

The Technological Transition of Information: applied implications

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Abstract

It is necessary to open informationally and consciously to the world. However, this movement and global transformation towards information and communication technology must not lead to dependency and distortion of the cultural and civilizational heritage of the society. This movement produced intellectual accumulation on the quantitative and qualitative level, which necessitated a radical new shift in the field of storage and processing, retrieval of information. In addition to the control of its sources.

For this reason, we tried in our topic to present some of the implications and outcomes of this technological transition (the digital divide and artificial intelligence). Especially those related to the information industry in the light of the information economy and according to what was imposed by technological inevitability for the better use of information resources.

Keywords: Artificial intelligence, Digital divide, Information economy, Information industry, Technological transition.

1. Introduction

Information science falls within the circle of social sciences when considering the phenomenon it studies, its methods of research, its theoretical and applied aspects. Information technology has become the driving force for economic, social and political transformations at the global level. This led to the necessity of integration into the information revolution and the dedication of efforts to involve the beneficiaries of information in the exploitation of modern technologies.

Information and communication technologies can be used especially in improving production and developing the economy within the framework of the global economy. The global economy is based on information economy technology and as a result, it imposed the research on how to employ information between the industrial economy and the information economy.

In the information economy, information was a tool that served the industries as a secondary and not a primary element. In the information economy, it is an essential element for the production of industries and services. For this reason, the rapid growth of the information industry has caused an unprecedented boom in the nature of economic operations, the development of human resources and investment in them mainly with high quality and great capabilities. This boom is manifested through training, development and the provision of information and communication technology.

On this basis, calling the era we live in today the information age or the information revolution era is something that needs explanation, analysis and clarification. The most important features of the contemporary information revolution, including information, knowledge, vessels and sources that transmit it, to the extent that the human mind and traditional methods have become incapable of controlling and organizing it. As well as harnessing its use and retrieval for the beneficiary decision makers. This new transformation in the world of the new information and communication revolution attracted attention and follow-up by the cultural heritage in one hand. In the other hand, it created a fear of the process of cultural invasion regarding the use of the Internet which is the pinnacle of development in the field of information and communication technology.

In our topic, we will try to include the technological inevitability inherent in the huge amount of scientific and intellectual production. Moreover, we will deal with the applied implications of this information on the level of human and societal thought, especially with regard to the possession of information within the information society, or what is known as the digital divide created by the information economy.

The role of information as a major resource in this social and economic transformation becomes clear through the process of surveying information and the uses of artificial intelligence

in the applied practices of the information technology transformation, and according to the advanced technological applications made by the information.

The main features of the problem of our subject are evident in the presentation. They include the analysis and interpretation of the process of technological transformation of information. In addition to the resulting practical and applied contents and practices. These elements are studied in order to organize and use effectively direct discoveries for the purpose of development and achieving better performance. As well as the systematic application of information and developments in scientific knowledge within these discoveries, applications and practical purposes.

Accordingly, we can ask the research question for our topic as follows: - What are the applied practices for the outputs of the technological transitions of information?

1. Information science and Technological inevitability

Information technology refers to all kinds of technology used to operate, transmit and store information in an electronic form. Just like the communication technology revolution, both benefited from the development of the digital system that succeeded to link communication and information networks.

Thus, ICT (Information and Communication Technology) is a whole set of technologies, tools, means or systems used to process the content required through public, personal or organizational communication. This operation is responsible for collecting, storing and retrieving information and various data in a timely manner, so all these communication materials can then be disseminated, transmitted and exchanged from one place to another. (Sherif, D, E. 2000, p102)

As these developments and changes subsequently occurred, scientific and technological development has contributed on the other hand to people's well-being and surmounted the development divide between poor and artistic communities. The digital revolution has therefore created completely new forms of social and economic interactions, which explains the crucial role ICT plays in promoting human, economic, social and cultural development.

It is distinct and more efficient than traditional means of communication, and it is all thanks to its broad deployment throughout states' geopolitical boundaries. A reason why it is

necessary to focus on this technology and put more efforts developing its uses effectively as well as drawing individuals attention to use the technology and raise their awareness about its important contribution in worldwide development. (Mounir, I, A. 2021, p64,65)

Based on this technology, information science collects, processes, storages, broadcasts and retrievals various types of data. Because it is linked to the concept of automated and electronic use of information and its processing, which includes information production activities in terms of processing, characteristics, flow, organization or reorganization for the purpose of availability and utilization. That is, information science is academic, theoretical and a practical science that examines knowledge characteristics and entity in addition to the various linkages, interactions and overlaps in various subjects and fields of knowledge.

It is also important to mention that library science or documentation science is the most contributing science to the information science field. Providing sophisticated and modern professional work tools that align with the modern developments and technologies associated with scientific knowledge, discoveries, inventions and practical applications.

Accordingly, information technology shows the useful investment and optimal use of different types of knowledge, and the search for the best means to provide and facilitate accessibility and availability of the desired information that is eventually going to be exchanged and communicated with the required speed, accuracy and effectiveness that meets today's human needs.

These new shifts in the field of information and informatics have imposed the use of emerging concepts such as: the information society, the information revolution and the age of information which is, the concept used to refer to our present age. Because of the growing reliance on information and the crucial role it plays to successful contemporary management, scientific research and information marketing. (Amer, I, K., & Imen, F, E., 2009, p 40)

Our present age is witnessing a phenomenon, the phenomenon of the age of information and information revolution that became inevitable in nowadays life. Hence, it is important to pay attention to its negative and positive interactions and consequences, may it be through multimedia and technologies, or the quality and forms of such complex and overlapping information transmissions.

It is also important to mention that ICT is an imperative consequence of the full control and preparation of information with the required speed, comprehensiveness and accuracy. It is an essential resource for development in all its economic, scientific, social and political aspects; given the unique characteristics of accuracy, validity, timeliness, complementarity, clarity, measurability, objectivity and verifiability.

2. Information Industry and Information Economy

The concept of information economy has emerged as the engine of progress and development in human societies. The basic determinant of an economic power is no longer based on the agricultural or capitalist economy as it is the case in the industrial economy; yet, it is the dominant information resource in various economic relations. Hence, we are dealing with knowledge industries whose products and data are their primary materials, and the human mind is their performance.

On this basis, several labels have been used to express the knowledge economy: the information economy, the internet economy, the digital economy, the virtual economy, the electronic economy, the network... etc. All of which entirely refer to the knowledge economy. Interchangeably, it reflects a sophisticated economic pattern based on the widespread use of informatics and the internet in various economic transactions in general, and electronic commerce in particular; based on knowledge, creativity and technological development of information and communication technologies. (Khelifi, A. & Menssouri, K., 2005, p 69)

The Organization for Economic Cooperation and Development defines knowledge economy as a concept primarily based on the production, dissemination and use of knowledge and information. (Abd Erahman, E. & Faiza, A., 2007, p 25)

This concept is most importantly characterized by its innovation, the provision of skilled labor, the adoption of electronic methods in various transactions or the so-called infrastructure features, globalization, expanded client adaptation and reliance on the internet for marketing activities. (Selwa, A, A., p 9, 10)

These features are what built the information economy as an asset-based economy that is way distinct from the traditional one, since it was thrown in time and space constraints hands dealing with limited numbers of customers. In addition to the difficulty of access to global

markets and limited competition mainly at the national level, and the focus on quantity over quality.

However, due to the importance given to mental capital over the physical capital, many concepts have changed. The new source of wealth is not only material anymore, it is yet reflected in special applied information at the level of means of production to serve the objectives of the information economy. Therefore, statistical studies indicate a continuous spending increase on the information sector. With global investment in the information industry estimated at 500\$ million, an annual increase of about 20% underscoring the important role information and technology play influencing countries' economic growth rates.

The information revolution is taking place in the pursuit of the old industrial age, replacing it with a new information society; which proves that IT (Information Technology) and knowledge are the strongest funds holders. Thus, competitive advantage will be the product of human capabilities and manufacture, fueling in with information and scientific research, expenditure on education and training, the importance of human resources, and its position in society's public policy.

Consequently, today's civilization has shifted from an industrial to an information economy. As mentioned in the UNESCO report about the world's communication, the information sector and its services have remarkably evolved in most countries; despite the differences inherent in the informatics workforce, to the overall population of each country. (Abd Erahman, E. & Faiza, A, 2007, p 250, 251)

The massive flow of information has divided the world into productive and consuming countries. This explains the information industry being such an influential force in the economy as a whole. Unlike other sectors, especially in terms of the objective of contributing to the profit market, where information institutions, companies, and their industry improve, develop and expand their information activities and products in order to be widely available and present in the computer services economy field.

This resulted the information globalization dominating the stocks of human mind's achievements and human experience by individuals, institutions and groups; contributing to the

realization and dissemination of knowledge and facilitating access to knowledge. It has therefore allowed developed countries to control them technically and substantively.

Although the information revolution has its advantages and beneficial repercussions among which rapid economy growth and high living and education standards, it also carries social, moral and economic disadvantages. Such as: the repercussions of globalization, dominance, melting privacy, the rapid spread of crimes and other cybercrimes, as well as the anti-educational and non-spiritual culture values and also the widening information gap at the individual and international levels.

2.1 Digital Gap in the Information Society

Human societies made strategic leaps in various economic, social and cultural fields, fundamentally represented in the intense prevalence of ICT. Yet, these leaps have remarkably pointed out a significant disparity in levels of development between individuals, groups, states, as well as between developed and developing countries in ICT and the shift towards the information society.

This, is known as the digital gap between developed and developing countries in accessing, using and exploiting sources of information and knowledge. (Nabil, A., & Nadia, H., 2005, p 47)

The digital gap also represents the difference between those who have the access to information and those who do not. This occurs through means and techniques of communication (fixed and mobile telephone, computer and internet) which may reveal the digital gap between the developed and developing countries, or between countries within the same geographical group and those in one country. (ITU, 2010, p 40)

The digital gap is a concept that belongs to the information society to illustrate how different rich and poor countries are in terms of modern technology use (mostly internet use), and the difficulty they face accessing information sources. This makes them struggle with inaccuracy, while the developed countries struggle with information burst contributing in creating this gap between the two, and this may be due to several reasons:

- Technological reasons (speed of technological development, growing technological monopoly, weak information technology investment).

- Economic and Political reasons (unequal distribution of infrastructure, income, lack of implementation of clear policies on the information society, powerful states agglomeration oppressing weak states).
- Social and Cultural reasons (low level of education, illiteracy in its all kinds, language barriers).

Consulting these reasons, the instrument through which the entities or organizations advanced in the ICT sector can measure the digital gap reveal some indicators, the most important of which are:

- Telecommunication Density Index (measured by the number of fixed and mobile phones and telecommunication network capacity in terms of data flow rate).
- Indicators of Technological Progress (measured by the number of computers, internet users and the number of electronic devices).
- Information Scale Index (measured by the number of online panels, scientific papers or scientific meetings).
- Financial and Business Sector Index (measured by the proportion of employees' use of the internet and the proportion of management that relies on electronic applications).
- Cultural and Scientific Indicators (measured by the prevalence of digital libraries and reliance on databases in scientific research). (Geraf, N., & Lakhouider, N., 2019, p 110, 111).

2.2 Information and Artificial Intelligence Survey

Business wars nowadays, became wars of information search. Knowledge is now key to success and competitive excellence under an international and global openness including the evolution of the means of communication and internet networks that shortened distances and enabled costumers to easily access any product they need. Therefore, better opportunities for confrontation and response is for those who have more accurate information about the market, competitors or about the resources and forces that exist in the business environment; and it is all thanks to what is known as intelligence e.i adaptability and problem-solving.

Intelligence in its general concept, is the ability to solve problems, understand axioms in addition to the ability to produce reflective thinking and ability to learn. Thorndike defines it as being embodied in an individual ability to develop viable responses to the reality, in which

he/she lives. He also distinguishes between three types of capabilities: meditative, mechanical-motor and social. He considers that man can possess these three capabilities simultaneously, yet only one of them can be functioned.

Gelfert on the other hand, sees intelligence as a combination of more than one hundred and twenty capabilities, classified in five major mental processes: perception, memory, complex thinking, focused thinking and evaluative thinking. (El khatib, A, M, & Adel, S, 2009, p 421, 422)

He also assumes that individuals' intelligence ratios vary depending on several factors; most notably their environment. The environment therefore, has a significant role to play determining individuals, features, mindset and culture including the genetic factors acquired from the parents.

Back to information technologies, the strategic concept of intelligence reveals in the AI (Artificial Intelligence), which is one of the most important modern sciences. It is produced by the intersection between the technical or the technological revolution in systems science, computer and machine control in one hand, and logic, mathematics, languages and psychology on the other. It generally aims at to understand the nature of human intelligence by delivering computer software, which is able to simulate intelligent human behavior. Providing computer with such software, enables it to solve problems and make decisions depending on particular situations, due to the problem description of this situation. (Elmelkaoui, I, E, 2007, p 216)

Greasley et al has explained that AI is a term interested in studying how a computer can reproduce human intelligence through expert systems and neural networks that are one of the most important fields of applied business. (Greal, A, & al, 2006, p 278)

There are many intelligence technicalities to improve decision-making, and they are all based on artificial intelligence technology. Computer-based systems consist of hardware and software that attempt to simulate human behavior and thinking patterns. This technology includes expert systems, neural networks and genetic algorithms...(London, K, & Marakas, G, M, 2010, p 378)

Accordingly, AI aims to understand the complex mental process of the human mind during the practice of thinking; then, translate it into computer processes that increase the

computer system's ability to solve complex problems. Hence, the main reason for this interest in the artificial intelligence is the establishment of a structured knowledge base in which information is effectively stored that the organization staff can acquire knowledge, learn empirical rules and protect its own knowledge from leakage and loss due to constant turn-ons.

Therefore, AI systems and applications are one of the most successful means in times of crisis, as they work to find solutions to complex problems that may be difficult for human beings.

Artificial Intelligence is an area of learning and technology that depends on some sub-sciences. For instance computer science, biology, mathematics and engineering. Since the goal of AI is to develop computers that simulate human thinking, hearing, seeing, talking and feeling abilities, then its fundamental ideas should be to simulate computer functions in association with human intelligence like logic, learning and problem solving. (O'Brien, J, A, 2010, p 378)

Contextually, AI's benefits have become more and more visible and effective in business and research; including the individual systems, procedures, equipment, software, data and the knowledge required to develop computer systems and machines that possess intelligence features. Artificial Intelligence eventually, can be used by many applications involving researchers, scientists and experts by developing systems similar to human thinking. The most important areas of AI research and development are: cognitive science, robot and natural interventions.

For cognitive sciences, they are all about making research on how human minds work; how humans think and how they learn. Meanwhile robots is a technology that produces robot machines with a smart controlled computer, which has same human physical capabilities. As for difficult the difficult overlaps, it is the normal use of a computer by humans through natural languages and computer sound perception. (Akram, M, E, & Ahmed, A, E, 2015, p 230, 231)

3. Information Supplier's Role in Industry and Economy

Our current era is known for interactive technology or multimedia technology that led to the emergence of diverse and multiple services to meet and satisfy individuals' needs for information, such as: digital communication, optical fiber, microwave, satellite... This resulted

the emergence of new communication services, the most important of which is direct contact with databases, conferences and email. (Mohamed, A, E, 1993, p 132)

It has then contributed to the third communication revolution for both means of communication and their technologies, especially through the use of electronic computers that control the collection, documentation, storage, processing, production and dissemination of data and information to audiovisual and print media.

Information has now become indispensable in all aspects of human activity, constituting the appropriate background for good decision-making, in addition to a necessary resource for industry, the economy, administrative, military and political affairs.

Accordingly, technology is considered to be outdated, contemporary and the basis of the future as it constitutes a combination of knowledge and machine, where ideas are transformed into a machine that helps people fulfilling their endless daily needs; requiring development in machine uses.

Today's image of information technology is reflected in computers; their enormous balance capabilities and their superior processing retrieval speed. It is for this reason, the concept of information technology has evolved from age to age, aiming to facilitate handling the multiplicity and diversity of information. It represents applications of scientific and technical knowledge in the processing of information in terms of production, formulation and retrieval by automated means. (Geraf, N, & Lakhouider, N, 2019, p 51)

Since internet is the world's largest electronic information network, it contains a vast number of information centers and databases from around the world, where users share different information and data quickly through telecommunication networks and satellites. Bearing in mind that this network is also called 'Cobwebs' due to its interconnectedness, overlap and ability to smoothly move into one another.

In this context, information has been overly flowing through new containers and pathways, with information technology contributing to the development of different levels of growth. It is the so-called information globalization, it allows the transition from material sources wealth, into knowledge source wealth. It is all about the dissemination of information

that it becomes accessible to everyone, it also refers to the dissolution of states' geographical boundaries and increasing the similarities within societies.

Globalization has now become an economic phenomenon based on trade and economic aspects, resulting in the world's subordination to global market forces. The technological and communication globalization of informatics has made technology dependent on the processes of miniaturization and digitization; facilitating the integration of information with the human system and society. (Brunner, C, 1991, p 514, 515)

According to Marshall McLuhan's expression in his technological inevitability theory, modern technology has transformed the world into a small village; this era's advantage is now a concern due to the penetration of all barriers and geopolitical boundaries of states and territories. On the other hand, information globalization is an opportunity for dialogue and benefit from other societies and dive deeper inside the information society to take advantage of their ways of organizing the economy, politics, social affairs, etc. However, some negative consequences occurred when globalization crushed the national culture within communities; individuals found themselves in a state of alienation because of these information societies.

This is clearly reflected in the emergence of the concept of cultural poisoning, which denied the Arab role and broken our cultural existence; thus, disrupting the crisis of the cultural identity and eradicating our cultural personality. It is now known as the civilizational shock based upon the civilization of knowledge. (Geraf, N, & Lakhouider, N, 2019, p 96, 97)

Conclusion

This contemporary society of ours has been influenced by information and the information revolution, may it be directly or indirectly, such impact went through two different directions, especially in our Arab society and those of developing countries. While the first reflects the positive direction of investment in various uses; the second one require greater understanding and treatment.

Overall, information technology interacted with communication technology to connect the world into a single information society, where information became information marketing commodity and a key resource in economic, social, administrative, scientific and political

development leading to a significant growth in information-based societies, industrial societies or industrial revolution societies have been transformed into information societies.

Consequently, information are know the raw material and the beginning of the industrial revolution, especially with the emergence of computer-related artificial intelligence; which paved the way for people to showcase their distinction and creativity.

Information technology has effectively contributed to the emergence of a new science indeed, information science that emphasizes the evolving interactions and documentation of scientific research sources of information and their selection for storage and accounting in the light of the digital gap challenges.

It is also important to mention that information as a computerized output is a product or commodity produced and distributed, and it is called the information marketing. it primarily focuses on the value of information and the value of informatics work.

Based on the foregoing, it is necessary to emphasize that the internet is a computerized information network that consists of an enormous amount of different types of information and also of means and techniques of communication through which information is exchanged and transmitted.

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