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HUMAN CAPITAL IN INFORMATION ECONOMIES

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Introduction

What is new about new media? Its development and use is more influenced by economic factors than the old media. And the new media is more central to the new economy. Indeed, an ever more popular theme in the scientific literature, government policy documents and the popular press, is that technologically advanced economies are in the process of moving beyond industrial capitalism to information-based economies. This transformation is expected to bring profound changes in the form and structure of economic, social, cultural and political systems. European Union integration is just one aspect of this restructuring of economies and societies (see Bell 1973; Melody 1985; Soete 1997).

This transformation is being driven by the development and pervasive application of information and communication technologies and services. The electronics, computer, telecommunication, media and information content industries constitute a \$US trillion global industry sector. It is the fastest growing sector of the global economy and is expected to remain so for the foreseeable future. Most national governments are counting on these industries to provide the primary stimulus to their future economic growth.

If one were to believe the “blue sky” speculation and industry promotion about the technological and service possibilities in this field, one would quickly conclude the new information and communication technologies (ICT) will solve all of society’s problems. A more realistic assessment of the process of transformation to an information economy may provide a little deeper understanding and help fashion more realistic policies by governments, market decisions by industries, and education and research decisions by universities. It can also help set the framework for comprehensive research programs that can inform decision makers and enlighten scholars and students (Melody 1996).

THE MACRO ECONOMY

When one examines the progress to date in the transformation from an industrial economy to an information economy, two observations seem self-evident. First this transformation has much in common with past major transformations in the economy, such as from agriculture to industrial manufacturing. And transformations are, by definition, challenging, uncertain, and difficult times - what Joseph Schumpeter called periods of “creative destruction”. There has never been a painless transformation (Schumpeter 1950).

The second observation is that the most fundamental problems and challenges of the future economy will be essentially the same as the past economy, i.e. employment, inflation, cycles of expansion and contraction, achieving growth in the real income of the population, and ensuring that all members of society share in the benefits of economic growth. Thus, the need for informed government policy to guide the economy will be even more important in the future than it has been in the past. Because the structure of the economy is changing continuously, future information economies will be structured very differently from the past industrial economies. New approaches to old problems, new priorities and new policies will be needed to manage information economies effectively (Soete 1997, Melody 1988).

Let us note some characteristics of the new information economy as it has evolved over the past quarter century.

Economic Productivity.

Despite widespread applications of continuously improving information technologies (IT) throughout the economy, and many examples of increased productivity at the micro level, there is very little evidence that the IT revolution has improved productivity in the economy as a whole. Despite the recent economic prosperity in the US and the UK, economic growth rates over the past quarter century have been significantly below expectations in the developed countries. Average real incomes have not increased significantly. Most developed countries are dismantling their welfare states because they can no longer afford it. Nobel prize winning productivity economist Robert Solow's most widely noted observation on the subject is that the IT revolution appears everywhere except the productivity statistics.

Instabilities in the Economy.

Improved communication and information exchange are associated with increased interdependence and instabilities in the economy. The volume of international financial exchanges is now twenty times greater than the value of trade in goods and services, which has prompted some analysts to interpret the information economy as "casino capitalism". This is associated with increased volatility in stock markets, currency markets, and economic activity in regions and small nations that are vulnerable to the resource allocation decisions of transnational corporations. The recent collapse of most Asian economies is simply the latest large scale development.

Unemployment.

The stimulus of IT to new employment has been disappointing, as IT has been associated more with the elimination of jobs than the creation of jobs. It now seems clear that the IT revolution will not provide expanded employment opportunities commensurate with its claim on investment resources. As a stimulus to employment, it cannot be compared with the

pattern of past waves of transforming inventions such as the railroads, electricity or the automobile. Moreover IT tends to displace unskilled work by skilled work, leaving the majority of unemployed with vastly reduced opportunities for employment. In the information economy, to be in work is better for many people, but to be out of work is worse, and “the natural rate of unemployment is unnaturally high” (see Soete & Freeman 1994; Reich 1992).

Inequality.

A minority of the population is benefiting significantly from these changes, but the gap between rich and poor is steadily widening. This is driven, in part, by the changing structure of employment, but is compounded by the very biased distribution of information economy opportunities and benefits across income classes. The opportunities favour the already privileged - by income and education. The IT revolution is not closing the gaps of inequality in society; it is exasperating them. The effect has been quite dramatic the United States over the past 20 years, but it is also growing in Europe.

THE MICRO ECONOMY

When one looks beyond the macro economy indicators, to specific sector and industry activity, additional trends are observable.

Technology and Training.

Telecommunication reform is opening opportunities for private sector participation in an industry not noted for either efficiency or customer service as a public sector monopoly, with beneficial results for business and residential users. R&D expenditures in the telecom and computer equipment hardware and software sectors are increasing steadily, supported by both the private and public sectors, with major technological improvements announced continuously.

Yet government expenditures for education and training, as a percentage of total expenditures, are declining almost everywhere across the developed countries, indicating the priority of education and training in government programs is being reduced. This is partially offset by an increase in corporate expenditures for staff training. However it is clear the commitment to invest in people cannot compare with that for investing in technology (see Preston & Wickham 1997).

Applications.

Although the information/communication sector of the economy is extremely important in providing a foundation for a modern economy, the major transformations that will bring about an information economy lie elsewhere. For the most part, the new information/communication technologies and services are intermediate goods. Their primary benefit lies not in their intrinsic value, but in their applications for other purposes. The excitement about an information economy lies in the

potential for applying these technologies and services to change the way business is done, eg. electronic commerce, the way organisations and industries are structured, and the way people choose to conduct their lives.

Banking and finance has been a leading applications sector. The industry has been restructured on a global basis. Banks have reorganised the way they function. We can readily recognise that we do our banking and finance very differently today than ten or even five years ago. Other industry sectors, including transport and tourism, manufacturing and services are at earlier stages in their respective transformation processes. Despite official government pronouncements by most countries announcing national commitments to Information Society 2000 policy goals, public sector applications lag noticeably behind private sector applications. It is particularly ironic because it is in the sectors of education, health and government administration where the potential benefits of information/communication technologies and services are arguably the greatest (Melody 1997).

Decline of the Public Interest.

Liberalization reforms of telecommunication and other infrastructure segments of the economy have provided much needed new opportunities for private initiative. But governments have yet to mark out the domain of the public interest in the new market environment. Indeed this is a dilemma that is common to all welfare state reforms.

Whereas industrial economies have been driven by waves of massive investment in physical capital, eg. rail, road, ports, pipelines, electrical grids, etc. information economies will be driven by investments in human capital, which will also have to be massive if growth and development are to be achieved. The most valuable information and knowledge - the most important economic resource in an information economy - is housed in human beings. In the information economy, employment, welfare and human development issues are converging, and government policies must be developed to recognize this new reality (see Lundvall & Johnson 1994).

Steps to Building Human Capital

It is by now clear that the IT revolution will not provide a wave of economic expansion in capital-intensive physical assets, comparable to the past waves of investment initiated by the railway, electricity, natural gas and the automobile. Each of these innovations required enormous investments in physical infrastructure that carried with them massive employment of relatively unskilled and semi-skilled labour. In contrast, the information revolution is being driven by skilled labour, representing a much smaller portion of the labour force. For the first time in the history of capitalism, the primary driving economic force is not physical capital, but human capital – the investment in skilled labour (see Stewart 1997).

This is evident in the R&D that is yielding continuous innovations, and even in the equipment manufacturing industries, which are increasingly

dominated by software development. Just as computer software grew from almost nothing in the mid-1960's to become larger than the computer hardware industry 20 years later, so a similar process has now begun in the telecommunication sector, most dramatically illustrated by the explosion of internet services. The driving force is the content, not the facility systems.

This is also true in the applications of information/communication technologies and services throughout the economy, and even in the delivery of new services to the home. Experimental trials around the world over the last decade have demonstrated that investments in state of the art technologies and services are not enough. There must be far more investment both in understanding consumer needs and in enhancing the consumer skill base before there will be widespread acceptance of these services. Thus there is increasing evidence that the pace at which the new technologies and services are driving the process of transformation to an information economy depends primarily on the pace of productive investment in human capital, i.e., the skill base of labour, management, consumers and policy makers (see Becker 1993; Schultz 1972, 1975).

In many respects, this is a very positive state of affairs for it implies some very promising tendencies. First, it could significantly reduce the oscillations in the business cycle, which, in the past have been aggravated by the rise and fall of enormous investment in location-specific fixed physical capital. Investment in human capital can avoid these fluctuations. Further, in times of deficient aggregate demand in an information economy, it will be investment in human capital that should be the priority need to stimulate renewed economic growth.

A second important characteristic of investment in human capital is that it closes the gaps between the traditional distinct economic activities of investment, employment, service provision and benefit to the population. In the industrial economy, investment frequently does not provide satisfactory employment, and a significant portion of the economy cannot take advantage of the goods and services on offer. If the priority infrastructure investment is in human capital, then the needs of people as workers, as consumers and as citizens, can be met with the same investment. It is both a resource input and a service output at the same time (see Millar 1996; Machlup 1980).

Understanding Human Capital

An information economy is so different from an industrial economy, and the understanding of economists and policymakers about its characteristics so limited, that we do not have nearly enough knowledge and understanding to manage an information or knowledge-based economy. To paraphrase Kenneth Boulding, "the knowledge of economics does not include the economics of knowledge" (Boulding 1966). It is one of those areas that economists have long recognized, but rarely pursued. Only now that information and knowledge are becoming central to the next phase of capitalist economic development is the subject beginning to get some concentrated attention.

Thus at present we have only very poor indicators to help tell the difference between productive and unproductive investments in human capital. Like any other form of investment, bad investments will simply waste resources. For example, by the best indicators available, the US invests more per person on education than any other country, but gets far less benefit from this investment than many other countries. At present we have only crude measures for identifying precisely where productive investments in human capital might be made, or even identifying very clearly where good investments have been made. The best indicators available identify short run skill shortages, which are often misleading for the purpose of building the long run productive capacity in human capital that will best serve a country's population and interests. In fact, we don't know how to conceptualize adequately or measure the productivity of specific investments in human capital. This is one reason for the IT productivity paradox.

At the micro level we don't know much more about the characteristics of information as resource inputs into production processes or service outputs from them. Information is not a commodity in the conventional sense, and we are just beginning to develop the conceptual economic and legal foundations for different forms of intellectual property (Noll 1993). In a free market system the incentive to invest in upgrading the skills of employees is restrained by the increasing mobility of employees. Firms are not particularly interested in upgrading the skills of employees who are then likely to be attracted to competitors. Even at the national level, as increasing labour mobility is opened up, it may be cheaper to bring in outsiders to fill shortages than to expand education and training at home. The US Congress has continuously increased the import quota of foreign software engineers to meet the rapidly growing needs of industry. Also, investments in the skill and intellectual property of employees cannot be valued as assets, as can investments in physical property. Investment funds may be borrowed to invest in physical property such as factories, homes and automobiles, but generally not for intellectual property. We have yet to develop the equivalent of double entry bookkeeping for investments in human capital. For this and other reasons, the market will tend to underestimate investment in human capital, particularly in the long term productive capacity of human capital, the most important infrastructure of the 21st century information economy (Millar 1996).

Conclusion

Sustained growth in future information economies will require investments in human capital as a high priority policy tool of governments – for macro economic management of the economy, for enhancing the micro economic performance of specific economic sectors, for building competitive advantage in regional and global markets, and for enhancing individual income and well being.

The challenge of developing a comprehensive understanding of human capital is by no means limited to economists, for the issues of the new

information economies require contributions across the social sciences and the humanities. The so called “economic man” of industrial capitalism, the servant of accumulating physical capital, can be transformed back into a multi-dimensional human being whose human development is served by investment in the accumulation of human capital.

The new concepts and criteria for assessing the productivity of investments in human capital that must be developed will be very different from these concepts and criteria developed for investments in physical capital. For government and industry, the challenge is to develop policies, programs and implementation mechanisms that will build human capital and spread it throughout society. The new media will be an integral aspect of this process. This is an opportunity and a challenge like no other. Successes and failures in the next stage of capitalism will rest on the efficiency, effectiveness and wisdom of societies’ investments in human capital.

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