



African Virtual University

Applied Computer Science: ITI 1100

# INFORMATION AND SOCIETY

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Dessaiegn Mequanint

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# Foreword

The African Virtual University (AVU) is proud to participate in increasing access to education in African countries through the production of quality learning materials. We are also proud to contribute to global knowledge as our Open Educational Resources are mostly accessed from outside the African continent.

This module was developed as part of a diploma and degree program in Applied Computer Science, in collaboration with 18 African partner institutions from 16 countries. A total of 156 modules were developed or translated to ensure availability in English, French and Portuguese. These modules have also been made available as open education resources (OER) on [oer.avu.org](http://oer.avu.org).

On behalf of the African Virtual University and our patron, our partner institutions, the African Development Bank, I invite you to use this module in your institution, for your own education, to share it as widely as possible and to participate actively in the AVU communities of practice of your interest. We are committed to be on the frontline of developing and sharing Open Educational Resources.

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The following institutions participated in the Applied Computer Science Program: (1) Université d'Abomey Calavi in Benin; (2) Université de Ougagadougou in Burkina Faso; (3) Université Lumière de Bujumbura in Burundi; (4) Université de Douala in Cameroon; (5) Université de Nouakchott in Mauritania; (6) Université Gaston Berger in Senegal; (7) Université des Sciences, des Techniques et Technologies de Bamako in Mali (8) Ghana Institute of Management and Public Administration; (9) Kwame Nkrumah University of Science and Technology in Ghana; (10) Kenyatta University in Kenya; (11) Egerton University in Kenya; (12) Addis Ababa University in Ethiopia (13) University of Rwanda; (14) University of Dar es Salaam in Tanzania; (15) Université Abdou Moumouni de Niamey in Niger; (16) Université Cheikh Anta Diop in Senegal; (17) Universidade Pedagógica in Mozambique; and (18) The University of the Gambia in The Gambia.

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# Course Overview

## Welcome to Information and Society

This course primarily introduces learners to the evolutions that information as a product has gone through with respect to its creation, use, dissemination, and management along with its impact on the development and history of societies. The module covers several issues about information and society's evolutions over time driven by technological advancements. It is designed in order to empower learners and equip them with the necessary skills on its strategic use.

## Prerequisites

The module has no prerequisite. Learners can register for the course in their first year.

## Materials

The materials required to complete this course are:

- Besides the Module content authored for the course, students are advised to refer to or use information and society e-books series authored by Frank Webster, particularly the book on "Theories of the information society".
- Online materials available from the url: <http://sutherla.tripod.com/infosoc/lectures.html>

## Course Goals

Upon completion of this course the learner should be able to:

1. analyse the evolution of information as a product;
2. use appropriate technologies for creating, disseminating and managing information;
3. enhance their ability to use information products strategically;
4. explain the characteristics of the knowledge economy;
5. analyse the characteristics of the Information society; and
6. explain the characteristics of the Network Society.

## Units

### **Unit 0: Pre-Assessment**

In this unit, a summary of important notions in the domain of information and society that learners are assumed to have known before learning the core issues of information and society discussed in subsequent units.

### **Unit 1: Introduction to Information and Society**

In this unit, you, the learner, will find out about the importance of information and its emerging position as a distinguishing feature of the contemporary society.

### **Unit 2: The Role of Libraries- Knowledge Management in the Digital Age**

In this unit, you, the learner, will be introduced to the role of libraries, archives, records management operations in storing and providing access to information in the digital age, the major phases in the developmental stages or cycles of knowledge management, and the implementation phases or steps of knowledge management.

### **Unit 3: The Digital and Knowledge Economy**

In this unit, you, the learner, will be introduced to the transformative power of information technologies in societies economic progression thereby understanding the socioeconomic implications of advances in information and communication technologies (ICTs).

### **Unit 4: Ethics in the Information Society**

In this unit, you, the learner, will be introduced to the legal, social and ethical issues that surround and affect individuals and society in the information age as a whole. You will explore issues such as ethical use of information, as well as legal and social responsibility in society's use of technologies. The unit will also introduce learners to the nine core concepts of ethics and values of the Information or Knowledge Societies.

### **Unit 5: Information Management and Strategy in the Digital Age**

In this unit, you, the learner, will be introduced to the various information management techniques. The unit describes how the world of information is changing quickly in the digital world or economy and provides explanation on what an information strategy and information management constitutes in the digital world.

### **Unit 6: The Network Society**

In this unit, you, the learner, will be introduced to elements of the network society which are the social structure of the information age. It describes the framework of the network society and highlights the main transformations taking place in social structures around the world in the information age.

## Assessment

Formative assessments, used to check learner progress, are included in each unit.

Summative assessments, such as final tests and assignments, are provided at the end of each module and cover knowledge and skills from the entire module.

Summative assessments are administered at the discretion of the institution offering the course. The suggested assessment plan is as follows:

1	Quizzes- after the completion of each unit students are required to take a quiz.	Each quiz weighs 5%, total 30%
2	Tests covering three units	20%
3	Creating a group composed of 4 and learners discussing the assessment or reflective activities and share their take on the activities to classmates in think-pair-share set up	10%
3	Final Exam	40%

## Schedule

Unit	Activities	Estimated time
Unit 0: Pre-assessment	Learning Activity 1: Differences and Similarities between Data, Information and Knowledge	3 hours
	Defining Data, Information and Knowledge	
Unit 1: Introduction to Information and Society	Learning Activity 1.1- Storage Devices and Society	8 hours
	Learning Activity 1.2- Information Retrieval Systems and Society	7 hours
	Learning Activity 1.3 : Information Communication Systems and Society	7 hours



## Course Overview

Unit 2: The Role of Libraries- Knowledge Management in the Digital Age	Learning Activity 2.1 The Role of Libraries in Contemporary Society.	6 hours
	Learning Activity 2.2: Characteristics of Digital Libraries and Knowledge Management	6 hours
	Learning Activity 2.3 Implementation of Knowledge Management Systems and the Life Cycle of Knowledge Management.	6 hours
Unit 3: The Digital and Knowledge Economy	Learning Activity 3.1: The Digital Economy and Transformation of Services	6 hours
	Learning Activity 3.2: Issues and the Key Challenges of Digital Economy	6 hours
	Learning Activity 3.3: The Knowledge Economy and its Effect on Globalization, Measuring the Knowledge Economy and the Challenges of African Countries in the Digital Age.	6 hours
Unit 4. Ethics in the Information Society	Learning Activity 4.1: Privacy Issues in the Digital Age	7 hours
	Learning Activity 4.2: Ethical Aspects of the Nine Core Topics of the Information or Knowledge Societies	8 hours
	Learning Activity 4.3 Additional Ethical Elements of the Information or Knowledge Societies and the Rationale for Information Policy	8 hours
Unit 5. Information Management and Strategy in the Digital Age	Learning Activity 5.1: The Information Cycle and Main Activities of Information Management	6 hours
	Learning Activity 5.2: Information Management Techniques and Information as Commodity.	6 hours
	Learning Activity 5.3: What is Information Strategy? Planning Information Strategy, Developing Information Strategy and Information Audit.	6 hours

Unit 6. The Network Society	Learning Activity 6.1: Characteristics of the Network Society, and the Transition to the Network Society	6 hours
	Learning Activity 6.2: The Network Society and the Macro-Level Factors Determinant to the Transition to the Network Society	6 hours
	Learning Activity 6.3: Media, Communication, Wireless and Policies in the Networks Society	6 hours

## Readings and Other Resources

The readings and other resources in this course are:

### Unit 0

Required readings and other resources:

- French, Carl (1996). Data Processing and Information Technology (10th ed.). Thomson. p. 2. ISBN 1844801004
- <http://www.slideshare.net/ryanschudel/what-is-the-difference-between-knowledge-and-information?related=1>
- <http://www.journals.elsevier.com/information-systems/>

### Optional readings and other resources:

- It is impossible to get a material that covers all the topics covered in this module, however a topic by topic online search is also helpful to get materials for on a specific theme or topic.

### Unit 1

Required readings and other resources:

- <http://legacy.earlham.edu/~seidti/iam/papyrus.html>, Date accessed- November 2014.
- [http://www-03.ibm.com/ibm/history/exhibits/storage/storage\\_350.html](http://www-03.ibm.com/ibm/history/exhibits/storage/storage_350.html), Date accessed- November 2014.
- <http://mashable.com/2012/06/22/data-created-every-minute/>, Date accessed- November 2014.
- [http://en.wikipedia.org/wiki/Holographic\\_data\\_storage](http://en.wikipedia.org/wiki/Holographic_data_storage), Date accessed- November 2014.
- The History of Computer Storage Innovation from 1928 to Today, <http://www.zetta.net/history-of-computer-storage/>, Date accessed- November 2014.

- American Society For Indexing, <http://www.asindexing.org/about-indexing/history-of-information-retrieval/>, Date accessed- November 2014.
- Daly, Lloyd. Contributions to the History of Alphabetization in Antiquity and the Middle Ages Brussels, 1967. p. 25
- NISO Technical Report 2- NISO-TR02-1997, Guidelines for Indexes and Related Information Retrieval Devices, <http://www.niso.org/publications/tr/tr02.pdf>.
- National Instruments Signal Generator Tutorial series, Introduction and History of Communication Systems, <http://www.ni.com/white-paper/14797/en/>, Date accessed- November 2014.
- Brief History of the Internet, <http://www.internetsociety.org/internet/what-internet/history-internet/brief-history-internet>, Date accessed- November 2014.

Optional readings and other resources:

- It is impossible to get a material that covers all the topics covered in this module, however a topic by topic online search is also helpful to get materials for on a specific theme or topic.

## Unit 2

Required readings and other resources:

- ENCYLOPAEDIA BRITANNICA, <http://www.britannica.com/EBchecked/topic/339421/library/62006/The-history-of-libraries> , Date accessed- November 2014.
- History Magazine, <http://www.history-magazine.com/libraries.html>, Date accessed- November 2014.
- CLIR(Council on Library and Information Resources) Issues, <http://www.clir.org/pubs/issues/issues04.html>, Date accessed- November 2014.
- [4] Michael Agresta, What will become of a Library?, [http://www.slate.com/articles/life/design/2014/04/the\\_future\\_of\\_the\\_library\\_how\\_they\\_ll\\_evolve\\_for\\_the\\_digital\\_age.single.html](http://www.slate.com/articles/life/design/2014/04/the_future_of_the_library_how_they_ll_evolve_for_the_digital_age.single.html), Date accessed- April, 2015.
- Howard Besser , The Shape of the 21st Century Library, <http://besser.tsoa.nyu.edu/howard/Papers/peters.html>, Date accessed- April 2015.

Optional readings and other resources:

- It is impossible to get a material that covers all the topics covered in this module, however a topic by topic online search is also helpful to get materials for on a specific theme or topic.

### Unit 3

Required readings and other resources:

- Defining the Knowledge Economy, the Work Foundation, [http://www.theworkfoundation.com/assets/docs/publications/65\\_defining%20knowledge%20economy.pdf](http://www.theworkfoundation.com/assets/docs/publications/65_defining%20knowledge%20economy.pdf).
- The Knowledge-Based Economy, General Distribution- OCDE/GD(96)102, <http://www.oecd.org/sti/sci-tech/1913021.pdf>.
- List of African countries by Human Development Index, [http://en.wikipedia.org/wiki/List\\_of\\_African\\_countries\\_by\\_Human\\_Development\\_Index](http://en.wikipedia.org/wiki/List_of_African_countries_by_Human_Development_Index), Date accessed- December 2014.
- United Nations Development Programme- Human Development Resources, <http://hdr.undp.org/en/countries>, Date accessed- December 2014.
- Sustaining Educational and Economic Momentum in Africa, World Bank, [http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/Sustaining\\_edu\\_econ\\_momentum\\_Africa.pdf](http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/Sustaining_edu_econ_momentum_Africa.pdf)

Optional readings and other resources:

- It is impossible to get a material that covers all the topics covered in this module, however a topic by topic online search is also helpful to get materials for on a specific theme or topic.

### Unit 4

Required readings and other resources:

- Globethics.net Principles on Sharing Values across Cultures and Religions, [http://www.globethics.net/documents/4289936/13403256/Texts\\_1\\_online.pdf/1f335f4b-2ad8-43a4-87ff-bb651ac810fb](http://www.globethics.net/documents/4289936/13403256/Texts_1_online.pdf/1f335f4b-2ad8-43a4-87ff-bb651ac810fb), Data accessed March 27, 2015.
- Barry Leiba , Pervasive Monitoring and Opportunistic Security: Defending the Internet's Protocols, Issue No.02 - Mar.-Apr. (2015 vol.19), pp: 75-77, IEEE Computer Society. Thisdfdfdfdfdfdf
- <http://glossarium.bitrum.unileon.es/Home/etica-intercultural-de-la-informacion/intercultural-information-ethics>, Date accessed- March 28, 2015.
- Pak-Hang Wong, What Should We Share? Understanding the Aim of Intercultural Information Ethics, [http://doc.utwente.nl/76121/1/AP-CAP\\_What\\_Should\\_We\\_Share.pdf](http://doc.utwente.nl/76121/1/AP-CAP_What_Should_We_Share.pdf), AP-CAP 2009, October 1–2, 2009, Tokyo, Japan.

Optional readings and other resources:

- It is impossible to get a material that covers all the topics covered in this module, however a topic by topic online search is also helpful to get materials for on a specific theme or topic.

## Unit 5

Required readings and other resources:

- Bill Haskins and Technical Information Service, Information Strategy Topic Gateway Series No.6,[http://www.cimaglobal.com/Documents/ImportedDocuments/cid\\_tg\\_information\\_strategy\\_jul08.pdf](http://www.cimaglobal.com/Documents/ImportedDocuments/cid_tg_information_strategy_jul08.pdf).
- Susan Henczel, THE INFORMATION AUDIT AS A FIRST STEP TOWARDS EFFECTIVE KNOWLEDGE MANAGEMENT: AN OPPORTUNITY FOR THE SPECIAL LIBRARIAN, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.453.7589&rep=rep1&type=pdf>

Optional readings and other resources:

- It is impossible to get a material that covers all the topics covered in this module, however a topic by topic online search is also helpful to get materials for on a specific theme or topic.

## Unit 6

Required readings and other resources:

- Manuel C. , Informationalism, Networks, And The Network Society: A Theoretical Blueprint, <http://annenbergl.usc.edu/Faculty/Communication/~media/Faculty/Facpdfs/Informationalism%20pdf.ashx>, Date accessed- April, 2015.
- Manuel C., Gustavo C., The Network Society From Knowledge to Policy, [http://www.umass.edu/digitalcenter/research/pdfs/JF\\_NetworkSociety.pdf](http://www.umass.edu/digitalcenter/research/pdfs/JF_NetworkSociety.pdf)
- ITU, Measuring the Information Society, [https://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2014/MIS2014\\_without\\_Annex\\_4.pdf](https://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2014/MIS2014_without_Annex_4.pdf).
- Castells M., The Internet Galaxy: Reflections on the Internet, Business and Society, OUP, 2001.
- Betty C., E-Learning and the Transformation of Education for a Knowledge Economy [http://www.cies.iscte-iul.pt/linhas/linha2/sociedade\\_rede/pr\\_htdocs\\_network/apps/collis.pdf](http://www.cies.iscte-iul.pt/linhas/linha2/sociedade_rede/pr_htdocs_network/apps/collis.pdf).
- M.A. Thomas , What Do the Worldwide Governance Indicators Measure?, [http://cityindicators.org/deliverables/measuring%20governance\\_1-2-2007-836890.pdf](http://cityindicators.org/deliverables/measuring%20governance_1-2-2007-836890.pdf)
- M. Alshehri, S. Drew, Implementation of e-Government: Advantages and Challenges [http://www98.griffith.edu.au/dspace/bitstream/handle/10072/40620/72631\\_1.pdf?sequence=1](http://www98.griffith.edu.au/dspace/bitstream/handle/10072/40620/72631_1.pdf?sequence=1).

Optional readings and other resources:

- It is impossible to get a material that covers all the topics covered in this module, however a topic by topic online search is also helpful to get materials for on a specific theme or topic

# Unit 0. Pre-Assessment

In this unit, you, the learners is to remind learners some of the concepts that they need to have covered and are assumed to be known.

## Unit Goals

Upon completion of this unit the learner should be able to

1. Explain the data, information and knowledge chain;
2. Distinguish a variety of terminologies that relate to data, information and knowledge;
3. Explain the evolution of data and information processing cycles with respect to the history of society;
4. Explain how the choice, use and development of information systems can affect the society; and
5. Analyze the strategic use of information systems.

## Learning Activity 1: Differences and Similarities between Data, Information and Knowledge

### Defining Data, Information and Knowledge.

#### Introduction

Before delving into the core issues of information as a product, which you will do in subsequent units, in this unit, terminologies or domain vocabularies that relate to information as a product are discussed. Understanding the terminologies associated to data, information, knowledge, information systems and technology tools available for managing small as well as large scale datasets will enable you to have a clear understanding of the unique properties of information as a product as well as its impact on society.

### Data and Information

Data is defined as raw facts expressed in figures, texts, images and sounds without context, whereas information is derived from data and can be defined as data with context, or processed data, or value-added data. In other words, averaging, summarizing, graphing, adding context, adding value or selecting part of the data constitutes Information. Hence there is a subtle difference between data and information and they are therefore not synonyms.

### Knowledge

In everyday language we use knowledge all the time and sometimes we use it as a substitute word for know-how while at other moments as a substitute word for wisdom. In some cases we use it also as a substitute word for information. Part of the difficulty of defining knowledge stems from its close relationships with the two other concepts - data and information. Data and information are more often regarded as lower denominations of knowledge but their degree of relationship to knowledge varies across disciplines'. For instance, in Information Technology oriented disciplines, particularly in Information Systems, more often knowledge is used as a synonym for information. For the purpose of this module the definition given by (Gamble and Blackwell, 2001, Page 3) has been adopted. Accordingly, knowledge is defined as:

"a fluid mix of framed experience, values, contextual information, expert insight, and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information. It originates and is applied in the mind of the knowers. In organizations it often becomes embedded not only in documents or repositories, but also in organizational routines, practices and norms."

Knowledge is the factor that connects fragments of information together which helps to create a mental map or picture and understanding of things or phenomena. In other words knowledge forms meaning from bits of information and as such it is more than a bulk of facts and information. However, information is existent without knowledge and knowledge is non-existent without information . The following diagram illustrates the relationship between the three concepts, data, information and knowledge, with Information defined in terms of data and knowledge defined in terms of information.

### Information Systems

There exists a more or less universal definition of Information Systems across many books and other forms of resources available on the web. For the purpose of this module we have taken the definition given by the Information Systems Journal, Elsevier. Information systems are defined as the software and hardware systems that support data-intensive applications . Information systems in general have five more specific components such as people, data, hardware, software and data communication network. The hardware and software are used to process the data and people take the role of interpreting the processed data which is known as information.

Data communication networks are used to transport data or information from a source to a consumer. The term Information Systems is also occasionally used in more restricted senses to refer to only the software used to run a computerized database or to refer to only a computer system.

### Database Management Systems

A database management system is a software tool that enables you to create, store, modify and retrieve data from a database. At the core of an information systems is a database or raw data, and information systems enable the capturing of data via software components such as Transaction Processing Systems (TPS) and Process Control Systems (PCS), which are also known as information processing systems. A transaction is a unit of operation on a database such as inserting new data items, updating or removing existing ones.

### Data processing

Data processing has undergone its own evolution since it was performed manually for millennia. Manual data processing methods have been and still are augmented with the use or application of mechanical or electronic calculators.

Data processing in modern days refers to the analysis, organization, storage, retrieval and manipulation of data, through the use of computers. Data processing is, broadly speaking, “the collection and manipulation of items of data to produce meaningful information.” Based on this definition data processing can be considered as a subset or synonym of information processing, however, in a broad sense, data processing may be said of anything that computers do. In this context some prefer to use information processing over data processing because ‘information’ does not carry the connotation of ‘numbers’, which data naturally are.

### Data Governance

Quality data are required at all levels as information which is vital for decision-making is generated from it. Thus, quality assurance mechanisms to maintain the integrity of the data from which information is generated are required. This is where the notion of data governance comes in.

Data Governance refers to a set of processes that ensures that important datasets are formally managed throughout the enterprise. It encompasses the people, processes and information technology required to create consistent and proper handling of an organization’s data across the business enterprise .



### Information Governance

New ways of record management have never been as pressing an issue as it has become in recent years because of the huge volumes of data. Thus, the traditional way of managing records which solely focused on the creation, retention, storage and disposition of records has become inadequate and needed further elements such as privacy, access controls and other compliance related elements. This is where the notion of information governance comes in.

Information governance is about setting rules and regulations that ensure all information within an organization is being used ethically and is in compliance with the legal framework of the law .

### Information Privacy Principles

Information privacy principles center on safeguarding personal data by placing mechanisms to assure that information practices are fair and provide adequate information privacy protection. They provide guidelines that represent widely accepted concepts concerning the manner and purpose of personal information collection, storage and security of personal information, access to and alteration of records containing personal information and other related issues .

## Unit Summary

In this unit preliminary notions such as data, information, knowledge, information systems, database management systems, data processing, data governance, information governance and information privacy principles have been discussed in order to prepare you for the core issues of the information society dealt in subsequent units.

### Assessment : Reflective Activities

This preliminary assessment assesses the learner's previous knowledge of various notions associated to information as a product. In order to answer some of the assessment questions you may be required to read additional resources beyond this unit.

1. Which one of the following statement is correct about data, information and knowledge?
  - A. Information can never be incorrect
  - B. Data can never be incorrect
  - C. Knowledge can never be incorrect
  - D. Data and Information can never be incorrect
2. Give two examples of information systems.
3. Give two examples of database management systems.
4. Describe the differences and similarities between data processing and information processing.
5. How can countries ensure the protection of personal data?

### Answers

1. B
2. Office Information Systems (OIS), Management Information Systems (MIS), etc.
3. Microsoft SQL Server, Oracle, etc.
4. The result or output of data processing is "Information" whereas the result or output of information processing is "Knowledge."
5. Countries can ensure the protection of personal data by introducing data protection acts or laws in their legislation.

# Unit 1: Introduction to Information and Society

In this unit, a summary of important notions in the domain of information and society that learners are assumed to have known before learning the core issues of information and society discussed in subsequent units.

## Unit Goals

Upon completion of this unit you should be able to:

1. Explain how technologies are used to create, manipulate, and disseminate information;
2. Analyse technological change and changes in information communication tools in an historical perspective ;
3. Trace historical development of information storage devices;
4. Trace historical development of information retrieval techniques;
5. Predict the trend of storage device development;

### Key Terms

**TDMA:** which stands for Time division multiple access is a time-based channel access method for shared medium networks.

**CDMA:** which stands for Code-Division Multiple Access, CDMA is a digital cellular technology that uses spread-spectrum techniques.

**DSL:** which stands for Digital Subscriber Line is a technology for bringing high- bandwidth information to homes and small businesses over ordinary copper telephone lines.

**Wireless Communication:** is the transfer of information between two or more points that are not connected by an electrical conductor.

## Learning Activity 1.1- Storage Devices and Society

### Introduction

Information is the name for content which could be in the form of text, audio, image and video that people create, manipulate and exchange or disseminate using various types of media with Information Technology being the dominant means in the contemporary society. The core point of this unit is the discussion of the evolving role of information as a product in the digital age.

### Information Storage and Society

People have been storing information since the Stone Age; from the beginning of mankind, man has been using various mechanisms to store information for subsequent generations. Before storage technologies reached the level they are at today, people were able to use different mechanisms such as hematite, manganese oxide and charcoal to paint information about their life on rock walls, caves and ceilings.

In ancient Egypt, Papyrus, which is a thin-paper like material made from the pith of the papyrus plant, was used to store information [1]. The Chinese ordinarily wrote documents on bamboo. There were several other storage mechanisms and devices people in the past used to store information and, in general, before the advent of modern day digital storage systems, mankind has used these to store and preserve information. However, a breakthrough in information storage mechanisms in the history of mankind took place in 1956. IBM invented a hard disk with 5MB capacity for the IBM's 305 RAMAC computer [2]. Also, in the years between 1950 and 1980, several other storage devices critical to the development of the computer industry were built. Between 1980 and now, several storage devices like the CD-ROM, DVD, Flash drive or Memory sticks, HD-DVD have been introduced.

Throughout history, humans have been on the lookout for available means not only to acquire but also to preserve knowledge. In the contemporary world, computers and other technologies have fundamentally changed the information access and storage landscapes. The Internet and other emerging technologies such as social media (e.g. Facebook and Twitter) have made publishing as well as access to information a lot easier. As a result of unprecedented storage devices capacity growth new notions and developments such as the use of big data (structured in the form of database records and unstructured in the form of Facebook or Tweeter posts of text, image, audio and video) for social good or societal development, and the social data revolution which is characterized by increased personal information sharing have now become common realities.

The latest storage device developments have contributed a lot to mankind's ability to create, process, store and recall information and, as a result, it can be said that the contemporary society is light years ahead of the days of cave paintings and engravings on stone tablets. Vast amounts of information can be stored on devices that are much smaller than optical discs and steady improvements in size are expected to continue. The volume of data being created or generated reaches a new high every minute [3].

With the pace storage devices are evolving it would be natural to ask questions like: What does the future of data storage hold? When will we become much closer to the realization of the holographic data storage technique? Holographic data storage is a mass storage technology that uses three dimensional holographic images to enable more information to be stored in a much smaller space. In holographic storage, data are stored in the form of magnetic bits and read out simultaneously as holographic images, thereby enabling storage devices' performance, particularly data transfer, rate improvement [4].

The following table is a summary of the historical evolution of information storage devices: it depicts storage device innovation that took place from 1929 to today.

**Table 1- The Evolution of Storage Devices Since 1929**

Year	Storage Technology and the Year People Started to Use them	Description
1920s	Magnetic Tape in 1928	Fritz Pfleumer, a German engineer, patented magnetic tape in 1928. He based his invention off Vlademar Poulsen's magnetic wire
1930s	Magnetic Drum in 1932	G. Taushek, an Austrian innovator, invented the magnetic drum in 1932. He based his invention off a discovery credited to Fritz Pfleumer.
1940s	Williams Tube in 1946	Professor Fredrick C. Williams and his colleagues developed the first random access computer memory at the University of Manchester located in the United Kingdom. He used a series of electrostatic cathode-ray tubes for digital storage. A storage of 1024 bits of information was successfully implemented in 1948
	Selectron Tube in 1948	The Radio Corporation of America (RCA) developed the Selectron tube, an early form of computer memory, which resembled the Williams-Kilburn design.
	Delay Line Memory in 1949	The delay line memory consists of imparting an information pattern into a delay path. A closed loop forms to allow for the recirculation of information if the end of the delay path connects to the beginning through amplifying and time circuits. A delay line memory functions similar to inputting a repeating telephone number from the directory until an individual dials the number.
1950s	Magnetic Core	A magnetic core memory, also known as a ferrite-core memory, uses small magnetic rings made of ceramic to store information from the polarity to the magnetic field it contains.
	Hard disk in 1956	A hard disk implements rotating platters, which stores and retrieves bits of digital information from a flat magnetic surface.

1960s	Music tape in 1963	Philips introduced the compact audio cassette in 1963. Philips originally intended to use the audio cassette for dictation machines; however, it became a popular method for distributing prerecorded music. In 1979, Sony's Walkman helped transformed the use of the audio cassette tape, which became widely used and popular.
	DRAM in 1966	In 1966, Robert H. Dennard invented DRAM cells. Dynamic Random Access Memory technology (DRAM), or memory cells that contained one transistor. DRAM cells store bits of information as an electrical charge in a circuit. DRAM cells increased overall memory density.
	Twistor Memory in 1968	Bell Labs developed Twistor memory by wrapping magnetic tape around a wire that conducts electrical current. Bell Labs used Twistor tape between 1968 to the mid-1970s before it was totally replaced by RAM chips.
1970s	Bubble Memory in 1970	In 1970, Andrew Bobeck invented the Bubble Memory, a thin magnetic film used to store one bit of data in small magnetized areas that look like bubbles. The development of the Twistor memory enabled him to create Bubble Memory.
	8" Floppy in 1971	IBM started its development of an inexpensive system geared towards loading microcode into the System/370 mainframes. As a result, the 8-inch floppy emerged. A floppy disk, a portable storage device made of magnetic film encased in plastic, made it easier and faster to store data.
	5.25" Floppy in 1976	Allan Shugart developed a the 5.25-inch floppy disk in 1976. Shugart developed a smaller floppy disk, because the 8-inch floppy was too large for standard desktop computers. The 5.25-inch floppy disk had a storage capacity of 110 kilobytes. The 5.25-inch floppy disks were a cheaper and faster alternative to its predecessor.
	CD in 1980	During the 1960s, James T. Russel thought of using light to record and replay music. As a result, he invented the optical digital television recording and playback television in 1970. In 1975, Philips representatives visited Russel at his lab. They paid Russel millions for him to develop the compact disc (CD). In 1980, Russel completed the project and presented it to Sony.
	3.5" Floppy in 1981	The 3.5-inch floppy disk had significant advantages over its predecessors. It had a rigid metal cover that made it harder to damage the magnetic film inside.

## Unit 1: Introduction to Information and Society

	CD Rom in 1984	The CD-ROM, also known as the Compact Disk Read-Only Memory, used the same physical format as the audio compact disks to store digital data. The CD-ROM encodes tiny pits of digital data into the lower surface of the plastic disc, which allowed for larger amounts of data to be stored.
	DAT in 1987	In 1987, Sony introduced the Digital Audio Tape (DAT), a signal recording and playback machine. It resembled the audio cassette tape on the surface with a 4 millimeter magnetic tape enclosed into a protective shell.
	DDS in 1989	In 1989, Sony and Hewlett Packard introduced the Digital Data Storage (DDS) format to store and back up computer data on magnetic tape. The Digital Data Storage (DDS) format evolved from Digital Audio Tape (DAT) technology.
	MOD in 1990	The Magneto-Optical disc emerged onto the information technology field in 1990. This optical disc format used a combination of optical and magnetic technologies to store and retrieve digital data. A special magneto-optical drive is necessary to retrieve the data stored on these 3.5 to 5.25-inch discs.
	MiniDisc in 1992	The MiniDisk stored any kind of digital data; however, it was predominately used for audio. Sony introduced MiniDisk technology in 1991. In 1992, Philip's introduced the Digital Compact Cassette System (DCC). MiniDisk was intended to replace the audio cassette tape before it eventually phased out in 1996.
	DLT in 1993	The Digital Equipment Corporation invented the Digital Linear Tape (DLT), an alternative to the magnetic tape technology used for computer storage.
	Compact Flash in 1994	CompactFlash (CF), also known as "flash drives," used flash memory in an enclosed disc to save digital data. CF devices are used in digital cameras and computers to store digital information.
	Zip	The Zip drive became commonly used in 1994 to store digital files. It was a removable disk storage system introduced by Iomega.
	DVD in 1995	DVD became the next generation of digital disc storage. DVD, a bigger and faster alternative to the compact disc, serves to store multimedia data.
	SmartMedia	Toshiba launched the SmartMedia, a flash memory card, in the summer of 1995 to compete with MiniCard and SanDisk.

## Information and Society

1990s	Phasewriter Dual	The Phasewriter Dual (PD) was the first device that used phase-change technology to store digital data. Panasonic introduced the Phasewriter Dual device in 1995. It was replaced by the CD-ROM and DVD.
	CD-RW	The Compact Disc Rewritable disc, a rewritable version of the CD-ROM, allows users to record digital data over previous data.
	Multimedia Card in 1997	The Multimedia Card (MMC) uses a flash memory card standard to house digital data. It was introduced by Siemen's and SanDisk in 1997.
	Microdrive in 1999	A USB Flash Drive uses a NAND-type flash memory to store digital data. A USB Flash Drive plugs into the USP interface on standard computers
2000s	SD Card	The Secure Digital (SD) flash memory format incorporates DRM encryption features that allow for faster file transfers. Standard SD cards measure 32 millimeters by 32 millimeters by 2.1 millimeters. A typical SD card stores digital media for a portable device.
	Blu Ray in 2003	Blu-Ray is the next generation of optical disc format used to store high definition video (HD) and high density storage. Blu-Ray received its name for the blue laser that allows it to store more data than a standard DVD. Its competitor is HD-DVD.
	xD-Picture Card	Olympus and Fujifilm introduced the xD-Picture Card in 2002, which are exclusively used for Olympus and Fujifilm digital cameras.
	WMV-HD in 2004	The Windows Media High Definition Video (WMV-HD) references high definition videos encoded with Microsoft Media Video nine codecs. WMV-D is compatible for computer systems running Windows Vista, Microsoft Windows XP. In addition, WMV-D is compatible with Xbox-360 and Sony's PlayStation 3.
	HD-DVD	High-Density Digital Versatile Disc (HD-DVD), a digital optical media format, uses the same disc size as Blu-Ray. It is promoted by Toshiba, NEC, and Sanyo.
	Holographic	The future of computer memory resides in holographic technology. Holographic memory can store digital data at high density inside crystals and photo-polymers. The advantage of holographic memory lies in its ability to store a volume of recording media, instead of just on the surface of discs. In addition, it enables a 3D aspect that allows a phenomenon known as Bragg volume to occur.
Today	Cloud Backup or Storage Solutions	Similar to how data is stored on the Internet, cloud storage allows data to be stored on multiple servers, which are generally hosted by third parties.



## Activity Summary

In this activity, the evolution of information storage devices with respect to society has been discussed. It has been recognized that the widespread dissemination of the Internet as well as companies cloud computing demand have been the driving factors for the exponential growth of information storage devices capacity. Since their invention hard disks have been able to remain the dominant type of information storage device because they have maintained their advantage over the other types through gradual improvements in their information holding capacity for longer period of time.

### Assessment- Reflective Activities on Storage Devices and Society

1. Discuss the principal factor that has driven the fast evolution of storage technologies in the history of society.
2. What are the characteristics of holographic data storage techniques?
3. Compare magnetic disks with magnetic tapes?
4. What are the differences between primary and secondary storage devices?

## Answers

1. The widespread use of the internet led to the continuous evolvement of storage devices that brought improvements in areal density, physical volume, capacity, etc of storage devices mainly hard disks.
2. Store a volume of recording media, instead of just on the surface of discs, , it enables a 3d aspect that allows a phenomenon known as bragg volume to occur
3. Magnetic disks better access time, capacity and support for random access where as magnetic tapes lack all those.
4. Primary storage devices- better access time but volatile and low capacity, secondary storage devices- slow access time, non-volatile and high capacity

## **Learning Activity 1.2- Information Retrieval Systems and Society**

### Introduction

Though in the contemporary world people have the luxury of using several modern information retrieval aiding techniques and tools, the notion of information retrieval is not a whole new thing, regardless of the era it encapsulates the same activity of obtaining information resources relevant to an information need from a pool or collection of information resources. The meaning of the term can be very broad from just getting a credit card out of your wallet so that you can type in the personal identification number (PIN) in order to authenticate (verify that you are who you claimed to be) to finding material (usually documents) of an unstructured nature (usually text). In general retrieving information requires two principal inputs, the user's request (which is also known as query) and stored information which tends to be too voluminous to be examined in its entirety, and one subsequent output, the information provided (which is also known as query response).

In the section below some of the information retrieval mechanisms which have been used in the history of mankind have been presented.

## **Information Retrieval Techniques or Mechanisms**

### 2.1 Papyrus Scroll

The Papyrus scroll used by the ancient Greeks and Romans in many respects was not the most efficient way of storing information in a written form as well as retrieving it. Though organizing information particularly storing and retrieving at the time was way difficult compared to what it is in the contemporary world, Greek and Roman scholars continued to write large works that were compilations of data of various sorts, that drove them to devise various means of organizing the material to make locating certain passages easier for the reader. Thus, the Papyrus scroll mechanism, due to its inability to serve the demands of the then scholars gave way to other better information retrieval mechanisms described below.

### 2.2 Table of Contents

Table of contents was the next systematic approach people use to retrieve information from books or any other forms of resources. It was used by Pliny the Elder (die 79 A.D.) to make the 37 books he authored a bit more user friendly for readers in terms of locating a particular subject of interest. In his preface he suggested that the use of table of contents to make book contents more searchable was first practiced in Latin literature [6].

### 2.3 Alphabetization

Another method of information organization which today we commonly use, namely alphabetization was assumed to be first used by Greek scholars of the third century B.C at the library of Alexandria in Egypt. It was the first effective use of alphabetical order as a cataloging device among scholars for organizing the growing number of the then Greek literary works[7].

### 2.4 Hierarchies

This way of organizing information is based on arranging information resources under headings in order to make the writing more user friendly and easier to locate. It is pretty much similar to how modern word processing documents enables a user organize the contents of a writings in to headings and subheadings. For instance early days scholars use this technique to organize their writings into several books, and each book was subdivided into chapters, and each chapter with its own heading, and all entries within each chapter contain related stories. The then style of information organization enhanced significantly users ability of searching contents in a given pool of information resources.

### 2.5 Indexing

The use of indexes goes way back beyond the 17th century. Most early indexes were arranged only by the first letter of the first word, the rest being left in no particular order at all. Gradually, alphabetization advanced to an arrangement by the first syllable, that is, the first two or three letters, the rest of an entry still being left unordered. Only very few indexes compiled in the 16th and early 17th centuries had fully alphabetized entries, but by the 18th century full alphabetization became the rule (Wellisch, Indexing from A to Z, page 136).

In the contemporary world, indexes according to the National Information Standards Organization(NISO) Technical Report (NISO-TR02-1997, page 8) is defined as a systematic guide designed to indicate topics or features of documents in order to facilitate retrieval of documents or parts of documents. They are composed of five major components:

- Terms representing the topics or features of documentary units(document segments or parts);
  - A syntax for combining terms into headings or search statements in order to represent compound or complex topics, features, and/or queries;
  - Cross references or other linking devices among synonyms, equivalent, broader, narrower, and other related terms;
  - A procedure for linking headings or search statements with particular documentary units or document surrogates; and
  - A systematic ordering of headings or a search procedure.
- Indexing according to niso technical report (niso-tr02-197, page 8) is also defined as the operation of creating an index for information retrieval. It involves:

- The selection and assignment of terms to, or other extraction of terms from, a documentary unit in order to indicate topics, features, or possible uses of the unit;
- The combining of terms into headings or the tagging of terms for subsequent combination;
- The linking of synonyms, equivalent, broader, narrower, and other related terms or headings;
- The linking of terms or headings to documentary units or surrogates; and
- The arrangement of headings in a systematic order.

### 3. Activity Summary

Though in the contemporary world people have the luxury of using several modern information retrieval aiding techniques and tools, the notion of information retrieval is not a whole new thing, regardless of the era it encapsulates the same activity of obtaining information resources relevant to an information need from a pool or collection of information resources.

#### **Assessment- Reflective Activities on Information Retrieval Systems and Society:**

1. Do the information retrieval techniques discussed in this section used by search engines? Explain how search engine works.
2. Can we use existing retrieval techniques used for retrieving text data usable for retrieving multimedia data ? Why?
3. What does indexing mean in the content of search engines?

#### **Answers**

1. Search engine use different techniques for document retrieval such as stemming, case folding
2. No, multimedia data particularly video, audio and text use different retrieval technique
3. Collecting, parsing and storing documents to facilitate fast and accurate retrieval to documents

## **Learning Activity 1.3 : Information Communication Systems and Society**

### Introduction

There are various ways in which messages may be transmitted or conveyed, they include written language, spoken language, graphic symbols, and representational images. The media of communication include books or written materials, films, TV, and the Internet. The growing importance of information communication systems in the development of society has never been more apparent than it has become in the last couple of decades. Over the years, communication systems, particularly digital media, have become enormously important and gained an important position in society development. Its effect has been felt in every aspect of our lives in that every day, we come in contact with and use a variety of modern communication systems and communication media. In the sections that follow, a brief historical review of major developments with respect to information communication systems is presented.

## **Information and Communication Systems Evolutions**

### 4.1 Telegraphy and Telephony

The first milestone that laid down the foundation for modern day fixed line communication systems is the invention of electric battery by Alessandro Volta in 1799[9]. It was one of the earliest inventions of major significance to communications. This invention led Samuel Morse to develop the electric telegraph, which he demonstrated in 1837. Telephony came into being with the invention of the telephone in the 1870s. Alexander Graham Bell patented his invention of the telephone in 1876, and in 1877 established the Bell Telephone Company. Early versions of telephone communication systems were relatively simple and provided service over several hundred miles. Significant advances in the quality and range of service during the first two decades of the twentieth century resulted from the invention of the carbon microphone and the induction coil.

### 4.2 Wireless Communications

The second milestone in the development of communication systems was achieved during 1894. In 1894, a sensitive device that could detect radio signals, called the coherer, was used by its inventor Oliver Lodge to demonstrate wireless communication over a distance of 150 yards at Oxford, England. Guglielmo Marconi is credited with the development of wireless telegraphy. Marconi demonstrated the transmission of radio signals at a distance of approximately 2 kilometers in 1895. Two years later, in 1897, he patented a radio telegraph system and established the Wireless Telegraph and Signal Company. On December 12, 1901, Marconi received a radio signal at Signal Hill in Newfoundland, which was transmitted from Cornwall, England, a distance of about 1700 miles[11].

The invention of the vacuum tube was especially instrumental in the development of radio communication systems. Amplitude modulation (AM) broadcast was initiated in 1920. From then, AM radio broadcasting grew rapidly around the world. The superheterodyne AM radio receiver, as we know it today, was invented by Edwin Armstrong during World War I. Another significant development in radio communications was the invention of Frequency modulation (FM), also by Armstrong. In 1933, Armstrong built and demonstrated the first FM communication system. However, the use of FM was slow to develop compared with AM broadcast. It was not until the end of World War II that FM broadcast gained in popularity and developed commercially.

The first television system was built in the United States by V. K. Zworykin and demonstrated in 1929. Commercial television broadcasting began in London in 1936 by the British Broadcasting Corporation (BBC). Five years later the Federal Communications Commission (FCC) authorized television broadcasting in the United States[11].

### 4.3. Breakthroughs in Digital Communications

With the rise of the Internet arguably the most important tool in the history of humankind, the 1990s saw tremendous advances in new digital transmission techniques. These include the emergence and widespread use of digital subscriber line(DSL) technology, which increases the maximum possible data rate over low bandwidth copper cables, MPEG standards for efficient video compression, and time division multiple access (TDMA) and code division multiple access (CDMA) in mobile cellular communication systems. With the recent launch of fourth generation mobile cellular systems which supports voice and data transmissions, communication systems exciting advances and evolutions are set to continue without limits.

The Internet is the decisive technology of the information age, it has revolutionized the computer and communications world like nothing before. With the ongoing explosion and pervasiveness of wireless communications it could be said that in the not distant future the potential for humankind being entirely connected is high. The invention of the telegraph, telephone, radio, and computer set the stage for the current unprecedented integration of communication capabilities. The Internet is increasingly becoming at once a world-wide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location[10]. It is continually evolving to become the springboard of many different kinds of communication with social networking sites most notably Facebook and Twitter enabling people every day, in their work as well as leisure time come in contact with other people and build social networks or social relations.

The Internet has become the major channel for communication for people around the world. The primary advantages of using the Internet as a communication tool are the flexibility and ease it provides. Through email, the Internet has replaced to a large degree postal services because of the speed and convenience by which communication is made possible and which many prefer. In general the Internet has transformed the traditional verbal and hardcopy based communications to online communication.

It provides tools such as e-mail, instant messaging, skype, discussion forums, hangouts and others that enable people to keep in touch as well as share information in real time.

### Activity Summary

Though in the contemporary world people have the luxury of using several modern information retrieval aiding techniques and tools, the notion of information retrieval is not a whole new thing, regardless of the era it encapsulates the same activity of obtaining information resources relevant to an information need from a pool or collection of information resources.

#### Assessment - Reflective Activities on Information

##### Communication Systems and Society:

1. What is the difference between analog and digital communication systems?
2. How has the Internet changed the communication landscape?
3. Discuss the characteristics of contemporary communication mediums such as the Internet.

### Answers

1. Analog communications systems are designed to carry sound or audio, whereas digital communication systems are designed to carry both audio, video, image and text data
2. He internet is increasingly becoming at once a world-wide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location.
3. The internet provides pervasive communication (communication at anytime, anywhere using any devices)

### Unit Summary

In this unit, the major milestones that characterize the evolution of storage devices, information retrieval techniques and communication systems have been discussed. With the widespread dissemination of the Internet and cloud computing, demand for information storage devices has been exponentially increasing. The magnetic hard disk drive (HDD) plays an important role in every information system; in fact its role is constantly growing as a result of improvements in capacity, performance and price.

Since their invention hard disks have been able to remain the dominant type of information storage device because they have maintained their advantage over the other types through gradual improvements in their information holding capacity as well as speed of data access for more than 40 years.

The Internet, which is seen as the decisive technology of the Information Age; and the driver of many other technology innovations or tools of the modern time including social media has made the creation, processing and dissemination of information a lot easier.

Huge volume of data such as text, audio, video, image and other forms of documents are produced in the Internet in every moment. Users need to be able find relevant information from information repositories to satisfy their particular information needs for that effective information retrieval techniques are required.

The Internet besides its increasing role as the gateway of information resources, communication has become the most popular use of the Internet. The Internet enables people to communicate with each other in faster, more efficient and economical ways. It has transformed the contemporary society from verbal and hardcopy based communications to online communication. The Internet tools such as e-mail, ,instant messaging, skype, discussion forums, hangouts and others enable people to keep in touch as well as share information in real time.

### **Summative Assessment Activities**

1. Prepare a comparative analysis of how storage devices have evolved over the last three decades with respect to capacity and access speed?
2. Prepare a comparative analysis of information retrieval techniques discussed in this unit with respect to performance or speed of retrieving information and ease of use?
3. What is information overload?
4. What is information repository?
5. Mention the two critical developments that lead to unprecedented storage devices growth
6. In this unit, only some of the positive aspects of the Internet are presented what are the negative aspects of using the Internet if any?
7. What for information retrieval techniques are needed?



## Answers

1. Magnetic tape, magnetic disk, cd-rom speed and performance have improved over the years however the access speed of secondary storage devices such as hard disk and cd-rom is in the range of milliseconds and tertiary devices such as tape has a lower speed than secondary storage devices.
2. There have been significant improvements in secondary storage devices over the years initially secondary storage devices was in the range of kb , at present storage devices of tb(terabyte) have become a common reality.
3. The high degree of availability of information from diverse sources in multiple formats which creates confusion to users in their decision making
4. The place where information is stored or archived for latter use
5. The advancement of the electronic industry particularly in producing highly integrated circuits and the development of the internet
6. It makes accessible negative contents equally
7. To make documents/resources easily searchable

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# Unit 2: The Role of Libraries- Knowledge Management in the Digital Age.

In this unit, you, the learner, will be introduced to the role of libraries, archives, records management operations in storing and providing access to information in the digital age, the major phases in the developmental stages or cycles of knowledge management, and the implementation phases or steps of knowledge management.

## Unit Goals

Upon completion of this unit you should be able to:

1. Describe the evolving roles of libraries in the digital age;
2. Describe the key communication technologies that can be used to support knowledge sharing within an organization;
3. Evaluate knowledge management tools;
4. Explain the constituents of knowledge management in the digital age;
5. Identify the steps necessary for implementing knowledge management systems; and
6. Distinguish knowledge management life cycle.

### Key Terms

**Digital Library:** a library that offers access to digital resources such as eBooks, eJournals, etc.

**XML:** which stands for Extended Markup Language is a tool used to tag information or data in order to better organize and classify content for easier future retrieval and use.

**Intranets:** enterprise or company wide networks

## **Learning Activity 2.1 The Role of Libraries in Contemporary Society.**

### Introduction

In the ancient times there was no separation between a record room or archive and a library, and it can be said that libraries existed almost as long as records have been kept. In other words, the collection of written knowledge in some sort of repository is a practice as old as civilization itself. To mention the evolution that libraries of the contemporary world have undergone and the era where the collection of written knowledge first surfaced, a temple in the Babylonian town of Nippur, dating from the first half of the 3rd millennium BC, was found to have a number of rooms filled with clay tablets, suggesting a well-stocked archive or library. Similar collections of Assyrian clay tablets of the 2nd millennium BC were found at Tell el-Amarna in Egypt. Afterwards the evolution of libraries reached several milestones and the major ones were the establishment of the Great Library of Alexandria, the public library in Rome established by Asinius Pollio, theological libraries established by monastic communities and the establishment of the Laurentian library in the renaissance of learning era. The Golden age in the history of libraries was the time between 1600s and 1700s, which is considered as the forerunner of modern day's libraries [1,2]. They continued to grow as universities developed and as national, state-supported collections began to appear where many of these latter became national libraries. Then comes the era where libraries gone to digital.

### Overview of Evolutions of Digital Libraries

Spurred by technological developments, libraries are in the midst of evolution[4]. They are in the process of redesigning services and information products to add value to their services and to satisfy the changing information needs of the user community. Since the advent of the Internet there have been fundamental changes to the libraries' working environment and acquisition of information resources. They can acquire and secure ownership of digital content or object and make them accessible to their users' community instantaneously with relative ease. They are in the process of shifting their traditional operational model to go digital and, as a result it is now common place to prepend the word digital to libraries. These latest developments have elevated their status making them increasingly important for more sophisticated learning and education.

Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities [3]. Though the resources that digital libraries require serve functions similar to those within conventional libraries, they are, in many ways, different in their model of operation. For example, for storage and retrieval, digital libraries are dependent almost exclusively on computer and electronic-network systems, and systems-engineering skills, rather than the skills of librarians.

### Libraries in The Digital Age

We are in the digital age where digital information is changing the role of libraries radically with the Internet having a monumental impact on how people find and access information. The primary means of sharing information in the digital age is the digital network.

With unprecedented advances taking place in the technology sphere, information in various formats such as text, audio, video and image can be created, stored, organized, accessed and transmitted with relative ease, in ways we could not have imagined before[5]. The rising popularity of e-books is helping transform the reading habits of many. In this changing landscape, libraries are trying to adjust their services to these new realities while still serving those who rely on more traditional resources .

The changes that the digital age has brought on library services delivery include:

- Decoupling library services from physical location,
- Making more information resources available or accessible,
- Making information available in raw forms- indexing and abstracting services have moved from providing searchable index terms to searchable abstracts even full texts or books,
- Diminishing roles for intermediaries- less reliance on library staff with users able to check circulation information without even contacting the circulation unit), to name but a few.

Library services are under continuous evolution, efforts are also ongoing to enable libraries offer personalized services to their users thereby making finding and using library resources easier than ever.

### **Activity Summary:**

Spurred by technological developments, libraries are in the midst of evolution. They are in the process of redesigning services and information products to add value to their services and to satisfy the changing information needs of the user community. We are in the digital age where digital information is changing the role of libraries radically with the Internet having a monumental impact on how people find and access information with the digital network being the primary means of sharing information.

## **Assessment- Reflective Activities on The Evolving Role of Digital Libraries in Contemporary Society**

1. How ICT enables library services decoupled from physical location?
2. What do personalized library services mean?
3. How ICT(including mobile devices) enable the realization of personalized services?

### **Answers**

1. Library users can gain access to library resources available in digital formats anywhere as far as network or internet connectivity is available.
2. A service suited to the convenience of the library user
3. They add pervasiveness or accessibility of library to its users with distance no longer be a barrier

## **Learning Activity 2.2: Characteristics of Digital Libraries and Knowledge Management**

### Characteristics of Digital Libraries

Digital libraries promise new societal benefits; they are libraries without wall- they enable ubiquitous anytime and anywhere access to information. E-learning in the digital as well as mobile ages has eliminated the space and time constraints of traditional library settings. In many ways the digital age has transformed library services to a new level in that digital libraries bring the library to the user[6].

The traditional role of libraries has always been as an intermediary between the information producer(and publisher) and the user(information consumer). For information producers, libraries acted as a clearinghouse of products. Information producers would normally provide the library with their products that enable them reduce administrative problems and costs stemming with providing the products directly to users. Thus in a nutshell, libraries role can be categorized into four items, selection, storage, services and support. Selection involves choosing and acquiring information resources available in the market place; storage involves maintaining the availability of publications though short-term as well as long-term; services involve making information resources available through facilities and procedures for onsite use, circulation, and loan from other libraries; and support involves providing guidance and assistance to users, including the development of support systems such as catalogues user education and information services.

However, in the digital age there have been significant departures in the roles of modern day libraries, from being the clearinghouse of products and a service center for printed publications to an intermediary for access to networked digital library services. The following are items that characterize digital libraries:

Digital libraries(Sun and Yuan, 2012):

- Must serve a clearly identified community or set of communities;
- Encompass both electronic and paper materials;
- Include digital materials that exists outside the physical and administrative bounds of any one digital library;
- Provide fast and efficient access to vast amount of digital and non-digital resources; and
- Are ubiquitous- digital resources can be accessed anytime and anywhere using desktop or other forms of handheld devices.

### Knowledge Management in the Digital Age

Knowledge management is a broader term and its origin dates back to two decades ago. The concept and name “Knowledge Management” was started and popularized in the business world during of the 20th century. It was the business world that first recognizes the importance of knowledge in the “global economy” of the “knowledge age”. The applications of knowledge management have now spread to other organizations including government agencies, research and development departments, universities and others. Knowledge management is defined as the process of capturing, distributing, and effectively using knowledge (Davenport 1994). Simply put, it can be defined as the sharing of knowledge to get the most out of knowledge resources.

In the digital age, knowledge is increasingly being recognized as the principal ingredient to enhance organization’s competitive advantage. The most established example is that knowledge is power. In the past the business world has to hide knowledge away, keep it to itself or the entity to maintain an advantage over competitors or business rivals. In the digital age however knowledge is considered as power more than ever but the understanding has changed enormously. In the modern time knowledge is no longer seen as a commodity that people want to hide it away rather people want to share it in order for it to grow. In the digital age it has been glaringly obvious that the organization that shares knowledge among its management and staff grows stronger and becomes more competitive(Filemon 2008).

What does Knowledge Management(KM) constitute?

- It is the process of making data as well as information resources available to the organization’s staff through portals and with the use of content management systems
- the development of lessons learned database in order to capture knowledge embedded in persons and making it sharable or explicit to a wider community.

The lessons learned databases are essentially efforts to capture and to make accessible knowledge that has been operationally obtained and typically would not have been captured in any other way.

- to be able identify and locate persons with an organization who have expertise in a particular area.
- The development of communities of practice- linking communities electronically – enabling people working remotely using the Internet or other technological tools to be able to replicate the natural knowledge sharing that occurs in social spaces.

### Activity Summary

Digital libraries promise new societal benefits; they are libraries without wall- they enable ubiquitous anytime and anywhere access to information. E-learning in the digital as well as mobile ages has eliminated the space and time constraints of traditional library settings. In many ways the digital age has transformed library services to a new level in that digital libraries bring the library to the user. However, it is important to recognize that there has been a misconception about digital libraries in that some people assume that a digital library is a repository of digital materials which is not the case. A digital library needs to encompass both electronic and paper materials.

#### **Assessment: Characteristics of Digital Libraries and Knowledge Management**

In the digital age there is a widely held perception that knowledge is power, what does it mean?

1. Why knowledge management?
2. Discuss the role of modern libraries, and how their roles have evolved over the years because of their main activities going to digital.
3. Why do we still need community or public libraries in the digital age?

### Answers

1. Knowledge empowers people and gives a competitive advantage over others who do not have.
2. Knowledge management is critical for knowledge sharing
3. Modern library has become an intermediary access to networked digital library services
4. Accessibility of anywhere and anytime library services is yet to become a common occurrence.



## Learning Activity 2.3 Implementation of Knowledge Management Systems and the Life Cycle of Knowledge Management.

### Implementation of Knowledge Management Systems

Recent advances in information technology, combined with widely available access to high-speed networks, provide organizations with unparalleled opportunities to formalize the collection, protection and use of knowledge. To accomplish this, new software systems and processes have been developed to integrate with existing information systems and spread throughout the enterprise. These evolving approaches or trends, which are collectively referred to as “Knowledge Management” involve seven steps to implement. They are enumerated as below[7]:

- Identify the Business Problem
- Prepare for Change
- Create the Team
- Perform the Knowledge Audit and Analysis
- Define the Key Features of the Solution
- Implement the Building Blocks of Knowledge Management

**Step 1:** Identifying the Business Problem: successful implementation of knowledge management requires a clear identification of the business problem to be solved and an alignment of the knowledge management project with overall business objectives.

**Step 2:** Preparing for Change: knowledge management is more than just an application of technology. It involves cultural changes in the way employees perceive the knowledge they develop. A successful implementation of knowledge management also requires endorsement from corporate management.

**Step 3:** Creating the Team: a well staffed team with a strong team leader and “cross departmental” expertise is essential for successful implementation of knowledge management.

**Step 4:** Performing the Knowledge Audit: The knowledge audit identifies sources of knowledge required to solve the business problem. It begins to organize knowledge by developing categories that reflect how your organization operates.

**Step 5:** Defining Key Features: Creating a checklist of required key features will ensure that knowledge management technologies you acquire will help solve your key business problems while enhancing your overall IT infrastructure.

**Step 6:** Building Blocks for Knowledge Management: Implement knowledge management systems using a phased approach. Each phase of the implementation addresses a specific part of the knowledge management solution, lays the foundation for the next phase, provides immediate benefits and provides a measurable return on investment(ROI).

**Step 7:** Linking Knowledge to People: finding “who knows what” in an organization has always been a time-consuming process and a knowledge directory is required to smooth out. A knowledge directory enables employees to locate subject-matter experts in order to share tacit knowledge—their experiences, “know how” and insights.

### **Knowledge Management Life Cycle:**

The knowledge management life cycle is composed of five phases- they are knowledge creation, knowledge sharing, knowledge structuring, knowledge utilization and knowledge auditing[8].

#### **I. First Phase- Knowledge Creation:**

Knowledge creation involves the formation of new ideas through interactions between explicit and tacit knowledge in individual human minds. Tacit knowledge refers to the type of knowledge which people carry in their mind, and is difficult to access whereas explicit knowledge refers to knowledge that can be articulated or codified and stored in certain storage media.

#### **II. Second Phase- Knowledge Sharing:**

Knowledge sharing is an activity through which knowledge in the form of either information, skills, or expertise exchanged among people, friends, families, communities or organizations via social or technical communication infrastructure.

#### **III. Third Phase- Knowledge Structuring:**

Knowledge structuring involves three principal activities such as information mapping, information storing and information retrieval.

Information Mapping (categorizing the knowledge asset): information mapping is a process through which organizations can identify and categorize knowledge assets within their organization.

Information Storing: it consists of knowledge repositories such as databases, data warehouses, and information centers which constitute the electronic memory of an organization memory.

Information Retrieving: knowledge is stored and retrieved via information retrieval systems.

#### **IV. Fourth Phase- Knowledge Utilization:**

Organizations use knowledge for three main reasons:

- In order to determine the organization’s work processes and making strategies for sustainable competitive advantage;
- In order to design and market products; and
- In order to improve the organization’s services quality.

## **V. Fifth Phase- Knowledge Auditing:**

This phase involves activities such as gauging the amount or extent of knowledge used in enhancing the organization's products, services and processes.

The figure below, figure 2.1, depicts the knowledge management life cycle.

## **The Stages of Development of Knowledge Management**

The development of knowledge management can be summarized into the following historical stages[9,10].

### First stage: Information Technology (1992)

The initial stage of knowledge management was driven by information technology tools more specifically by the Internet and intranets(enterprise wide networks) where the tools were used for knowledge sharing and coordination across the enterprise. The concept of intellectual capital provided the justification and the framework, and the availability of the Internet provided the tool. In a nutshell, the first stage of knowledge management was about how to deploy or use technology tools to accomplish more effective use of information and knowledge.

### Second stage: Human and Corporate Culture(1995-2002)

The second stage of knowledge management emerged when it became apparent that simply deploying new technology was not sufficient to effectively enable information and knowledge sharing. Lessons learnt from the first stage was that human and cultural dimensions needed to be addressed. There was an added focus on human and cultural factors as essential in getting humans to implement knowledge management. One of the fundamental prerequisites of a culture that fosters rather than hinders knowledge management is the notion of trust. When organizational members feel that they are respected, that they can expect to be treated in a professional manner, and that they can trust the other members of their group, then knowledge sharing is greatly enhanced.

### Third Stage: Taxonomy and Content Management(2002 to the present time)

The third stage emerged from the awareness of the importance of content, it is all about finding relevant content, and also taxonomy development and content management to facilitate this goal. The key driver for the third stage are the awareness of the importance of the retrievability of content, and therefore of the importance of the arrangement, description, and structure of that content.

## Knowledge Capture and Creation Tools

### Content Creation Tools

Content management is a process and/or software application used by groups to plan, create, manage, store and distribute content. Contents to be created and managed can include web pages, images, videos or streaming media, news release, etc. Content management systems usually consist of a front-end editor(word processor or any other content creation tools) for creating as well as editing the content and a backend system for storing the content(usually a database).

Content authoring tools, the most commonly used content creation tools, range from the most general such as word processor to the more specialized such as web page design software. Annotation technologies enable short comments to be attached to specific sections of a text document, often by a number of different authors (e.g., by making use of the track changes feature in Word). This allows a “running commentary” to be built up and preserved. Annotations may be public (visible to all who access and read the document) or private (visible to the author only). Software tools that can be used to author or create content include: Microsoft Word, Microsoft PowerPoint, HTML(Hyper Text Markup Language, XML(Extensible Markup Language), Flash, etc.

### Content Management Tools

Content management refers to the management of valuable content throughout the useful lifespan of the content. Content lifespan will typically begin with content creation, then multiple changes and updates, merging, summarization, and other repackaging follow, and will typically end with archiving. Metadata (information about the content) is used to better manage content throughout its useful lifespan. Metadata includes such information as source/author, keywords to describe content, date created, date changed, quality, best purposes, etc. It is also useful to include attributes such as storage

medium, location, and whether or not it exists in a number of alternative forms (e.g., different languages). XML is increasingly being used to tag knowledge content, and taxonomies serve to better organize and classify content for easier future retrieval and use. Taxonomies are hierarchical information trees for classifying information, analogous to the library subject catalog. Software tools that can be used to manage content include: WordPress, Drupal, Joomla, etc.

## Activity Summary

Recent advances in information technology, combined with widely available access to high-speed networks, provide organizations with unparalleled opportunities to formalize the collection, protection and use of knowledge. To accomplish this, software systems are used to integrate both tacit and explicit knowledge with existing information systems and spread throughout the enterprise. In this activity, besides issues that surround the implementation of knowledge you also been introduced to the knowledge management life cycle which involves five phases- are knowledge creation, knowledge sharing, knowledge structuring, knowledge utilization and knowledge auditing.

### **Assessment: Implementation of Knowledge Management Systems**

1. Discuss an organization who want to implement a knowledge management system needs to do?
2. How do you implement a knowledge management system for an organization?
3. Compare and contrast tacit versus explicit knowledge.
4. Discuss the role of social medias in knowledge management.

## Answers

1. Conduct the following steps:
  - A. Identify the Business Problem
  - B. Prepare for Change
  - C. Create the Team
  - D. Perform the Knowledge Audit and Analysis
  - E. Define the Key Features of the Solution
  - F. Implement the Building Blocks of Knowledge Management
  - G. Link Knowledge to People
2. First conduct the steps outline above, and use content creation as well as content management tools
3. Tacit knowledge is about knowledge people carry in their minds whereas explicit knowledge is about knowledge available in many forms.
4. Social medias such as twitter and facebook enable the sharing or dissemination of explicit knowledge a lot easier.

## Unit Summary

In this unit, several issues that surround the role of digital libraries or archives and knowledge management have been discussed. Digital libraries are heavily dependent on technologies; they are highly diversified in their product as well as the services they offer.

Knowledge management is a complex undertaking that involves people and cultural issues,

### Summative Assessment Activities

Read more about

- The wiig knowledge management model, and
  - Content creation and management tools.
1. Why people use libraries in the digital age?
  2. What is metadata, what for they are used?
  3. Many of the expected benefits of knowledge management stem from being able to deliver the “right information to the right person at the right time in the right format.” What are the implications of this statement for issues of privacy of information?
  4. List three content management tools
  5. Given an example of annotation tool that can be used during content creation

### Answers

1. There are materials which are still available in paper and even for materials available in digital form people need libraries all be it with a different role such as being an intermediary for resource repositories compared to what it was before in the non-digital age.
2. Metadata is defined as a data about data, an auxiliary data used to describe objects in order to make them more searchable.
3. It gives due emphasis for privacy concerns by not allowing unauthorized person to have access to information
4. Wordpress, drupal, joomla
5. Xml

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# Unit 3: The Digital and Knowledge Economy

In this unit, you, the learner, will be introduced to the transformative power of information technologies in societies economic progression thereby understanding the socioeconomic implications of advances in information and communication technologies (ICTs).

## Unit Goals

Upon completion of this unit you should be able to

1. Analyse the impacts of advances in ict on the socioeconomic transformation of society;
2. Describe the key features of the digital and knowledge economy;
3. Explain the key challenges of the digital and knowledge economy;
4. Evaluate options or ways of addressing the challenges of the digital and knowledge economy ;
5. Identify the characteristics and scale of changes in business models that enable enterprises in the digital and knowledge economy to succeed.

### Key Terms

**Piracy:** the act of claiming the intellectual or property right of another person or institution.

**Knowledge economy:** an economy that relies on the creativeness or innovation of the labor force.

**VAT:** stands for Value Added Tax is one of the forms of taxes collected by a government.

**GDP:** which stands for Gross Domestic Product (GDP) is a quantitative measure of a nation's total economic activity

**Digital Divide:** is the term that refers to the gap between people who have access to information and communication technologies and those who have not.



### **Learning Activity 3.1: The Digital Economy and Transformation of Services**

#### The Digital Economy

Digital technologies are transforming business, government and society underpinning a growing digital economy that will shape the way we live and work. The digital economy which is also called the Internet economy, the new economy, or the Web economy is an economy based on digital technologies, which encompasses:

- communication networks (the Internet, intranets, and extranets),
- computers,
- software,
- and other related technologies.

Digital infrastructures provide a global platform over which people and organizations interact, communicate, collaborate, and search for information. They have enabled a drastic decrease in reproduction costs and distribution costs thereby leading to important structural changes in the economy and potentially a global rise of social welfare as a consequence of the increase in quantity, quality and variety of goods and services available in the economy. While originally restricted to a few types of good (software, mostly), the scope of use of digital technologies have progressively increased to encompass many kinds of goods such as music, films, photos, books, etc. Digital technologies have not only permitted the creation of many new goods or services, but have also dramatically changed the way an entire category of goods in the economy are created, produced, distributed, exchanged and consumed. The scale of Internet usage also gives an indication of the scale at which digitally enabled services are being offered globally. They include not just IT-related services but also financial, insurance and other business services, plus many personal, cultural and recreational services, royalties and licensing fees.

#### Digitally-Enabled Transformation of Services

Services that are principally or largely enabled by information and communication technologies are rising. These services include (UNCTAD, 2007):

- Communications services;
- Insurance;
- Financial services;
- Computer and information services;
- Royalties and license fees;
- Other business services;

Driven by developments in ICT tools fundamental transformation of services is underway. The traditional view of considering some services immune to significant technological productivity increases are no longer in existent, and in the digital age:

- ICT tools are widely recognized as a source of productivity growth and dynamism in the economy that is changing the structure of employment, the division of labor, and the character of work and its location.
- The transformations that ICT tools are enabling are dramatic, pervasive as well as far reaching.
- Advancements in digital communications, software and other aspects of information technologies apparently are stimulating or fueling economic growth globally.

However, in order to succeed in the digital economy, complete change of business models and strategies are imperative with the Internet and the World Wide Web being the two principal catalysts in helping organizations to maintain competitive advantage.

As technology has advanced and costs of ICT have continued to fall, ICT has proven to be general-purpose technology that has become embedded in and central to the business models of firms operating across the economy. Businesses across all sectors are now able to design and build their operating models around technological capabilities, in order to improve flexibility and efficiency and extend their reach into global markets. Businesses across all sectors have changed the way their business is conducted by taking advantage of advances in communications and data processing capacity to lower transaction costs and extend their reach into global markets(OCED, 2014).

### **Activity Summary:**

Digital technologies are transforming business, government and society underpinning a growing digital economy that will shape the way we live and work. In this activity you have been introduced to the evolving transformative power of ICT on countries or societies economic activities.

#### **Assessment: Reflective Activities**

1. Discuss the way how ICT more specifically the Internet has transformed government services of countries (you can assess existing citizens to government interactions or business to government interactions or business to business interactions)
2. Discuss the cost and benefits of introducing digitally-enabled government services.
3. What are the challenges of making government services online aside from cost factors.

### Answers

1. Ict more specifically the internet is transforming government services by enhancing citizens interaction with governments as well as citizens participation in decision making.
2. Governments will have only initial costs mainly the cost of in placing a telecommunication infrastructure which will be amortized over the years and in the course of using the infrastructure, the benefits are many like government services being responsive, and high level of efficiency and effectiveness in services, etc
3. Security awareness of service users, digital literacy level of people, etc

### Learning Activity 3.2: Issues and the Key Challenges of Digital Economy

#### The Key Challenges of Digital Economy

The spread of the digital economy brings about many benefits, for example in terms of growth, employment and well-being more generally. At the same time it gives rise to a number of challenges for policy makers. These challenges extend well beyond domestic and international tax policy and touch upon areas such as piracy, international privacy law and data protection, as well as accounting and regulation. In this section only the two of the digital economy challenges such as piracy and taxation are discussed and learners however are expected to read further in order to be able solidify their understanding of the whole spectrum of the challenge.

#### Piracy

Understanding the challenges of the digital economy amounts on understanding the economic nature and characteristics of digital goods. Digital goods because of their replicability (they can be reproduced with little or no quality degradation or information loss) in some way can be considered as public goods. This has resulted in side effects such as consumer piracy. Consumer piracy is a serious concern in that it has the potential to undermine firms ability to recover initial investments.

Although piracy in the form of copies of vinyl discs, audio and video tapes, photocopies of books, etc. has existed long before the advent of digital goods, the piracy of the pre-digital age was different and never reached the extent of digital piracy. The reason for this lies in the replicable nature of digital goods. Indeed, pirating a non-digital information good necessarily leads to the creation of a substitute good of lower quality and as a result the piracy in the pre-digital age was restricted. However, the advent of digital technology has allowed piracy to develop to its full potential and the following reasons account for the practice to deepen:

- Any copy of a digital good is indistinguishable from the original,
- Only one original needs to be sold for all consumers to be able to pirate or one original unit is sufficient to start a virtually infinite stream of absolutely identical copies,
- Since additional transfers of a digital good do not lead to any loss of quality, no direct contact between consumers is required for digital piracy to take place

In many cases consumers are expected to be completely indifferent between the original and the copy – due to digital technology abilities to create perfect clones.

### Taxation

Over the years, ICT, as good as they have been in terms of transforming the various services and sectors, they can also be used for potentially harmful practices. Digital technologies have the potential to enable economic actors to operate in ways that avoid, remove, or significantly reduce, their tax liability.

Up until now international taxation rules or system that fits the digital age are yet to emerge. The evolution of business models in general, and the growth of the digital economy in particular, have resulted in non-resident companies operating in a market jurisdiction in a fundamentally different manner today than at the time international tax rules were designed (OCED, 2014). For example, while a non-resident company has always been able to sell into a jurisdiction without a physical presence there, advances in ICT have dramatically expanded the scale at which such activity is possible. In addition, traditionally, for companies to expand opportunities in a market jurisdiction a local physical presence in the form of manufacturing, marketing, and distribution was very often required. These in-country operations would have engaged in potential high-value operations such as procurement, inventory management, local marketing, branding and other activities that earned a local return subject to tax in the market country. Advances in business practices, coupled with advances in ICT and liberalisation of trade policy, have allowed businesses to centrally manage many functions that previously required local presence, rendering the traditional model of doing business in market economies obsolete.

The challenges that digital economy has brought to policy makers in terms of tax fraud or evasion can broadly be described as follows:

- The fact that less physical presence is required in market economies in typical business structures today — an effect that can be amplified in certain types of businesses in the ICT sector — raises challenges for international taxation.
- Other elements of the digital economy have also raised challenges for policy makers- growing reliance in certain new business models on data raises tax challenges in terms of characterization of and attribution of value from data.

- Further, new revenue streams adopted in particular due to the spread of multi-sided business models or the use of massive computing power and broadband connection trigger questions regarding the appropriate characterization of certain transactions and payments for tax purposes.
- Digital technologies make it easier to do business within and across jurisdictions, as well as enabling consumers to access products and services from anywhere in the world, generating challenges in terms of collecting the appropriate amounts of consumption tax.

As identified in (OCED, 2014), the policy challenges raised by the digital economy because of existing international taxation rules being obsolete fall into four broad categories:

**Nexus:** The continual increase in the potential of digital technologies and the reduced need in many cases for extensive physical presence in order to carry out businesses raises questions as to whether the current rules are appropriate.

**Data:** The growth in sophistication of information technologies has permitted companies in the digital economy to gather and use information to an unprecedented degree. This raises the issues of how to attribute value created from the generation of data through digital products and services, and of how to characterize for tax purposes a person or entity's supply of data in a transaction, for example, as a free supply of a good, as a barter transaction, or some other way.

**Characterization:** The development of new digital products or means of delivering services creates uncertainties in relation to the proper characterization of payments made in the context of new business models, particularly in relation to cloud computing.

**VAT Collection:** Cross-border trade in both goods and services creates challenges for VAT systems, particularly where such goods and services are acquired by private consumers from suppliers abroad. This is partly due to the absence of an effective international framework that would allow economic actors, and in particular small and medium enterprises, to register and manage payments to a large number of tax authorities, as well as to the need to manage tax liabilities generated by a high volume of low value transactions, which can create a significant administrative burden but marginal revenues.

### Taxation and Administrative Challenges in the Digital Economy.

Tax administration in the digital economy poses new challenges that never exist before. The borderless nature of digital economy produces specific administrative issues around identification of businesses, determination of the extent of activities, information collection and verification, and identification of customers. There is a pressing need to consider how investment in skills, technologies and data management can help tax administrations keep up with the ways in which technology is transforming business operations.

**Identification:** While global business structures in the digital economy involve traditional identification challenges, these challenges are magnified in the digital economy. For example, the market jurisdiction may not require registration or other identification when overseas businesses sell remotely to customers in the jurisdiction.

This may create issues for tax administrations, who will not easily be able to identify the remote seller to ascertain whether other activities are carried out in the jurisdiction and hence ensure compliance with existing rules.

**Determining the Extent of Activities:** Even if the identity of the local entity can be determined, it may be impossible to ascertain the extent of sales or other activities without information from the offshore seller, as there may be no sales or other accounting records held in the local jurisdiction or otherwise accessible by the local revenue authority. It may be possible to obtain this information from third parties such as the customers or payment intermediaries, but this may be dependent on privacy or financial regulation laws.

**Information collection and verification:** To verify local activity, the market jurisdiction's tax administration may need to seek information from parties that have no operations in the jurisdiction and are not subject to regulation therein. While exchange of information can be a very useful tool where the proper legal basis is in place, this is predicated on knowledge of where the offshore entity is tax resident and information retained or accessible by the reciprocating tax authority. This can create challenges for a source state revenue authority seeking to independently verify any information provided by the offshore entity.

**Identification of customers:** There are in principle a number of ways in which a business can identify the country of residence of its client and/or the country in which consumption occurs. These could include freight forwarders or other customs documentation or tracking of IP and card billing addresses. However, this could be burdensome for the business and would not work where customers are able to disguise their location.

### Activity Summary:

The spread of the digital economy brings about many benefits, for example in terms of growth, employment and well-being more generally. At the same time it gives rise to a number of challenges for policy makers. These challenges extend well beyond domestic and international tax policy and touch upon areas such as piracy, international privacy law and data protection, as well as accounting and regulation. In this activity, you have been introduced to the various issues that surround the digital economy such as piracy, taxation and tax administration challenges.

#### Assessment: Reflexive Activities

1. Discuss how piracy issues are more critical in the knowledge economy.
2. What makes taxation a more challenging issue in the digital economy?
3. Discuss the policy challenges raised by the digital economy.

### Answers

1. Digital technology abilities to create perfect clones makes piracy more serious.
2. Controlling transactions over the internet is almost impossible and the internet is a borderless medium
3. Nexus(extreme lack of physical presence) , data, characterization and vat collection are some of the policy challenges

### **Learning Activity 3.3: The Knowledge Economy and its Effect on Globalization, Measuring the Knowledge Economy and the Challenges of African Countries in the Digital Age.**

#### Introduction

In the digital age economies are increasingly based on knowledge and information. Knowledge is now recognized as the driver of productivity and economic growth, leading to a new focus on the role of information technology and learning in economic performance. The term “knowledge-based economy is derived from the growing recognition of the role of knowledge and technology in economic growth. Knowledge, as embodied in human beings (as “human capital”) and in technology, has always been central to economic development. But only over the last few years has its relative importance been recognised, just as that importance is growing. Economies which are directly based on the production, distribution and use of knowledge and information is known as knowledge-based economy.....

In the digital age economic success is increasingly based on upon the effective utilisation of intangible assets such as knowledge, skills and innovative potential as the key resource for competitive advantage. The term “knowledge economy” is used to describe this emerging economic structure” (ESRC, 2005).

#### **Knowledge as an Economic Good**

The ability to store, share, and analysis knowledge through networks and communities using the new ICT technologies allows firms to exploit the unique properties of knowledge to gain competitive advantage. Perhaps the most important property is that knowledge is the ultimate economic renewable - the stock of knowledge is not depleted by use. Indeed, the value of knowledge to an economy comes from sharing with others.

Firms also obtain value from sharing knowledge internally and in some circumstances by sharing with suppliers and customers. But they may try to restrict external sharing if that might benefit potential competitors.

Hence the difficult balancing act policy makers have in ensuring intellectual property rights are sufficiently strong to provide an incentive for firms to invest in innovative products and processes and yet not so strong they unduly inhibit the diffusion of knowledge.

A distinction is often made between codified or rule based knowledge that can be written down and stored and tacit knowledge that is acquired on the job and resides with the individual as know-how

and experience. Some argue that one of the key distinguishing features of the knowledge economy is deploying new technologies to allow the more systematic exploitation of tacit knowledge. The latter

can of course walk out of the door – and firms may make strenuous efforts to retain key workers or impose restrictive clauses in their employment contracts about future employment.

However, despite all these efforts by firms to retain knowledge, knowledge is essentially a public good because knowledge leaks - it is very difficult for a firm to retain knowledge just for their own advantage for any length of time.

As it has been described below, advanced industrial economies around the globe are steadily moving to the unprecedented position where knowledge based industries and knowledge based organisations will within the foreseeable future generate more than half of total GDP and total employment.

They have the most well educated workforces in economic history – and in the foreseeable future quite possibly the majority of the population will have degrees or the equivalent.

However, this

raises a difficult question – if the knowledge economy is as economically significant as we think it is why have we seen so little impact on underlying growth and productivity performance.

## **Globalization and the Knowledge Economy**

The ability of a society to produce, select, adapt, commercialize, and use knowledge is critical for sustained economic growth and improved living standards. Knowledge has become the most important factor in economic development. Today, economic growth is as much a process of knowledge accumulation as of capital accumulation and the process of globalization is accelerating this trend.

The development of the knowledge economy and globalization has been seen as closely related. Global firms have built integrated international production chains, with innovation (for example, Research and Development facilities) in the US and Europe creating new products that are built in assembly plants in China and shipped back to the West for added value in “knowledge” areas such as design and marketing and providing associated services in Europe and the US. The following excerpt summarizes the essence of knowledge economy in the modern society- “Our future success depends upon mobilizing even more effectively the imagination, creativity, skills and talents of all our people. And it depends on using that knowledge and understanding to build economic strength and social harmony”



The development of a knowledge-based or services economy is centrally linked to globalization. The knowledge economy defines itself in terms of creative labour, concepts and ideas. It is therefore an economy that can only compete in terms of innovation. According to (Mazrui, 2001), there are three distinct ways in which globalization is interpreted- as economic interdependency across vast distances; information availability and movement across vast distances; and reduction of the world into a global village. He states further that two forms of globalization can be identified- economic and cultural globalization. Globalization is also viewed as the opening up and interconnectedness of the world. This openness and interconnection have been given impetus by the need to open up economic and trade markets, as well as by developments in information and communication technology (ICT) culminating in the so-called “knowledge economy”. There has been also shift in knowledge formation from national into global space due to globalization of science-based innovation industries, demilitarization of high-tech companies and global growth of information and communication technologies.

For countries in the vanguard of the world economy, the balance between knowledge and resources has shifted so far towards the former that knowledge has become perhaps the most important factor determining the standard of living- more than land, than tools, than labour. Today's most technologically advanced economies are truly knowledge-based (World Bank, 1999).

### **Measuring the Knowledge Economy**

While it could be possible to quantify the knowledge economy say as a percentage of Gross Domestic Product (GDP), given its nature as a concept, there is no ready way of measuring its scale or extent in practical terms. On the other hand, it is easier to quantify knowledge workers (workers that produce and manipulate knowledge) (Harold, 2008)..

There have been attempts to measure the true effect as well as features of the knowledge economy from other forms of economy. There has not been universal agreement on what exactly the “knowledge economy” is, therefore, metrics that can be used to objectively measure the knowledge economy are yet to be developed, however some features of the knowledge economy include:

- High and growing intensity of digital or information and communication technologies usage,
- An economy that depends on knowledge for growth,
- The provision of superior services,
- Highly educated and trained people,
- And knowledge supplanting the traditional resources of production (labour, land and capital).

In addition a summary of the key features of knowledge economy and knowledge economy organizations are described below:

- The knowledge economy represents a “soft discontinuity” from the past – it is not a “new” economy operating to a new set of economic laws;
- The knowledge economy is present in all sectors of the economy, not just the knowledge intensive industries;
- The knowledge economy has a high and growing intensity of ICT usage by well educated knowledge workers;
- A growing share of GDP devoted to knowledge intangibles compared with physical capital;
- The knowledge economy consists of innovating organizations using new technologies to introduce process, organizational and presentational innovation;
- Knowledge economy organizations reorganize work to allow them to handle, store and share information through knowledge management practices.

### **The Knowledge Economy and its Challenge in Africa**

The challenges that African countries need to address are complex and diverse, below are a flavor of the key challenges that lie in their way of digital and knowledge economy:

- The digital divide,
- Disproportionately low skilled workforce,
- Brain drain,
- Gaps in policy frameworks, and
- Sustainability.

#### **Digital Divide**

The Internet is the main medium for the knowledge economy. One of the most important claims made for the Internet is that it enables economic interaction irrespective of geographic location. According to this claim, countries in underdeveloped regions like Africa should be able to connect and compete in the knowledge economy irrespective of their location. However, African countries are known for being the least in ICT penetration particularly the Internet. The digital divide in African countries in general is deeply rooted because of the diverse as well as complex nature of the factors that exacerbate the digital divide- it would be therefore a long and gradual process for the continent to feel the true effects of the knowledge economy.

#### **Skilled Workforce**

The majority of African countries are also known for being the least in the world of human development index , knowledgeable and skilled workforce in the majority of African countries are way too low- one of the biggest challenges to cross in order to benefit from the knowledge economy.

### Brain Drain

Developed countries have a broader network to global search for talent – the migration of skilled labour from developing countries to developed countries has been significantly increasing. Brain drain acts as a double-edged sword on poverty- it increases further inequality at home and slows down economic growth.

### Gaps in Policy Frameworks

Government policy on creating the internal environment for national access to the knowledge economy is not only confined to facilitating economic growth in this sector. Government also has the responsibility to engage with the challenge of developing and implementing an e-government vision.

The knowledge economy among other things require a policy drive or framework that provides incentives to domestic and foreign firms to innovate – by looking for best innovation practices African countries need to develop a policy framework that hastens the knowledge economy journey.

### Sustaining the Knowledge Economy Workforce Through Education

African countries are hugely benefiting from the knowledge economy and in recent years there have been significant efforts by governments and stakeholders to sustain education as well as economic momentum(World Bank, 2010). However there needs to be a strong policy drive in order to broaden the base of access to ICT and universal education so as to foster innovative culture through research and education. A sustained universal access to education plays a major role towards the creation of knowledge-based society to this effect countries need to align their policy of universal access to education or expansion of primary, secondary and tertiary education closely with the needs of the economy thereby equipping with the workforce with the skills, particularly in science, technology, and innovation, to help business compete successfully in the knowledge economy.

### Assessment: Reflexive Activities

1. In the digital age what does the knowledge economy mean?
2. Discuss the key factors or drivers of the knowledge economy.
3. Discuss some of the features of the knowledge economy that can be used to gauge how a far a country has come to achieve the status
4. What are the challenges of African countries in their long journey to the knowledge economy?

### Answers

1. An economy driven by ict
2. Robust telecommunication infrastructure, tailored policy framework, skilled workforce, etc

3. The following are features of a knowledge economy
  - high and growing intensity of digital or information and communication technologies usage,
  - an economy that depends on knowledge for growth,
  - the provision of superior services,
  - highly educated and trained people,
  - and knowledge supplanting the traditional resources of production (labour, land and capital).
4. Some of the challenges are: digital divide, digital literacy, lack of robust telecommunication infrastructure, etc

### Unit Summary

In this unit several notions and issues that surround the digital and knowledge economy have been discussed. In summary notions such as the distinguishing characteristics of the digital and knowledge economy, requisites and the key challenges of the digital or knowledge economy, the link between globalization and the knowledge economy, and the key challenges of African countries in their long journey to the digital or knowledge economy have been discussed.

#### Summative Assessment Activities

1. Articulate the nature of the roadmap that African countries need to have to successfully embark on the digital and knowledge economy.
2. Of the four policy challenges raised by the digital economy which one is a concern to the scenario described below and why?
3. The social networking website such as Facebook supplies its users data to several companies, and the companies use the data in order to be able to develop new products and services.
4. Mention some of the prerequisites of the knowledge economy
5. Mention some additional features of the knowledge economy
6. What is the most important property of knowledge?

### Answers

1. A road map that focuses better telecommunication infrastructure coverage, digital literacy campaigns, internet penetration, etc
2. The issue of privacy, granting access permission for personal data without the knowledge of the user
3. The lay down of modern telecommunication infrastructure, digitally literate population, modern payment systems, etc
4. The use of digital technologies to enhance the exploitation of tacit knowledge by firms

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# Unit 4. Ethics in the Information Society

In this unit, you, the learner, will be introduced to the legal, social and ethical issues that surround and affect individuals and society in the information age as a whole. You will explore issues such as ethical use of information, as well as legal and social responsibility in society's use of technologies. The unit will also introduce learners to the nine core concepts of ethics and values of the Information or Knowledge Societies.

## Unit Objectives

After completing this unit you should be able:

1. Identify legal and ethical issues that characterize the information society;
2. Apply the core values and ethics of information and knowledge societies;
3. Analyze the ethical challenges of the information society; and
4. Distinguish the nature of inter-cultural information ethics.

### Key Terms

**Privacy:** the right to have some control over how a person's personal information is collected and used.

**Ethics:** moral principles that govern a person's behavior or the conducting of an activity.

**Intercultural:** derived from different cultures.

## Learning Activity 4.1: Privacy Issues in the Digital Age

### Introduction

Society universally shared core values such as the desire to live a happy and fulfilling life and accomplish goals. However, there are two diametrically opposite views of the world- self-centered point of view, where a person only considers himself and his values, and ethical points of view where a person needs to respect other people and their core values. From the very definition of society, society is the association of people organized under a system of rules with the rules being formulated to advance the good of members of the society over time. Morality is one of a society's rules of conduct, which dictates what people ought or ought not to do in various situations. Ethics involves the rational examination of morality and evaluation of people's behavior. It helps to find out a way for a person to decide the best thing to do.

Over the years information and communication technologies have been key drivers of development in a globalized, multicultural, knowledge-based societies, however it is an accepted fact that new problems accompany new technologies. Therefore, addressing the ethical challenges as well as the key issue of how information and communication technologies can be used in order to strengthen ethical development and avoid unethical consequences will continue to be the most pressing issue as it has been today. The ethical elements and the core values that surround the information society are many and they have cultural affinity to an extent as well. How can information, communication and knowledge be used in order to strengthen ethical development and avoid unethical consequences? In this unit several pertinent issues that surround ethics in the information society have been discussed.

### **Privacy**

Data collection and distribution has become a lot easier because of advancements in information and communication technologies and most importantly the Internet. Information which was previously regarded as private is now easily accessible to anyone, for instance Google has made cross referencing of phone numbers and addresses much easier.

In the recent trend we are witnessing one of the rare negative sides of technology in that it has made people to be less community oriented than before. Privacy has become increasingly important for people and the Internet provides the platform for people to spend many hours of time connected undermining the importance of community or society non-virtual interaction and togetherness. In the literature there have been several definitions associated to privacy, the following are existing attempts at defining privacy:

- Privacy defined in relation to no access to the person or the personal realm,
- Privacy as defined in relation to control over personal information, and
- Privacy defined in relation to freedom from judgment or scrutiny by others.

### Privacy as No Access to a Person or Personal realm

People who see privacy in terms of no access to a person or personal realm define privacy as the “right to be let alone.” As defined by Haag(1971), privacy “ is the exclusive access of a person to a realm of his Own The right to privacy entitles one to exclude others from (a) watching, (b) utilizing, (c) invading his private [personal] realm.” It is easy to see why this definition is incomplete because there are certain institutions or in some cases individuals who have legitimate rights not to leave others alone, such as tax service or loan creditors. As is clear, this and other similar definitions are too limited in that they do not take enough cognizance of the subtle and complex social context where privacy is at stake.

### Privacy as control over personal information

There are several flavors of Privacy with respect to the degree of control over personal information. Fried (1968) defines privacy as “control over knowledge about oneself.” And Westin defines it as “the claim of individuals, groups or institutions to determine for themselves when, how and to what extent information about them is communicated to others” (1967, 7, 42). In both definitions there could be a passive way of privacy violation in that people may experience violation of the right to privacy with no loss of privacy- consider the scenario when a person taps the phone conversations of two other persons who devised and use an elaborated coding system to exchange very intimate information, the intruder gleans nothing from the tap. The communicating parties have absolute control over the flow of personal information. The intruder may have violated the communicating parties’ right to privacy, but the communicating parties have experienced no loss of privacy because of the use of the coding system. This clearly shows that from a legal point of view, the violation of the right to privacy is very important. However, from a social relationship perspective it is the actual loss of privacy that is the issue at stake. Gavison (1980) defines a loss of privacy occurring when “others obtain information about an individual, pay attention to him, or gain access to him.”

### Privacy as freedom from judgment or scrutiny by others

People desire privacy or private space of immunity because of the fear of the inevitable loss of control over the decontextualization and recontextualization of their private information obtained and subsequent judgment thereof. It is the knowledge that others would judge us in a particular way, perhaps based on preconceived ideas and norms, that makes people or the individual’s desire a personal or private space of immunity. This judgment-by-others issue is well captured by DeCew (1986) in stating that “an interest in privacy is at stake when intrusion by others is not legitimate because it jeopardizes or prohibits protection of a realm free from scrutiny, judgment, and the pressure, distress, or losses they can cause.” In general certain aspects of the notion of Privacy can be summarized as follows:

- Privacy is a relational concept. It comes to the fore in a community. Where people interact, the issue of privacy emerges.



- Privacy is directed towards the personal domain. What is deemed personal is, to some extent at least, culturally defined. In general one may state that personal or private aspects of my life are those aspects that do not, or tend not to, affect the significant interests of others.
- To claim privacy is to claim the right to limit access or control access to my personal or private domain.
- An effective way to control access to my personal realm is to control the distribution of textual images or verbal information about it.
- To claim privacy is to claim the right to a (personal) domain of immunity against the judgments of others.
- Privacy is a relative concept. It is a continuum. Total privacy may be as undesirable as total transparency. It is a matter of appropriateness for the situation at hand. It is unfortunately (or fortunately) a matter of judgment.

### Privacy in the Information Society

Information technology tools are rapidly multiplying interaction possibilities by orders of magnitude by overcoming time and space barriers with a plethora of Social Medias being common occurrence. This has simultaneously, in the same proportion increasing privacy dilemmas that the typical digital citizens or society are facing with.

As the technological infrastructure expands, the issues of social relationships, roles and autonomy will become more and more urgent. As argued by Reinman's (1976), privacy is an essential part of the complex social practice by means of which the social group recognizes and communicates to individuals that their existence is their own. However, as information technology (cellular telephones, television, the Internet, Groupware, etc.) progressively invades more and more private space (turning it into public space), individuals will be faced with fewer possibilities for making their existence their own.

### **Activity Summary:**

People desire privacy or private space of immunity because of the fear of the inevitable loss of control over their private information and subsequent judgment thereof. In this unit, several the notion of privacy has been discussed from three perspectives:

- Privacy in relation to no access to the person or the personal realm,
- Privacy in relation to control over personal information, and
- Privacy in relation to freedom from judgment or scrutiny by others.

### **Assessment: Reflective Activities**

1. Discuss the privacy challenges of the digital age
2. What is your understanding of Rienman's argument that "privacy is an essential part of the complex social practice by means of which the social group recognizes and communicates to individuals that their existence is their own."
3. Discuss the mitigation techniques that need to be used to resolve privacy issues

### **Answers**

1. Loss of control of personal information, sophistication of technological tools to gather personal data without the consent of technology users, etc
2. Privacy of critical importance that communication of individual users need to be protected against all sorts of breach.
3. In placing regulatory frameworks for cyber security, the wide spread use of security protection mechanisms or tools such as encryption, password protection, etc.

### **Answer rubric:**

Learners grasp of notions discussed need to be evaluated based on clarity of the discussion, ability to write on one's own words as opposed to taking contents from the referenced sources as they are.

## **Learning Activity 4.2: Ethical Aspects of the Nine Core Topics of the Information or Knowledge Societies**

### **Ethics and values of the Information or Knowledge Societies**

There are seven core values that characterize the development of knowledge of information, communication and knowledge in the information or knowledge societies. They are equity, freedom, care and compassion, participation, sharing, sustainability and responsibility. These values are illustrated in the nine core topics of the information or knowledge society, which are also known as the nine P's, principles, participation, people, profession, privacy, piracy, protection, power and policy. In this learning activity, the core topics of the information or knowledge society have been briefly discussed.

### Principles: Ethical Values

Ethical values have paramount significance for knowledge societies to be sustainable, coherent, innovative and integrative. In a globalized multicultural world these values need to be maintained globally towards creating global ethics that promotes an inclusive approaches to common binding values, guiding principles, personal attitudes and common action across cultures, religions, political and economic systems and ideologies[1].

Fundamental values for the knowledge societies are:

- Justice/equity: it is about people developing deep respect towards each other and total acceptance of human dignity of every human being and on their equality. In the information society it is believed that fair and equal chances of access to information are a precondition for mutual understanding.
- Freedom of access to information; freedom of expression; freedom of belief; freedom of decision: are core values for human dignity as well as development. Freedom, equity and responsibility balance each other.
- Care and Compassion: it is about one's ability for empathy, respect and support of the other which leads to solidarity.
- Participation: it is the right and ability to participate in societal life and in decisions of concern.
- Sharing: helps to sustain relationships between human beings and strengthens communities. For instance sharing power leads to a responsible, community-oriented use of power.
- Participation: for instance making decision-making processes participatory is a sign of expression of respecting human dignity.
- Peace: it embeds security and facilitates or enables to achieve the goal of sharing values.
- Reconciliation: it is about overcoming past and existing offences thereby rebuilding relations and communities.
- Responsibility: it about individual's accountability for one's own actions.

### Intercultural Information Ethics

Culture according to (UNESCO 2003) is defined as the set of distinctive spiritual, material, intellectual and emotional features of society or a social group, and that it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs. Information networks and ICT play an important part in the development of culture and arts.

Two of the principal areas or agents in cultural production are :

- Content production - film, television, radio, publishing - and the music industry,
- The digitisation of cultural heritage, archives and museums - and content services in the youth, sport and cultural and nature tourism fields.

ICT is the key catalyst of globalization and ethical issues that emanate in the use of ICT as a result have become global ethical issues. However, ICT has at first sight changed the horizon of human thinking and action in such a way that we have to deal with many problems for which classic ethical theories do not have only any answers but they cannot even provide a sufficient basis to deal with them[4].

The definition found in the literature about what intercultural information ethics means more or less are identical, however for this learning material the definition given in[3] has been adopted. Intercultural Information Ethics (IIE) can be defined in a narrow or in a broad sense. "In a narrow sense it focuses on the impact of information and communication technology (ICT) on different cultures as well as on how specific issues are understood from different cultural traditions. In a broad sense it deals not only with intercultural issues raised by ICT but by other media as well allowing a large historical comparative view."

IIE aims at addressing both local and global issues that come with naturally with people of different social, economic and political background or culture using ICT[5]. In other words IIE aims to provide to responses to ICT-related ethical issues which are acceptable from various cultural perspectives.

The concrete impact of information and communication technologies on different cultures and particularly on their moral foundations has been discussed in detail in [4,5].

### **Participation: Access to Information or Knowledge for All**

We are in the digital age where access to information, communication, education and knowledge is more and more becoming basic human rights in addition to being public goods. Open access to these resources enables participation of all segments of the society in developmental activities. The digital divide gaps that exist in both the developed and developing countries are spanning into access divide in that those who have access to ICT tools can easily gain access to information and other relevant resources while those without are subjected to exclusions in social, economic and political activities.

### **People: Community, Identity, Gender, Generation, Education**

As a user or source and recipient of information and knowledge people are the key actors of information, communication and knowledge management. People are capable of filtering, digesting and assimilating information and knowledge. They can use them for enrichment and clearing confusion, identity building, tolerance to diversity, equity, etc. People can also use knowledge generated from information strategically primarily to gain competitive advantages over others.

In the digital age or information society it is envisaged that society share knowledge in fairness where access to it should be open. The knowledge society should be in favor of these six aspects- value-based, people-centered, communities as well as identities oriented, education-focused, gender-oriented and elders inclusive[1].

### Profession: Ethics of Information Professionals

Information or content professionals such as information technology professionals, Journalists, librarians, archivists, teachers, bloggers, etc have a special ethical responsibility in implementing core values in the process of knowledge creation, processing, dissemination, control, renewal, preservation, archiving and policy-making.

For information content professionals to live up to their ethical responsibility an enabling environment needs to be created. This includes: the space and freedom for value-based, unbiased and honest journalism; value-based vision of media-owners to support cultural, linguistic and religious diversity and views expressed[1]. Professional code of ethics play pivotal roles in enhancing the ethical responsibility of content providers in the information society. The following are some of the ethical responsibilities of information professionals as well as content providers in the information society:

- Information networks should be open to content from all sources, encouraging all stakeholders to be creators of content rather than mere consumers.
- Associations and network of professionals need to be empowered so as to ensure the promotion and enforcement of ethical codes in the production, distribution and archiving or information, communication, and knowledge.
- Individuals should take steps to protect their privacy and to improve the security of their data
- Entities that have access to personal data should comply with international standards on fair information practices.
- Governments should recognize and enact the right of universal access to public and government-held records including information relevant for citizens in a modern democratic society, giving due account to confidentiality, privacy and national security concerns.
- Stakeholders in control of scientific and historical data should grant the maximum possible access to people so that they may interpret events and further the progress of knowledge.
- Individuals should be ready to acquire basic skills in ICT and ethics in the information society.

### Privacy: Dignity, Data Mining, Security

The protection of privacy is a human right recognised in the UN Declaration of Human Rights of 1948, Art. 12. In the information society where open access to information is promoted individual's privacy has become more and more a concern. In recent years we have been witnessing unprecedented and pervasive surveillance of the Internet where users' data are being massively collected, aggregated and analysed[2]. The internet has opened up possibilities for private and state organisations to data mine huge amounts of individuals' data and use them for their own private ends. As much as the technology has been an enabler in the creation of the information society or digital citizens it can be used unethically for practices that can harm society. The technology has given the platform for people or companies to do anything technically possible even the outcome may not be socially desirable and legally acceptable.

### **Activity Summary:**

ICT is the key catalyst of globalization and ethical issues that emanate in the use of ICT as a result have become global ethical issues. However, ICT has at first sight changed the horizon of human thinking and action in such a way that we have to deal with many problems for which classic ethical theories do not have any answers but they cannot even provide a sufficient basis to deal with them.

### **Assessment: Reflective Activities**

1. Discuss what intercultural information ethics in the digital age means compare how the concept has evolved over time.
2. If access to information requires payment by authors or authoring institutions, what kind of solutions and preferential treatments do you think institutions in developing countries who cannot afford subscription fees and resources for publication need to consider?
3. How is Open Access related to copyright issues? Do "creative commons" licenses help resolve the free circulation of knowledge?
4. What should educational institutions need to do in order to ensure the ethical use of information and other related resources?
5. Discuss the ethical responsibilities of information professionals

### **Answers rubric:**

Learners grasp of notions discussed need to be evaluated based on clarity of the discussion, ability to write on one's own words as opposed to taking contents from the referenced sources as they are.

## **Learning Activity 4.3 Additional Ethical Elements of the Information or Knowledge Societies and the Rationale for Information Policy**

### Piracy: Intellectual Property, Cyber Crime

Piracy is a classic problem; in the information society it has now a new digital face. The term “piracy,” in the digital age refers to the illegal copying and distribution of proprietary content such as software, music, or movies. It manifests in many ways, for instance some unauthorized copies are copied by some people for later resale at below market prices, and other unauthorized copies are also made and distributed by consumers who trade them without payment. In the digital age, there has been a shift from the traditional perception of the notions of piracy and counterfeiting in that the “digital piracy” of primary concern today involves non-physical objects: digital files sold or exchanged over the Internet[6].

Mode and motivation aside, the extent of piracy is most frequently measured in monetary terms- the revenues that might otherwise have resulted from the authorized sale of the goods that were illegally copied instead. How one can estimate the loss that product owners may experience as a result of piracy?

This could be one way of doing it- just asking the obvious question what would happen if all “pirates” otherwise have purchased all the same goods at full price?

The content industry and some consumer views of piracy vary. The content industry primarily perceives “piracy” as a threat to their business models; undoubtedly others perceive great opportunity. Accordingly, the content industry has gone to great lengths technologically, politically, and legally to stem the tide of unauthorized copying and distribution facilitated by the Internet and other technological advances[6].

### Protection- Children and Young People

As much as ICT has been one of the pinnacles of human innovations in the history of mankind, it would show its dark side if not regulated or monitored properly. Internet the gateway of information and the most critically needed resource of our time is vulnerable for misappropriation. Through access to the Internet on computers, smartphones and tablets, young people are able to connect with each other and socialize in ways that were previously unimaginable. However, there are concerns that children and young people and particularly young adults may face specific risks and hazards, including sexual exploitation and potential addiction to online networks.

It has now become common for countries to develop online privacy protection act or children’s online privacy protection act in order to circumvent children and young people from becoming victims of unfair, deceptive acts and practices.

The act requires the operator of any website or online service directed to children that collects personal information from children or the operator of a website or online service that has actual knowledge that it is collecting personal information from a child to post a distinctive and easily found link to the website's privacy policy and the policy must detail the kinds of information gathered by the website .

### Power: Economic Power Of Technology, Media And Consumers

The value chain and number of suppliers in the production, processing, dissemination, control and archiving of information, communication and knowledge is very long, complex and global[1]. ICT have been at the heart of economic changes for many years now. It has revolutionized the relationship between information consumption and economic production, more and more becoming a critical economic productivity tool for consumers and business firms alike. However, the nature of information or knowledge as a product is different from other services or commodities in that its impact on behavior, mentalities, ideologies, worldviews, identities, cultures, economic and political developments is huge. Information products differ from tangibles in both what constitutes value and what it means to sell, buy or otherwise transfer the product[7]. Information products primarily convert data into information. This requires creative skill or effort from the information supplier or the data recipient. An information supplier's goal aims at fitting data into the users' frame of reference. Unless data make sense to the end user, they inform no one of anything. Information products thus involve data compilation, judgment, and structure-essentially, they incorporate a services component.

The free market together with a political regulatory framework and informed consumers can provide the necessary innovative dynamics. But the ethical responsibility of political regulators and economic investors are higher in this sector than for other commodities.

### Policy: Ethics of Regulation and Freedom

Many countries have started to embrace the notion of the right to information by introducing it in their legislations, and people around the globe as a result are afforded legal rights to information. The access to information law enables the general public access to data held by national governments. The law establishes a "right-to-know" legal process by which requests may be made for government-held information, to be received freely or at minimal cost, barring standard exceptions . Also variously referred to as open records, or sunshine laws (in the United States), governments are also typically bound by a duty to publish and promote openness. In many countries there are constitutional guarantees for the right of access to information. Parliaments, governments, civil society and educated citizens assumes the responsibility to ensure that regulatory measures are cohesive with freedom of expression, the right to seek, receive and impart information and ideas through any media and regardless of frontiers. Because of the fast-paced developments taking place in the technology sphere ethical standards and regulatory framework need to be more synchronized to new advancements in the technology field.



### **Information policy**

Information policy is the set of all public laws, regulations and policies that encourage, discourage, or regulate the creation, use, storage, access, and communication and dissemination of information . It thus encompasses any other decision-making practice with society-wide constitutive efforts that involve the flow of information and how it is processed. There are several fundamental issues that surround information policy. Most prominent are public policy issues concerned with the use of information for democratization and commercialization of social life. These issues include, inter alia, digital environment, such as intellectual property, economic regulations, freedom of expression, confidentiality or privacy of information, information security, access management, and regulating how the dissemination of public information occurs.

Although information policy generally has a broader definition and encapsulates a multitude of components, its scope and impact vary depending on the contexts where its definition is applied. For example, in the context of an information lifecycle, information policy refers to the laws and policies that deal with the stages information goes through beginning with its creation, through its collection, organization, dissemination, and finally to its destruction. On the other hand, in the context of public administration, information policy is the means by which government employees, institutions, and information systems adapt themselves to an environment in rapid fluctuation and use information for decision-making.

### **Activity Summary:**

As much as ICT has been one of the pinnacles of human innovations in the history of mankind, it would show its dark side if not regulated or monitored properly. Internet the gateway of information and the most critically needed resource of our time is vulnerable for misappropriation. Through access to the Internet on computers, smartphones and tablets, young people are able to connect with each other and socialize in ways that were previously unimaginable. However, there are concerns this critical resource can be used for unethical purposes and information policy are necessary to mitigate the concerns.

### **Assessment Reflective Activities:**

1. Discuss the consequences of privacy violation in the information society
2. Discuss the roles that information technology professionals can play towards ensuring that software developed for business purposes comply with basic privacy and human rights laws.
3. Not everyone opposes efforts to circumvent patent and copy-right laws, why is that?
4. Discuss the challenges of children and young people online protection.
5. How can measures taken to protect children and young adults and affirming their rights to participate fully in the information society, including freedom of information/expression be balanced?
6. Discuss how producers and consumers of information and knowledge can use their respective power to promote ethics in information society.
7. Assess the right-to-information act or law of your country if it exist or another if not yet, to what extent country fares with the right-to-information act or law?

### **Answers rubric:**

Learners grasp of notions discussed in this activity need to be evaluated based on clarity of the discussion, ability to write on one's own words as opposed to taking contents from the referenced sources as they are.

### **Unit Summary**

In this unit several issues that surround ethics in the information society have been discussed. The significance of the nine core topics of information or knowledge society- principles, participation, people, profession, privacy, piracy, protection, power and policy in globalized, multicultural, knowledge-based societies have been discussed at length. In this digital age, ethical use of information, as well as legal and social responsibility in society's use of technologies has paramount significance for preserving values that emanate from cultural, linguistic and religious diversity.

### Summative Assessment Activities

1. People who use the Internet and other information and communication technology tools are concerned over the rapid loss of their individual privacy, what mechanisms do you think is needed in order to address threats related to individual privacy?
2. How can IIE circumvent the domination of one culture by another in other words how IIE can guarantee the avoidance of "cultural-ethical imperialism?"
3. Recently pirating has declined what are the causes of this recent phenomenon? Hint read more about legal download cites and emerging notions such as open access movements to lay down your argument.
4. In existing access to information model, what kind of solutions do you think institutions(learning and others) in developing countries that cannot afford subscribe resources or publications behind a pay-wall need to consider or devise?

### Answer rubric:

Learners grasp of notions discussed in the entire unit need to be evaluated based on clarity of the discussion, ability to write on one's own words as opposed to taking contents from the referenced sources as they are.

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# Unit 5. Information Management and Strategy in the Digital Age

In this unit, you, the learner, will be introduced to the various information management techniques. The unit describes how the world of information is changing quickly in the digital world or economy and provides explanation on what an information strategy and information management constitutes in the digital world.

## Unit Goals

After completing this unit you should be able to:

1. Understand how the world of digital information is growing and developing rapidly;
2. Analyse how this development is affecting the everyday lives of both individuals and organizations;
3. Understand what constitute an information strategy and information management;
4. Analyze the challenges of information management;
5. Explain how an information strategy and information management involve different parts of the organization;
6. Apply appropriate techniques to effectively manage information.

## Key Terms

**Digital Citizenship:** The terms coined out to represent the segment of society who have access to as well as the capability to use ICT tools.

**Data Mining:** information extracting technique applied on a large volume of data to enable people to extract information from a data which conventional query techniques could not do.

**Text Mining:** information extracting technique applied on documents to search for similarity or other forms of pattern in a document.

## Learning Activity 5.1: The Information Cycle and Main Activities of Information Management

### Introduction

In the world which has become more and more digital, computing, storage and networking capacities are growing exponentially. The volume of information and data are also growing at an alarming pace. This ongoing evolution consequently is creating impacts on people's daily lives.

The growth of digital information is changing the way we work – the way researchers conduct researches, learners attend their education, libraries and others (companies or organizations) offer services have radically changed. The myriads of communication means available for people to use have dramatically changed the traditional way of doing things and, as days go by digital citizenship is becoming more and more a prerequisite to succeed in every endeavor.

Current developments in the digital world have made possible such as some of the following:

- Communication has long been digital- email and the web connect professionals and researchers from around the globe. A growing range of emerging as well as existing tools (blogs and other "social media") further enhances informal communication.
- Vast collection of literature on researches, development and education are now created and available only digitally,
- Vast amounts of scholarly written literature originally available in print reports form are being digitized,
- It is now a common place to have e-books and e-journals than the traditional paper-based publication,
- Emerging notions such as open data is making accessible datasets of digital nature for reuse or repurpose with open license

The various forms of digital information available in the digital world are published and managed by organizations that created the data as opposed to the tradition to have a publisher full and exclusive control of it.

### Information Management

Information management (IM) is the process by which an organisation efficiently plans, creates, purchases or captures, organizes, stores, accesses, retrieves, disseminates, transforms, communicates, and disposes of its information, communication and associated resources.

Information management is a way for organizations of all types and sizes to acquire and organize information, whether originating internally or externally, to exploit the value that the information has for making informed decisions and for solving problems.

Almost all organizational activities have information components which depend on timely, reliable, accurate, usable, and relevant information.

### The Information Cycle- The Main Activities of Information Management

In the literature there have been many alternative models which summarize the information management cycle. You may find this one useful. Information management includes at least five activities:

1. Information Content Creation- this includes activities of producing information content. Examples of information content creation include a researcher writing a paper or article for publication, or analysis report of the data collected for a research; a photographer taking pictures; a software developer creating a new piece of software; etc.
2. Capture or Purchase of Information Content (from both external and internal sources)- this includes activities of acquiring information content through purchasing or other means. An example of capture of information content includes, a librarian purchasing or obtaining licensed digital resources for the library's collections.
3. Storage, access and retrieval of information Content- this involves storage, access and retrieval of information content purchased or captured.
4. Dissemination of Information Content- this includes activities of making available information content using various means for users. Information contents could be disseminated by a publisher, or by an information management system, or by an individual, which targets the end users who have interest in using that information.
5. Information Content and knowledge Communication- this involves communicating information content or knowledge to appropriate users. Communication can also be called repackaging. Information content may be transformed (or repackaged) by various intermediaries (such as video makers, developers of mobile phone networks, or publishers) into forms which are more directly usable by other end users such as policy makers, the media, farmers or disadvantaged communities. A software developer may create an infographics app from a dataset so that the data can be communicated a broader range of users.

Information content or knowledge can be disseminated using various means, once it is communicated or made accessible to users, users may start to recreate or repurpose it, and the information cycle begins all over again. Remember that all information available online are not reliable and trust only information contents obtained from sources that you know is reliable and trusted.

The following is a graphic representation of the information cycle.

### Why Information Management is Critically Important?

Studies have shown that corporate executives spend more than 20 hours a week looking for information, while middle managers spend up to 25 percent of their time searching for information required to do their jobs and knowledge workers spend from 15 to 35 percent of their time searching for information.

To be well resourced and efficient an information management operation needs:

- Information sources and resources;
- Qualified human resources;
- Information and communication technologies and networks;
- Information systems and applications;
- Other physical facilities;
- And an information strategy.

### **Activity Summary:**

The growth of digital information is changing the way we work – the way researchers conduct researches, learners attend their education, libraries and others (companies or organizations) offer services have radically changed. Since the advent of ICT traditional practices of information management have been fundamentally altered.



### **Assessment: Reflective Activities**

1. Why all information obtained online are not reliable?
2. Explain the information cycle and in the figure 5.1 what does the arrow that links the communication box with the information creation box mean?
3. Identify costs associated to information management in addition to expenditures made on the laying out technical infrastructure (software, hardware).
4. What does an information management mean?
5. What are the components or elements of information management?

### **Answers**

1. It is because due to that some people or unethical internet users publish false or fabricated stories online.
2. The information cycle involves five phases where information content is created, it can be captured or purchased, stored and disseminated using communication tools. The communication box in figure 5.1 Means communicating information content or knowledge to appropriate users.
3. Cost incurred for content creation or purchase and communication
4. Information management (im) is the process by which an organisation efficiently plans, creates, purchases or captures, organizes, stores, accesses, retrieves, disseminates, transforms, communicates, and disposes of its information, communication and associated resources.
5. They are:
  - Information sources and resources;
  - Qualified human resources;
  - Information and communication technologies and networks;
  - Information systems and applications;
  - Other physical facilities;
  - And an information strategy.

## **Learning Activity 5.2: Information Management Techniques and Information as Commodity.**

### **Information Management Techniques**

The ways in which information and knowledge is created, managed and shared among researchers, educators and others are changing because of advancements in content creation, management and sharing technologies or tools. The following are some of the information management techniques predominantly employed by organizations:

- Data and text mining, or exploratory data analysis techniques- the process of discovering interesting and useful patterns and relationships in large volumes of data .
- Social scientists are developing and sharing databases such as the Atlas of Inequality using digital data that they and others have amassed.
- Open archives such as arXiv.org , PubMed Central , and thousands of institution-based repositories enable authors to ensure their works are openly available on the Internet to a world of potential users.
- Open (government) data movements- emerging efforts towards achieving the vision of open and accessible data up and down the information chain .

The above and other emerging platforms have huge potential in connecting data, knowledge, researchers and educators.

### The Key Components of Information Management in the Digital Age

The information management in an organization works best within a framework set by an information strategy.

We are all living in an information-rich environment. Because organizations need to be able to adapt quickly and flexibly to this environment, many parts of the organization, both human and infrastructural, will need to play a part.

The key components to a successful information management initiative are :

- People- this component is all about having the right people to an information management initiative. Identifying driven individuals is the first step in ensuring that the initiative can evolve through its infancy stage to maturity.
- Culture- an organisation's culture directly impacts the uptake of the information management initiative. Ensuring a culture of quality, accuracy and how each and every individual has an impact of the "information value chain" is critical.
- Process- introducing governance processes are key to ensuring the information management initiative is targeted, measureable and managed effectively. These processes must clearly outline what people must do, when they must do it and how to go about doing it.

- Content- it is all about the what, where, how, when and why of data. It is where data becomes information. This component involves executing and implementing some of the processes defined in the previous 'process' component.
- Technology- this component is all about to simplifying the complexity behind the scenes and empower the business users to answer the question they are asking their content.

Success depends on how these components work together in harmony.

Below are some important elements that best information management practices involve :

- Data should not be duplicated, there needs to be always one correct version.
- Data quality standards need to be developed and they must be defined in measurable terms.
- Information should be relevant for its intended purpose.
- Information should be openly available and accessible for intended users wherever possible.
- Data should be secure and confidential where necessary.
- All information related activity should comply with legal requirements.
- All staff with information related roles should be properly trained and equipped. etc.

### **Information as a Commodity**

When planning and implementing information management and information strategy, viewing information as a commodity has paramount significance. This applies both to information generated internally within the organisation or externally acquired from other sources. Information like any other commodity is protected by law called collectively intellectual property rights(IPR). IPR protects the creation, ownership and integrity of information. Whether it is available for free or locked by a pay-wall individual person or organizations assumes ownership of information.

Besides access to online to databases or other forms of information resources information users have access to e-mail, online forums, blogs and social medias. In all these settings and the online world it is an absolute necessity to emphasize that information is a commodity and that it has a wealth of features.

### Important Features of Information as a Commodity

Information as a commodity possesses the following features:

- Relevance- the extent or degree to which the information is relevant to its intended users.
- Quality- the extent or degree of the reliability of the information.
- Timeliness – the extent or degree how the information is current or relevant in time.
- Ownership- the extent or degree of accessibility of information in terms of licensing.
- Long-term Usability- the extent or degree of information access longevity with respect to the terms of licensing.

### **Activity Summary**

The ways in which information and knowledge is created, managed and shared among researchers, educators and others are changing because of advancements in content creation, management and sharing technologies or tools. Various information management techniques are in use, techniques such as data and text mining techniques are widely used techniques.

Information like any other commodity is protected by law called collectively intellectual property rights(IPR). IPR protects the creation, ownership and integrity of information. Whether it is available for free or locked by a pay-wall individual person or organizations assumes ownership of information.

#### **Assessment: Reflective Activities**

1. Mention or list commonly used technological tools for information management.
2. Whether you agree or disagree in each case explain why, having the right people will instill the precise culture required for a successful information management initiative
3. Whether you agree or disagree in each case explain why, having the right culture will ensure the creation of much needed processes to govern the information management initiative.
4. Whether you agree or disagree in each case explain why, the information management initiative is a continuous journey that matures and improves with time.
5. What is data preservation means?
6. What must an organization do to ensure the long-term usability of digital information?

### Answer rubric

Learners grasp of notions discussed need to be evaluated based on clarity of the discussion, ability to write on one's own words as opposed to taking contents from the referenced sources as they are.

### Learning Activity 5.3: What is Information Strategy? Planning Information Strategy, Developing Information Strategy and Information Audit.

#### Information Strategy

An information strategy is a plan of action or roadmap, designed by an organization, regarding the objectives, processes, and resources to effectively and efficiently acquire, utilize, and communicate information to achieve the organization's goals and objectives. Like the people, money, buildings and equipments, information is an important asset of an organization. It

can help to make sure that the organization:

- Understands staff and stakeholders' needs,
- Makes effective decisions,
- Develops new products and services,
- Improves existing products and services, and
- Identifies opportunities and risks

#### Why is Information Strategy Critically Important?

When considering the ways in which information are generated and used, it is imperative to think strategically, because without information, it is difficult to know what we need to do or how to do it. Moreover, companies or individuals needs of doing something will almost always involve collecting, exchanging or processing information.

There are more reasons why information has a strategic significance. Because information guides decisions and it impacts companies or your futurity. Thus strategic planning is needed in order to identify and address long term issues which may arise as a result of any decisions taken.

Some of the benefits that organization can achieve out of using or implementing information strategy are listed as below.

An Information Strategy can engage and guide staff and stakeholders and help to ensure that:

- Information contributes to achieving your organization's overall vision and mission.
- Information is exploited to the benefit of your organization and its stakeholders.
- People in your organization have a shared understanding of your information-related goals and how they will be achieved.
- Investment in information content, technologies and services is effective and efficient.
- Risks can be managed and opportunities seized.
- Progress can be reviewed and evaluated more easily.

Strategic thinking is particularly important at times of change, because unless there is a clear idea of about needs to be achieved, it can be hard to assess the many new opportunities that come along your way in systematic way.

An information strategy helps organizations to have a clear vision for:

- What information to acquire and use,
- What specific information management capabilities to develop (staff skills, technologies, systems, and so on),
- How and when to implement information management activities,
- Monitoring and evaluating the information management activities towards the realization of organizational goals and objectives.

Information strategy provides a framework for efficient and effective information management across the organization. It should relate to the overall corporate strategy or it in a nutshell be related to the goals and objectives of the organization as a whole.

Therefore, an Information Strategy serves as a link between the broader strategic goals and information-intensive processes of the organization.

### Planning Information Strategy

It is important to remember that there is no single way of developing Information Strategy. Every organization has its own context and needs, and to what extent the strategy is sensitive or tailored to local conditions is the key factor for information strategies to succeed. There are a range of methods and tools that can help in the planning process and content development of an information strategy for an organisation.

Developing an information strategy involves:

- Clarifying the purpose and scope of the information strategy
- Answering questions such as why is the information strategy needed and what will be included in it.
- Securing organizational support
- Engaging decision makers in the process and getting them committed
- Deciding on which approach to follow
- Top-down: senior management defines with the required level of details what it expects and how it should be realized.
- Bottom-up: staff closely working information are tasked to develop the objectives and priorities using their own experience or familiarity with the operations as well as the technologies.
- Project team organization
- Forming a team that leads the information strategy development process who will be responsible for coordinating the work, planning and monitoring the project, making decision when the need arises and championing the process is critically needed.
- Resources
- As with any project, resource planning for completing the strategy development is required.

## Developing Information Strategy

In the literature several recommendations have been made as to how to develop information strategy and no single approach works for all organizations. Depending on the various contexts organisations find themselves in and differences in organisational culture as well as the aims of information strategy, the process of information strategy development vary from organization to organization[1]. Tailoring the development of information strategy to the specific needs as well as contexts of the organization has paramount significance for the information strategy to succeed. The following steps of information strategy development are taken from (Orna, 2004 and CIPFA, 2001).

1. Understanding the organisation's strategic objectives, its culture and its business processes/methods of working.
2. establishing what activities and information resources are required to meet the organisation's objectives.
3. Examining current processes and information resources through an information audit.
4. Identifying shortcomings or gaps between (a) what is required (Step 2) and (b) existing processes and resources.
5. Formulating information policy based on the organisation's objectives. It comprises a series of statements covering: (a) the organisation's attitude to information; (b) principles governing the management of information, the use of staff and I.T. for the management of information, and cost effectiveness.
6. Developing and implementing the information strategy in stages.
7. Periodic review of the information strategy to ensure its aims are still appropriate and are being met.

## Information Audit

An information audit is: "A systematic examination of information use, resources and flows, with a verification by reference to both people and existing documents, in order to establish the extent to which they are contributing to an organisation's objectives." Although there is no universally accepted definition of an information audit, this definition adopted by Aslib, the Association for Information Management in the UK is the most appropriate as it incorporates the critical elements of 'information use' and 'people' (Orna, 1999 p69).

Information audits employ a number of methods including surveys, interviews, focus groups, and examination of existing databases and documents - both electronic and paper records. Information audits are not one-off exercises. They should be repeated periodically. They may identify opportunities for quick wins - improvements that can be made immediately.



An information audit is a process used to[2]:

- Identify the information needs of the organisation and assign a level of strategic importance to those needs.
- Identify the resources and services currently provided to meet those needs.
- Map information flows within an organisation and between an organisation and its external environment.
- Analyse gaps, duplications, inefficiencies and areas of over-provision that enables the identification of where changes are necessary.

Through information audit organizations can examine the activities and tasks that occur in the organisation and identify the information resources that support them. Information audit helps to examine, not only the resources used, but how they are used and how critical they are to the successful completion of each task. Combining this with the assignment of a level of strategic significance to all tasks and activities enables the identification of the areas where strategically significant knowledge is being created. It also identifies those tasks that rely on knowledge sharing or transfer and those that rely on a high quality of knowledge.

The information audit process enables the mapping of information flows within an organisation and between an organisation and its external environment. It identifies:

- Efficient flows,
- Gaps,
- Duplications,
- Bottlenecks and other inefficiencies in existing flows,
- Existing channels that can be utilised for knowledge-transfer and areas of the organisation where there is a need for high quality knowledge that isn't being met.

### **Activity Summary:**

An information strategy is a plan of action or roadmap, designed by an organization, regarding the objectives, processes, and resources to effectively and efficiently acquire, utilize, and communicate information to achieve the organization's goals and objectives. Like the people, money, buildings and equipments, information is an important asset of an organization.

It is important to remember that there is no single way of developing Information Strategy. Every organization has its own context and needs, and to what extent the strategy is sensitive or tailored to local conditions is the key factor for information strategies to succeed.

Information audits employ a number of methods including surveys, interviews, focus groups, and examination of existing databases and documents - both electronic and paper records. Information audits are not one-off exercises. They should be repeated periodically. They may identify opportunities for quick wins - improvements that can be made immediately.

### Assessment: Reflective Activities

1. Discuss the reasons why developing information strategy for an organization is an absolute necessity or imperative?
2. We are in the information society, what could go wrong if an organization operates without in placing information strategy ?
3. The following items should be a sample list of information strategy of which manager?
  - a. How do I negotiate better license terms with publishers?
  - b. How do we keep the cost of e-journals down? And what about e-books?
  - c. I need to understand more about researcher needs.
  - d. Could we link up access to our collections with those of other organizations?
  - e. Should our information literacy courses cover more than just searching for information?
  - f. We should make sure it's easy to deposit materials in our repository.
  - g. Should we train researchers in accessing information that is free?
  - h. We need to make more information available about licenses and copyright.
  - i. Do we need better access controls for valuable or confidential content?
  - j. Should I be lobbying senior management for better library resources?
4. Develop an information strategy for an IT manager.
5. Discuss the advantages and disadvantages the top-bottom and bottom-up approaches.
6. Identify cost items in the development of information strategy.
7. Read the examples or cases studies available in the following URLs:
  - <http://digbig.com/4xdwy>, <http://digbig.com/4xdws>
8. How Information audit helps the development of effective information strategy?
9. List the techniques or tools that can be used to conduct information audit.

### **Answer rubric:**

Learners grasp of notions discussed in this activity need to be evaluated based on clarity of the discussion, ability to write on one's own words as opposed to taking contents from the referenced sources as they are.

### **Unit Summary**

In this unit several issues that surround information management and information strategy have been discussed. Understanding the information life cycle is imperative for effective information management. The success of information management in an organisation depends on how the key components to information management such as people, culture process, content and technology work together in harmony. Information strategy is an absolute necessity for organizations to achieve their business goals. It provides a framework for efficient and effective information management across the organization.

### **Summative Assessment Activities**

1. The digital world is under continuous evolution, make your own prediction how it will look like or shape up over the coming five years( think of what the digital communication landscape will be, how workplace cultures will look like, etc as a result of the ongoing digital as well as data or information revolution ) . Try to read as much articles or papers as you can to have some idea of current trends in the digital technology sphere.
2. Discuss how the key components of information management are related.
3. Identify the key elements of information strategy for an organization of interest(choose a college or university or another organization as a case study)

### **Answer rubric:**

Learners grasp of notions discussed in this unit need to be evaluated based on clarity of the discussion, ability to write on one's own words as opposed to taking contents from the referenced sources as they are.

## References:

[1] Bill Haskins and Technical Information Service, Information Strategy Topic Gateway Series No.6,[http://www.cimaglobal.com/Documents/ImportedDocuments/cid\\_tg\\_information\\_strategy\\_jul08.pdf](http://www.cimaglobal.com/Documents/ImportedDocuments/cid_tg_information_strategy_jul08.pdf).

[2] Susan Henczel, THE INFORMATION AUDIT AS A FIRST STEP TOWARDS EFFECTIVE KNOWLEDGE MANAGEMENT: AN OPPORTUNITY FOR THE SPECIAL LIBRARIAN, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.453.7589&rep=rep1&type=pdf>

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# Unit 6. The Network Society

In this unit, you, the learner, will be introduced to elements of the network society which are the social structure of the information age. It describes the framework of the network society and highlights the main transformations taking place in social structures around the world in the information age.

## Unit Goals

After completing this unit you should be able to:

1. Explain the patterns and dynamics of the network society in its policy dimension;
2. Analyse the macro-level factors that characterize the transition to Network Society;
3. Identify the competing forces in the network society, and how are they reshaping the world;
4. Explain the relationship between the network society with media, culture and politics.

### Key Terms

**Network:** The network is a type of structure viewed as less hierarchical (that is more “flat”), more decentralized, and more flexible than other structures.

**Social Networking Sites:** is an online platform that allows users to create a public profile and interact with other users.

**Analog Transmission:** is the sending of information over a physical method in the form of analog signals.

**Digital Transmission:** is the sending of information over a physical communications media in the form of digital signals.

**Pervasive:** availability of a service without geographical limits.

## **Learning Activity 6.1: Characteristics of the Network Society, and the Transition to the Network Society**

### Introduction

In modern society lifestyle of people is continuously evolving and people's dependencies on digital information networks have reached to unprecedented high. A new lifeline is being added to all the ones we already had. Today, we no longer only depend on roads, electricity cables, water pipes, gas lines, sewers, post-boxes, telephone wires and cable television to conduct our daily lives and manage our households. We now also need networks of electronic communication. Young people in the developed world countries can no longer imagine a world without mobile telephony, the Internet and Facebook or any of the other social networking sites. Missing them for only a day would cause serious withdrawal symptoms. Besides individuals, this dependence spans across organizations and societies at large.

According to [1], the network society is defined as a society whose social structure is made of networks powered by information and communication technologies and digital computer networks that generate, process, and distribute information on the basis of the knowledge accumulated in the nodes of the networks. A network is defined as a formal structure (Monge and Contractor, 2004) with a system of interconnected nodes. Nodes are, formally speaking, the points where the curve intersects itself. Networks are open structures that evolve by adding or removing nodes according to the changing requirements of the programs that assign performance goals to the networks. Naturally, these programs are decided socially from outside the network. But once they are inscribed in the logic of the network, the network will follow efficiently these instructions, adding, deleting, and reconfiguring, until a new program replaces or modifies the codes that command its operational system.

This learning activity discusses one of the core elements of the information age, the network society. In doing so it tries to provide answers to questions such as What characterizes the network society? How did it evolve and what sustains it? What are its effects upon media, upon cultural production and upon politics?

### **Understanding the Network Society**

It can be said that the world has been in the process of structural transformation for over a couple of decades. This process has been multidimensional and it continues to be, it is associated with the emergence of a new technological paradigm, based in information and communication technologies that took shape in the 1970s and diffused unevenly around the world. In the course of the last couple of decades one thing has become more obvious in that technology does not determine society whereas society does. Society shapes technology according to the needs, values, and interests of people who use the technology. Furthermore, information and communication technologies are particularly sensitive to the effects of social uses on technology itself. The history of the Internet provides ample evidence that the users, particularly the first thousands of users, were, to a large extent, the producers of the technology.

It can be argued that nowadays wealth, power, and knowledge generation are largely dependent on the ability to organize society to reap the benefits of the new technological system, rooted in microelectronics, computing, and digital communication, with its growing connection to the biological revolution and its derivative, genetic engineering[2]. Digital communication networks are the backbone of the network society, as power networks (meaning energy networks) were the infrastructure on which the industrial society was built.

Major characteristics of the network society, details are found in [2]:

- It is based on networks,
- Communication networks transcend boundaries, the network society is therefore global or it is based on global networks.
- It is pervasive throughout the planet- its transformative power extends to every country in the planet, as it is diffused by the power embedded in global networks of capital, goods, services, labor, communication, information, science, and technology.
- To an extent it could be used interchangeably with globalization - globalization is can be used to refer to the network society.
- A central feature of the network society is the transformation of the realm of communication, including the media- societies have moved from a mass media system to a customized and fragmented multimedia system, where audiences are increasingly segmented. The network society constitutes socialized communication beyond the mass media system that characterized the industrial society.

### **The Transition to Network Society**

The state of societies transition to the network society is largely characterized by macro-level factors such as the education and generation dimensions- the divisions between those who use and those who do not use technologies such as the Internet are greater. Utilization of technologies in general is more a question of the generation to which one belongs in that the younger the generation the greater the use, and the higher the education level the greater the use[2]. This division is large in developing countries which also magnifies the extent of lag they are experiencing with respect to developed countries such as United States, Denmark, Korea, and the like who have attained the status of "information society." Two factors can be taken into account towards gauging the transition of countries to Network Society or Information Society status, they are the country's practice level of democratization and their informational development rankings.

However, an analysis of the different information society models can have as its starting point the individualization of four dimensions through which one can better understand what each society's position is in relation to the global information society panorama[3 4]. These are:

- Technology or ICT infrastructure- provides an indication of the available ICT infrastructure and individuals' access to basic ICTs.

- Economy- provides an indication of macroeconomic performance and business growth- how ICT is increasing labour productivity, enlarging enterprises' market reach, saving costs and driving innovation?
- Social well-being- The information societies are characterized not only by the appropriation of technology but also their internal openness and social well-being.
- Level of ICT Use or Values- provides an indication of ICT diffusion level and usage.

On this basis one can consider that a society is an informational society if it possesses a solid information technology: infrastructure, production and knowledge. That is, classification of a society as an information society is based on a solid information technology at the infrastructure, production and knowledge levels.

The Internet use figures is also one reference value used for characterizing the transition of a society to the network society because they reflect both the dimension of use in the socialization context and the market potential. Indeed, without a high number of users, there would also be no incentive for increasing electronic commerce (be it at the inter-company level or with private persons).

Societies in transition are also characterized by the change dynamics within them. Some of the following characteristics to some extent cut across:

- **Educational transition-** the transition of populations with lower education levels to a society in which the younger generations have already more consolidated educational competences.
- **Technological transition-** The transition from intermittent or sparse diffusion of technologies to robust or ubiquitous access. A transition expressed through the diffusion of the Internet and the appearance of the network society in the social structure and practice.

### Activity Summary

Digital communication networks are the backbone of the network society, as power networks (meaning energy networks) were the infrastructure on which the industrial society was built. Communication networks transcend boundaries, the network society is therefore global or it is based on global networks.

The state of societies transition to the network society is largely characterized by macro-level factors such as the education and generation dimensions- the divisions between those who use and those who do not use technologies such as the Internet are greater. Utilization of technologies in general is more a question of the generation to which one belongs in that the younger the generation the greater the use, and the higher the education level the greater the use.



**Assessment Reflective Activities :**

1. Identify the limits of networks before the advent of digital technologies.
2. Discuss how digital networking technologies enable networks to overcome their historical limits.
3. Global development is now largely seen as a function of enabling countries and their people to function productively in the global economy and the network society. What is the enabler of this evolving reality?
4. What is networked individualism?
5. The International Telecommunication Union (ITU) in measuring information society it uses 11 indicators, what are they?
6. What do the ICT infrastructure and access indicators entail?
7. Is there a generation divide in the society we live in? If yes, What do you think are the causes?

**Answer rubric:**

1. It was not pervasive, it was largely a mass media system-as opposed to a customized and fragmented multimedia system which is what the current medias are
2. Digital technologies made networks to transcend boundaries, pervasiveness of networks, etc
3. ICT is the enabler of the evolving realities such as digital economies
4. It is about linking individuals with little regard to space
5. Go to the ITU website and find them out
6. Specify pertinent factors more specifically ICT related that causes a generation divide

## **Learning Activity 6.2: The Network Society and the Macro-Level Factors Determinant to the Transition to the Network Society**

### **E-Learning and the Transformation of Education for a Knowledge Economy**

Major changes are continuously occurring in society in the ways in which we work and interact with each other. It is clear to see that collectively we are experiencing a change to a knowledge economy. Pertinent issues that surround the knowledge economy are presented in unit 3 of this module and you can revisit the unit to refresh your memory of the notions. Characteristics of a knowledge economy include: the increased mobility of services, information, and workforce; the need to derive local value from information often in creative ways that go beyond expected performance; the need to work in multidisciplinary and distributed teams; the need to use information technology (IT) for knowledge management, sharing, and creation; the need to update and change ones skills throughout one's lifetime; and the need to "act autonomously and reflectively, joining and functioning in socially heterogeneous groups" (The World Bank Group, 2003, p. 17).

There are different kinds of knowledge that can be distinctively distinguished [2]:

- Know-what- refers to knowledge about facts, is nowadays diminishing in relevance.
- Know-why- is knowledge about the natural world, society, and the human mind.
- Know-who- refers to the world of social relations and is knowledge of who knows what and who can do what. Knowing key people is sometimes more important to innovation than knowing scientific principles.
- Know-where and know-when are becoming increasingly important in a flexible and dynamic economy.

Personal knowledge management skills as well as a knowledge management infrastructure for the organization or professional body supporting knowledge workers are critical to the learning needed for a knowledge economy.

In the recent past, teaching technologies or tools were limited to chalkboards, books, pens and paper. However, because of the advances in ICT over the years the use of technology mediated learning has become the norm almost in all tertiary education institutions in the world. There is a widely accepted perception The World Bank (2003) contrasts traditional learning with learning for a knowledge economy as moving away from the teacher and textbook as sources of knowledge towards the teacher as a guide for finding and interpreting real-world information; away from learning being delivered to learners who receive it toward learning by doing and participating as close to the real world as possible; from assessment being based on responding to questions with pre-determined right and wrong answers to assessment being based on competence development as documented by a variety of forms

of performance including those that require integrating one's work with the work of others. Developments in higher and professional education as well as corporate learning are gradually occurring that reflect these shifts. However it should be emphasized that Information and communication technologies are necessary tools only when used in ways appropriate to the ways people will work and learn in a knowledge economy[2]. Much of what is currently called e-learning, where a computer system is used for selecting learning objects for knowledge transfer, is in fact counterproductive to the development of competencies for a knowledge economy.

When implemented and used correctly e-learning tools can transform the learning and teaching processes of higher institutions. Electronic portfolios are increasingly being used as reflection and assessment tools in higher education [2]. An electronic portfolio uses electronic technologies, allowing the portfolio developer to collect and organise portfolio artifacts in many types (audio, video, graphics, text) in a way that is scalable and accessible over time, distance, and modality. It provides a comprehensive storage medium for the results of individual assessments, accommodating a potential variety in the instruments themselves as well as providing assessment opportunities at different time frames and for different performance indicators, in particular indicators dealing with less-tangible results. For uses of the electronic portfolio that involve accessing the resources in a scalable and convenient way, network tools are needed, thus electronic portfolio use becomes a form of e-learning.

The use of learning models centered on knowledge sharing, management and creation are steadily increasing in higher education. However for a true transformation of education to occur national policy and accreditation processes and institutional assessment and curriculum requirements will need to better reflect the societal transformation that is already emerging[2,5].

### **eGovernment Reshaping the State and its Relationship with Citizens**

In recent decades government services to citizens have been improved because of the integration of ICT in public sector organizations. Each emerging wave of technology has changed the options available for the organisation of government, shaping how much can be managed, delegated, commanded or coordinated, which has resulted in also significant improvements in techniques of governance. The use of information and communication technologies to improve the activities of public sector organisations is known as eGovernment.

There are three main domains of eGovernment:

- **eAdministration-** which is all about improving government processes with the Integration of ICT.
- **eCitizens and eServices-** which is all about connecting citizens and enabling citizens gain access to government services using ICT.
- **eSociety-** which is all about building external interactions using ICT as a communication medium.

The digital transformations of government processes and services promote the realization of the good governance constructs such as below[3,6]:

- Transparency- making decisions and actions of governments open to public scrutiny.
- Participatory- enables citizens influence decision making.
- Efficiency- it saves cost and improves service delivery.
- Effectiveness – improves the quality of public services.
- Accountability- taking responsibility for actions, products, decisions, and policies taken.
- Rule of law- the extent to which government agents have confidence in and abide by the rules of society.

When successfully implemented eGovernment systems transformative power in the relationship between government and citizens can be significantly felt.

E government has evolved as a means of contributing to value in the following three areas[3]:

- Outcomes,
- Services, and
- Trust.

### Outcomes

The following are some of the varied ways in which the broad family of eGovernment applications can assist governments in the achievement of outcomes for which they are held accountable (such as lower crime and unemployment, better health, etc):

- The simplest applications are models of information provision that help to deliver superior outcomes—for instance online systems that provide comprehensive jobs databases have helped employment services to improve their outcomes in many countries. Often these have required new kinds of public private partnership.

- Somewhat more sophisticated are online curricula that assist home based working. These are having a huge impact on the various public and private on-line learning services now available. They can provide a base of common knowledge, along with diagnostic tools as well as learning.
- Within public services a growing impact is being achieved by much more transparent performance data: a well known example is the use made of crime statistics for regular peer review sessions and performance management in the New York COMSTAT system. In many countries there is now web access to near real time performance data on schools, police forces, hospitals and welfare providers.
- Within fields of public policy we are beginning to see the use of more sophisticated knowledge management systems to spread best practice, research findings and organise communities to share tacit knowledge.
- Some governments are using more sophisticated tracking of data to improve outcomes. For instance some countries use the web to control gender-based violence.

In all of these areas eGovernment systems are bound up with the broader trends towards making government more consciously knowledge based, shaped by evidence, and also providing much greater quantities and quality of knowledge for society and the economy to organise themselves.

### Services

The use of eGovernment systems particularly eServices in government services have tended to follow a fairly common pattern of evolution[7]:

- First stage which is also classified as Emerging: An official government online presence is established through a few independent official sites. Information is limited, basic and static.
- Second stage which is also classified as Enhanced: Government sites increase; information becomes more dynamic. Content and information is updated with greater regularity.
- Third stage which is also classified as Interactive: Users can download forms, e-mail officials, interact through the web and make appointments and requests.
- Fourth stage which is also classified as Transactional: Users can actually pay for services or conduct financial transactions online.
- Fifth stage which is also classified as Seamless: Full integration of eservices across administrative boundaries. Total integration of e-functions and services across administrative and departmental boundaries. offering users the means to pull together a mix of elements to customise services to their own needs.

### Trust

Trust is the most difficult area of public value to attain. The implementation of e government is bound up with the broader opening up of the state to scrutiny, and the changing nature of the conversation held between states and the public [2]. There have been some common moves to reframe the environment for trust, including:

- Greater use of pre-legislative scrutiny, with legislation online prior to its agreement.
- The establishment or enactment of Freedom of Information legislation- governments are to some extent being turned inside out as previously secret performance information becomes public.
- Methods of policy making with wider communities involved- government decision making process moving towards being participatory.
- Changing practices in politics and parliaments, as politicians open themselves up to email, dialogue (and learn to cope with new ways of orchestrating campaigns).
- More and more social programmes trying to address digital divides.

### **Activity Summary**

Major changes are continuously occurring in society in the ways in which we work and interact with each other. It is clear to see that collectively we are experiencing a change to a knowledge economy. Pertinent issues that surround the knowledge economy are presented in unit 3 of this module and you can revisit the unit to refresh your memory of the notions. Characteristics of a knowledge economy include: the increased mobility of services, information, and workforce; the need to derive local value from information often in creative ways that go beyond expected performance; the need to work in multidisciplinary and distributed teams; etc.

#### **Assessment Reflective Activities:**

1. Discuss the state of ICT pedagogy integration (the level of ICT use in the learning and teaching process) of the university you are currently enrolled.
2. Discuss the benefits of eLearning systems in the knowledge economy or society.
3. Who benefits from E-government and how?
4. Explain the five stages of e-government model and using the model consider a country of interest and assess where it stands.
5. Discuss the disadvantages of e-government or the digital transformation of government processes as well as services.
6. Give examples of eGovernment systems being used in your country or a country of interest.

### **Answer rubric:**

Learners grasp of notions discussed need to be evaluated based on clarity of the discussion, ability to write on one's own words as opposed to taking contents from the referenced sources as they are.

## **Learning Activity 6.3: Media, Communication, Wireless and Policies in the Networks Society**

### **Elements that Contributed to the Network Society**

#### The Analog to Digital Transition

Current realities such as the new world of media abundance have happened as a result of the seminal transition from analog to digital. Media systems are now under continuous evolutions and ICT in particular the Internet is empowering content owners and independent filmmakers and musicians to reach their audiences without needing the distribution power of multi-national media companies, which bodes well for the future of an independent media system[2].

#### The Role of Television and the Internet in Constructing Identity

In an attempt to give a picture of ICT's role in shaping as well as building identities particularly collective identity in the network society, two of the most important communication tools of our time are taken into considerations.

Advancements in digital technologies have dramatically changed the world of communication landscape more than ever. The rapid growth of Television channels and the Internet, and accessibility of information in all available formats from around the world has transformed the traditional media into the next level. Current trends in the technology sphere strengthen Thompson (1997) points of view- digital technologies have transformed the spatial and temporal organization of social life, creating new forms of action and interaction, new kinds of social relationship and new ways of relating to others and to oneself.

Developments such as the new forms of social interaction allowed by the Internet oblige us to reconsider the meaning of concepts as community or identity. One of the most important factors for the development of collective identity is and has been communication. There are two types of identity building- individual identity understood as the sense of oneself as an individual endowed with certain characteristics and potentialities, and collective identity, understood as a sense of oneself as a member of a social group. It is a sense of belonging, a sense of being part of a collectivity.

The big impact of Internet on the expression and perception of social identities is relatively clear- it spans cultural spheres and geographical boundaries and allows communication from many-to-many.

The role of Television in the construction of identity is vertical in that it favours an interactions of one-to-many or the reverse nature. In general the real difference between the Internet and all preceding media forms lie in the role it gives to people in that millions are connected in many to many relationships and interactions[2].

### The Internet Infrastructure- Wireless

In this learning activity, one of the recent developments in speeding up the Internet's infrastructure diffusion that inflames the evolving role of the Internet in the network society such as the spread of Wireless infrastructure more specifically the Wi-Fi of the IEEE 802.11 suit has been discussed. The reasons why Wi-Fi is chosen is that it has gained broad acceptance because of cost reductions and its high level of penetration being usable in a variety of consumer devices such as PCs to PDAs to mobile as well as smart phones which helps ubiquitous access to the Internet[2].

There has been unprecedented growth of the global number of public hotspots. The number of public hotspots is projected to amount to 5.8 millions in 2015 . The following are the most important reasons behind Wi-Fi deployment rise[2]:

- Wi-Fi can deliver high-bandwidth without the wiring costs- which makes it an effective replacement for last-mile.
- There is widespread industry support for the standard, coordinated through the Wi-Fi Alliance- which resulted in a rapid drop in equipment prices, and users can expect compatibility between Wi-Fi client devices and access points (APs) made by different vendors.
- Lack of regulatory overhead- Wi-Fi networks have blossomed on unlicensed bands, namely, thin slices of radio spectrum reserved for low power applications in which radio devices can operate on a license-exempt basis—though this is not always the case in the developing world.

However, Wi-Fi has its own shortcomings in that it operates in short signal range. Even though point-to-point connections have been made over several kilometers, Wi-Fi networks typically extend for a few hundred meters at most. This makes the technology generally unsuitable for long-haul transmissions. Nonetheless, related technologies are emerging to address this problem, notably 802.16x (also known as WiMax).

### **Activity Summary**

Advancements in digital technologies have dramatically changed the world of communication landscape more than ever. The rapid growth of Television channels and the Internet, and accessibility of information in all available formats from around the world has transformed the traditional media into the next level.



In this learning activity, one of the recent developments in speeding up the Internet's infrastructure diffusion that also inflames the evolving role of the Internet in the network society such as the spread of Wireless infrastructure more specifically the Wi-Fi of the IEEE 802.11 suit has been discussed.

### Assessment Reflective Activities

1. Discuss the benefits digital technologies have brought to the network society?
2. Discuss vertical versus horizontal relationships and interactions with respect to the two most widely used communication mediums such as Television and the Internet.
3. What does mean that Wi-Fi does not have regulatory overhead? Name countries which demand licenses for the use of Wi-Fi networks if any?

### Answer rubric:

1. Communication as well as networking has become a lot easier- the Internet is a universal tool of interactive communication
2. Because of the Internet, the television business has changed from provider-driven to consumer-driven. Internet is quickly taking over as a primary medium for consumers, relegating television to second screen status.
3. Wi-Fi networks are available under unlicensed spectrum

### Unit Summary

In this unit a range of pertinent issues that characterizes the network society have been discussed. In summary notions such as the network society and its characteristics, the distinguishing characteristics of society in transition to the network society, E-Learning and the transformation of education for a knowledge economy, eGovernment with respect to reshaping the state and its relationship with citizens, and some pivotal advancements in the technology field that makes the realization of a network society(Media, Communication, Wireless technologies) have been covered.

### Summative Assessment Activities

1. What are the factors that need to be considered in analyzing information society models?
2. Discuss how countries need to fare with respect to the model in order to become a network society.
3. How has the emergence of Wi-Fi contributed the evolution of the network society?
4. What are the factors that stand in the way of African countries become part of the network society?

### Answers rubrics:

1. The following are the factors that need to be analysed to gauge a country's standing in the transition effort to the Network Society:
  - **Technology or ICT infrastructure-** provides an indication of the available ICT infrastructure and individuals' access to basic ICTs.
  - **Economy-** provides an indication of macroeconomic performance and business growth- how ICT is increasing labour productivity, enlarging enterprises' market reach, saving costs and driving innovation?
  - **Social well-being-** The information societies are characterized not only by the appropriation of technology but also their internal openness and social well-being.
  - **Level of ICT Use or Values-** provides an indication of ICT diffusion level and usage.
2. Addressing the factors that inhibits the realization better or robust telecommunication infrastructure, solid economy, better social well-being and good level of ICT use or penetration.
3. Wi-Fi has made both networking and communication pervasive
4. African countries need to address the following issues to become part of the network society:
  - Robust telecommunication infrastructure
  - Improved digital citizenship
  - Robust economy
  - Improved social well-being
  - Better level of ICT penetration or high-level of Internet diffusion

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### Module Summary

In this module you have been introduced to various notions that surround information as a product and its role in the modern society. A detailed explanation of emerging notions such as the knowledge economy, the digital economy, the information society, and other pertinent issues have been covered. The advancement of technologies particularly ICT is making information society a reality. The information society may not be a new concept, but it is one that is constantly evolving. It is still in its youth, and as such, its dynamics are changing every day. We know much about the potential, though we are still learning as the information age unfolds. What seems clear is that the ongoing development of ICTs in all its forms and applications is driving radical change in our lives, with the constant creation of new products and services, new ways of conducting business, new markets and investment opportunities, new social and cultural expressions and new channels for citizens and government to interact





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