

ICT Applications in Management

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Abstract: *Information Communication Technology (ICT) plays an important role in enhancing the quality of education. Administration and management applications of ICT are currently popular in various fields due to its capabilities in facilitating administration activities from data storage to knowledge management and decision making. In this paper, review of the literatures regarding applications of ICT focused on its applications and effectiveness for administrative activities in an organization. Result may shed light on administrators to improvise and increase the utilization of ICT in daily administrative tasks to make their work more efficient and effective. Thus, ICTs have a prominent role on various fields of Management initiatives. In the current business environment, the implementation of Knowledge Management projects has become easier with the help of technological tools. The value of Knowledge Management is more when made available to the right people at the right time. Thus, knowledge sharing is facilitated through information and communication technologies including computers, telephones, e-mail, databases, data-mining systems, search engines, video-conferencing equipment and many more. The purpose of this study is to identify the significant role of information and communication technologies (ICTs) in Knowledge Management (KM) initiatives that lead to organizational effectiveness.*

Keywords: ICT, Telecommunication, e-Society, e-Government, e-science & technology, e-Management, e-Transport, e-Villages

1. Introduction

Humans have been storing, retrieving, manipulating and communicating information since the Sumerians in Mesopotamia developed writing in about 3000 BC. ICT is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise. The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. Several industries are associated with ICT, such as computer software, electronics, semiconductors and internet, telecom-equipment, e-commerce and computer services.

In a reference to business, the ICT is defined as "the study, design, development, application, implementation, support or management of computer-based information systems". The responsibilities of those working in the field include network administration, software development and installation, and the planning and management of an organization's technology life cycle, by which hardware and software is maintained, upgraded and replaced. ICTs have become, within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICTs and mastering the basic skills and concepts of ICTs as part of the core of education, alongside reading, writing and numeracy. ICT improves the business environment, success of modern business organizations, for achieving their goals. As per records of World Bank report, an increase in high speed internet connections, there is a considerable economic growth. The impact of ICTs is also seen in their creative and cost-efficient application in basic sectors.

Telecommunication is now considered an infrastructure essential to a country's economic development and

competitiveness. Apart from facilitating communication and various economic activities, telecommunications is an economic sectors in ICT self. The mobile phone boom worldwide has created jobs and generated income for the government, operators, manufacturers, service providers, and application/content developers. In developing countries, mobile phones serve as the universal access tool, especially for their low-income populations. ICT consists of ICTs, as well as telecommunication, broadcast media, all types of audio and video processing and transmission and network based control and monitoring functions. The term ICTs is now also used for integration of audio-visual and telecommunication networks with computer networks through a cabling or wirelessly for achieving many incentives. [1, 2]

2. Information & Communication Technology and ICTs applications

Applications of ICT are useful in numerous instances to facilitate the developments of various aspects of the society, which are expressed as under.

(a) E-government: Implement e-government strategies focusing on applications aimed at innovating and promoting transparency in public administrations and democratic processes, improving efficiency and strengthening relations with citizens. Develop national e-government initiatives and services, at all levels, adapted to the needs of citizens and business, to achieve a more efficient allocation of resources and public goods. Support international cooperation initiatives in the field of e-government, in order to enhance transparency, accountability and efficiency at all levels of government. E-government is a key aspect of civil society and it includes a range of services to citizens and industry. It provides various functions that enhance the social, economic and political developments of the citizenry. Most importantly, it provides public information that is

useful to the community at large. ICTs facilitate these public administration activities. For instance, e-Government, a concept that defines a situation where government activities and public information can be made available. In the context of the arrival of a new society, E-government is a witness for changes at different levels, such as, intelligent citizenship, the nature of skills, work processes, job design and Organizational changes and the entire government.

(b) E-Villages and Urbanizations: The rapid development of ICT has greatly accelerated economic globalization. The 21st century is a century of global urbanization and cities will play an increasingly important role in a country or region. The ongoing ICT evolution re-shapes and re-assembles the traditional cities and transforms their social and economic bases enormously. Just like industrial development completely changed the spatial structure of cities in the agricultural society, the progress of information and communication technologies is the key element of the transformation of modern cities.

The Rural development in a country is one of the most important factors for growth of the economy of country. The infusion of ICT is playing a prominent role in strengthening such a demand of ICT applications which are useful in facilitating development programmes in various countries. The establishment of tele-centres and mobile telephony in rural communities can facilitate economic empowerment for facing challenges of backwardness in rural areas. Introduction of computers, e-commerce and cloud computing, are some initiatives of e-government are playing an important role in universal global villages.

(c) E-Transport: E-Transport infrastructure is indispensable for a democratic governance of the country. Moreover, "E-Transport" encompasses the entire process of planning, funding, and building physical facilities, administrating and managing them, monitoring their effectiveness, as well as building the institutions and organizations to regulate and sanction the efficient provision of transport and information services for public interest. E-Transport and ICT services help people's security and social stability, improve productivity and income distribution, support peoples' quality of life directly or indirectly, and enhance the opportunity for people to make use of their potential. E-Transport infrastructure is an indispensable public device to craft "good governance" of the world, nations, and local communities, as well as a mechanism to help people enjoy cultural and human lives.

(d) E-Roads and Transport infrastructure: In nationwide network type infrastructure such as trunk road networks, the issue is the division of roles between central and local government. On the other hand, in local area network type infrastructure such as rural roads, participation by and reflection of the needs of beneficiaries also become important. Division of role between central and local governments is associated with classification of roads according to their function and service coverage of the corresponding supervisory agency. How to distribute

road-related funds to finance maintenance is also an important issue in E-roads concept.

(e) E-Railway: In nationwide network type infrastructure such as national railways network, horizontal unbundling depending on the railway project service type or area based division of service provider has been implemented as a sector reform. This does not match with the decentralization concept of administrative organization stated here. Transport facilities of interurban railway, urban railway, and local railway are provided either by public sector unit which owns railway facilities in the case of horizontal unbundling or by railway organization serving the respective area in the case of area based division.

(f) E-Port and Airport: Similar to roads, in the case of port and airport, the central government operates and maintains major ports and airports, which function as the nodes of major maritime and air traffic. In other ports and airports, local government plays a large role in constructing, operating and maintaining the facility, by providing investment funds and by operating the facility by ICT self. Therefore, the issue relates to how to divide the coverage of responsibilities and funding in planning, building, operating, and maintenance between central and local governments.

(g) E-Service Provision: When the transport sector is deregulated parallel to decentralization, local government faces the problems of how to promote entry of private sector and how to develop local transport industry, as targeted service area of transport service is limited for urban and local transport (subway and bus) services. In such case, local government takes over the role of central government, which has been traditionally assured, by the central government such as developing the comprehensive urban transportation strategy and planning and maintenance of each transport mode.

(h) E-education: E-education sector is arguably one major area that ICTs are playing remarkable a role. These technologies help in facilitating learnship and exchange of educational materials. ICTs are helping library professionals store and manage academic information. Libraries have migrated from the traditional cataloguing system to an e- system, which is a web-based cataloguing and search application. The online learning system is another web-based application that is revolutionalising the learning platform of education. This system compliments the traditional face-to face teaching and learning format. In the on-line system, students can access class notes, submit assignment and also join a discussion group with other learners.

3. Impact of ICTs

The big stories in ICT development are not of particular breakthrough technologies, but rather those of rapid and continuous improvement in price performance of computing and communications, the explosion of bandwidth capacity in fixed and mobile networks, and the emergence and development of the internet and internet-based applications.

Perhaps the most important development is the convergence of technologies, which is opening up new possibilities in a number of fields. Over recent years the drug discovery pipeline has been a concern for many in the pharmaceutical industry. Escalating costs, increasing complexity and a dwindling population of drug candidates suggest that traditional R&D methods are unlikely to produce enough breakthrough drugs to ensure industry growth. The convergence of information and bio-technologies is already revolutionizing drug discovery and design and may radically alter the economics of the drug discovery over the coming years. In a detailed analysis of the potential economic impacts of genomics and genetics on the pharmaceutical industry's R&D pipeline. There is an enormous range of opportunities for significant cost reductions, service enhancements and behavioural change through what is often broadly referred to as 'e-health'. The major impact of ICTs on payers will be the ability to manage the system in order to better account for expenditures, to manage the flow of funds and contain costs. There will be strong motivation to adopt systems which enable payers to track expenditures and exercise control over the processes of referral and prescription of health services.

It is clear that the entire healthcare system could reap significant gains from an integrated approach to supply chain management that includes the entire range of hospital and medical supplies and linkages to other players in the healthcare system. Electronic scheduling and patient management systems could improve scheduling of tests and procedures, and thereby reduce the length of hospital stays and reduce the need for multiple ICTs. Linking insurers, healthcare providers, financial institutions and consumers into claiming and payments systems also has the potential to reduce significantly administrative costs and improve quality of service. From the perspective of individual medical practitioners, knowledge enrichment or education, practice administration, and clinical tools are among the most important ICTs applications. ICTs are altering the relationship and balance of power between patients and providers, leading to more empowered consumers and enhanced self, home and community care capabilities. Perhaps the greatest change in the patient-provider relationship will be brought about by the use of internet by patients.

ICTs applications are becoming valuable resources in the medical field. They support efficient exchange of information between health professionals, they enable transfer of patient records between sites and they can improve clinical effectiveness, continuity, and quality of care by health professionals ICTs applications facilitates telemedicine. Telemedicine provides medical service to people in geographically diverse settings: at home and in isolated places or in emergencies.[3-6]

4. Applications of ICTs in Other Area's

ICTs applications can support sustainable development, in the fields of public administration, business, education and training, health, employment, environment, agriculture and science within the framework of national e-strategies. This would include actions within the following sectors. For most

of businesses, there are a variety of requirements for information. Senior managers need information to help with their business planning. Middle management needs more detailed information to help them monitor and control business activities. Employees with operational roles need information to help them carry out their duties. [7]

5. E- Business

Information System	Description
Executive Support Systems	An Executive Support System (ESS) is designed to help senior management make strategic decisions. It gathers analyses and summarises the key internal and external information used in the business. A good way to think about an ESS is to imagine the senior management team in an aircraft cockpit - with the instrument panel showing them the status of all the key business activities. ESS typically involves lots of data analysis and modelling tools such as "what-if" analysis to help strategic decision-making.
Management Information Systems	A management information system (MIS) is mainly concerned with internal sources of information. MIS usually take data from the transaction processing systems (see below) and summarise it into a series of management reports. MIS reports tend to be used by middle management and operational supervisors.
Decision-Support Systems	Decision-support systems (DSS) are specifically designed to help management make decisions in situations where there is uncertainty about the possible outcomes of those decisions. DSS comprise tools and techniques to help gather relevant information and analyze the options and alternatives. DSS often involves use of complex spreadsheet and databases to create "what-if" models.
Knowledge Management Systems	Knowledge Management Systems (KMS) These are typically used in a business where employees create new knowledge and expertise, which can then be shared by other people in the organization to create further commercial opportunities. To share the knowledge, a KMS would use group collaboration systems such as an intranet.
Transaction Processing Systems	Transaction Processing Systems (TPS) are designed to process routine transactions efficiently and accurately. A business will have several TPS, depends upon the nature of organisations and type of business.
Office Automation Systems	Office Automation Systems (OAS) is systems that try to improve the productivity of employees who need to process data and information. To improve the productivity of employees working in an office.

6. E-Communication

Telecommunication is the transmission of information over significant distances to communicate. In earlier times, telecommunications involved the use of visual signals, such as beacons, smoke signals, semaphore telegraphs, signal flags, and optical heliographs, or audio messages via coded drumbeats, lung-blown horns, or sent by loud whistles, for example. In the modern age of electricity and electronics, telecommunications now also includes the use of electrical devices such as the telegraph, telephone, and teleprinter, as well as the use of radio and microwave communications, as well as fiber optics and their associated electronics, plus the use of the orbiting satellites and the Internet. [8,9]

- a) **Telecommunication Networks:** A communications network is a collection of transmitters, receivers, and communications channels that send messages to one another. Some digital communications networks contain one or more routers that work together to transmit information to the correct user. An analog communications network consists of one or more switches that establish a connection between two or more users. For both types of network, repeaters may be necessary to amplify or recreate the signal when it is being transmitted over long distances. This is to combat attenuation that can render the signal indistinguishable from the noise.
- b) **Communication Channels:** The term "channel" has two different meanings. In one meaning, a channel is the physical medium that carries a signal between the transmitter and the receiver. Examples of this include the atmosphere for sound communications, glass optical fibers for some kinds of optical communications, coaxial cables for communications by way of the voltages and electric currents in them, and free space for communications using visible light, infrared waves, ultraviolet light, and radio waves called the "free space channel".
- c) **Modulation:** The shaping of a signal to convey information is known as modulation. Modulation can be used to represent a digital message as an analog waveform. This is commonly called "keying", a term derived from the older use of Morse code in telecommunications and several keying techniques exist. The "Bluetooth" system, for example, uses phase-shift keying to exchange information between various devices. There are several different modulation schemes available to achieve amplitude modulation (AM) and frequency modulation (FM). Telecommunication has a significant social, cultural and economic impact on modern society. The impact of telecommunication on society is a majorly based economic and social impact.[10-15]

7. E-Economics

On the microeconomic scale, companies have used telecommunications to help build global business empires. This is self-evident in the case of online retailer Amazon.com but, according to academic Edward Lenert, even the conventional retailer Wal-Mart has benefited from better telecommunication infrastructure compared to ICTs competitors. In cities throughout the world, home owners use their telephones to order and arrange a variety of home services ranging from pizza deliveries to electricians. Even relatively poor communities have been noted to use telecommunication to their advantage. In Bangladesh's Narshingdi district, isolated villagers use cellular phones to speak directly to wholesalers and arrange a better price for their goods. In Côte d'Ivoire, coffee growers share mobile phones to follow hourly variations in coffee prices and sell at the best price. On the macroeconomic scale, Lars-Hendrik Röller and Leonard Waverman suggested a causal link between good telecommunication infrastructure and economic growth.[16-21]

8. E-Medical Care

Promote collaborative efforts of governments, planners, health professionals, and other agencies along with the participation of international organizations for creating a reliable, timely, high quality and affordable health care and health information systems and for promoting continuous medical training, education, and research through the use of ICTs, while respecting and protecting citizens' right to privacy. Facilitate access to the world's medical knowledge and locally-relevant content resources for strengthening public health research and prevention programmes and promoting women's and men's health, such as content on sexual and reproductive health and sexually transmitted infections, and for diseases that attract full attention of the world.[22-26]

9. E-Science & Technology

Promote affordable and reliable high-speed Internet connection for all universities and research institutions to support their critical role in information and knowledge production, education and training, and to support the establishment of partnerships, cooperation and networking between these institutions. Promote electronic publishing, differential pricing and open access initiatives to make scientific information affordable and accessible in all countries on an equitable basis and applications of peer-to-peer technology to share scientific knowledge and pre-prints and reprints written by scientific authors who have waived their right to payment. Express the long-term systematic and efficient collection, dissemination and preservation of essential scientific digital data, in all countries.[27-31]

10. E-Society

Telecommunication has played a significant role in social relationships. Nevertheless devices like the telephone system were originally advertised with an emphasis on the practical dimensions of the social devices. New promotions started appealing to consumers' emotions, stressing the importance of social conversations and staying connected to family and friends. Since then the role that telecommunications has played in social relations has become increasingly important. In recent years, the popularity of social networking sites has increased dramatically. [32-35]

11. Conclusion

Globalization is powered in part by tremendous and rapid ICTs advances, and young people are often among the first to take advantage of new developments in this area. Youth are capable of using ICTs in diverse and novel ways, as a result of which traditional forms of socialization such as the family and school are increasingly being challenged and overtaken. Many of the perceptions, experiences and interactions that young people have daily are "virtual", transmitted through various forms of information and entertainment technology, the foremost of which continues to be television rather than the Internet. These technologies offer a culture of information, pleasure and relative autonomy, all of which are particularly appealing to young

people. Youth are at the forefront of the information revolution, but they face the challenge of reconciling the reality of their daily existence with the popular images presented in the media. Many young people are simultaneously experiencing life within the global and local spheres. They may develop a global consciousness yet still have to function and survive in their own locality and culture. At the same time, many young people, particularly in developing countries, are excluded from the information revolution, leaving them on the wrong side of the digital divide. A fundamental question about how ICTs and the digital divide relate to the process of global development is not about technology or politics; it is about reconciling global and local practices. The challenge is to give culturally valid meaning to the use of new technologies. While the importance of ICTs use for development cannot be underestimated, it should not be seen as a panacea that will solve problems of unemployment or social exclusion in the near future. This observation is of particular relevance to young people, because there is ample reason to question whether the adoption of technology-based development strategies will produce results of real benefit to all young people.[36,37] It will take many years for all youth to gain access to the opportunities promised by ICTs. Notwithstanding these caveats, there is reason to be cautiously hopeful and optimistic about the potential of ICTs, especially in view of the relative advantage young people have in embracing these technologies for their own benefit.

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