learning society" really exists, a large proportion of the population will be directly and deeply related with such system.

Let us mention an example: "Finland, one of the leading promoters of continuing education in Europe, is among the most advanced nations in conceptualising and organising tertiary education along these new lines. Today, Finland has more adults engaged in continuing education programs at the tertiary levels (200.000) than young people enrolled in traditional degree courses (150.000)." (World Bank, 2002: 29)

In fact, the generalisation of lifelong advanced learning can be seen as the defining process in the emergence of the learning society. The enrolment revolution opens the way.

Such system shows some similarities with the factory system, and of course substantial differences. The rise of the factory characterised the Industrial Revolution (Landes, 1969, 1998; Mokyr, 2002). It exemplifies the deep interactions between organisational and technological change. It also exemplifies the interactions between different sources of power. After discussing the factors that made the factory competitive, Landes (1998: 209) concludes: "So was born what Karl Marx called 'Modern Industry', fruit of a marriage between machines and power; also between power (force and energy) and power (political)."

Great social conflicts in the industrial society and some influential collective protagonists were rooted in the factory system. This was one of the main "sites of power", characterised as "interactions contexts or organisational milieux in and through which power operates to shape the action capacities of people and communities; that is, to mould and circumscribe their effective opportunities, life chances and resource bases." (Held et al, 1999: 23)

Manufacturing employment rose to almost 40% of total employment in different technologically advanced countries in different moments during the 20th century, when those countries became "postagricultural"; it has been diminishing more or less quickly, particularly after 1970, when the same countries became "postindustrial" (Castells, 1999: vol I, 208-9)

It has been said that the factory became a bridge between invention and innovation. It also became, during the 19th century, a main unit in the transmission of the knowledge characterised as competence, but, with "the formalisation and codification of much technical knowledge, the importance of the firm as mechanism of knowledge transmission over time declined to some extent" (Mokyr, 2002: 145).

The prospective dimension of the enrolment revolution suggests that tertiary lifelong educational systems may become fundamental "sites of power". The extension and quality of the tertiary lifelong educational system, in a given nation or region, will highly influence the results of economic competition with other regions or nations; those factors will also be an important determinant of the internal distribution of power. For a person, a group, a locality,

to be or not to be connected to such systems will shape not only occupational situations but also expectations, global views and levels of self-reliance. Being clues of stratification and sources of identities, tertiary lifelong educational systems will also be main arenas of conflicts.

Universities will be located at the core of such system. That is quite different of anything like the absorption of societies by universities. Once tertiary education institutions meant almost the same as universities. Today universities are only a part of the "subsystem" of formal tertiary education. Both prospective and prescriptive studies point to the consolidation of such trend. But universities - briefly defined as organisations dedicated to the combination of teaching and research - will be fundamental actors in the emergence of the tertiary lifelong educational system, wherever it happens; it will not happen if universities do not promote it; if it happens, universities will be highly influential in the extension and stratification of the system, in its efficiency levels, in its main orientations.

The place of universities in the societies of tomorrow will be deeply conditioned by their involvement in the generation of the systems we have been talking of; the extent and defining traits of such involvement will shape different types of universities. That is our guiding conjecture. In order to explore it, it is necessary to consider (i) the different types of learning, innovation and competence building environment in which universities live, and (ii) some main continuities, discontinuities and tensions in academy. With those issues we deal in the following two sections, always in a very preliminary and tentative manner.

II.- Associative levels and techno-economic paths

What geographic units should we consider when discussing the "environment" of universities? And when we speak of LICS? We find more differences between some states of Brazil than between Scandinavian countries. The majority of Central American countries (El Salvador, Guatemala, Honduras and Nicaragua) show important similarities concerning learning, innovation and competence building. So perhaps, speaking loosely, we may consider "regions" (Scandinavia, France, the Brazilian state of Sao Paulo, etc.) with well defined boundaries and a certain degree of homogeneity concerning social and economic features.[1]

Associational capabilities, prevailing norms and values, levels of trust - "social capital" - are a main aspect of innovation processes and conflicts, including resistance to innovation. In the "learning economy", social capital is perhaps even more relevant than before:

> The learning economy is a complex phenomenon where the social dimension is important because interactive learning is basically a social process, and because the learning economy has an impact on social patterns such as inclusion and exclusion. We need research that gives us better understanding of the role of learning and knowledge in an economic perspective, but also inter-disciplinary research bringing together economists and sociologists, and experts in cognitive science and communication. We need to analyse the role of social cohesion and trust as a prerrequisite for learning." (Lundvall and Borrás, 1997: 164)

LICS can be roughly characterised by combining the prevailing associational characteristics of a given region with its fundamental techno-economic traits. The innovation systems approach naturally connects those two issues.

[1] This is always relative: "it is easy to understand why a distant observer would tend to speak about these two small and rich countries [Denmark and Sweden] as reflecting one single Scandinavian, or Nordic, model. One point to be made in this chapter is that such similarities in overall aggregate performance might coexist with - and even conceal - radical differences between national systems of innovation." (Edquist and Lunvall, 1993: 266)

On social capital

Specific case studies point to the relevance of the notion of *social capital*, seen essentially as the potential for efficient associative behaviours, that stems from the *longue durée*. "The only way to explain the strong economic performance of Denmark and other small economies with a weak specialisation in high technology products it to take into account the social capital that makes it easier for people to learn, collaborate and trade." (Lundvall et al, 2002: 219)

It may be said that social capital measures (i) the potential for effectively co-ordinating interactions, which is a requisite for a "systemic" behaviour, and (ii) the consequences of prevailing collective traits for the overall performance of a society. Social capital "refers to features of social organisation, such as trust, norms, and networks, that can improve the efficiency of society by facilitating co-ordinated actions" (Putnam, 1993: 167) "Stocks of social capital, such as trust, norms, and networks, tend to be self-reinforcing and cumulative. Virtuous circles result in social equilibria with high levels of co-operation, trust, reciprocity, civic engagement, and collective well-being. These traits define the civic community. Conversely, the absence of these traits in the *un*civic community is also self-reinforcing." (Putnam, 1993: 177) "By analogy with notions of physical capital and human capital - tools and training that enhance individual productivity - the core idea of social capital theory is that social networks have value." (Putnam, 2000: 18) "A society characterised by generalised reciprocity is more efficient than a distrustful society, for the same reason that money is more efficient than barter." (Idem: 21)

Putnam's characterisations and studies suggest a classification of the different types of "social capital" a region may be endowed with. By the way, he also shows that the amount of social capital differs significantly in different regions of the US.

Very roughly, we can consider the following "levels of associationism": (1) the civic community; (2) strong associationism; (3) "bowling alone"; (4) the uncivic community.

The first and last case are polar types that are defined in the above quotations. The second and third cases are of a more mixed nature.

Many countries or provinces, although not really near to the almost ideal situation that defines the civic community, show remarkable levels of social capital. Some positive collective behaviours are strongly rooted in history. In some difficult situations, positive outcomes stem from the capacities to organise people and to handle conflicts by argument and negotiation. Social actors, permanent or transient, often make significant contributions to the solution of social problems. In such contexts, we may speak of "strong associationism".

Conversely, many situations are quite different from "uncivic communities", but individualism can be seen as the prevailing social attitude. That can happen in the same place where civic engagement has been high before, and the reverse process can also take place. Hirschman (1982) analysed masterfully the "shifting involvements" from individual private interest to public action and back. The celebrated book "Bowling alone" analyses a remarkable example of such shifts in the US: "The dominant theme is simple: For the first two-thirds of the twentieth century a powerful tide bore Americans into ever deeper engagement in the life of their communities, but a few decades ago - silently, without warning - that tide reversed" (Putnam, 2000: 27). Thus, when individualism prevails clearly over associationism, the level of social capital may be termed "bowling alone" or, more prosaically, "weak associationism".

The North(s) and the many "Souths"

Concerning techno-economic traits, the relevance of learning suggests the following typology of regions - not less tentative than the previous one concerning associative levels.

(1) The *North*, characterised by the emergence of a knowledge-based economy. Capabilities are high; the population with age over 25 have on average 10 years of schooling or more (World Bank - UNESCO, 2000); the tertiary enrolment of people between 19 and 24 is around 50% or even more. Opportunities to work in learning demanding contexts are also high; as already recalled, the proportion of employees with tertiary-level qualifications is over 40%.

Different "post industrial" paths to the Knowledge Economy can be seen in the North. Its cores are R&D intensive regions, specialised in high technology. Several indicators show differences between, say, Spain and Germany, Australia and USA, even Denmark and Sweden. In spite of them, the North exists.

The "rest" is the South, characterised by the fact that capabilities and opportunities are not both high. In such context, "paths" and "situations" are highly dependent on demands for upgrading learning capabilities and opportunities, as well as on the dynamics of knowledge generation and utilisation. In turn, that depends on internal processes and on the connections with the "centres" of the global economy, i.e., the North. Taking such elements into account, we can consider, besides the North, three other types as subdivisions of the South.

(2) *Possible learning paths*, where special situations and/or connections with the North and/or high investment and/or endogenous "national" projects open possibilities - always intertwined with risks and problems - for upgrading capabilities and opportunities, perhaps quickly, perhaps showing some "convergent" trends in relation to the North.

Widely commented examples are some East Asian nations; more controversial ones are given by coastal regions of China, some states of Brazil or Mexico, Chile, Costa Rica.

(3) The *peripheral condition*, characterised by weak and slowly changing learning demands. The connections with the North are relevant. In some sense, they reproduce the "international division of labour" of yesterday between "central" industrial countries and "peripheral" primary producers. Nowadays, the peripheral condition is characterised by specialising in the production of goods and services with low learning and innovation-value added. Regions in such situation are not converging with developed countries. In general, average years of schooling in population over 25 were between 3 and 6 years in the nineties (World Bank - UNESCO, 2000). Technological change takes place quite actively, but frequently damages are at least as remarkable as benefits, for example in the realm of employment, where low skilled jobs are lost while the learning structure is only narrowly upgraded.

Some possible exceptions notwithstanding, this is the dominant situation in Latin America. It is also the situation of extensive Asian regions and of several countries in Africa. But in the Third World of yesterday "divergent" trends are also shaping a Fourth World, which corresponds to another type.

(4) *Marginal situations*, characterised by well known indicators, of which we only point out that average years of schooling in population over 25 are below 3 years. The most appalling example is Sub-Saharan Africa. During the last decade in Africa we have witnessed "the incorporation of some minuscule sectors of some countries into global capitalism, as well as the chaotic de-linking of most people and most territories from the global economy." (Castells, 1999: vol III, 113) Marginal situations are evidently not restricted to Africa. They may be expanding in some regions of Asia and Latin America. In such contexts LICS simply do not exist.

LICS in the North and in the South

Let us point out some combinations of the two typologies just sketched, that is, levels of associationism and techno-economic levels. Before, we want to pose a question: is the actual polarisation between globalisers and "alterglobalisers" akin to the option "bowling alone in the high-tech road" versus "low-tech social capital"? If that is so, the future of development looks dark.

Social capital influences many aspects of LICS, particularly their degree of connectivity and their social basis, i.e., the sectors that are inside the "system".

In the North, "civic communities" or "strong associationism" define the *associational model* à la Cooke and Morgan (1998). The corresponding examples show high performances, although not always the most competitive ones. Internal learning divides are comparatively low. Nations in such situation have truly "national" LICS. They are integrated emerging learning societies.

"Bowling alone" in the North is perhaps typical of highly stratified emerging learning societies. Learning divides are relevant; we may speak of "middle and upper class" LICS - or "symbolic analysts" systems. They may be very competitive, depending on their higher education and research basis.

The "uncivic communities" in the North may be related with technologically sophisticated manifestations of the criminal economy.

Let us now consider "possible learning paths" in the South. In such cases, "civic communities" and "strong associationism" may open new roads to self sustainable human development, in the first case even to "development as freedom" à la Amartya Sen (2000). What may be termed "developmental LICS" would be a dominant trait of the social landscape. In such situations, the GLOBELICS frame of analysis would be most useful because it offers a fresh approach which, in our view, while acknowledging the necessary role of markets and states, allows to go beyond market-centred or state-centred strategies. Thus, it leads to explore the possibilities of "socio-diversity", which involves a plurality of social actors and their conflicting and co-operating interactions.

"Bowling alone" in rapidly changing contexts, with strong learning demands, fosters the expansion of "contradictions", meaning acute learning divides, the conformation of "upper class LICS", and, more generally, the multiplication of social and environmental conflicts. "Uncivic communities" in the same contexts will probably foster dynamic mafia types of capitalism.

What are the possible outcomes of different levels of associationism in peripheral conditions and in marginal situations?

Assume first that "civic communities" or "strong associationism" prevail. In peripheral conditions, it may foster innovation-resistance associationism. For example:

> [A] key agent that plays a vital role in shaping agro-biotechnology is social movement NGOs that oppose globalization and genetic technology. Environmental NGOs that oppose the release of genetically modified organisms (GMOs) into the environment and the production and distribution of genetically modified (GM) foods are important agents in regulating research and trade in agricultural biotechnology. Indigenous rights activists that oppose the commodification and piracy of traditional plants and agricultural knowledge, and farmers' movements that oppose infringement on their right to owning and propagating seeds and farming systems are also influential, to some extent, in influencing the trajectory of biotechnology. (Parayil, 2003: 985)

Such movements often have a good cause. Due to them Monsanto gave up the commercialisation of "terminator" seeds. In general, high levels of social capital in peripheral conditions may not strength innovation systems but anti innovation social movements; while LICS remain weakly integrated. The same levels of social capital in marginal situations may show similar consequences and/or highly fragile communities based on indigenous technologies.

"Bowling alone" in peripheral conditions widens internal learning divides and shape highly stratified societies, where status frequently depends directly on connections with the North; LICS are not really "systems" but fragments of such. Bowling alone in marginal situations leads to disintegrated societies.

Uncivic communities in peripheral conditions characterise very unequal societies, where patrimonial politics and criminal economy are intertwined; LICS don't exist. The same type of social capital in marginal situations frequently foster the combination of criminal economies with war lords in the place of the State.

The following table summarises what has just been said.

<table>
<tr><th></th><th>Civic community</th><th>Strong associationism</th><th>"Bowling alone"</th><th>Uncivic communities</th></tr>
<tr><td>North</td><td colspan="2">associational models
high performance
low learning divides
truly "national" LICS</td><td>middle and upper class LICS</td><td>technologically sophisticated criminal economies</td></tr>
<tr><td>South (1)
possible learning paths</td><td>"development as freedom"</td><td></td><td rowspan="2">acute learning divides
upper class LICS
social and environmental conflicts</td><td rowspan="2">mafia types of capitalism</td></tr>
<tr><td colspan="2">"developmental" LICS</td></tr>
<tr><td>South (2)
peripheral conditions</td><td colspan="2">innovation-resistance associationism</td><td>widened learning divides; highly stratified societies; "fragmented" LICS</td><td>very unequal societies
patrimonial politics and criminal economy intertwined</td></tr>
<tr><td>South (3)
marginal situations</td><td colspan="4">LICS do not exist</td></tr>
</table>

III- Changing academic roles

At the end of the 20th century, many universities became direct producers of goods and services for final users (Sutz, 1997). Thus we are witnessing great transformations in academic life, which are fostered by a strong trend towards the commodification of knowledge and by changes in knowledge generation, both in the "mode of production" and in the "products".

Knowledge production and academic revolutions

Current changes in higher education have been characterised by as a "second academic revolution". Its defining trait is the assignment of a "third role" to universities besides teaching and research: co-operation with economic development. Consequently, an "entrepreneurial university" is emerging. This approach has been elaborated by Etzkowitz (1990, 1997, 2003).

The Academic Revolution was defined by the assignment to universities, besides their original task of teaching, of the new task of doing research. The symbol of the revolution was the foundation of the University of Berlin, in 1809-1810, by W. Humboldt. The "Humboldtian project" is the joint practice of teaching and research (Clark, 1997).

The original medieval university can be seen as a unitary actor; although internal conflicts were not absent, it had a well defined mission: it was "the university of faith" (Müller, 1996). It was not attracted by the Baconian program of doing science in order to dominate Nature and improve the quality of human life. The main organisations that promoted the Scientific Revolution of the 17th century were the new academies and scientific societies, not universities. Higher education remained on the whole weakly connected with the modern science, not to mention the search of its eventual applications to improve technology.

Two main processes started changing such situation during the 18th century. One has been called the "Industrial Enlightenment" by Joel Mokyr; its symbol was the *Encyclopédie.* "The *philosophes* of the Enlightenment echoed Bacon's call for co-operation and the sharing of knowledge between those who new things and those who made them." (Mokyr, 2002: 35) "The Industrial Enlightenment placed a great deal of trust in the idea of *experimentation*, a concept inherited directly from seventeenth century science. […] Experimental philosophy became the rhetorical tool that connected the scientific revolution of the seventeenth century to the industrial transformations of the eighteenth." (Idem: 38)

The Industrial Enlightenment was a fundamental inspiration for the French educational innovations of the last years of the *Ancien Régime* and, fundamentally, of the French Revolution. On such innovations was based the French leadership in science and education during the first decades of the 19th century (Ben-David, 1984: 88) .

Another main process took place during the 18th century in the universities of Germany and other "culturally peripheral countries" of Europe where "the scientists did not secede from the universities in the seventeenth century as they did in the important centres such as France and England." There, humanities started to be "considered as empirical sciences, and, at times, even as models for empirical research." This movement "led to the transformation of the university into a scientific institution whose members were engaged in creative research." (Ben David, 1984: 112)

That movement led to what has been called "the university of reason" (Müller, 1996). In fact, the foundation of the University of Berlin can be seen as a main achievement of the efforts oriented to the institutionalisation of a new type of academic life. It was also a national answer to the military defeat of Prussia by France; it aimed to a victory by surpassing the French educational accomplishments. It became instrumental for Germany to catch up with Britain in the techno-economic race.

During the 19th century the university of reason became the "university of discovery" (Müller, 1996), better known as the research university. This university and the entrepreneurial R&D laboratory were the main institutional basis of the "marriage of science and technology". Also called the "marriage of science and useful arts", it characterised the Second Industrial Revolution. It was the delayed accomplishment of the Baconian program that the Industrial Enlightenment had promoted. The research university developed in Germany; it was imported with substantial modifications to the US. It became one of the clues of the scientific and technological leadership of those countries in the world of the Second Industrial Revolution.

So the classic denomination of Academic Revolution refers to the emergence of a university characterised by two fundamental roles, teaching and research. Now, different versions of a "third role" have been known for a long time. Land grant universities in the US were created in the second half of the 19th century, as an important innovation in technological teaching at tertiary level; soon their "research centres became a second component" of them and in "the early 1900s, state extension activities became another component of the land-grant colleges." (Rogers, 1995: 358)

A different notion of "university extension" appeared in Latin America, early in the 20th century. It was defined as a third mission of universities, centred in cultural diffusion

and technical assistance oriented to deprived groups; extension should be carried in close connection with teaching and research; its aim was to engage students, graduates and universities as such in the transformation of very unequal societies. This was, in short, the project of the Latin American University Reform Movement: starting by the democratisation of universities, the purpose was to engage universities in the democratisation of societies. Such project, the efforts and struggles it inspired during several decades, its achievements and limitations, shaped a specific "Latin American idea of University", quite different from the classic "idea of University" in Germany, but not less vigorous and socially influent. In Latin America, from the 1920s to the 1980s, prevailing ideas concerning higher education converged with the search of alternative roads for autonomous development.

In every continent, since the last decades of the 20th century, we are witnessing new battles for the products and souls of universities.

The marriage between science and technology has evolved. In many areas, it is not any more a traditional couple with well defined and separated roles. In the information and communication disciplines, in the biological disciplines and in other cases, it is more like a modern couple with shifting and interchangeable roles. Many research teams shift from "know why" problems to "know how" problems and back. In terms of a celebrated metaphor (Stokes, 1997), the role of "Pasteur's quadrant" is increasing quickly. The direct connections of basic academic research with "practical" problem-solving are today more frequent than yesterday. Of course, we are speaking of a phenomenon with very old roots, but its frequency is quite new. And - to use an old formulation - the accumulation of quantitative changes generates a qualitative change. As Marx asserted when it was not yet happening, science has become a direct productive force.

In fact, three intertwined trends are apparent in the emergence of what is not only a knowledge society but a capitalist knowledge society, where capitalisation of knowledge is an increasingly relevant issue.[2]

. One trend is the new and increased direct role of science as a productive force and, more generally, as a main source of risk, conflict and power.

The second trend is the shift to more interactive modes of production of knowledge, which involves different actors and, in particular, strengths the connections of universities with non academic organisations. This shift has been conceptualised as a transition to a new "mode of production" of knowledge, in Gibbons et al (1994) widely quoted and debated approach. It is not so widely remarked that the same approach suggests that there is also a shift on the "products" of knowledge generation: on average (but not necessarily in absolute numbers) less people work in solving theoretical problems "from first principles" - knowing why - and more people work in the "description of complex systems". We see this process as a main example of the closer relations between science and technology: in the "Pasteur's quadrant", the guiding questions are usually "how does it function (or work)?". These questions are typical in bio-research, which is the best but not the only example of the new stage of the marriage of science and technology.

Those trends are pushing academic research to a more central position in social relations and conflicts. They converge with a third relevant trend, the commodification of knowledge; perhaps its best description has been given by the US Supreme Court dictum of

[2] "Following Marx, I define capitalism in the following terms:
1. *Commodity production.* Every factor of production, including labor, is treated as a means, not an end in itself, is given exchange value, and is exchangeable against any other factor. Thus capitalism is a diffuse form of economic power, except that it requires authoritative guarantee of:
2. *Private exclusive ownership of the means of production.* The means of production, including labor power, belong exclusively to a private class of capitalists.
3. *Labor is 'free' but separated from the means of production.* Laborers are free to sell their labor and withdraw it as they see fit, without authoritative prohibitions; they receive a freely negotiated wage but have no direct claims of ownership over the surplus." (Mann, 1993: 23-24)

1980: “Everything under the sun made by man is patentable” (quoted in Parayil, 2003: 983). This trend is apparent in the realm of life sciences and technologies:

> Unlike the Green Revolution, the Gene Revolution is being shaped by dominant forces in the international private domain where the technological innovation process is determined, largely, by private capital and its quest for profit, market share and shareholder value. The technological trajectory is being shaped by the tension between the public and private domains because of the exigencies of globalization. Most of the knowledge that is being mobilized and utilized by the private agro-biotech corporations to develop proprietary technologies comes from local and global public knowledge domains (government, academe, and global/local intellectual commons). The trend is to privatize the means and sources of knowledge production and to deploy strategies to enclose knowledge commons through intellectual property right regimes. (Parayil, 2003: 974)

From a descriptive (and non normative) point of view, it seems that academic life is an arena of conflicts between, on the one hand, traditional ways of regulating the “academic commons” and of “reputational retribution”, and on the other hand, regulations and retributions linked to the commodification of the increasingly relevant knowledge that is produced in universities.

Some relations between changes in knowledge production and the institutional mechanisms for “governing the academic commons” are discussed by Hellström (2003). In order to consider the governance strategies for an “increasingly wired” collective academic production, the paper consider the “E-Biomed” initiative to “create a free on-line archive of all publications dealing with the biomedical sciences”, with a structure that guarantees the assignment of academic credit and the mutual monitoring.

As Whitley (2003: 1017) says, public academic research has been co-ordinated by “reputationally controlled work organisations. These organisations structure the production of formal knowledge around the competitive pursuit of intellectual reputations for scientists’ published contributions to collective goals as judged by their colleagues/competitors.” The same author analyses “the strength of the separation and division of labour between research universities focused on the production of theory driven knowledge for intellectual reputations, applied research institutes, technology transfer agencies, research association laboratories and private companies.” (Whitley, 2003: 1023) When such separation and division of labour are weakened, regulation, evaluation and retribution of academic work become really complicated.

Let us go back to the beginning of this section. Are the above mentioned trends and tensions converging to a new “academic revolution”? Does this mean that an “entrepreneurial university” is emerging? Can such university be considered not only as an arena of conflicts but also, in some sense, as a unitary actor with a specific “idea of university”?

<u>On the future of universities</u>

Most probably, the answers to such questions will be highly context-dependent. Possible outcomes will be shaped by several factors that include the type of prevailing social demands faced by universities, academic traditions and accumulated capabilities in society at large. Here we very briefly connect an approach to academic changes and a prospective study of Latin American universities (Arocena and Sutz, 2001a, b) with social capital and LICS as discussed in section II.

First let us remark that we are aware of two different notions of the “entrepreneurial university”. We shall use this expression in the already mentioned sense given to it by Etzkowitz. In a very interesting study Clark (1998) speaks of “entrepreneurial universities” to analyse their innovative capabilities, so perhaps they could be called innovative universities.

Entrepreneurial universities à la Etzkowitz are characterised by the third role of capitalising knowledge for economic development; in the knowledge economy, these universities become "core institutions", as corporations and government with which they closely co-operate (Etzkowitz, 1997); the logic of private firms has an increasing influence in the evaluation and retribution of academic work.

The identification of development with economic growth is a main aspect of the notion of entrepreneurial universities. We see them acting in a context characterised both by the relevant economic role of knowledge and by its increasing commodification. Internally, the social capital of academic life is jeopardised because different disciplines and different types of external relations are very differently evaluated by the market.

Thus we may say that entrepreneurial universities can be strongly linked with "bowling alone" levels of associationism and with the techno-economic situations of the "North" or of the "possible learning paths" we referred to in section II. In such contexts, those universities are important actors in LICS and, also, relevant arenas of conflict.

In peripheral or marginal situations, one main obstacle to the emergence of entrepreneurial universities will be the weak knowledge demand addressed to universities. They may be willing to become "entrepreneurial" but, in such context, they are not really able to make an important contribution to the capitalisation of knowledge; consequently, it is very difficult to become "core institutions" in that way.

We conjecture that, when "bowling alone" prevails in peripheral conditions, the higher education landscape shows many examples of the *consulting university*, the peripheral version of the entrepreneurial university. It is also characterised by market type internal and external relations, but its contribution to economic growth is mainly of a routine "consulting" type. Of course, there are many exceptions, but that is the dominant situation, because the periphery is characterised not only by a weak knowledge demand but also by the fact that such demand is mainly attended by firms and research organisations based in the North. Such universities are some of the pieces of fragmented LICS, and they do not have much possibilities of contributing to build real LICS.

Similar consideration suggest that, when "Bowling alone" prevails in marginal situations, we may find many examples of *isolated universities*. LICS are simply absent.

Of course, we are speaking of (less than) "ideal types" of universities. Real universities are much more complicated, and different types coexist, even within the same institution. In fact, the last situation is so common that we may include in the list the type of *fragmented universities*; they are above all arenas of conflicts between different projects concerning symbolic and material retributions, external relations and academic priorities.

Fragmented universities may be found in the North and, perhaps more often, in the South, where a particular "sub-type" is frequent. It may be defined by the opposition of two main attitudes. One is the "modernising" project; it looks to the North, to the international "Republic of Science" and/or to the "entrepreneurial university"; it is based on closed relations with the Northern academy and/or international co-operation and/or private firms. The other attitude is built by different traditions that resist the prevailing trends of the globalising knowledge economy. Remembering the "dualisation" theories of development, in this case we may speak of the *dual university.*

The dual university is the name of an unstable equilibrium between conflicting trends. In peripheral conditions, the comparatively low role of advanced knowledge and learning jeopardises modernising projects. If associationism is strong, collective resistance to main traits of the capitalist knowledge economy is usually also strong. It is embedded in networks of social actors closely connected with academic sectors. In such conditions, universities may be neither isolated nor really "dualised" but above all *resistance universities.*

A different alternative may be the *innovative and socially committed university,* seen as a core institution of an expanding tertiary lifelong educational system which is able to attain the generalisation of such educational levels. Such university needs to be connected with strong learning and innovation dynamics; it also requires high doses of social capital, in society at large and particularly in academy. Specifically, it requires "ideas of universities" that include co-operation with the extension of democracy as a "third mission" of universities, closely connected with teaching and research.

In the North, such universities require "civic communities" or at least "strong associationism". They will probably cope efficiently and in relatively egalitarian ways with the challenges stemming from some tensions characterised as follows: "Universities […] have witnessed a dramatic growth over the last twenty years, and also are undergoing in most countries a radical reorganisation of their research activities. […] two tensions […] - being critical to the crystallisation of science districts and serving as the privileged proximity knowledge provider - entail major changes in the higher-education landscape." (Laredo, 2003: 8) More generally, innovative and socially committed universities in the North will be main actors of integrated "learning societies".

In the South, it will be very difficult to have such universities without "civic communities" or where possible learning paths are not actively explored. If these requisites are fulfilled, prevailing academic values may be oriented towards the promotion of development, understood not only as economic growth but as human sustainable development. In such context, the "idea of university" shaped by the Latin American University Reform Movement may be revitalised. Innovative and socially committed universities would be main actors in building "developmental" LICS.

Conclusion

National and regional innovation processes are deeply dependent on the types of education offered by universities, on the priorities of their research agendas, on the defining traits of their external relations, and particularly on the prevailing attitudes of their graduates. Innovation processes are strongly moulded by the type of "knowledge demands" addressed to universities, and by the demands of society that universities attend or ignore. Universities all over the world are being pushed to give quick answers to market demands. In many cases, the influence of universities will depend more on the answers they give to more general social demands, which are often "non solvent" demands;

Since universities are "memorious institutions", where the past deeply conditions the present, particular attention should be given to some traditions of socially committed universities, and to the possibilities that new meanings might be given to old projects. As an example we have briefly mentioned the Latin American University Reform Movement of the 20th century.

It has been asserted that the good "performance" of some innovation systems is connected with the "social capital" endowment of the corresponding region or nation. Several studies suggest that social capital is highly correlated with education. In fact, different social sectors and countries are endowed with different types of social capital. Grosso modo, the associative capabilities of deprived sectors and underdeveloped countries are weakly related with knowledge demanding activities. In this sense, learning divides tend to be self-reinforcing. Concerning this crucial issue, universities' ideals and effective practices may be highly influential.

It is conjectured that, in overcoming learning divides, a main potential role of an innovative and socially committed university may be its contribution to a key issue for enhancing LICS: the generalisation of a tertiary level and diversified lifelong high-quality education, closely connected with the world of work and based on co-operative nets of

different organisations and social actors. This should be a main pillar for building "knowledge-based" social capital.

Now, "life long learning has so far been a slogan with little real foundation in practice. In the learning economy it becomes a major challenge for universities and other institutions to make it a real phenomenon." (Lundvall, 2002: 4) Measuring how near or how far a country or region is from achieving generalised life long learning, is perhaps a good indicator of where it stands concerning the learning society.

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