

# The Triumph and Tragedy of Human Capital: Foundation Resource for Building Network Knowledge Economies

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## Abstract

*A fundamental transformation to a global information and knowledge economy is underway, driven by dramatic changes in technologies, markets and government policies - the combination of pervasive applications of information and communication technologies and services, and the world-wide movement to market liberalisation and deregulation. People are expected to be the central resource attracting investment because knowledge is essentially produced, stored and applied by humans. Although many indicators suggest the economic well-being of people today is better than at any time in human history, global – and particularly youth - unemployment continues to increase. More balanced global liberalisation policies will tighten regulation of financial markets and liberalise agriculture, textile and labour markets. For the future, increased investment in human capital, and in access to education and training institutions is essential. The next generation Internet will make possible expanded educational networks and the global sharing of university resources. New programmes must build more productive linkages between universities and other societal institutions, and broaden the disciplinary foundations of traditional programmes. The LINK Centre is now prepared to join the international network of leading ICT policy centres, and crack the training dependency syndrome in this field. Through its support for an African network of similar centres, LINK will help create the foundation for the ultimate triumph of human capital in 21<sup>st</sup> century knowledge economies.*

## Introduction

We enter the 21st century in the early phase of a fundamental transformation of the global economy. The industrial economy of the 20<sup>th</sup> century is being transformed into an information and knowledge economy. This is changing the character of local, national and international economic, social, cultural and political activity. The primary forces driving this transformation are dramatic changes in technologies, markets and government policies - the combination of the development and increasingly pervasive applications of information and communication technologies and services (ICTS) on the one hand, and the world-wide movement to market liberalisation and deregulation on the other. The conversion of telecommunication (telecom) networks and all forms of communication and information content to digital standards is creating an electronic network foundation that facilitates exchanges and transactions of all kinds. Electronic commerce and the next generation Internet represent the next step in this process. Together with liberalised markets and reduced barriers to trade, this will ensure the 21<sup>st</sup> century knowledge economy becomes primarily an international, or even global economy.

In an agricultural economy, land is the most valuable resource attracting investment capital. In an industrial economy, manufacturing plants and machinery are the focal point of investment activity. In the knowledge economy, the expectation is that people will be the central resource attracting investment because knowledge is essentially produced, stored and applied by humans. Whereas the industrial economy was an era of physical capital with labour employed to facilitate its needs, the knowledge economy is expected to be an era of human capital with investment in the skills, competencies and capabilities of people being the central activity.

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This suggests that the knowledge economy will provide for a considerably higher level of human development than the industrial economy, for the conversion of what we know as the "labour force" into "knowledge workers", and for a significant expansion in investment in education, training, research and development – the major formal knowledge generating activities. It also suggests a more widespread distribution of the wealth generated in the knowledge economy because the human resources attracting this increased investment are also workers and consumers.

In this paper I wish to examine two aspects of the idea of human capital in network knowledge economies. The first is how efficiently existing human capital is being allocated and used, and the direction of policy changes necessary to improve it. The second, following directly from the first, is how established knowledge institutions, such as the University of Witwatersrand, can meet the challenge of building the human capital needed for 21<sup>st</sup> century network knowledge economies. The success of knowledge economies in different countries and regions may depend critically upon the ability of knowledge institutions to adapt to the rapidly changing environment, and produce human capital and knowledge output that generates a high level of economic productivity.

The concept of a knowledge economy is highly abstract and used here to simplify the analysis and permit a more direct focusing on some generic issues relating to human capital. In fact, the economies of different countries will differ dramatically in the 21<sup>st</sup> century, as they do now. It is anticipated that all countries will have opportunities to benefit from the trend toward knowledge economies and global markets, and that the poorer regions and countries in particular may be presented with a unique opportunity to overcome some current disadvantages.

## **The Allocation of Resources in the Industrial Economy**

### ***The Accomplishments***

In many respects the economic well-being of people today is better than at any time in human history. Indicators of the number of people employed, average wealth, income, gross national product, real wage rates, life spans, health, unemployment and welfare benefits, in most developed and some developing countries, are greater than they have ever been. Average levels of literacy, education, training and skill development are higher than they have ever been. More people go to university than ever before. A significant level of human capital is clearly evident in most economies, and large investments in building human capital are being made continuously. The historical evolution of the typical worker from the peasant farmer to the blue-collar factory worker, to the white-collar administrator, and now preparing for the knowledge worker, provides evidence of a triumph of human capital and individual development through a series of very different techno-economic systems.

### ***Resources and Markets Under Capitalism***

The idea of "capital" is a central concept of capitalism, the overwhelmingly dominant economic system in the world today. Capital refers to valuable endowments that can be applied for a productive purpose over a future time period, what we might more readily recognise as assets. The allocation of capital to its most productive uses is done primarily through the interaction of supply and demand in markets. Traditionally many industries and markets have been regulated by national governments for a variety of reasons, primarily to protect domestic producers and employment in particular industries. However, the global trend to increasing deregulation of markets, at the same time as information and communication technologies and services are facilitating the expansion of markets to global dimensions, is dramatically increasing the role of markets in allocating money capital as well as the production and sale of goods and services on a global basis.

Throughout the history of capitalism the priority resource for efficient allocation through markets has been money capital. Precious little money capital lies idle in mattresses or safe deposit boxes when there is interest to be earned or profits anticipated from investment. The unemployment rate of money capital is less than one percent and global markets now

facilitate the instant transfer of money capital around the world to the point where it can destabilise national currencies and entire national economies, as has been experienced in South Africa and is most recently illustrated in Argentina.

The second most important resource in industrial capitalism has been physical capital, i.e., the production facilities of industry and other inanimate physical assets that we can see and touch, like the building we are in, a car or your personal computer. Although investments in physical capital are always made with expectations of efficient and profitable use, the uncertainties of demand, technological change, unexpected competition, the business cycle and other factors sometimes create inefficiencies, wasted resources and bankruptcies. But even here, in the vast majority of cases the remaining value for future productive use stimulates careful attention to the preservation and enhancement of the physical capital assets. The lost investment from the abandonment of physical capital assets – as illustrated by derelict plants and buildings - as a percentage of the total investment in physical capital assets is relatively small, although in a global market this can be devastating to specific localities and even small countries.

To illustrate, a few years ago the utilisation and profitability of telecommunication long distance transmission capacity in the US, Europe and across the Atlantic was high, and expectations for explosive growth and continued technological improvement great, so that capacity was expanded by several orders of magnitude using the most advanced fibre optic cable. Today there are a number of bankrupt companies and substantial excess capacity waiting to serve the growth in demand that now has been postponed to a more distant future. The value of these assets is a lot less than anticipated, but they are still valuable physical capital. They are still assets and very serious attention is being paid to preparing these unemployed but valuable assets for future productive use. Comparable attention is not being paid to the associated excess capacity created in the human capital employed by the bankrupt companies. These human assets have been and are being abandoned by the old and new owners in great numbers, without regard to their capabilities for future production.

Under industrial capitalism, the efficient allocation and use of the labour resource has been a third tier consideration for several reasons. First, the major demand has been for unskilled and low skilled labour for which there generally has been an ample supply. Shortages in one country can be met by immigration from another. Second, the societal rejection of slavery and indentured service has removed the property rights in direct ownership of labour in most parts of the world, so organisations do not consider employees as assets. Not only can employees leave an employer on short notice, they can be dismissed on short notice – particularly in relation to the long lives of investments in physical capital. Physical capital assets are a fixed cost. Labour costs are variable and flexible. The labour resource bears the primary uncertainty and inefficiency imposed by market instabilities.

The essential characteristics of human freedom make it difficult to capture the value of investments in human capability as a property right of an investor or an institution. Even organisations that are totally devoted to investment in human capital, such as universities and research centres, only recognise physical assets in their balance sheets. The faculty and students, the quality of whom determine a university's output, productivity and reputation, are not counted as assets, although the funds they attract to the university for long term research, and the equipment those funds buy, will be counted.

This differential treatment of money capital, physical capital and labour or human capital under industrial capitalism has meant that less attention is directed to the efficient use of labour than to the other resources. Despite the enormous achievements in what I have called the triumph of human capital, there are some demonstrable inefficiencies in labour markets that are not only wasting potentially valuable human resources, but also contributing to significant human misery.

## **The Market for Human Capital**

### ***Employment and Unemployment in the EU***

Economically these are good times in Europe. Unemployment has been reduced pretty much to what economists call the “natural rate of unemployment”, i.e., the minimum achievable in a dynamic economy, and there are even labour shortages in some areas. This means that an unemployment rate of about 9% and 17 million people in the European Union is about as good as can be expected. The natural rate of unemployment in a full employment EU economy is an unemployed labour force a little larger than the population of the Netherlands, and growing faster.

The youth of today represent the backbone of the knowledge economy of tomorrow. If one unpacks the aggregate statistics, and looks particularly at youth employment, i.e., people under 25, the statistics tell a very different story. Across Europe, youth unemployment is typically two to three times average unemployment rates, and sometimes higher. After implementing a massive program to reduce youth unemployment between 1995 and 2000, that is now being marked for its outstanding success, Spain reduced its youth unemployment from 40 to 28%.

If we examine the definition of employment that is used in gathering these statistics, we will note that governments have sought to get employment numbers up and unemployment numbers down over the years, and the definition of employment has expanded to include part-time employment and relatively short-term employment, especially as women have been more active in the labour force. And a third category of people has been created for those not actively seeking work - usually because of a lack of success in previous efforts - who are considered to be employable, but are not counted in the unemployment statistics. In addition, among those in employment, a significant percentage of people are not in positions that utilise their basic skills and training. They have jobs, but their existing human capital is not being used most productively.

All of these factors suggest that even under current conditions of relative full employment, there is a massive underemployment of human capital capability in the European Union, a level of underemployment that, if applied to physical capital or money capital would be considered a massive depression. A similar story can be told from the statistics of other developed countries.

### ***The Global Labour Market***

But the knowledge economy is increasingly a global economy. Resources and markets for this economy must be examined on a global basis. In most developing countries, official unemployment rates of 20% are considered pretty good and 40% common. The South Africa Labour Force Survey reports for September 2001 an official unemployment rate of 29.5% and an expanded unemployment rate of 41.5%.

Youth unemployment is alarming. About half the world's population is under 25 years of age. The International Labour Organisation (ILO) estimates that 66 million young people are unemployed in the world, about 41% of total unemployment. Across Latin America, youth unemployment rates range from 36% to 66%. Comparable statistics are reported across Africa, the former Soviet Union countries and Southern Europe. Even with significant economic growth in the world economy between 1995 and 2000, world youth unemployment increased by 8 million.

Despite the fact that a significant number of the most skilled people in many developing countries have been attracted to the developed countries to meet skill shortages there, and the existence of large informal and black economies functioning in developing countries, the available evidence indicates that the underemployment – i.e., unused and under-utilised skills – of people is also far greater than it is in developed countries. Today there are more refugees in the world than at any time since the second world war. The vast majority of these refugees are economic refugees, people looking for jobs to sustain a better life. For the future

some experts fear the possibility of a tidal wave of unemployment across the globe over the next 10-15 years.

All of this has prompted the conservative Financial Times to report, "If the world were a company, the chief executive would be dismissed for making such poor use of its assets." The assets being referred to here are unemployed labour, and particularly young people. This has been the tragedy of human capital in the industrial economy - the monumental and increasing waste of human resources.

### **The Global Knowledge Economy**

Within this larger picture of both a triumph and a tragedy of human capital, the employment trends suggest a continuing increase in the numbers of skilled jobs, with the information and communication technology (ICT) and knowledge industries driving economic growth. Is it likely that the ICT revolution and the transformation to a global knowledge economy will change the current trend to inefficiency and waste in the use of labour? Will the continued liberalisation of markets bring about a more efficient allocation of human capital resources? Can the latent potential of human capital be unlocked by exploiting the opportunities made possible by next generation Internet capabilities, liberalised markets and an expanded role in the economy for the human capital production sector, - i.e., education, training, research and development?

These developments make it possible to reverse the global trend of increasing unemployed and underemployed human resources, but they by no means guarantee it. This will depend in part on national and international government policy and funding priorities, and also on how effectively the telecom and Internet infrastructure resources can be used by transformed education and training institutions to serve a vastly expanded number of people with an increasing variety of education and training needs. This is a formidable challenge - and an exciting opportunity!

### ***The Unbalanced Structure of Market Liberalisation***

The world-wide deregulation of markets has proceeded at a very uneven pace. The virtually complete deregulation of the financial markets, in combination with new global information and communication financial networks, has provided for such rapid movements of money capital around the world that it has become a cause of instability. Some analysts think it has gone too far, encouraging financial speculation and "casino capitalism" rather than investment in productive activity. The liberalisation of production and services markets is proceeding more slowly through negotiations at the World Trade Organisation and related regional organisations on a sector-by-sector and industry-by-industry basis, but major steps in liberalising markets have been taken over the last 15 years. More industries are subject to global competition, and consumers can buy more products and services in global markets. Deregulation has had, and is having a demonstrable impact on product and services markets and on resource allocation.

But the liberalisation of labour markets has yet to get off the ground, due primarily to the fear in the rich countries of being invaded by the surplus army of unemployed from developing countries. The impeccable logic of the efficiency of markets and the improved productivity from resource allocation on a global scale, which is immediately accepted for money capital, accepted in principle for physical capital in product and services markets, somehow hasn't been applied to human capital, which remains highly regulated, with even tighter restrictions being adopted by many rich countries today, with exceptions of course for meeting skill shortages in the most developed countries. Neither this inefficiency in the allocation of human capital, nor its accompanying hypocrisy in the rich countries, is sustainable. In the "so-called" global knowledge economy, the policies of liberalisation must be extended to the labour market. A global knowledge market can only function efficiently if there is a global market for human capital. Global markets must function in the best interests of the people of the globe, not just those in rich countries.

Clearly there is considerable evidence of market failures in some labour markets, as there is in some capital and product markets. An immediate deregulation of the world's labour markets might create even more instability than deregulation of the capital markets. The challenge is to consider steps to the efficient deregulation of all markets for economic resources in a co-ordinated and balanced approach. This suggests a very clear policy agenda to improve the allocation efficiency of all resources in a global knowledge economy.

1. Increased regulation in financial markets to reduce incentives for speculation and market manipulation, to achieve greater stability and efficiency.
2. Decreased regulatory protection of economic sectors now being subsidised and protected in the rich countries, for which poor countries have an international comparative advantage – especially in agriculture and textiles.
3. A gradual liberalisation of international labour markets to improve the efficiency of the market allocation of labour resources.
4. Significantly increased levels of investment in building human capital by all sectors of the economy, including governments and corporations; and
5. An order of magnitude increase in access to education, training and skill development institutions and resources, now made possible by the expanding capacity of the telecom network infrastructure and innovative applications of next generation Internet capabilities.

### **Building Human Capital for Knowledge Economies in Global Markets**

#### ***The Investment Environment***

As there is widespread acceptance by politicians and governments everywhere of the transformation to a knowledge economy now underway, one would expect this to be associated with an increased allocation of financial resources to education and training, and the establishment of government commissions to examine how the education and training sector can be restructured to meet the enormous demands that will be placed upon it in the evolution to a global knowledge economy. Most national governments in the world have issued information society policy statements; South Africa recently appointed a Presidential Commission on the Information Society; the European Commission has an Information Society Directorate; the annual meeting of the G-8 country leaders last year highlighted the information society development issues, with particular emphasis on overcoming the “digital divide” between the rich and poor countries.

But government funding of universities and training institutes, and of research and development, when measured as a percentage of total resource allocation, has been declining steadily for several years across most countries, rich and poor. Although this can be attributed in part to a failure of governments to comprehend the contradictions in their policies and the magnitude of the task ahead, it is primarily due a lack of confidence that existing education and training institutions can deliver the knowledge and human capital that is needed for the new economy.

Rather it is hoped – and the correct word is definitely "hoped" - that in a deregulated market environment the private sector will provide the major contribution to building new knowledge and human capital, as well as providing a competitive stimulus for some fundamental reforms by public sector educational institutions. As the OECD has described it, “Reduced public funding, in combination with greater demands for economic relevance and increasing student enrolments, are forcing universities to adjust.” (OECD 2001).

#### ***Creating New Network Universities and University Networks***

Clearly the market for education and training will be transformed over the next decade with public sector institutions subjected to increasing competition from new private sector entrants and from universities in other countries, in an increasingly global market. In this respect North American, Australian and British universities have a very large head start over other universities. Operating increasingly in a global education and training market, these countries now count education and training exports in the trade accounts.

Historically, educational institutions have been highly resistant to change. The basic organisation and structure of how universities go about their business hasn't changed much in the last 300 years. Universities, with a few exceptions, have been very slow to take advantage of the potential of the Internet. Yet the learning and knowledge business is more ideally suited to benefit from information sharing over communication networks perhaps than any other. Almost everyone can be an effective tele-worker. The capacity to teach students, or undertake research in many areas, is not constrained by the physical capacity of buildings, classrooms and offices. Many leading universities are already becoming quasi-virtual organisations. Although seminars and meetings with a physical presence are an essential part of learning, they will no longer be the dominant foundation of university courses or most research projects. Rather each course and research project will be a virtual network of people, with a faculty or group leader. Student access to courses will become much easier. Professors and most staff will no longer need their own private offices. In fact, based on hours in residence, most Professors can't justify their private offices today. The capacity of a university to serve students well and undertake high quality research need no longer be constrained by the capacity of physical resources, but only by the capacity of the human capital employed by the university. This permits an order of magnitude increase in the capability of universities to provide programs at a dramatically reduced cost per student. Today one-third of the employees of IBM world-wide have no offices. IBM is primarily a producer of physical products; universities are primarily producers of intangible learning and research services.

The next generation Internet also will make possible the sharing of university resources even more widely. The productive twinning of universities, university programmes, and individual faculty and students in rich countries with those in poorer countries can help to improve both the quality and quantity of education and training in poorer countries. Electronic access to university libraries, course materials, and even direct participation in virtual courses in the wealthier countries can enhance the productivity of universities in poorer countries by an order of magnitude at very little additional cost. This kind of quantum leap in the capacity and service of universities and training institutes in both rich and poor countries is not only possible, it is essential if the size of the surplus army of unemployed youth in the world is to decline, and if the global knowledge economy policies are to be converted from rhetoric into reality.

### ***Creating More Relevant University Programmes***

But what about the relevance question? If government and corporate leaders do not believe that existing education and training institutions can deliver the knowledge and human capital needed for a knowledge economy, there will be no opportunity for these institutions to make the major structural adjustments necessary to respond to the opportunity I have outlined.

One distinguishing characteristic is direct and productive linkages between the university and a variety of external institutions, including government agencies, corporations, foundations and others. These linkages do much more than simply cultivate funding for university research. They provide a basis for specialised training programs, and exchanges of personnel for short and even long periods, with considerable flexibility in how they are implemented. This helps the university get a better understanding of the real needs and requirements of external institutions, including funders, and gives the external institutions continuing benefits throughout the university programs. Productivity and relevance will improve when these programmes are given a higher priority on university agendas and considered to be an integral part of, rather than a minor appendage to the University's mission, as they are in most universities today - but not in leading universities such as MIT or Cambridge.

A second characteristic is the broadening of the disciplinary foundations of traditional programs in the established disciplines devoted to the study of technologies, the economy, government policy and regulation – primarily engineering, economics, management, political science and law, but often including other disciplines as well. In a dynamic environment, static theories, concepts and methodologies in narrowly interpreted disciplines are more likely to lead to erroneous conclusions and misleading recommendations than helpful solutions to the difficult problems of adjustment during a period of rapid and fundamental institutional change.

A few years ago the European Union established an initiative called "Career Space" that brought together the leading information and communication technology companies in Europe and 26 leading technical universities and training institutes from 13 EU countries to develop curriculum guidelines for 21<sup>st</sup> century ICT educational programmes. In its report last year it stated,

*"It should not be forgotten that other disciplines are relevant to ICT curricula, as well as technical ones. Economics, business studies, creative design, social sciences and psychology all have important and increasing parts to play in ICT training. Indeed, for some ICT careers these aspects have greater importance than the technical skills..... Again, university structures may sometimes inhibit the adoption of innovative cross-disciplinary ICT curricula incorporating those elements."* (International Co-operation Europe, 2001, 12).

Full fledged multidisciplinary programs in the relatively new area of ICTS and the knowledge economy have been, and are being established at many universities around the world to bring closer linkages that connect the relevance of the academic teaching and research programs, and the knowledge and skill sets of the matriculating students, to the changing needs of the external organisations employing them and of the knowledge societies in which these students will live.

I had the good fortune to be a member of a group of faculty that set up a small multidisciplinary program at the University of Pennsylvania almost 30 years ago, focusing on the implications of computer-communication, in association with the Bell Laboratories, the U.S. National Science Foundation and other organisations. The principal question being addressed was, what will be the implications of connecting computers to the telecommunication network on a large scale? Only a multidisciplinary team of faculty, PhD students and experts from the external organisations could hope to address such a question comprehensively. Of course we did not even dream of anything like the Internet, but we did make contributions to program changes at the university, and policy changes in government and in corporate management that were a step in that direction. The most fundamental message coming out of that work was that progress would require the constructive participation from a diverse array of organisations and people from several industries and disciplines, many of which were prevented or restricted from participating under the inherited policies, regulations and institutional arrangements. The liberalisation policies of the last 30 years have been about broadening the participation of capital, institutional and human resources in the development of knowledge societies.

#### *The LINK Centre and the African and Global Network of Centres*

It is that early experience that led me back to my native Canada, and then on to the UK, Australia, Denmark and The Netherlands to take up challenging opportunities to develop new multidisciplinary programs integrating technology, economic and policy disciplines on important issues centred around fundamental technological change, its opportunities and implications. Now I take up a new challenge, and a unique opportunity – to help South African colleagues strengthen education, training and research programs at the LINK Centre and Wits University more generally. Our goal is to make the LINK Centre and Wits University an equal partner in the international network of ICT knowledge economy centres, capable of providing education through the PhD, a variety of external training programs for government, industry and other institutions in society, as well as ongoing distinctive contributions to research, all at a leading international standard.

We expect the LINK Centre at Wits University will be the first developing country program to join the international network of leading ICT knowledge economy centres and begin the process of cracking the dependency syndrome that now requires people from developing countries to go to the developed countries for internationally recognised education and training in this field. As an ever stronger institution for generating human capital, LINK and Wits University will provide a base for cultivating an African network of similar centres and more productive links to similar networks on other continents. As this African network grows to critical mass, it will contribute to overcoming the tragedy of human capital and helping to establish a path for its ultimate triumph in 21<sup>st</sup> century knowledge economies.