

SUSTAINABLE ECONOMY V

2. KNOWLEDGE-BASED ECONOMY – AN ANSWER?

Introduction

We hear many people today extolling the virtues and benefits of a knowledge-based economy – their view is that our economy is now knowledge-based and this the way of the future. For the last two centuries, neo-classical economists have recognized only two factors of production: labour and capital. This has now changed – information and knowledge are replacing capital and energy as the primary wealth-creating assets, just as the latter two replaced land and labor 200 years ago. In addition, technological developments in the 20th century have transformed the majority of wealth-creating work from physically-based to "knowledge-based." Technology and knowledge are now the key factors of production.

With increased mobility of information and the global work force, knowledge and expertise can be transported instantaneously around the world, and any advantage gained can be eliminated by competitive improvements overnight. The only comparative advantage can be gained through the process of innovation, i.e., combining market and technology know-how with the creative talents of knowledge workers to solve a steady flow of competitive problems. It is through innovation that value can be derived from information. We are now an information society embedded in a knowledge economy, in which knowledge management is essential.

Definition

A knowledge-based economy is an economy based solely on the production, distribution and the use of knowledge. In short, it means that the most important thing in the coming economy model will be knowledge and skills, not the material products or infrastructure.

Is There a Difference?

At first it may seem that there is only very little difference between a model of a normal economy and a knowledge-based model. In both we just create, buy and sell the products – seems that both models are very similar. But, a closer look reveals some major differences:

- Knowledge can be easily copied – a good idea will soon be owned by the world unless something is done to prevent it.
- Knowledge comes and leaves through a country's borders easier than do material products.
- Knowledge-based models call for moving jobs to those countries that have a skilled but a much cheaper workforce (e.g., India, and the eastern part of European Union).
- New knowledge quickly becomes old. Knowledge half-life seems to diminish each year. Our knowledge base is apparently doubling every two years.

There are different kinds of knowledge that can usefully be distinguished. *Know-what*, or knowledge about facts, is nowadays diminishing in relevance. *Know-why* is knowledge about

the natural world, society, and the human mind. *Know-who* refers to the world of social relations and is knowledge of who knows what and who can do what. Knowing key people is sometimes more important to innovation than knowing scientific principles. *Know-where* and *know-when* are becoming increasingly important in a flexible and dynamic economy. *Know-how* refers to skills, the ability to do things on a practical level.

The implication of the knowledge economy is that there is no alternative way to prosperity than to make learning and knowledge-creation of prime importance. There are different kinds of knowledge. "Tacit knowledge" is knowledge gained from experience, rather than that instilled by formal education and training. In the knowledge economy tacit knowledge is as important as formal, codified, structured and explicit knowledge.

How to Cope With the Problems of a Knowledge-Based Economy

A knowledge-based economy can create a lot of problems for small and large businesses. Counterfeits and violation of copyrights can erode profits. Most knowledge producers and users can move their skills and orders abroad and, at the speed of light, affect the situation a government agency or a company (and the whole economy) faces. The coming of a new economy model will, however, create as many new possibilities as problems:

- Outsourcing jobs and work can be utilized to minimize production costs.
- Instead of preventing everyone from using one's ideas, one can go for paid Internet-sharing and let everyone profit from one's concepts. Or leave it altogether, offer the ideas for free and profit from the advertisements and high traffic on your website.
- With coming of the knowledge-based economy, business management has become easier than before. Internet and cell phones make contacting anyone anywhere anytime possible.

The Organization for Economic Cooperation and Development (OCED) believes that its science, technology and industry policies should be formulated to maximise performance and well-being in "*knowledge-based economies*."¹ This is reflected in the trend in OECD economies towards growth in high-technology investments, high-technology industries, more highly-skilled labour and associated productivity gains. Although knowledge has long been an important factor in economic growth, economists are now exploring ways to incorporate knowledge and technology more directly in their theories and models.

New Growth Theory is based on work by Stanford economist Paul Romer^{2,3} and others who have attempted to deal with the causes of long-term growth, something that traditional economic models have had difficulty with. Romer has proposed a change to the neo-classical model by seeing technology (and the knowledge on which it is based) as an intrinsic part of the economic system. Knowledge has become the third factor of production in leading economies.^{2,3} *New Growth Theory* reflects the attempt to understand the role of knowledge and technology in driving productivity and economic growth. In this view, investments in research and development, education and training and new managerial work structures are key.

¹ Organization for Economic Cooperation and Development. 1996. The knowledge economy. Science, Technology and Industry Outlook, Paris, France.

² Romer, P.M. 1986. Increasing returns and long-run growth. J. Political Economy 94(5): 1002-37.

³ Romer, P.M. 1990. Endogenous technological change. J. Political Economy 98(5): 71-102.

According to New Growth economics a country's capacity to take advantage of the knowledge economy depends on how quickly it can become a "learning economy." Learning means not only using new technologies to access global knowledge, it also means using them to communicate with other people about innovation. In the "learning economy" individuals, firms, and countries will be able to create wealth in proportion to their capacity to learn and to share innovation.^{4,5} Formal education, too, needs to become less about passing on information and focus more on teaching people how to learn.

At the level of the organisation, learning must be continuous. Organisational learning is the process by which organisations acquire tacit knowledge and experience. Such knowledge is unlikely to be available in codified form, so it cannot be acquired by formal education and training. Instead it requires a continuous cycle of discovery, dissemination, and the emergence of shared understandings. Successful firms are giving priority to the need to build a "learning capacity" within the organisation.

Knowledge Distribution

In addition to knowledge investments, knowledge distribution through formal and informal networks is essential to economic performance. Knowledge is increasingly being codified and transmitted through computer and communications networks in the emerging "*information society*." Also required is tacit knowledge, including the skills to use and adapt codified knowledge, which underlines the importance of continuous learning by individuals and firms. In the knowledge-based economy, innovation is driven by the interaction of producers and users in the exchange of both codified and tacit knowledge; this interactive model has replaced the traditional linear model of innovation. The configuration of *national innovation systems*, which consist of the flows and relationships among industry, government and academia in the development of science and technology, is an important economic determinant.

The Importance of Intellectual Capital

Intellectual capital is a firm's source of competitive advantage. To become knowledge driven, companies must learn how to recognise changes in intellectual capital in the worth of their business and ultimately in their balance sheets. A firm's intellectual capital - employees' knowledge, brainpower, know-how, and processes, as well as their ability to continuously improve those processes - is a source of competitive advantage. But there is now considerable evidence that the intangible component of the value of high technology and service firms far outweighs the tangible values of its physical assets, such as buildings or equipment. The physical assets of a firm such as Microsoft, for example, are a tiny proportion of its market capitalisation. The difference is its intellectual capital.

Employment

Employment in the knowledge-based economy is characterised by increasing demand for more highly-skilled workers. The knowledge-intensive and high-technology parts of OECD economies tend to be the most dynamic in terms of output and employment growth. Changes in technology, and particularly the advent of information technologies, are making educated and skilled labour

⁴ Foray, D. and B. D. Lundvall. 1996. The knowledge-based economy: from the economics of knowledge to the learning economy. In: Employment and growth in the knowledge-based economy OECD, Paris. pp. 11-32.

⁵ Lundvall, B. and B. Johnson. 1994. The learning economy. J. Industry Studies 1(2): 23-42.

more valuable, and unskilled labour less so. Government policies will need more stress on upgrading human capital through promoting access to a range of skills, and especially the capacity to learn; enhancing the *knowledge distribution power* of the economy through collaborative networks and the diffusion of technology; and providing the enabling conditions for organisational change at the firm level to maximise the benefits of technology for productivity.

Science System

Our science system, essentially public research laboratories and institutes of higher education, carries out key functions in the knowledge-based economy, including knowledge production, transmission and transfer. But the science systems are facing the challenge of reconciling its traditional functions of producing new knowledge through basic research and educating new generations of scientists and engineers with its newer role of collaborating with industry in the transfer of knowledge and technology. Research institutes and academia increasingly have industrial partners for financial as well as innovative purposes, but must combine this with their essential role in more generic research and education.

Whose science do you believe?

The Importance of Information and Communication Technologies (ICTs)

ICTs release people's creative potential and knowledge – they are the enablers of change. They do not by themselves create transformations in society. ICTs are best regarded as the facilitators of knowledge creation in innovative societies¹. The new economics looks at ICTs not as drivers of change but as tools for releasing the creative potential and knowledge embodied in people. The ICT sector has a powerful multiplier effect in the overall economy compared with manufacturing. Wealth-generation is becoming more closely tied to the capacity to add value using ICT products and services..

Globalisation

ICTs open up global markets and foster competition. With the advent of information and communication technologies, the vision of perfect competition is becoming a reality. Consumers can now find out the prices offered by all vendors for any product. New markets have opened up, and prices have dropped. When businesses can deliver their products down a phone line anywhere in the world, twenty-four hours a day, the advantage goes to the firm that has the greatest value-addition, the best-known brand, and the lowest "weight". Software provides the best example: huge added value through computer code, light "weight" so that it can be delivered anywhere at any time.

Competition is fostered by the increasing size of the market opened up by these technologies. Products with a high knowledge component generate higher returns and a greater growth potential. Competition and innovation go hand in hand. Products and processes can be swiftly imitated and competitive advantage can be swiftly eroded. Knowledge spreads more quickly, but, to compete, a firm must be able to innovate more quickly than its competitors.

Conclusions

The title of this discussion paper asked if a knowledge-based economic system was an answer for the New Economy. My conclusion is, “No.” If the question is re-phrased to ask if knowledge-based industries and technologies can be useful in the development of the New Economy, then my answer is, “Yes.” I view ICTs and knowledge-based industries as tools which may be used to assist in the development and implementation of a new and sustainable economic system. My main concerns with respect to a knowledge-based approach is that it is being used easily now to help perpetuate an out-of-date economic paradigm which is based on corruption and greed. The ICTs provide the financial predators with a number of tools with which to quickly and surreptitiously plan and implement their schemes.

I also see ICTs as tools which might undermine a community-based economy which is attempting to foster local businesses, local marketing, and local purchasing. Granted the local businesses can use these tools to market their products elsewhere, especially if they have an excess of product. But one of the main intentions of a community-based economy is that the local market must come first. I hear of more and more on-line shopping, looking for the lowest prices and the best deals.

In my mind, ICTs foster globalization, increased competitiveness, and increased consumption of resources. Will such tools work against local entrepreneurs and businesses trying to survive in local and regional markets? Will promoting an knowledge-based economy support the social and cultural objectives of a sustainable society, especially when the success of that society will be dependent on better inter-personal communications.

But, let’s not deny the exceptional value knowledge-based systems have as learning tools, not only in our educational systems but in our business and everyday lives.

Compiled and synthesized by:

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