

ROLE OF KNOWLEDGE WORKERS IN DIGITAL ECONOMY: A PROPOSED PROGRAM FOR TEACHING OF KNOWLEDGE MANAGEMENT IN INFORMATION AND LIBRARY DEPARTMENTS OF ARAB UNIVERSITIES

Dr. Awatif Ali Elmekawi

College of Arts, Tanta University, Egypt

ABSTRACT: *The present study aims to investigate the role of knowledge workers in the digital economy, knowledge management, and contributions to the different institutions in libraries and information. It also identifies the potential to integrate knowledge management course into university education. The study adopted the descriptive and analytical approach. It concluded that knowledge workers play an important role in the different institutions to enrich and consolidate the knowledge assets and to increase the financial value. They are also a major competitive value internationally. Knowledge management has an important central role in institutions where many disciplines compete to join the bandwagon of knowledge management including economists and information technology professionals. Furthermore, the educational institutions qualify few numbers of students in the skills required for the international standards in the changing digital society. The study recommended integrating a gradual comprehensive system on the knowledge economy and management and knowledge workers; preparation into the programs of information and library departments in the Arab world. Therefore, a study program was proposed reflecting modern trends in knowledge management, digital economy, as well as knowledge workers and their role in libraries and information departments.*

KEYWORDS: Knowledge control, digital economy, knowledge management

INTRODUCTION

Significance

Knowledge is the core of economic development. It has promoted the level of social well-being for ages. Innovating new ideas and knowledge is a basic component of development in different countries. However, knowledge economy, digital economy and knowledge management are relatively new concepts. They were introduced in the late 20th century. They assure the role of knowledge in economy and social development. They also focus on the value of intellectual and knowledge abilities of individuals in establishing the wealth of nations.

Terms including knowledge and knowledge worker are key concepts for this new economy. Because knowledge is the primary source of the nations' wealth and competitiveness,

knowledge workers are the pillars of institutions' success in such a dynamic environment (ECSSR, 2003) where work continually requires innovation and creativity. This is not limited to processing and producing materials and data. Therefore, they, as knowledge workers, shall be able to investigate and expand their knowledge base with continuous learning and ability to employ it to provide and generate knowledge (Davis, 1997).

The term "knowledge workers" has been extensively used in the literature (ECSSR, 2003). Almekkawy (2009) argues for the importance of studying knowledge and its components highlighted by the World Bank and the Organisation for Economic Co-operation and Development in the following items:

1. Linking innovations and activities in different countries.
2. Infusing knowledge as an economic investment that meets the community needs.
3. Providing the community with a distinctive workforce characterized by innovation and creativity.
4. Considering human skills as a capital that can be invested by integrating them with information.
5. Developing courses and life-long learning.
6. Developing information and knowledge technology to establish the infrastructure of countries.
7. Providing information and communication technology at low costs, especially with the global spread of the Internet.

The author was motivated to conduct the study due to the lack of Arab studies on knowledge, knowledge management, knowledge economy, digital knowledge, as well as knowledge workers. Many authors argue that the modern knowledge terms are only extensions to the former concepts of information science. Others believe that knowledge with its two domains, i.e. self-knowledge and explicit knowledge, turned the difference with information real in both degree and type. In other words, the present study is conducted due to the lack of studies on the basic concepts of knowledge and its workers.

Statement of the problem and questions

The problem of the study is defined in investigating the role of knowledge workers in the 21st century and their contributions to the different institutions, especially in libraries and information. The study also distinguishes the types of knowledge in relation to the economy, management, or digitalization. It aims to answer the following questions:

1. To what extent do knowledge workers add value to their institutions?
2. What is the importance of knowledge management in increasing institutional efficiency? How can a knowledge management course be integrated into the Arab university study?

3. What is the importance of knowledge economy in increasing institutional efficiency? How can a knowledge economy course be integrated into the Arab university study?
4. What is the importance of digital knowledge and the role of knowledge workers in increasing work efficiency? What are the relevant sciences and how can they be integrated into the library and information science?
5. What is the proposed study program on knowledge and knowledge workers in the libraries and information departments?

METHOD

The study adopted various approaches to answering the questions, e.g. survey the courses related to knowledge or knowledge workers in the regulations of relevant departments, namely departments of library and information, management, economy, computer and information sciences in Egypt. It also reviewed the literature regarding the proposed approaches in foreign universities and adopting them at the Arab ones.

REVIEW OF LITERATURE

The following section reviews the relevant literature.

Algohary (2008) addressed knowledge management and employing institutional information by applying the skills, ideas, perceptions, commitments, motives, and imaginations of the staff. Knowledge workers conduct such tasks, as they are concerned with some activities related to personal and external knowledge to produce outcomes classified according to the information content. The study also analyzed the current situation of bachelor courses of the Arab library and information departments and their representation of the key categories of the courses of knowledge managers' preparation. In this aspect, the study adopted the classification of Chaudhary and Higgins (2003) shown in the following table.

Curriculum area	Specification	Topics
Foundations	Materials related to the main concepts in knowledge management as well as relevant issues including economic and social issues	(knowledge management, intellectual capital, and knowledge sharing models)
Technology	Commonly used technologies to help ultimately utilize knowledge and supporting technologies.	(Knowledge management applications, knowledge architecture, management information systems, Internet, websites, and database administration systems).
Process	Courses on knowledge acquisition	(Indexing, classification,

Curriculum area	Specification	Topics
	and organization	objective indexing, organization of knowledge sources, knowledge mapping, developing and maintaining knowledge repositories, as well as search and retrieval).
Applications	Case studies and success stories of knowledge management in industrial and technological institutions and sectors	(E-commerce, medical information projects, and industrial information projects).

Comparing these categories to the available courses in the departments under study reveals that:

- Foundation courses supporting knowledge management
Despite the importance of this category as an approach to understanding knowledge management, as well as its components and relevant issues socially and economically, it is weakly represented. It is only offered by three universities, namely Cairo University in Egypt, Umm Al-Qura University in Saudi Arabia, and Neelain University in Sudan. Each university offers one course only. The former and later universities offer one course entitled “knowledge economies”, while Umm Al-Qura University offers a course entitled “knowledge management” at the 8th level of the program.
- Technology
A total of (83) technology courses are offered. While Neelain University was ranked first with (13) courses (17%), Umm Al-Qura University was ranked second with 10 courses (12%). Furthermore, Mustansiriyah University was ranked last with (3) courses only.
Dalemy (2009) aimed to make a proposal for knowledge management course at Saudi universities by analyzing graduate programs of knowledge management at three American universities. Then, it was limited to two universities, i.e. Kent and Oklahoma. It compared these courses to the study plans of graduate programs at King Abdulaziz University, Imam Muhammad ibn Saud Islamic University, and College of Arts for Girls in Saudi Arabia. The study conducted a content analysis of the most important studies in a symposium entitled “librarians: qualification and needs of the Saudi and Gulf labor markets of skills and backgrounds). It concluded that the graduate programs at the Saudi universities under study lack the appropriate coverage of knowledge management and structure, leadership, decision making, and strategic planning, while they increasingly focus on knowledge organization and resources.

The following table shows the study plans for knowledge management at the universities of Kent and Oklahoma (Dalemy, 2009)

University of Kent	University of Oklahoma
Knowledge management in IAKM information Architecture and knowledge management	Master of science in knowledge management University of Oklahoma
Master Program in knowledge management requires studying the foundation courses (12) hours of elective courses and 3-6 hours for the thesis or 3 hours for the research project.	The program covers (42) hours. The student spends (12- 15) hours of foundation courses. Then, the student pursues one of three specializations for 12 study hours+ 3 hours for the research project or 6 hours for the thesis. Additionally, s/he may choose a comprehensive specialization to obtain many degrees.
- Foundation courses • Introduction to information architecture and knowledge management • Information architecture and knowledge management (Advanced) • Information technology • Strategies for information management • Information economy	- Foundation courses (15) hours • Information and knowledge society • Information and knowledge management in organizations • Information organizations and knowledge sources • Beneficiaries of information in the knowledge society
- Three programs are offered to match business jobs. 1. Information architecture 2. Information use 3. Knowledge management	

Almekkawy (2009) aimed to investigate the different aspects of knowledge economy and proposed a course to be offered to the students at the library and information departments. The study addressed the concept of knowledge economy; the role of intellectual, cultural, and social capital in knowledge economy; attitudes of teaching knowledge economy at some foreign universities, as well as library and information departments and the faculties of computer and information at the Egyptian universities; units of the proposed program to teach knowledge economy at the departments of library and information. The author surveyed the departments that may offer the course using paper and soft handbooks issued by the competent faculties and departments. It was revealed that the course is only offered by the Universities of Cairo and Benha only. Additionally, the proposed regulation of Tanta University comprises a course entitled “knowledge economy”. The following section

provides an overview of the proposed program to teach knowledge economy at the departments of library and information at the Egyptian universities.

A. Objectives

The program aims to educate the students on the concept and theories of knowledge; its relation to data, information, and wisdom, as well as introduction to their distinctive social features; knowledge management and the role of the Egyptian universities in it.

B. Desired learning outcomes

1. Introducing the concept, theories, features, and pioneers of knowledge society.
2. Introducing the domain of knowledge economy and its relation to the alternative concepts at the macro-economy level.
3. Skills of knowledge management as well as their investment and guidance based on information technology and its massive revolution in communication.
4. Highlight the role of the librarian in guiding and managing knowledge economy and Egypt's present situation.

C. Contents and units of the program

1. The concept, theories, features, emergence and development, and pioneers of knowledge society.
2. The domain and distinctive features of knowledge economy and its relation to data, information, and wisdom.
3. The position of knowledge economy to macro-economy in any society. It addresses innovation and its sources, research and its relation to development and education, knowledge revolution in the digital age, challenges facing societies in accessing knowledge economy including the protection of intellectual property rights, shifting from a knowledge-based economy to a knowledge-based society. It also covers establishing a new world in which the economy depends on digitalization and combination of human intelligence and information based on technology and the importance of its role in the knowledge economy.
4. Knowledge management and the social, intellectual, and cultural capital depending on technology; displaying the methods of access, distribution, development, maintenance, and use of knowledge based on the integration of technology and societies after highlighting the role of knowledge as a basis for revolution and development in the advanced societies and its implications of changes in the economy of societies.
5. Library role in managing and investing the knowledge economy because the development of knowledge is the scale of library efficiency and gives information specialists an opportunity to expand their role and use their skills to meet the stakeholders' needs.
6. Egypt's position in the knowledge society by highlighting the Egyptian Information Society Initiative for education, scientific research, and development...etc.

7. Further units on knowledge policy, ownership vs access to knowledge, ethics of knowledge ownership and dissemination, knowledge literacy, measurement of knowledge economy in the developed and developing countries, protection of intellectual property rights, and innovation of information as a basis for knowledge economy.

D. Teaching methods

Because of the diversity of knowledge economy, the program offers the following:

1. Lectures
2. Seminars (oral discussions among lectures and students)
3. Assignments and research papers

E. Student evaluation methods

Oral tests, assignments, and researches throughout the semester, as well as written tests by the end of the semester were to measure students' understanding of the academic content.

F. Evaluation timetable

- 1- The first evaluation is oral by the end of each unit.
- 2- The second evaluation is assignments and researches throughout the semester.
- 3- The third evaluation is a written test covering all units by the end of the semester.

Irvine (2003) addressed the concept of knowledge economy through post-Internet university, intellectual and social capital, issues of higher education and economy, political economy statistics in America and the world, works at universities, social studies on higher education, opportunities and challenges to electronic higher education. The study also introduced facts about political economy and conflict of economic forces and intellectual capital, e-learning models, cultural and intellectual capital management firms. It reviewed university assets and their relation to overall economy, costs of relying on information technology in higher education institutions before and after the Internet and distance education, using them for information access in the digital library, and intellectual property rights and authorship.

Peters (2003) handled the transformation from information economy to knowledge economy and from knowledge social studies to the knowledge society. He concluded that knowledge capitalism is predicted. Looney and Klenowski (2006) tackled knowledge society as one of the most comprehensive concepts in educational reform. It aims to produce the most information and knowledge and make them easily accessible to the greatest number of individuals seeking graduates with thinking skills and the ability to problem-solve. This cannot be achieved but with rationalizing and changing the educational policy to meet the requirements of the knowledge society.

Mansell (2008) investigated the units of new media, information and knowledge systems syllabus that covered the following topics:

1. Introduction to the conceptual framework
2. Marketing new media in knowledge economy
3. New media and discussion of self-knowledge
4. E-services to the citizens
5. E-services to the business
6. E-government and the Internet
7. Politics and knowledge society organization
8. New media, Internet, and economy
9. Intellectual property rights
10. Digital divides

The course is compulsory for master students at new media, information, and society program and elective for the students of other programs at the department of media and communication.

The contemporary role of knowledge workers to add value to their institutions

Definition

Knowledge workers are members of the workforce in any country. They can interpret information in a certain field. That is, they improve understanding in that field through intensive analysis and determination. They utilize search skills to define problems and introduce alternatives. They pursue problem-solving to affect the company's decisions and set its priorities and strategies. Furthermore, they can play different roles for information technology and may be university lecturers, lawyers, engineers, physicians, nurses, scholars...etc. Their numbers and quality have increased with the continuous development of business and reliance on information technology.

Change to the role of the knowledge worker in the 20th century

Tapscott and Willams (2006) argue that knowledge workers are greatly related to innovation and creativity but in a more developed way. They described the tools of social media, creating stronger forms of cooperation. That is, they cooperate with their mates via the organizational limits or companies, i.e. within experience networks that some of them are public. Despite the effects of the Digital Millennium Copyright Act in America, it was challenged by the market. Knowledge workers strongly feel that they have to cooperate to continue life and survive. Due to the fast global expansion of transactions based on information and online interaction with the different sectors, there is an increasing demand for a working force to do such activities. Consequently, the ratio of knowledge workers to the workforce in North America is 1:4.

This entailed by the focus on life-long learning to assure that all students match the skills required for generating knowledge in the 21st century.

1.1. Roles and features of knowledge workers in the institutions

Knowledge workers offer many benefits to their institutions, including:

- Data analysis to establish appropriate relationships with others and institutions.
- Accommodating inputs to evaluate the complex priorities conflicting their institutions' objectives.
- Defining and understanding the attitudes of their field in the institution.
- Understanding the methodological basis for the reasons in these institutions.
- Ability to brainstorm.
- Establishing or modifying strategies.
- Setting applicable priorities.

Despite the difficulty of evaluating the contribution of knowledge workers to their institutions, they increase the overall value of these institutions' intellectual capital, especially if their assets have a commercial or financial value. The institutions can register patents on their assets. Consequently, these materials are limited to intellectual property. Knowledge workers play a vital role in increasing the financial value of these institutions.

Extra factors in the productivity of knowledge workers

- The productivity of the knowledge worker requires raising the following question "what tasks are assigned to the knowledge worker?".
- This requires that the responsibility of productivity is taken by the knowledge workers themselves.
- Continuity of innovation is a portion of knowledge workers' tasks.
- The knowledge work requires the continuity of learning and teaching to others by the knowledge workers.
- This productivity is not only quantitative, but it is qualitative, as well.
- This productivity requires that the knowledge worker perceives himself/ herself as an institutional asset, not only an employee with defined tasks in order to prefer work in this institution to work in others (Drucker, 2001).

Historical development of the position of knowledge workers

Tapscott and Williams (2006) argue that Drucker (1995) was the first to introduce the term knowledge worker as a person who handles information or the person who develops and utilizes knowledge. Drucker (1973) was the first to define the knowledge work as a work category. Toffler (1990) notices that knowledge workers, especially scientists and research and development engineers in the age of knowledge economy shall establish a system to establish, prepare, and disseminate knowledge. They sometimes need to manage knowledge for their workmates.

Nonaka (1991) describes knowledge as the fuel of creativity and innovation. It represents the institutions working in the knowledge field as organisms. He believed that knowledge is renewable and changeable and that knowledge workers only move it towards change. This case may be the basis for the new practices of knowledge management that flourished in 1990s to support knowledge workers to utilize the standard tools and operations.

According to Savage (1995), knowledge focus is the third wave of human socio-economic development. While the agricultural age when wealth known as ownership of land was the first wave, the industrial age when wealth relied on ownership of capital, i.e. companies and institutions, was the second wave. In the knowledge age, wealth is the ownership of knowledge and the ability to use it to create or improve goods and services. Product improvements cover costs, durability, suitability, timeliness of delivery, and information security. Furthermore, in this era, 2% of the working population will work on the land, 10% will work in the industry, and the others will be knowledge workers.

It is predicted that attention is paid to knowledge workers as a thriving competitive good internationally because they have self-knowledge reflecting their distinctive experience and renewable life-long learning. They have important creativity that adds value to their institutions. Therefore, they are studied internationally based on international standards, e.g. selection criteria and financial allocations (Richardson, McBey, and McKenna, 2008).

Importance of knowledge management in enhancing work efficiency and integrating knowledge management course in the university study of library and information

Introduction

Knowledge management is an approach that relies on the central role of knowledge in the organizations to manage and support knowledge work and to maximize the knowledge's value added. In other words, knowledge management aims to define and analyze knowledge and knowledge work and develop the procedures and systems of knowledge generation, storage, distribution, and utilization in the institution. Therefore, information and communication technology plays an important role in many knowledge management applications. Knowledge management is not limited to information and communication technology applications, i.e. knowledge-intensive applications, because it is a new method of thinking in the modern organization, transferring knowledge to successful products and services, and maintaining good relations with the surrounding environment. Knowledge management is best defined as the management of knowledge-intensive organizations. It aims to create value added to the institution at three levels, namely

- a. Improve current business processes, especially for cost reduction.
- b. Develop new products and services.
- c. Improve the strategic situation.

To whom does knowledge management belong?

Owen (1999) reports that many disciplines have joined the bandwagon of knowledge management, and each of them claims knowledge management for itself. Economists argue that knowledge management operates in a knowledge economy. That is, it is an economic domain. However, some human resources professionals believe that knowledge

management aims at ensuring that the staff of the organization have adequate knowledge and skills. Hence, they claim that knowledge management is theirs. Information technology professionals and librarians claim that knowledge management is their domain because knowledge can be managed by means of storage and retrieval systems, distribution networks...etc. Consequently, there are many approaches to studying knowledge management. For example, the functional approaches investigate (human resource management, library and information services, as well as marketing and sales). The systems' approaches address the administrative systems, network services, and knowledge and expert systems to make decisions. In practice, people working in these different domains support knowledge management. As a result, it can take on different meanings to the organization's staff.

The aim of fully integrated knowledge management is to combine these different approaches. Thus, it is the concern of general management. But perhaps the only people who do not claim that knowledge management belongs to their specific domain are general managers as they often tend to view management as a set of distinct functional specializations, e.g. financial management, marketing management, human resources management, information technology management...etc.

Martin (2009) reviewed knowledge management. He distinguished the disciplines and associations that contributed to knowledge management, as follows:

- Knowledge society contributions
- Contributions of economy and social capital
- Learning contributions
- Contributions of data, information, and knowledge
- Intellectual capital

Martin reviewed different domains including organizational learning, creativity and learning, aspects of information and communication technology...etc. That is, there are a multiplicity and specialized integration in knowledge management. Additionally, he compared two close domains, namely knowledge management and information management, as shown in the following table:

Information management	Knowledge management
- Thing - apparent - Information - Systems - Procedures - Operations	- Concept - Self/ implied - People - Institutions - Relationships - Inventions

Knowledge management and information professionals

The table shows that an information professional is a person engaged in the domain of information resources. This is a very modest role if compared to the wider concept of knowledge management. However, it is useful as it provides advanced perspectives for the information professional.

In the future, the information professional will not be a knowledge broker because the basic principle of knowledge management is to remove the role of the broker between the source and the beneficiary. Its goals are not limited to allow knowledge as an individual material. Rather, they aim to create knowledge channels that allow cooperation among the individuals leading to collaboration and knowledge enrichment. Therefore, the institutions allow the end-user to transcend the libraries as a mediator and to access their archives directly (Owen, 2008). There is no need for mediator services because the beneficiary can perform the task to access knowledge. Knowledge professionals have to shift interest to the development of systems and supporting services helping the beneficiary in a better way as a knowledge worker.

Thus, they need to understand the role of the knowledge worker in each domain in the institution and to develop further skills including the ability to think; decision making when working on internal knowledge networks, e.g. personal networks, team projects, and the Internet, external networks of the beneficiaries, suppliers, and partners, as well as the Internet as external knowledge sources. In other words, the contributions of the professionals of information and knowledge management can be summarized, as follows:

- Organize indoor broadcasting
- Organize the external flow of knowledge
- Support the task of the knowledge worker
- Integrating data and personal knowledge
- Linking policies, sources, activities, and tasks.

That is, knowledge management is an extremely broad meaning that covers any institutional space or issue, and the knowledge professional is given many opportunities to contribute to the new domain of knowledge administration.

Therefore, it is important to integrate the “knowledge management” course in the courses of library and information. The proposed models include:

- A. Algohary (2008) proposed a knowledge management course to the Bachelor stag at information and library departments of Arab universities. The study was conducted in collaboration with information science experts at the Universities of Syracuse and Washington, USA and Seoul National University. It is an attempt to support teaching knowledge management to the undergraduates at information and library departments of Arab universities. It could not be claimed that there is a comprehensive academic

program to teach an interdisciplinary topic such as knowledge management where many departments claim, including computer science, administration, and information and library that it is there's. This section aims to develop the current situation of the Arab academic departments because analyzing the study plans illustrated the poor presentation of courses to qualify graduates in knowledge management.

The cooperation of the departments of computer science and administration on the future elective courses, graduation projects, and curricula to teach the students the environmental aspect of the concept and applications of knowledge management is considered.

- Objectives

The program aims to teach the students information and communication technology, beneficiaries' behavior, knowledge services, and knowledge management to be applied appropriately institutionally. Three pivotal issues are defined, as follows:

a. Techniques

This issue covers the architecture of information networks and databases with a special focus on the design of solutions to the technical problems in the institutions.

b. Knowledge management

It covers the administrative dimension of information and knowledge institutionally focusing on the economic, moral, economic, and behavioral aspects of knowledge management. It also handles the key issues related to project management and teamwork.

c. Information services

It covers the design and availability of information services compatible with the beneficiaries' needs in the digital environment, in particular, focusing on the operational environment of the web.

1.2. Learning outcomes

The learning outcomes are categorized in relation to the program's objectives, as follows:

a. Techniques

When completing the program, the student is expected to demonstrate the ability to:

- Understand the basics of information and communication technology.
- Evaluate modern applications of information technology.
- Manage the available applications of information technology in the institution.
- Use the life cycle of information systems to solve the technical problems in the institution.

b. Knowledge management

When completing the program, the student is expected to demonstrate the ability to:

- Understand the basics of project management in different work environments.
- Critically analyze the quantitative and qualitative problems within the professional practices of the institution's staff.
- Apply the basic operations related to knowledge management in the institution.

c. Information services

When completing the program, the student is expected to demonstrate the ability to:

- Analyze the behaviors of the beneficiaries using adequate methods and tools.
- Provide new information services compatible with the beneficiaries' needs and the institution's objectives.
- Manage the digital content of information services.

Expected job opportunities

It is expected that the program helps the student encumber a number of jobs, e.g. knowledge manager, digital content manager, information analyst, information architect, digital record manager, information security manager, and information system manager.

Proposed curriculum

This section preliminary overviews (54) accredited hours of the fundamental courses in knowledge management course

Fundamental courses

Domain	Course
Basic courses	1. Introduction to information science 2. Knowledge management 3. Integrated experience projects
Techniques	1. Basics and operations of networks 2. Programming languages and applications 3. Databases' design and management 4. Information architecture 5. Analysis and design of information systems
Knowledge management	1. Practices and behaviors of the institutions 2. Design and applications of metadata 3. Design and applications of anthology 4. Project management 5. Knowledge automatic systems
Information services	1. Beneficiaries and information systems 2. Design and management of Internet services 3. Digital information sources 4. Analysis of the beneficiary and benefit analysis methods 5. Skills of digital information retrieval

Importance of knowledge economy in enhancing work efficiency and integrating knowledge economy course in the study of library and information of Arab universities

Introduction

Two terms, i.e. knowledge economy and knowledge-based economy express the field. Knowledge economy focuses on knowledge generation and management within economic determinants. Knowledge-based economy refers to using information technology, e.g.

knowledge engineering and management to make economic profits. While knowledge economy perceives knowledge as a product, the knowledge-based economy perceives knowledge as a tool. However, this distinction is not that clear in literature because they both are multidisciplinary.

Drucker (1973) draws a distinction between the manual and knowledge workers. While the former works manually and produces goods or services, the later generates ideas, knowledge, and information.

The distinctive features of knowledge-based economy

- Knowledge economy differs from traditional economy from various aspects:
- Knowledge economy is not of shortage but of availability. It is not like most resources that drain after use. Instead, knowledge and information develop with application.
- The human capital abilities are key components of value in knowledge-based institutions.
- Increasing communication is a key for knowledge flow. Thus, social structures, cultural contexts...etc. affect social relations and are significant in knowledge economy.
- The success of the knowledge-based economy depends on invention, and the successful sections are those generating new ideas, utilizing new operations, producing new products, and offering new services.
- Community members are not consumers but generators of information. Knowledge is increasingly available to meet the needs of the individual and society. Therefore, an individual makes wiser decisions in all life cycles.

Intellectual property rights in knowledge economy

According to Drahos (2005), the economic theory assumes that a society with no intellectual property protection would almost not be allocating resources to invention and creation at optimally, while a society with extreme protection would certainly incur costs that exceeded the benefits. This is increasingly difficult in the digital age (Kho, 2007).

Some authors believe that the emergence of the Internet was a death certificate for authorship, especially with uploading more than (56) billion documents a year and most of them are not authorized. The 1998 Digital Millennium Copyright Act (DMCA) greatly affected the distribution of digital media. It makes the use of copyrighted works illegal. Critics assume that media companies try to prohibit the legally allowed and fair use of such materials.

The contemporary problem facing knowledge economy is decision making that is largely affected by the owners of intellectual property rights. Consequently, copyrights became strong. Many civil society associations rejected this act, especially regarding the dissemination of authorship in the digital environment. However, they achieved limited success. Clearly, the effect of big businesses on formulating laws and relevant standards is

Published by European Centre for Research Training and Development UK (www.eajournals.org)

a relatively new phenomenon, but it is a big problem for knowledge economy because they have limited effect. There are no easy responses to this problem. However, the contribution of beneficiary groups, especially university lecturers and jurists in the governmental political processes. This shall create opportunities for negotiation when defining the limit of intellectual property.

Analyzing the contents of ECSSR (2003)

In 2003, the Emirates Center for Strategic Studies and Research (ECSSR) published a book on knowledge economy. Dr. Jamal Sanad Al-Suwaidi, Director General, wrote the introduction and highlighted the beginnings of knowledge economy as a result of information revolution. While information economy addresses data processing, technology, and speed of communication, knowledge-based economy is interested in the intellectual value of the individual as a generator of knowledge.

In other words, knowledge and knowledge workers formulate the basic concepts of this new economy. Knowledge is the primary source for the institution and the source of wealth and competitiveness of the nations. Knowledge workers are the basis for the success of any institution that requires continuous creativity of ideas, and not only processing and generating materials, data, and symbols. Consequently, the issue relates to the knowledge base represented by knowledge workers, as well as the continuous development of life-long learning to introduce new knowledge products.

Human capital is the primary source of the knowledge-based economy in comparison to the traditional concepts of workers and their importance in production. It triggered a global war to obtain experts or skillful knowledge experts. Practically, knowledge is transformed into a product that becomes the key standard for the success or failure of the institution. Thus, intellectual capital is important. Furthermore, the successful institution is the one that is capable of matching the surrounding conditions to maintain the competitive level. It is a committed, dynamic, and creative working force. Commitment is continuing learning because it ensures the survival of any successful institution.

The challenges and opportunities of the knowledge-based economy were the focus of the 7th annual conference of ECSSR held in Abu Dhabi in 2002. The following ideas were raised:

- Davis and Christopher (2000) reported that investment in the high-level manpower can develop faster than others. The states that seek the knowledge-based economy have to restructure to achieve the highest economic and human ability. Additionally, information technology cannot create a knowledge-based environment alone because technology cannot operate in a vacuum as it requires supporting strategies and processes and cultural and behavioral standards.

- According to ECSSR (2003), Al-Suwaidi reported unexpected effects resulting from international and easy access to information at low costs compared to the high value of knowledge. The human attributes represented by knowledge including experience, intelligence, character, and style, cannot be digitalized and transformed into the explicit knowledge in databases, libraries...etc.
- The effective governmental role in the knowledge-based economy and training the human resources are an integral part of the national governmental politics because there is a gap between study in schools and universities and the real requirements of the labor market. Al – Ebrahim (2004) reported that the skills of the knowledge-based economy shall be developed by the collaboration and cooperation of the participants of the private, public, business, and investment sectors involved in the educational system. This is the real challenge for the planners of education, training, and manpower to achieve a continuous flow of high-level employees.
- In sum, developing human resources is not marginal for national wealth. Instead, human capital in the knowledge-based economy is the key to economic progress and wealth.

To have a clearer image of knowledge economy, the author made the following comparison:

Comparison of the contents and indexes of ECSSR (2003) Rooney, Hearn, and Ninan (2005)

Knowledge-based economy (ECSSR, 2003)	Knowledge economy (Rooney et al., 2005)
- Human resources' development in the knowledge economy. - Challenges and opportunities of building the knowledge economy. - Knowledge systems as a means of knowledge transfer. - Learning and human development in knowledge economy. - Governmental policies in knowledge economy. - Workforce planning in knowledge economy. - Investment in human capital: Costs and benefits. - Change leadership: From slow death to effective organization. - Organizational structure in knowledge economy. - Human capital in knowledge economy. - Bridging the gap between knowledge and application.	- Knowledge: Concepts, policy, and application. - Features of the material, mental, historical, and social knowledge. - Wisdom, morals, and post-modern organization. - Knowledge and social capital. - Knowledge and cultural capital. - Organizing innovation in knowledge economy. - Cooperation and network forms in the organization. - Self and explicit knowledge: Introductions to knowledge management practices. - Intellectual property in knowledge economy. - Creativity management in knowledge economy. - Knowledge workers and seeking meaning.

Some remarks

- The indexes of the first book reflect most of the second book's topics, but under different heads, as follows:
 - Investment in human capital in ECSSR (2003) is covered in Rooney et al. (2005) (pp: 7, 68, 132).
 - Creativity in ECSSR (2003) (pp: 179, 247, 248, 89, 90, 151, 187, 137, 141, 182, and 188) is covered in Rooney et al. (2005) in a whole chapter with the same title.
 - Self and explicit knowledge in Rooney et al., 2005 is covered in ECSSR (2003) (pp: 9, 13, 62, 63, 69, 74, 81, 128, 277, and 278).
 - Knowledge workers in Rooney et al. (2005) is covered in ECSSR (2003) (pp: 3, 4, 37, 151, and 198).

New media, information, and knowledge systems syllabus, Harvard University:

The author discusses some details of modern developments in the course. She accessed them online on 24/8/2009.

Introduction: Conceptual framework

The introduction covers the new online methods that give opportunities for the social, organizational, economic, and political change, as well as the development and applications of digital technology in the new knowledge systems.

Marketing new media in knowledge economy

The course displays some basic economic changes and the relevant factors that affect the new media markets. It highlights the importance of these markets nationally.

New media and discussing self and codified knowledge

The differences between the self and codified knowledge are the basis for organizational creativity. Additionally, the advanced information and communication technology raises new issues of the distribution and retention of information and knowledge. The self and codified knowledge are discussed within the wider framework of the creative changes at the local, national, regional, and global levels.

Electronic services to citizens

The relationship between e-services and geographic dimensions

Electronic services and businesses

The e-services from institutions or stakeholders are continuing and developing.

Electronic government and the Internet

This section aims to protect the need of the local, national, and global policies for protecting the citizens' interests.

Policy and knowledge societies' organization

Lectures set forth the basis for the components of the organization to be coordinated if the knowledge societies are to be highlighted as societies of continuous creativity.

New media, Internet, and economy

Via the open-source software that allows cooperation and participation as a reverse direction of traditional monopolistic markets.

Convergence and intellectual property rights

This requires the convergence of information and communication technology and service industries by reviewing the established policies and testing the imposition of intellectual property rights digitally in development issues.

Digital divides

Identifying the basics and results of digital divides between the poorer and richer countries and assuring the investigation of digital divides in the developing countries themselves.

Digital Economy and the significant role of knowledge workers

Introduction

Chaudhary and Higgins (2003) highlight many aspects, the most significant of which are introducing new opportunities in digital economy, opening new horizons to the private labor market based on the creative work power that meets the needs of new jobs. This can be achieved by addressing the role and impact of information technology on the work environment in the 21st century, the new horizons of market jobs in the new digital economy, the domains of engineering education and technical training, and the sets of skills required for fulfilling the labor market's needs.

New economy

Efforts are exerted to face the increasing rate of information generation and consumption, resulting in a new era of agricultural production, power, energy, and machinery. It also resulted in specialization in work, skill development, and strong human originality with discoveries, innovations, and inventions. These are the manifestations of new economy.

By the end of the industrial age, the age of knowledge began. Therefore, knowledge motivated the increasing development of industry and produced more goods. Additionally, industries could be rearranged and readjusted on knowledge and information (Beaudin, 2001). While robots replaced human beings in production lines, computers removed some jobs from the labor market. Automatic preparations and computers are of continuing relevance in collaboration with the skillful workers in their programming, maintenance, and operation. In other words, knowledge workers have special skills in reading, writing, mathematics, and basic sciences and focus on continuing education, innovation, communication, and competition.

Information technology and its impact on the work environment in the 21st century

The real investment in the knowledge society does not depend on machines. Rather, it is based on knowledge workers because without them the highly complicated machines are unproductive. The 21st knowledge-based society provided knowledge workers. Thus, knowledge society is institutional and their basic and distinctive work is information architecture and knowledge management.

Skills required for knowledge economy

Digital economy and knowledge society address the skill gap and its importance. The following are the sets of skills reflecting the requirements of the digital age and knowledge management:

- Studying applied mathematics: The graduate shall be skillful in applying mathematics to help solve the problems related to the economics of knowledge.
- Reading for information: The graduate shall be skillful in reading, understanding the task related to instructions and policies, including comprehension, analysis, and interpretation.
- Applied technology: The graduate shall be skillful in solving the problems of technological nature, e.g. applying the basics of mechanics, electricity, electronics, thermodynamics, and computers.

Additionally, the graduate shall master basic skills in operating computers and communication skills for control, analytical skills for thinking and problem-solving, human and behavioral skills, literary skills, and learning skills.

Proposal for a study program on knowledge or knowledge workers at library and information departments at the Arab universities

A study program on knowledge and knowledge workers is proposed. It considers the following:

- Maintaining the identity of information and library science based on the aforementioned pieces of literature, especially Chaudhary and Higgins (2003), Black (2001), and Duff (2002). Such studies are significant in the knowledge society. An integrated program that covers the undergraduate and graduate stages shall be developed. Consequently, supporting studies shall be conducted on every stage in the various stages of knowledge.

To conclude, many specializations, e.g. administration, economy, education, philosophy, sociology, and knowledge community claim that the discipline under study is their own. It covers the planning of science, technology, learning, and education, as well as the interest in creativity and innovation within the universal knowledge economy (Hilal, 2007; Hilal, 2008).

RESULTS AND RECOMMENDATIONS

- Knowledge workers play an important role in the different institutions to enrich and consolidate the knowledge assets and to increase the financial value. They are also a major competitive value internationally.
- Knowledge management has an important central role in institutions where many disciplines compete to join the bandwagon of knowledge management including economists and information technology professionals.
- Human capital is the key to economic progress and wealth. It is the objective of conflict among the countries.
- The educational institutions qualify few numbers of students in the skills required for the international standards in the changing digital society.
- The study proposes a program or course reflecting the modern trends in knowledge workers' preparation, knowledge management, knowledge economy, and digital economy.

The study recommends integrating a gradual comprehensive system on the knowledge economy and management, as well as knowledge workers' preparation into the programs of information and library departments in the Arab world.

References

- Al – Ebrahim, Y. (2004). *Education and development of human resources in economy-based knowledge*. Abu Dhabi: ECSSR.
- Algohary, A. (2008). Knowledge managers: A study of the functional needs and educational requirements. *Research on Library and Information Science*, 1, 227-272.
- Black, A. (2001). The scope of the syllabus of the Information society studies. *Education for Information*, 19 (3), 245 – 252.
- Almekkawy, A. (2009). Knowledge economy education: A survey with a proposal for its teaching in library and information departments of Egyptian universities. *Arab Journal of Library and Information*, 29(2), 143-168.
- Beaudin, M (2001). *Employment, skills and knowledge economy in Atlantic Canada*. Moncton: Canadian Institute for Research on Regional Development.
- Chaudhary, A. & Higgins, S. (2003). On the need for a multidisciplinary approach to education of knowledge management. *Library Review*, 52 (2), 65 - 69.
- Davis, G. (1997). *The Blackwell encyclopedic dictionary of management and information systems*. Massachusetts: Blackwell Publishers Inc.
- Dalemy, S. (2009). Teaching knowledge to specialists in graduate program of library and information science at Saudi universities: A proposal for knowledge management course. *Arab Journal of Library and Information*, 29(1), 121-164.
- Davis, S. & Christopher, M. (2000). *Future wealth*. Boston, M.A: Harvard Business School.
- Drahos, P. (2005). Intellectual property rights in the knowledge economy. In: D. Rooney, G. Hearn & A. Ninan (Eds.), *Handbook on knowledge economy* (pp. 139-154). Chilton, U.K: Edward Elgar Publishing.
- Drucker, P. (2001). The next society. *The Economist*, 1.

- Drucker, P. (1995). *Managing in a time of great change*. New York: Truman Talley Books.
- Drucker, P. (1973). *Management: Tasks, responsibilities, practices*. New York: Harper& Row.
- Duff, A. (2002). The status of Information society studies in the information science curriculum. *Library Review*, 51 (3,4), 139 – 148.
- ECSSR (2003). *Human resource development in a knowledge-based economy*. Abu Dhabi: ECSS.
- Hilal, H. (January, 2008). Development of knowledge economy the most significant scientists' responsibilities. *Alahram Newspaper*. Retrieved from www.ahram.org.eg.
- Hilal, H. (July, 2007). A new system of science and technology. *Alahram Newspaper*. Retrieved from www.ahram.org.eg.
- Irvine, M. (2003). *The post-Internet university and the promise of e-learning: Preliminary syllabus*. Retrieved from [http://www.georgetown.edu/faculty/Irvine/m/cctp73 - Prelim syllabus.html](http://www.georgetown.edu/faculty/Irvine/m/cctp73-Prelim%20syllabus.html).
- Kho, N. (2007). *Keeping up with copyright in the digital age*. Retrieved from <http://www.econtentmag.com/Articles/Editorial/Feature/Keeping-Up-With-Copyright-In-The-Digital-Age-37180.htm>
- Looney, A. and Klenowski, V. (2008). Curriculum and assessment for the knowledge society: interrogating experiences in the Republic of Ireland and Queensland, Australia. *The Curriculum Journal*, 19(3), 177-192.
- Mansell, R. (2008). *New media, information and knowledge systems syllabus*. Retrieved from <http://h201awhaward.edu/viewprojectyllabus.do?projectld=20>.
- Martin, B. (2009). Knowledge management. *Annual Review of Information Science and Technology*, 43 (1), 369-424.
- Nonaka, I. (1991). *The knowledge creating-company*. Oxford: Oxford University Press
- Owen, J. (1999). Knowledge management and the information professional. *Information Services and Use*, 19 (1), 7-16.
- Peters, M. (2003). Knowledge society. Proceedings of the *New Zealand Sociology Conference*, Auckland University of Technology.
- Richardson, J. McBey, K. & McKenna, S. (2008). Integrating realistic job previews and realistic living conditions previews: Realistic recruitment for internationally mobile knowledge workers. *Personnel Review*, 37(5), 490-508. <https://doi.org/10.1108/00483480810891646>
- Rooney, D., Hearn, G. & Ninan, A. (2005). *Handbook on knowledge economy*. Chilton, U.K: Edward Elgar Publishing.
- Savage, C. (1995). *Fifth generation management: Co-creating through virtual enterprising, dynamic teaming and knowledge networking*. Boston: Butterworth-Heinemann.
- Tapscott, D. and Willams, A. (2006). *Wikinomics: How mass collaboration changes everything*. New York: Penguin Group.
- Toffler, A. (1990). *Powershift: Knowledge, wealth, and violence at the edge of the 21st century*. New York: Bantam Books.