

LECTURE 1 THE PRE-KNOWLEDGE ECONOMY

ECONOMIC TRANSITION

- The world has already observed three eras such as primitive, agrarian and industrial era. Currently we are experiencing information and knowledge era.
- During the agrarian era, the more the land you have, the more you are richer and influential. We observe the emperors and the kings had a tendency to conquer more areas during agrarian age.
- With the advent of Industrial era, the tendency to conquer more land declined steadily. The industrial era witnessed mass production, the more the machinery you have, and the more you are affluent.
- With the emergence of information and knowledge era, a new type of economic activities and mode of production has emerged. The more the knowledge you have the more the wealthy you are. Knowledge has been the primary means of production, way of thinking and ideology.

ROLE OF KNOWLEDGE IN ECONOMIC TRANSITION

An attempt has been made here to describe how the knowledge acted as catalyst in the process of each economic transition.

PRIMITIVE ERA

- Exactly when the life began is almost impossible to predict but it is believed that the life on earth began about 3,800 million years ago
- The earliest form of human being, Homo sapiens were found about 300,000 to 400,000 years ago. The Homo sapiens is noted and marked the earliest forms of our own species.
- The use physical strength and stamina had played the primary role while the application of knowledge was very limited.
- The first economic activity recorded by human being was hunting and gathering - hunting animals and gathering roots and fruits from the forest.
- Life was very unpredictable and depending too much on natural environment.
- Hunter-gathers normally lived in smaller groups because they had to be mobile to find more food.

- In these small and mobile communities, there was little opportunity for economic or other kinds of specialisation to develop.
- However, there was little specialisation of roles within the group and the roles were basically divided according to gender where the women got expertise in gathering fruits and roots, while the men specialised in hunting.
- **Because of their mobile way of life and their methods of subsistence, hunting and gathering economies can support only a low child-to-adult ratio.**
- **Population growth was controlled by natural checks on fertility,** so that the human population tends to stay in balance with available resources.
- Even in these primitive communities, knowledge was developed and shared.
- Through their experiences in their economic activities, hunter-gatherers managed to develop and accumulate a large and deep understanding of their environment such as the food sources, dangers, and opportunities, which existed within it.
- The knowledge is widely diffused and shared among the members of the group. What one person knows and believes, the entire group tends to know and believe.
- Hunter-gatherers communities persisted for a period of time. Since the availability of food was not certain all the time, a revolutionary change

occurred that forced the primitive society to settle in a location and started to domesticate plants and animals for a more stable source of foods. **As a result, agriculture and pastoral *era* commenced.**

THE AGRICULTURE AND PASTORAL ERA

- **Ten to twelve thousand years ago, agriculture and pastorals emerged out of hunting and gathering.**
- **Many reasons have been identified to explain why hunter-gatherers began to cultivate plants and raise animals.**
- However, the two major forces that are widely recognised for the formation of agriculture and pastoral economy. They are:
 - lack of food due to depletion of local resources especially in terms of the extinction of animals
 - human learned the skills to cultivate plants and raise animals.
- Agriculture and pastorals (the herding of domesticated or partially domesticated animals) emerged at more or less the same time. These two ways of life were frequently compatible, or even mutually dependent.

THE ORIGINS OF AGRICULTURE

- Farming activity first appeared in the Middle East at least 10,000 years ago and spread quickly to Western Asia, Egypt and Europe.
- The earliest civilisation all relied primarily on cereal agriculture.
- The transition from hunters and gatherers to agriculturists and pastoralists is not a brief story, as it involved a long continuous developmental process.
- It is inaccurate to conclude that agriculture substituted such economic activities as hunting, gathering, and fishing entirely. Actually, at the early stages of the agricultural era, the majority of the people still persisted in their occupations as hunter-gatherers.

From the lengthy discussion presented so far, what are the major differences between the hunting & gathering and agriculture economies? Following Table illustrates major differences between these two economies.

The Hunting & Gathering and Agriculture Economy

Differences	Hunting & Gathering	Agriculture
Population	Lived in egalitarian, autonomous bands of about 20 closely related persons	Expanding population, children are the important economic assets.
Life Style	Nomadic, seasonal migration and exploiting a large amount of land extensively.	Sedentism, permanent living sites and exploiting a relatively small amount of land very intensively
Food sources	Have wide variety of food sources from natural environment (typically 350 plant varieties). No food surplus.	Dependency on few plants. Produces more food than is necessary for subsistence.

THE AGRICULTURAL REVOLUTION

- From the birthplace of agriculture in the Middle East, as other communities made the same kinds of discoveries and evolved similar cultural adaptations, agriculture **has dispersed to other parts of the world for the past 10,000 years.**
- The wide spread of agriculture remains a debatable issue on whether all of these regions came to discover agriculture independently or as a result of knowledge diffusion from one culture to another.
- Ever since human **learned the skills to produce their own food, agriculture** became the dominant mode of life in nearly all of the areas of the world

inhabited by humans. Gradually, people learned to select good seeds for planting, learned the technique to plant and harvest the produce and learnt to process and transform grain into food. This mode of life sustained until the Industrial Revolution brought a new wave of change.

- Over time, the settled way of life gives birth to many skills and special forms of knowledge. Since life no longer have to be on the move continually, human tools no longer have to be portable. Thus, it opened the door for inventions of instruments and technologies to assist the production, preparation and storage of food.
- At the early stage of the agriculture revolution, the inventions were normally based on materials readily at hand. They made use of existing materials, refined the ancient techniques and transformed them for new human uses. Henceforth, skills such as baking, brewing, weaving, dyeing, carpentry, pottery making, stone and metalworking, etc emerged and altogether they brought a revolutionary improvement to the quality of human life.
- For instance, the discovery of the techniques of making clothing from plant and animal fibres prevented human body from exposure to natural atmosphere.
- Another example is the creation of ploughs to till the soil enabled the substitution of other forms of energy, in this case animal power, for human muscles and this marked a revolutionary stage in human development.

- In addition, processes for irrigating lands were developed to enable large-scale agricultural production, seed drill and threshing machine were used to process grain, and the techniques to store and preserve food were discovered to meet the increasing demand for food.
- Life has been enriched by all these discoveries and inventions.
- The agricultural revolution produced a transformation of human society that led to the agrarian societies. During this same period, not only the plough and other man-made tools were invented, writing and numbers were also invented. About the origins of writing, the Sumerians could be recognised as the chief to learn to express their ideas in writing during 4000 B.C. They, in fact, are the fathers of language and their writing is known as Cuneiform.
- The art of writing and the development of language marked a tremendous advance in civilisation. Language and writing made it easy for the communication of ideas of one person or one society to other persons or other societies. Expansion of knowledge and its dissemination was another of the achievements of the era of agricultural revolution (Muhiht, 1999).
- In fact, the so-called “Agricultural Revolution” was a slow and continued evolution. It occurred independently at different times in different regions of the world. From Mesopotamia and China and shortly thereafter in India and Egypt and later in Europe, Central America and South America, the agricultural revolution noticed the continuously improvements on the farm practices and accumulation of technological knowledge. The accumulation

of knowledge encouraged specialisation and division of labour to enhance a better achievement of a more efficient farm production.

THE INDUSTRIAL ERA

- The industrial economy emerged out of agriculture and pastorlism economy as a result of the “Industrial Revolution” that caused a tremendous change in the ways by how the world produced its goods.
- The industrial revolution also changed the societies from a mainly agricultural society to one that in which machines were dominated and industry and manufacturing was in control.

WHAT IS INDUSTRIAL REVOLUTION?

- Basically, a revolution refers to a sudden, violent, and drastic change.
- Associated with this definition, industrial revolution may best be defined as the dramatic change in the nature of production in which a wide range of power-driven machinery were applied to production.
- There was a switch in production where human or animal power were substituted by steam and other energy sources, machines were created to replace the hand tools and hand made items while workers have changed their working place from home to a place called “factory”.

WHEN AND WHERE DID IT HAPPEN?

- It is extremely difficult to fix the exact time and venue of the industrial revolution. However, it is generally believed that the industrial revolution began in Great Britain, between 1700 and 1850¹.
- The industrial revolution started in England, because the nation had all the right ingredients in place for industrial growth to take off. The ingredients are: the technological means, surplus of labour, access to all the raw materials required such as wood, coal, wool and cotton, government encouragement and a large and varied trade network.
- The revolution marked the developments that transformed Great Britain from a largely agriculture-based economy to a town-centred society engaged in factory manufacture.
- From Great Britain, the same process occurred at later times in other countries in Europe and later in the United States and Asia.

¹ Past Notes: The Industrial Revolution, <http://britishhistory.about.com/library/weekly/aa060300a.htm>

WHY THERE WAS INDUSTRIAL REVOLUTION?

The driving forces that transformed the society from agrarian to industrial age are:

- The increased crop and wool yields during the agricultural revolution. The crop yields have increased during the agricultural revolution as a result of the more efficient farm production and increased in wool yield as a result of better care of animals and selective breeding provided the necessary resources for the textile production. As a matter of fact, the first machine – the flying shuttle invented by John Kay was meant for the textile production.
- The invention of machines and powerful engines. The invention of powerful machines in factories as a result of the discovery of steam power, particularly, created the major fuel for the revolution.
- The availability of cheap labour supply added to the emergence of the revolution.

THE DEVELOPMENT OF INDUSTRIAL REVOLUTION

- Industrial revolution was a time where inventions and technological innovations have revolutionised the productive capacity of countries experiencing the revolution.
- At first, most of the inventions were concentrated on cotton weaving. Machines such as the spinning jenny and the water-powered frame were invented to replace the human power to speed up the process of cotton production.
- However, the key to the industrial revolution was the successful development of the steam engine.
- Thomas Newcommon developed the first steam engine in 1712. The steam machines were first used in the tin and copper mines to pump water out of the mines.
- Between 1765 and 1776, James Watt redesigned the steam engine and made the steam engine a new source of power. Together with Matthew Boulton, James Watt improved the steam engine, scaled down and promoted the engine as provider of power for machinery in factories for all kinds of industrial processes, especially for the textile industry.
- The invention of machinery created the factory system that replaced the cottage industry. Prior to the industrial revolution, England's economy was based on cottage industry where workers, together with their family

members, produced goods at their cottages. With the creation of machines, the factory system was formed. The work place has shifted from the home to factories when the large powerful machines were employed in the work area.

Mass production had begun.

- In addition to causing a change in the working area, the creation of steam engine has also changed the communication system. Instead of the use of horses and carriages, steam engines enable a faster mode and wider coverage of transportation. With the invention of steam locomotion, railroads were built and the coming of the railroads have greatly facilitated the trading and hence the industrialisation in Europe.
- In 1831, Michael Faraday demonstrated how electricity could be mechanically produced². The discovery of electricity power has in fact spurred the development of second industrial revolution.
- The power of electricity was utilised for greater improvement in the quality of life by supplying people with light, and electricity to power machines. Communications improved as a result of electricity. The telephone and telegraph were the first communicational devices that were for public use. With the development of technology, radio waves were discovered. Now messages could be sent over long distances in virtually no time. The discovery of radio wave paved a way to enter into information and knowledge era.

THE INFORMATION AND KNOWLEDGE ERA

- The information and knowledge revolution is probably the most important force shaping human societies in the twentieth century. However, at the beginning of the twentieth-first century, a new force of change has emerged – the information and knowledge revolution.
- The emergence of knowledge era is basically the resultant of the information and communications revolution that took place during the 1980s and 1990s.
- Massive diffusion of personal computers, instant access to Internet and the advancement in information and communication technology has paved the way to generate and disseminate new knowledge.
- In other words, the revolutionary change happened in 1980s and 1990s with the creation of communications linkages through computer networks, phone, fax, modem, video conferencing, or e-mail where the exchange of e-mail messages, participation in mailing lists, bulletin boards and newsgroups, and the browsing of information on the World-Wide Web (WWW) stimulates intellectual interaction.
- Information and knowledge era is characterized not only by the advancement of information and communication technology (ICT) but it also associated with the ethical values, knowledge governance, and attitude towards life, democracy and free mechanism.

- The knowledge revolution has brought a dramatic change in the way of thinking and economic activities where the **knowledge is the primary factor of production while land labour and capital are the secondary inputs.**
- The priority is provided to produce more intangible goods and intangible assets instead of tangible goods and tangible assets.
- The information and knowledge revolution involved a dramatic change in economic activities where the basic element of wealth creation has been shifted from tangible goods such as factory and machine to intangible goods and services – the information and knowledge.
- Many people have regarded the information revolution as knowledge revolution. In fact, these two revolutions are closely linked and difficult to separate. As explained by Suliman Al-Hawamdeh and Hart, T.L. (2002), information and knowledge are two different things as knowledge means active and dynamic information, i.e. knowledge is information that is read, comprehended and applied.
- Since there lies no significant difference between information and knowledge, we shall be considering information and knowledge era as knowledge era.

ECONOMIC TRANSITION

Primitive Economy

Knowledge applied for hunting animals and gathering fruits and roots.

Agricultural Economy

Knowledge applied to earth and human power

Industrial Economy

Knowledge applied to tools and machines

Information and Knowledge Economy

- Knowledge applies to technologies
- Knowledge applies to knowledge

The Application of “Knowledge” in Each Economy

Economy Era	The “Knowledge” component and application
Primitive Economy	<ul style="list-style-type: none"> ◆ The experiences, understanding about food sources, dangers and opportunities were shared ◆ the organisation of these experiences and understanding contributed to the development of knowledge ◆ most valuable true possession was knowledge of their territory ◆ survival depended on knowing what food could be harvested, when and where ◆ used natural endowment (energy) to harvest food ◆ knowledge was used to adapt to natural environment for survival
Agricultural Economy	<ul style="list-style-type: none"> • used natural endowment (energy) to produce food • learned and altered the environment to exploit natural resources more efficiency ◆ learned to settle in a particular location ◆ Knowledge was used to create subsistence from the natural environment for survival
Industrial Economy	<ul style="list-style-type: none"> ◆ Created power-driven machines to replace hand tools ◆ produce many others goods than simply to fulfil the basic needs (food) ◆ manufacturing was the most important activity ◆ the formation of factory system changed the life style and social economic structure significantly ◆ Knowledge was applied to tools, processes and products, not necessary from the natural environment

<p>Information and knowledge Economy</p>	<ul style="list-style-type: none"> ◆ creation of communication linkages through ICT such as computer networks, phone, fax, modem and e-mail to complement communication through printed materials and broadcast media that only managed to provide one to many communication ◆ ICT provided interactivity and allowed many to many communication to enhance value creation in each transaction ◆ Knowledge was applied to ICT for information transmission ◆ Effective use of information for wealth creation ◆ increase productivity ◆ Focuses on creativity, innovation and idea generation ◆ The ability to create and apply knowledge is essential ◆ Knowledge is applied to knowledge
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Year 2009

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