

## UNIT-IV

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### LESSON 13

### KNOWLEDGE BASED ECONOMY

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#### STRUCTURE

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#### 13.1 INTRODUCTION

The knowledge economy is also seen as the latest stage of development in global economic restructuring. Thus far, the developed world has transitioned from an agricultural economy (pre-Industrial Age, largely the agrarian sector) to industrial economy (with the Industrial Age, largely the manufacturing sector) to post-industrial/mass production economy (mid-1900s, largely the service sector) to knowledge economy (late 1900s – 2000s, largely the technology/human capital sector). This latest stage has been marked by the upheavals in technological innovations and the globally competitive need for innovation with new products and processes that develop from the research community (i.e., R&D factors, universities, labs, educational institutes). In the knowledge economy, the specialised labour force is characterised as computer literate and well-trained in handling data, developing algorithms and simulated models, and innovating on processes and systems. Harvard Business School Professor, Michael Porter asserts that today's economy is far more dynamic and that comparative advantage is less relevant than competitive

advantage which rests on “making more productive use of inputs, which requires continual innovation”.

Consequently, the technical, STEM careers including computer scientists, engineers, chemists, biologists, mathematicians, and scientific inventors will see continuous demand in years to come. Additionally, well-situated clusters, which Michael Porter argues is vital in global economies, connect locally with linked industries, manufacturers, and other entities that are related by skills, technologies, and other common inputs. Hence, knowledge is the catalyst and connective tissue in modern economies.

### **13.2 OBJECTIVES**

The objectives of this chapter is:

- To understand the concept of k-economy
- To know about k-profit analysis

### **13.3 MEANING OF KNOWLEDGE BASED ECONOMY**

The knowledge economy is the use of knowledge to generate tangible and intangible values. Technology and in particular knowledge technology help to transform a part of human knowledge to machines. This knowledge can be used by decision support systems in various fields and generate economic values. Knowledge economy is also possible without technology.

The term was popularised by Peter Drucker as the title of Chapter 12 in his book *The Age of Discontinuity* (1969), that Drucker attributed to economist Fritz Machlup, originating in the idea of “scientific management” developed by Frederick Winslow Taylor.

Other than the agricultural-intensive economies and labour-intensive economies, the global economy is in transition to a “knowledge economy”, as an extension of an “information society” in the Information Age led by innovation. The transition requires that the rules and practices that determined success in the industrial economy need rewriting in an interconnected, globalised economy where knowledge resources such as trade secrets and expertise are as critical as other economic resources.

In other words, the knowledge economy is a system of consumption and production

that is based on intellectual capital. The knowledge economy commonly makes up a large share of all economic activity in developed countries. In a knowledge economy, a significant part of a company's value may consist of intangible assets, such as the value of its workers' knowledge (intellectual capital), but generally accepted accounting principles do not allow companies to include these assets on balance sheets.

### **13.3.1 Concepts of knowledge economy**

A key concept of the knowledge economy is that knowledge and education (often referred to as "human capital") can be treated as one of the following two:

- A business product, as educational and innovative intellectual products and services can be exported for a high value return.
- A productive asset

It can be defined as:

Production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence. The key component of a knowledge economy is a greater reliance on intellectual capabilities than on physical inputs or natural resources.

The initial foundation for the knowledge economy was introduced in 1966 in the book *The Effective Executive* by Peter Drucker. In this book, Drucker described the difference between the manual worker and the knowledge worker. The manual worker, according to him, works with his or her hands and produces goods or services. In contrast, a knowledge worker works with his or her head, not hands, and produces ideas, knowledge, and information. The key problem in the formalisation and modelling of knowledge economy is a vague definition of knowledge, which is a rather relative concept.

For example, it is not proper to consider information society as interchangeable with knowledge society. Information is usually not equivalent to knowledge. Their use, as well, depends on individual and group *preferences* which are "economy-dependent".

### **13.3.2 Driving forces**

Commentators suggest that there are various interlocking driving forces, which

are changing the rules of business and national competitiveness. These driving forces are:

- Globalisation - markets and products are more global.
- Information technology, which is related to next three:
- Information/Knowledge Intensity — efficient production relies on information and know-how; many factory workers use their heads more than their hands.
- New Media – New media increases the production and distribution of knowledge which in turn, results in collective intelligence. Existing knowledge becomes much easier to access as a result of networked data-bases which promote online interaction between users and producers.
- Computer networking and Connectivity – developments such as the Internet bring the “global village” ever nearer.

As a result, goods and services can be developed, bought, sold, and in many cases even delivered over electronic networks.

As regards the applications of any new technology, this depends on how it meets economic demand. It can remain dormant or make a commercial breakthrough.

### **13.4 FEATURES OF KNOWLEDGE ECONOMY**

It can be argued that the knowledge economy differs from the traditional economy in several key respects:

1. The economics are not of scarcity, but rather of abundance. Unlike most resources that are depleted when used, information and knowledge can be shared, and actually grow through application.
2. The effect of location is either:
  - Diminished, in some economic activities: using appropriate technology and methods, virtual marketplaces and virtual organisations that offer benefits of speed, agility, round the clock operation and global reach can be created.
  - or, on the contrary, reinforced in some other economic fields, by the creation of business clusters around centres of knowledge, such as universities and research

centres. However, clusters already existed in pre-knowledge economy times.

3. Laws, barriers, taxes and ways to measure are difficult to apply solely on a national basis. Knowledge and information “leak” to where demand is highest and the barriers are lowest.
4. Knowledge enhanced products or services can command price premiums over comparable products with low embedded knowledge or knowledge intensity.
5. Pricing and value depends heavily on context. Thus, the same information or knowledge can have vastly different value to different people or even to the same person at different times.
6. Knowledge when locked into systems or processes has higher inherent value than when it can “walk out of the door” in people’s heads.
7. Human capital competencies are a key component of value in a knowledge-based company, yet few companies report competency levels in annual reports. In contrast, downsizing is often seen as a positive “cost cutting” measure.
8. Communication is increasingly being seen as fundamental to knowledge flows. Social structures, cultural context and other factors influencing social relations are therefore of fundamental importance to knowledge economies.

These characteristics require new ideas and approaches from policy makers, managers and knowledge workers.

The knowledge economy has manifold forms in which it may appear but there are predictions that the new economy will extend radically, creating a pattern in which even ideas will be recognised and identified as a commodity. Considering the very nature of ‘knowledge’ itself, added to the fact that it is the thrust of this new form of economy, there is a clear way forward for this notion, though the particulars (i.e. the quantum of the revolutionary approach and its applicability and commercial value), remain in the speculative realm, as of now.

## **14      FRAMEWORK OF KNOWLEDGE ECONOMY**

The knowledge revolution and the technological and economic changes it implies

clearly entail the need to rethink countries' overall development strategies. Knowledge- and innovation-related policies should be at the core of those strategies, which should be built on four pillars: the country's education and training base, its information and telecommunications infrastructure, the innovation system, and the overall business and governance framework..

## **A Four-Pillar Framework of knowledge economy**

### ***I. Rationales***

A knowledge economy (KE) relies on knowledge as the key engine of economic growth. It is an economy in which knowledge is acquired, created, disseminated, and applied to enhance economic development. Intuitively, conditions for a knowledge based development process would seem to include an educated and skilled labour force, a dense and modern information infrastructure, an effective innovation system, and an institutional regime that offers incentives for the efficient creation, dissemination, and use of existing knowledge.

The labour force should be composed of educated and skilled workers who are able to continuously upgrade and adapt their skills to create and use knowledge efficiently. Education and training systems encompass primary and secondary education, vocational training, higher education, and lifelong learning. The weight placed on the different segments will differ somewhat depending on a country's level of development. For example, basic education will receive more attention at low levels of development, as basic literacy and numeracy are necessary foundations on which more advanced skills are built. Similarly, lifelong learning has increasing importance in the current context of the knowledge revolution, which requires constant adaptation of knowledge and know-how. It also grows in importance as the population ages. Globalisation, meanwhile, is bridging the distance between basic skill needs and advanced skills, forcing countries to cover a wide educational band even at low levels of development to catch up with advanced economies and then remain competitive.

- *A modern and adequate information infrastructure* will facilitate the effective communication, dissemination, and processing of information and knowledge. Information and communication technologies (ICTs)—including telephone,

television, and radio networks—are the essential infrastructure of the global, information-based economies of our time, as railways, roads, and utilities were in the industrial era. They can considerably reduce transaction costs by providing ready access to information. ICT-related policies cover telecommunications regulation as well as the investments needed to build and exploit ICTs throughout the economy and society through various “e-applications”—e-government, e-business, e-learning, etc. Low-income countries should focus first on the basic ICT infrastructure before promoting advanced technologies and applications.

- An *effective innovation system* is composed of firms, research centres, universities, consultants, and other organizations that keep up with new knowledge and technology, tap into the growing stock of global knowledge, and assimilate and adapt it to local needs. Public support for innovation, science, and technology covers a wide range of infrastructure and institutional functions, from the diffusion of basic technologies to advanced research activities. The former should receive a great deal of attention in developing countries. For most developing countries much of the knowledge and technology that nurtures innovation will originate from foreign sources, entering the country through foreign direct investment (FDI), imports of equipment and other goods, and licensing agreements. Foreign sources are important when the economy is less developed, though imports must not be allowed to obscure or marginalize the country’s unique indigenous knowledge assets, such as traditional knowledge. Diffusion of basic technologies should receive a great deal of attention in developing countries.
- The country’s *institutional regime*, and the set of economic incentives it creates, should allow for the efficient mobilisation and allocation of resources, stimulate entrepreneurship, and induce the creation, dissemination, and efficient use of knowledge. The notion covers a vast array of issues and policy areas, ranging from aspects of the macroeconomic framework, to trade regulations, finance and banking, labour markets, and governance. The latter includes the rule of law and its applications (judicial systems), the quality of the bureaucracy as reflected in measures of government effectiveness, and the level of corruption. Mediocre governance resulting in a poor business climate is the single greatest hindrance to economic and social development in general, and to knowledge-based development



in particular.

## ***II. Interactions among the Pillars and Virtuous Development Circles***

We have seen that each of the four pillars in the KE framework must function efficiently in order to spur knowledge-driven growth. But more is needed: investments in the four pillars must be balanced and coordinated so that the pillars interact to produce benefits greater than those obtainable from their independent operation.

The purpose of the World Bank's *Knowledge Economy framework* is to evaluate the quality, adaptation, and use of knowledge in an economy, with the goal of creating effective knowledge economies capable of competing in the global economy.

A Knowledge Economy is one that utilises knowledge to develop and sustain long-term economic growth, thus the Knowledge Economy framework focuses on four pillars which it suggests are needed to support a successful knowledge economy.

The first pillar of the framework is an economic and institutional regime that is conducive to the creation, diffusion, and utilisation of knowledge. A regime that provides incentives that encourage the use and allocation of existing and new knowledge efficiently will help to foster policy change. The economic environment must have good policies and be favourable to market transactions, such as being open to free trade and foreign direct investment. The government should protect property rights to encourage entrepreneurship and knowledge investment.

The second pillar is a well-educated and skilled population that creates, shares, and uses knowledge efficiently. Education, especially in the scientific and engineering fields, is necessary to achieve technological growth. A more educated society tends to be more technologically sophisticated, generating higher demand for knowledge.

The third pillar is a dynamic information infrastructure that facilitates the communication, dissemination, and processing of information and technology. The increased flow of information and knowledge worldwide reduces transactions costs, leading to greater communication, productivity and output.

The final pillar is an efficient innovation system of firms, research centres, universities, think tanks, consultants, and other organisations that applies and adapts global



knowledge to local needs to create new technology.

The generation of technical knowledge leads to productivity growth. With these pillars in place, countries can develop a knowledge economy and sustain long-term economic growth.

### **Example of the framework in use: South Korea after 1997**

The Knowledge Economy framework can be applied to the development strategy used by South Korea after its financial crisis in 1997. The World Bank, Organisation for Economic Co-operation and Development, and several think tanks worked together to develop a strategy to develop a knowledge economy. The organisations found that South Korea needed to improve its productivity since it was not getting the returns it expected from massive capital and investment inputs. They determined that updating Korea's economic incentive and institutional regime, including the role the government played, would improve productivity.

A more favourable climate was needed for innovation since universities conducted little research. The specialisation and knowledge exchange among universities, local government, firms, and research institutes would reduce transaction costs and lead to greater productivity. Contrary to expectations, information and communication technology was growing at a fast rate. Thus, no major improvements to the information infrastructure were needed.

However, education was determined to be a huge roadblock in the way of a knowledge economy. The country was only investing 13 percent of its GDP in education, which was deemed inefficient and inappropriate. Reforms included: deregulating the control by the Ministry of Education; implementing outcome-oriented governance; reallocating public and private resources; integrating learning systems; and strengthening links to the global education system.

By implementing good economic policies, adopting a high-growth development programme, and increasing social capital and improving the labour force through enhanced education, Korea was able to transform itself into a knowledge economy.

### **What sorts of policy advice does the framework deliver?**

The Knowledge Economy framework suggests that to be effective knowledge

economies in which knowledge is created, disseminated and used well, economies have to have four pillars in place. Policy advice would focus attention on which of the pillars is in particular need, in terms of appropriate policies, institutions, investments and coordination. The World Bank has produced a guide the Knowledge Assessment Methodology, which can be used to assess what a country needs if it is to become a knowledge economy

### **III. BREAKING DOWN ‘Knowledge Economy’**

Lesser-developed countries tend to have agriculture and manufacturing-based economies, while developing countries tend to have manufacturing and service-based economies, and developed countries tend to have service-based economies. Most countries’ economies consist of each of these three major categories of economic activity but in differing proportions relative to the wealth of that country. Examples of knowledge economy activities include research, technical support and consulting.

In the Information Age, the global economy moved towards the knowledge economy. This transition to the Information Age includes the best practices taken from the service-intensive, manufacture-intensive and labor-intensive types of economies and added knowledge-based factors to create an interconnected and globalized economy where sources of knowledge like human expertise and trade secrets are crucial players in economic growth and are considered as important as other economic resources.

The knowledge economy addresses how education and knowledge — generally called “human capital — can serve as a productive asset or a business product since innovative and intellectual services and products can be sold and exported and can yield profits for the individual, the business and the economy. This component of the economy relies greatly on intellectual capabilities instead of natural resources or physical contributions. In the knowledge economy, the production of services and products that are knowledge-based provides rapid acceleration in the technical and scientific fields, making way for more innovation in the economy as a whole.

### **IV. Knowledge Workers vs. Manual Workers**

The concept of the knowledge economy was first used by Peter Drucker in his 1966 book “The Effective Executive.” In this book, the difference between a knowledge

worker and a manual worker was discussed. According to Drucker, the manual worker uses his hands and other physical capabilities to produce and provide services and other goods. On the other hand, a knowledge worker uses his head and produces knowledge, information and ideas that may be beneficial for the overall system of the business or that may be the key source in building the business in the first place.

## **V. Technology**

The technology requirements for an Innovative System as described by the World Bank Institute must be able to disseminate a unified process by which a working method may converge scientific and technology solutions, and organizational solutions.<sup>[16]</sup> According to the World Bank Institute's definition, such innovation would further enable the World Bank Institute's vision outlined in their Millennium Development Goals.

## **VI. Challenges for Developing Economy**

The United Nations Commission on Science and Technology for Development report (UNCSTD, 1997) concluded that for developing countries to successfully integrate ICTs and sustainable development in order to participate in the knowledge economy they need to intervene collectively and strategically. Such collective intervention suggested would be in the development of effective national ICT policies that support the new regulatory framework, promote the selected knowledge production, and use of ICTs and harness their organizational changes to be in line with the Millennium Development Goals. The report further suggests that developing countries to develop the required ICT strategies and policies for institutions and regulations taking into account the need to be responsive to the issues of convergence.

### **14.1 K-PROFIT ANALYSIS**

Some might argue that the knowledge economy is so clearly self-evident that a more precise definition is unnecessary and that knowledge is such a difficult concept to pin down that any measures are bound to be unsatisfactory or even misleading. However, without measurable definitions, the knowledge economy will remain a vague concept. The impact of the knowledge economy on industrial organisation, institutional structures, employment and society would remain more a matter of assertion and intuition rather than

demonstrable proof based on hard facts. It would not be possible to answer basic questions about how big the knowledge economy really is, how many people work in it whether it is growing and at what rate, and how the UK compares with similar OECD economies. And it would be hard if not impossible to offer a set of practical evidence based policy recommendations to policy makers in both the corporate and public sector. However, developing better definitions of the knowledge economy will be challenging.

If the term knowledge economy is to be useful we need to identify distinctive features that we would not expect to find - or at least not in such abundance - in the rest of the economy. A clear distinctive feature is the central role of the use of new information and technologies in allowing knowledge and information to be used in ways that underpin the knowledge economy concept. The rapid fall in price and vast increase in computing power has been a key underlying driver in creating networked systems able to store, analyse and handle knowledge and information flows. Knowledge economy might be defined more precisely in ways that are measurable and therefore, in principle, testable against hard data: Industry sector definitions of knowledge intensive industries and services Occupational based definitions of knowledge workers Innovation related definitions of the share of innovating firms. The knowledge economy is often thought of and sometimes defined in terms of knowledge intensive industries based ICT production or usage and/or high shares of highly educated labour. Industrial definitions initially focused on manufacturing and often used R&D intensity as an indicator to distinguish between high, medium and low-tech sectors. The definition has steadily expanded to include service industries that invest little in R&D but are intensive users of ICT technologies and/or have a highly skilled workforce using the benefits from technological innovation. Defining the knowledge economy in terms of knowledge workers has the advantage of being cross-sectoral, so avoids the shortcomings of industrial definitions. It has the disadvantage that there is no agreed or straightforward definition of who is a knowledge worker. There are (at least) three ways we can work towards a definition of knowledge workers: All those who work in the top three standard occupational classifications (managers, professionals, associate professionals). All those with high levels skills, indicated by degree or equivalent qualifications (NVQ level 4) All those who perform tasks that require expert thinking and complex communication skills with the assistance of computers.