The Sustainable city, C.A. Brebbia A. Ferrante, M. Rodiguez & B.Terra (Editors)
© 2000 WIT Press, www.witpress.com, ISBN 1-85312-811-2

The quaternary city

M. Tomelin & R.G. DaSilva
ULAC – Universidade Latino-Americana e do Caribe, Brazil

Abstract

In economic theory until now, the three factors of production have been: labour, capital, and land. Today a third industrial revolution is under way. Microelectronics, computer science, telecommunication, robotics and biotechnology are transforming all facets of life – what we do and how we do it. The "knowledge-based economy" really changes the way we workout every day necessities of life. A knowledge worker is an "executive" who knows how to allocate knowledge to productive use, just as the capitalist knew how to allocate capital to productive use. In this third industrial revolution, technologies are changing so rapidly that no one knows whether future cities will work. In the first and second industrial revolutions workers were leaving agriculture (a low-income sector) and entering manufacturing and mining (high-income sectors). At the third revolution, workers are entering services (a generally low-income sector with a wide dispersion of wages). This has created opportunities to do things that had never been done before and, on the other hand, to do old things in new ways. The purpose of this paper show ways to produce new highly-value-added products with financial returns and growth rates far above those in the economy as a whole in the future cities, using leisure also as an opportunity of financial returns.

1 Introduction

One of the questions deserving the particular attention of economists and policy markers has to do with the division of labour in society, its implications on production and its organization in the cities.

As society develops, and cities in particular, this question acquires a growing complexity, in view of the number of interacting factors that might determine social organization, in this new Era of Knowledge.

The Sustainable city, C.A. Brebbia A. Ferrante, M. Rodiguez & B.Terra (Editors)
© 2000 WIT Press, www.witpress.com, ISBN 1-85312-811-2

This article aims at discussing the speed and impact of transformations on urbanization and the production of "Knowledge", generating a new economic sector, the QUATERNARY, which, in turn, will generate new productive activities.

In the near future we will not speak anymore of employment but only of productive economic activities. With the development of the Quaternary, the human being will be capable of generating an individual or group productive activity to his/her own economic support and social well being. This objective will only be reached through education.

2 Universal Age

Humanity's evolution and the consequent division of economic activities from the primary to the quaternary sectors has broken the vicious circle of the production factors: land, labor and capital. Nowadays we are in the Era the Knowledge. As Lester Thurow puts it, "The basis of the new economy is innovation and the return of investment is as infinite as imagination". Taking humanity's evolution as guideline, we conceived " the quaternary sector" which is characterized by the action of creating, to interpreting, organizing, guiding, controlling and transmitting knowledge, with the intervention of the scientific and technical environment and have attributed to those acts an economic value", Tomelin (1988). We have experienced in the nineties the arrival of the " Universal Age", under the aegis of globalization, in which history is no longer the sum of the parts, but is produced by the simultaneity of communications.

In re-defining the economic sectors we have redressed the production factors concept. Land, labor and capital can only be applied to the primary sector. In the secondary sector, labor and capital remain and a new factor – raw materials – is added. This sector which is characterized by the transformation of raw materials into consumption good has been removed from the urban centers.

In the third sector, labor and capital are combined for the production of the services required by the cities. A new sector - the quaternary – is now being brought about and is characterized by the production and dissemination of knowledge.

In this new conception, in every sector there are two permanent production factors – labor and capital. However, the three production factors concept remains. Land, in the first sector; raw materials, in the second; services, in the third; and knowledge, in the quaternary are added up to complete the trilogy of each sector.

The Sustainable city, C.A. Brebbia A. Ferrante, M. Rodiguez & B.Terra (Editors)
© 2000 WIT Press, www.witpress.com, ISBN 1-85312-811-2

In each economic sector there are the political power, the economic power and the power of knowledge which, combined in several orders, have determined the cycles of humanity's history. We are thus living in the "Universal Age" that began in the 90's in which scientific power defines what to produce. Economic power and political power are then subordinated to scientific power in the sense that they take knowledge as the prevailing guideline.

Unhappily, this order is not completed yet, because we are in a transition phase between the " Contemporary Age and the Universal Age" manifested by globalization. Hence, we're still living the crisis of the current world that is being commanded by economic power rather than scientific power, leaving to the political, power the mare right to comply.

The State is no more the driving force in society, as it has ceased to be the welfare state . The inefficacy of State's power is shown above all in the cities. Numbers are scaring when we of population, growth, migration, education, health, transport, lousing, criminality prisons or unemployment .
In the Universal Age, is new order is established: the power of knowledge points out the needs; the economic power produces the means demand to supply and the political power regulates the activities of the State, whit a prevalence of the executive over the legislative.

3 The productive activities in the city

In the Society of Knowledge, education is universal and requires that the trained person can absorb knowledge in a new scale through continuous education. Manpower will be recruited from university graduates and specialized workers. That means that in the near future the average worker should have an university degree and every worker will have to be self managed.

Besides formal education, every worker will receive specific training from the in employers. The classic examples of this are the engineers that are increasingly being trained in finances, and marketing, and mathematicians and physicists, who been absorbed by the financial sector. Thus, all companies will play a decisive role in investing in the development of workers' knowledge.

The transition from Industrial to Knowledge Society, where human capital is being given increased value, has brought a of challenges that should be faced the employers and for the employees.
A few years ago, the employees didn't show any interest or motivation to invest in their own education, as they saw it as a wage loss. Employers, in turn, took training costs as expenses rather than investment.

The Sustainable city, C.A. Brebbia A. Ferrante, M. Rodiguez & B.Terra (Editors)
© 2000 WIT Press, www.witpress.com, ISBN 1-85312-811-2

In the Society of Knowledge it has been already noticed that most of the youths support their own education, and increasingly they invest in continuous education in specialization courses or master's degrees.

With the increasing importance of education, there is a fundamental change in the role of the University. In the Industrial Era universities were seen as a place where élites should be educated and where should be prepared the leading cadres to occupy high echelons either in government or in the private sector.

In the Society of Knowledge, however, universities are being given great responsibility in disseminating knowledge, by developing more scientific and applied researches. In Peter Drucker's words, universities should be in charge of "begetting leaders" that should be prepared to face the challenges and constant changes in society.

The new professionals coming from the University of the "Knowledge 's Era" should prepared to do team work, because, in spite of carrying out developing specific tasks, they should understand the process as a whole and contribute to its success through their individual efforts.

One of the consequences of this process is the growth in the number of colleges and universities employing a larger contingent of teachers and researchers working as "quaternaries". Besides, the accelerated increase in research and production of knowledge will enhance publication and the development of applied research.

In this sense universities in the presents Knowledge Era will become one of the economic resources of larger importance, for academic institutions as well research centers, will be the center of production of human capital, by supplying continuous education and value added information. The main role of universities in the Knowledge Era is to contribute to the development of areas surrounding the cities, as it happened in California with the Silicon Valley.

The city of the quaternary will generate a larger number of jobs. Taking the development of productive units near universities, as a basis, be can clearly perceived that other direct or indirect activities linked to them are fitness clubs or academics physical conditioning which create number of jobs.

This activity is developed for two reasons: Firstly, the quality of citizen's lives is improving and their longevity perspective is increased; and, secondly, knowledge enhancement calls for a healthier citizens and opens a new field for a better formation of the third age citizen. The predominance of services and knowledge production in the development of cities leads to additional scientific production which, in turn, will give rise to new activities such as

The Sustainable city, C.A. Brebbia A. Ferrante, M. Rodiguez & B.Terra (Editors)
© 2000 WIT Press, www.witpress.com, ISBN 1-85312-811-2

book publishing, painting, music, theatre, sports and entertainment, thus generating new jobs and turning the cities into cultural centers.

With the enhancement of life expectancy new "Universities of the Third Age" will be established to meet aspirations and needs of old age people, mainly in cultural activities.

4 The phenomenon of the urbanization and conurbation

The space created for living in society, which was initially a place for the exchange of primary products was later transformed to provide services for the population. Humanity's evolution turned cities into places where the quaternary activity, i.e. the production of knowledge, occurs. Today's cities still have spatial problems as in the old towns like narrow streets needing to be widened for the circulation of automobiles, instead of " ox carts". Small cities, linked together by the automobile have given rise to the conurbation phenomenon observed in the big metropolis or metropolitan areas where the problems of transportation, housing, sewers, water supply, health, education leisure and others need to be jointly solved.

The dispute for a place to live has increased poverty which in turn is causing more violence in these connurbations. Group, violence, xenophobia or cultural intolerance are increasingly becoming dominant in big metropolis so much so that the state rests powerless and has totally failed in combating them.

In the Brazilian case penal agricultural colonies should be built, mainly in the Amazon region, to prevent the organized crime attempts to invade urban prisons. One wonders whether the State is concerned with the problem.

The process of connurbation and the urban problems it creates defies the State and it usually comes too late to solve them. State's failure could be compensated by the Third Sector, a new spontaneous alternative segment of society with a solidarity character aimed at substituting or supplementing State's obligations. This sector is meant to provide systems of mutual cooperation ,mainly in the areas of education and health. Non governmental organizations of many natures are serving this purpose.

5 The employment / unemployment equation

The equation employment versus unemployment keeps being unsolved and nobody knows how long it can last. Increasingly, work tends to be the exercise of paid productive activity with or without a formal job. To achieve such a paid productive activity the hiatus between the individual and the

The Sustainable city, C.A. Brebbia A. Ferrante, M. Rodiguez & B.Terra (Editors)
© 2000 WIT Press, www.witpress.com, ISBN 1-85312-811-2

necessary social capital that is made up of health, education and social welfare should be bridged.

The State and the family should supply these basic needs until adult age. In poor countries and for cower classes even in developed countries this aim has not been achieved. The poor countries may be able to provide a minimum of health, but usually appropriate education which is the basic prerequisite to get a job.

References

De MASI, D. O Futuro do Trabalho. Rio de Janeiro, J. Olympio/UnB, 1999.
FORRESTER, V. L'honeur économique. Paris, Librairie Arthème Fayard, 1996.
HENDERSON, J. & CASTELLS, M. Global Restructing and Territorial Development. London, Sage Publ., 1987.
HIRST, P. & THOMPSON, G. Globalization in Question. Cambridge, Polity Press, 1999.
MAKENZIE, W.J.U. Poder, Violência, Decisão. Brasília, Editora Universidade de Brasília, 1978.
OECD, Group an Urban Affairs. Stratégies pour le lojement et e'integation sociale dans les ville. Paris, 1996.
RIFKIN, J. O Fim dos Empregos. São Paulo, Makron Books, 1996.
STEWART, T. A. Capital Intelectual, Rio de Janeiro, Editora Campus, 1998.
SUE, R. La Richesse des Hommes – Vers L'Économie Quaternaire. Paris, 1997.
THUROW, L. Creating Wealth – The New rules for Individuals, Companies and Countries in a Knowledge-Based Economy, London Nicholas Braly Publ., 1999.
TOFFLER, A. The Third Wave. New York, Bantam Books, 1980.
TOMELIN, M. Brasília, cidade quaternária. Belo Horizonte, UNA Editorial, 1997.
TOMELIN, M. O Quaternário: Seu Espaço e Poder. Brasília, Editora Universidade de Brasília, 1988.
WALLERSTEIN, I. The Capitalist World – Economy. New York, Cambridge University Press, 1989.
WHO – OECD. Our cities, our future. First International Congress or Healthy and Ecological Cities. Copenhagen, 1996.
WORLD BANK. The Human Face of the Urban Environment. Washington D.C., 1995.