

THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGIES ON ECONOMIC COMPETITIVENESS

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ABSTRACT

Information Technology (IT) involves the use of computers and telecommunications devices to store, access, convey, and process data typically within a business or similar organization. The phrase is often used interchangeably with computers and computer networks, but it also includes other technologies for information distribution like television and telephones. Multiple sectors are linked to information technology, such as computer hardware, software, electronics, semiconductors, internet, telecommunications equipment, e-commerce, and computer services. Numerous companies today possess IT departments to oversee the computers, networks, and various technical aspects of their operations. IT positions encompass computer programming, network administration, computer engineering, web development, technical support, and various other similar roles. As we reside in the "information era," information technology has integrated into our daily routines. This indicates that the phrase "IT," which is already excessively used, is not going anywhere.

Keywords: Information Communication Technologies, Economy, Economic Competitiveness

INTRODUCTION

There has been an increase in the recognition of information and communication technologies (ICTs) as one of the most significant factors contributing to the growth and development of countries around the world in the twenty-first century. According to research, the use of information and communication technologies has been demonstrated to have a positive effect on productivity, efficiency, gross domestic product, and innovation activities in an organization. The development of an organization can be achieved in a variety of ways, all of which contribute to its success in the long run. Using information communication technologies contributes to improving the quality of education systems, changing the structure of business processes, facilitating employment opportunities among individuals, and facilitating daily activities among individuals. Additionally, information and communication regarding technology contribute to improving the quality of educational systems as well.

CURRENT SCENARIO

The World Economic Forum (WEF) publishes the Global Competitiveness Report on a regular basis. The report describes competitiveness as a set of institutional, policy, and factor factors that determine the level of productivity of a country. As part of its Global Competitiveness Index (Global Competitiveness Index), the WEF measures competitiveness in terms of three subindices and 12 pillars. It is important to note that the overall competitiveness index (Global Competitiveness Index) is made up of three subindices (Basic requirements, Efficiency enhancers, and Innovation and sophistication factors) which are composed of the different pillars of competition. There are associated costs associated with using and taking advantage of ICTs, both in terms of capital and human skills investments and in terms of the transformation of labor markets in order to realize the benefits of ICTs. In addition to the use of ICTs in production processes, structural changes are also associated

with their use. The implementation of these policies is often hindered by a lack of social dialogue as a result of social conflict. Therefore, policies must be able to adapt to the structural changes that result from such changes in order to be effective. It is important that any policy relating to ICT should take into account the costs associated with disseminating ICTs and ensuring an orderly adjustment of human resources.

As a result of the introduction of the Basic Requirements Index, we can identify four pillars of competitiveness: Institutions, Infrastructure, Macroeconomic Environment, and Health and Primary Education. There are six pillars of competitiveness that make up the Efficiency enhancers sub index: Higher education and training, Goods market efficiency, Labor market efficiency, Financial market development, Technological readiness, and Market size. Innovation and sophistication factors are two pillars of competitiveness that make up the Innovation and sophistication factors sub index: Business sophistication and Business innovation. According to the Geneva Plan of Action of the WSIS conference, all stakeholders should work together to promote ICT applications that support development for all. A special emphasis is placed on encouraging SMEs to utilize ICT in order to foster innovation, to realize productivity gains, to reduce the costs of transactions and to fight poverty as a result of ICT adoption. As a result of the report, a number of areas have been identified where action is required, such as the development of policy and regulatory frameworks to support the participation of SMEs, and the promotion of the use of e-business and international trade in developing countries. A thematic meeting on ICT and economic and social development has been jointly organized by four international organizations that are working on the subject of ICT and economic and social development in response to the Geneva Plan of Action and as a contribution to the second phase of the WSIS. ICT and development will be discussed at this workshop, as well as policies and practices that should be adopted in order to ensure that ICT adoption leads to equitable economic growth in an equitable manner.

Research has shown that global countries, which are also the most competitive in the world, have a leading role in the use and implementation of ICT when it comes to both firms investing significant funds in development of ICT as well as residents who make extensive use of ICT in their daily lives. According to the research and results of the study, the use of ICT in a country has a different impact on the competitiveness of that country depending on the level of economic and social progress of that country when it comes to the use of ICT. In addition to being one of the most developed countries in the world, Western, Northern, and Central Europe are also among the most competitive nations in the world and they lead both in terms of investments and in terms of the development and use of information and communication technology.

IMPORTANCE OF INFORMATION TECHNOLOGY

- **IT helps in re-engineering of work practices:** re-engineering is the reshaping of business process to eliminate obstacles that prevent an organization from providing better services and products and to help the organization capitalize on its strength. Many organizations have used information technology tools to increase and improve on their production
- **Speed:** Users of information technology can use tools like computers to perform different tasks faster and accurately. A computer can perform multiple functions on the same time which can not be done by humans. This helps users perform a given task on time and it even reduces tension and stress at work. Computers have applications which can store data in a systematic way making it easy to understand and organize important facts. Another important tool is internet, this can be accessed

any where at any given time, so users can easily interact with each other and exchange relevant information.

- **Consistency and accuracy:** Even though information technology is managed by humans, it is more likely to be more accurate than humans. Users are well trained on how to use information technology tools. For example, an accountant will be trained on how to use accounting software like Quick-books to perform accounting tasks. This user has formal knowledge on all accounting basics and they are as well equipped with IT knowledge to help them carry out their accounting tasks using software. The benefit in this is that, the user trained has formal knowledge on the subject in question and all they need is an IT tool which makes all their work easier and accurate.
- **Reliability:** Information technology systems can run 24hrs 7 days a week. These systems can only be interrupted for repairs and maintenance which takes just a few hours and the system will be up for use. This is a win-win process for both organizations and customers who need the service in time. Let's take a simple example of a Bank.

FUNCTIONS OF INFORMATION TECHNOLOGY

- **Data capture:** This is the process of compiling information. For example, electronic commerce companies like AMAZON.COM use internet cookies to capture data about a customer's purchases via their website. So in this case, they use this data to suggest items to a user related to their previous orders via their website. Also GOOGLE.com uses internet cookies to monitor websites and content we search for online, then they use that data to suggest adverts tailored basing on our interests.
- **Data Processing:** This involves converting, analyzing, computing and producing all forms of data, information. After capturing data, the system must re-organize that data basing on what the organization wants to use that information for. For example, when an e-commerce website captures data about your previous purchases via their website.
- **Generation of Information:** This involves organizing information into a useful form.
- **Storage of information:** This involves retaining information for future use. The best example is "Facebook.com" This is a social network which connects people, but upon registering with the network, the user will provide their interests, profession, background information like former college, etc.... Then facebook will use this information to suggest friends to that user.
- **Retrieval of Information:** It is process by which a computer device is used to find and copy data for further distribution and processing. A good example on this is a "Search Engine like Google, Bing, Yahoo" these companies have data centers which store information which can be used at a latter stage by the end user who will be searching for information online. They have robots which crawl and find information on website servers, this information is indexed and cached on data centers.

FIVE IT FUNCTIONS IN AN ORGANIZATION

- **IT helps small businesses remain competitive.**

Information technology transformed the way small businesses operate and interact with its key stakeholders, including employees, suppliers, customers and investors. From desktops and mobile devices to small business servers and powerful search engines, IT

helps small businesses manage daily operations, control costs and compete with large and established companies.

➤ **Communication**

IT enables efficient and high-speed communications. Email, teleconferencing and Internet calling allow employees to stay in touch with their colleagues around the world. IT also enables virtual collaboration. For example, U.S. employees can conduct product design meetings with their Chinese or Indian colleagues using video-conferencing. Employees can log into their company servers from home, and traveling managers can respond to emails or download documents using mobile technologies. Companies can also set up internal social media sites that allow employees to exchange information and collaborate on projects.

➤ **Data Management**

Data management is a key IT function. Technological advances and increasingly complex businesses have increased text, voice and video data traffic inside organizations. Businesses use databases to store, manage and access vast amounts of data, including customer information, inventory records, employee files and financial documents.

➤ **Marketing**

IT is increasingly central to a company's marketing operations. These may include creating advertising copy on powerful graphics computers, placing ads on social media sites and processing online orders on an e-commerce site. Small business owners can use online search engines to research consumer buying trends and identify profitable marketing opportunities.

➤ **Process Improvement**

Companies can leverage IT to improve processes and achieve cost savings. For example, a small business could insist on paperless communication inside the company to save on printing and duplication costs, while achieving reliable data transfer. Virtual collaboration saves on expensive travel costs and improves productivity because employees do not have to spend hours or days on planes and at airport terminals.

➤ **Enterprise Resource Planning**

Enterprise resource planning is the use of software systems to link together business functions, including sales, manufacturing, human resources and accounting. Management gets access to real-time aggregated information, which helps in operational and strategic decision-making. For large companies, these systems can be expensive and the installation can disrupt operations for months. However, small businesses can install the software modules for one function at a time, thus minimizing costs and disruptions.

SIGNIFICANCE OF IT IN EDUCATION

1. Access to variety of learning resources

In the era of technology. IT aids plenty of resources to enhance the teaching skills and learning ability. With the help of IT now it is easy to provide audio visual education. The learning resources are being widens and widen. Now with this vivid and vast technique as part of the IT curriculum, learners are encouraged to regard computers as tools to be used in all aspects of their studies.

2. Immediacy to information

IT has provided immediacy to education. Now in the year of computers and web networks the pace of imparting knowledge is very very fast and one can be educated anywhere at any time. New IT has often been introduced into well-established patterns of working and living without radically altering them.

3. Any time learning

Now in the year of computers and web networks the pace of imparting knowledge is very very fast and one can be educated .One can study whenever he wills irrespective of whether it is day or night and irrespective of being in India or in US because of the boom in IT.

4. Collaborative learning

Now IT has made it easy to study as well as teach in groups or in clusters. With online we can be unite together to do the desired task. Efficient postal systems, the telephone (fixed and mobile), and various recording and playback systems based on computer technology all have a part to play in educational broadcasting in the new millennium.

5. Multimedia approach to education

Audio-Visual Education, planning, preparation, and use of devices and materials that involve sight, sound, or both, for educational purposes. Among the devices used are still and motion pictures, filmstrips, television, transparencies, audiotapes, records, teaching machines, computers, and videodiscs. The growth of audio-visual education has reflected developments in both technology and learning theory.

6. Authentic and up to date information

The information and data which are available on the net is purely correct and up to date. Internet, a collection of computer networks that operate to common standards and enable the computers and the programs they run to communicate directly provides true and correct information.

7. Online library

Internets support thousands of different kinds of operational and experimental services one of which is online library. We can get plenty of data on this online library.

8. Distance learning

Distance Learning, method of learning at a distance rather than in a classroom. Late 20th-century communications technologies, in their most recent phases multimedia and interactive, open up new possibilities, both individual and institutional, for an unprecedented expansion of home-based learning, much of it part-time. The term distance learning was coined within the context of a continuing communications revolution, largely replacing a hitherto confusing mixed nomenclature—home study, independent study, external study, and, most common, though restricted in pedagogic means, correspondence study. The convergence of increased demand for access to educational facilities and innovative communications technology has been increasingly exploited in face of criticisms that distance learning is an inadequate substitute for learning alongside others in formal institutions.

9. Better accesses to children with disabilities

Information technology has brought drastic changes in the life of disabled children. IT provides various software and technique to educate these poor peoples. Unless provided early with special training, people profoundly deaf from birth are incapable of learning to speak. Deafness from birth causes severe sensory deprivation, which can seriously affect a person's intellectual capacity or ability to learn. A child who sustains a hearing loss early in life may lack the language stimulation experienced by children who can hear.

CHALLENGES IN INFORMATION TECHNOLOGY

Information technology challenges for long-term preservation of electronic information

Within the area of long-time preservation of electronic information there are many different problems remaining to be solved. The problems concern technical issues but also organizational and legal issues. Karjalainen et al [2000] has in their study found that Enterprise Document Management systems can be seen as a comprehensive framework for managing information resources, including both human and technological systems in a holistic way. This view covers organizational and legal issues as well as the technological challenges.

Technical problems

Issues at stake in this domain are of a variety of types, covering hardware, software and formats. The large amount of electronic records, which require to be stored for active use, in turn demands new mass storage media. Another problem is the fragility of the media which leads to low durability. There is often also a lack of knowledge concerning the durability of different media for storage. In addition, poor security exists for many electronic files [Wilson, 2000]. The software problem concerns the rapid development of new versions of the software product and occasionally changeovers to new software products.

BIGGEST CHALLENGES FACING IT PROFESSIONALS

A. New Technology

Technology advances rapidly and shows up in media on all sides. This means users, managers at all levels and even competitors pressure IT staff to implement this new technology just because it is new. The real challenge is deciding which of these new technologies will work to the best interest of advancing the organization and which is better to avoid for now.

B. Cloud

Many organizations have yet to make cloud plans. They choose to keep their data and applications in-house and manage everything themselves.

With the advances of cloud offerings and to future-proof the network, preparing the organization for a potential future cloud move is simple common sense. For example, what happens when organizational management decides to set up an internal cloud solution. Maybe that is a step toward moving applications and data off-site.

C. Big Data Analytics

Data is projected to grow by 800 percent in the next five years. The big challenge is that more than 80 percent of it unstructured. Unstructured data varies in its formats, including

plain text, email, blog, formatted document, standard and non-standard image, video, voice, animation, sensor input and web search logs. Unstructured data is growing faster than structured data.

D. Virtualization

Virtualization continues to expand from desktops to servers to switches, routers and firewalls. Virtualization will provide a much higher level of control of these devices rather than saving money. In fact, the organization's infrastructure will require larger servers, more VM licenses, and emulation software in addition to the continuing cost of desktop licenses.

E. BYOD and BYOA

For years, IT has controlled user's devices. With the advent of smartphones and tablets, that has changed. Users now bring in their own devices without IT's knowledge. They use them for both personal and work-related tasks. IT's initial plan was to attempt to maintain control. The facts are clear: Controlling user-owned devices in an organization's network is nearly impossible.

F. Shadow IT

IT continues to have a poor image inside organizations. Whether it be slow response times, dictatorial actions, or software challenges, many IT departments are facing users' preference of going to intra-department super users for help. Add the easily available cloud software and services, organizations see users and groups head toward bypassing the IT department altogether. They find and purchase third party SaaS (Software as a Service) packages to meet their needs.

G. Boomers

Starting in 2012, about 10,000 baby boomers will become eligible to retire every day for the next 15 to 20 years in North America. A lot of those potential retirees are IT people who have years of both IT and organization-specific knowledge and experience.

H. Energy Efficiency

According to most estimates, a 25,000 square foot data center will use about \$4 million in energy this year. At that rate, a savings of just a few percent can make a big difference to an IT budget. With an increasing trend of expanding green initiatives and alternate sources of energy, organizations are working on ways to improve energy monitoring and efficiency.

I. User Systems

Desktops, laptops, notebooks, tablets and smartphones are already an integral part of many users lives. In some cases, it has become increasingly difficult to draw the line between them. Will tablets replace laptops and notebooks? Will desktops go the way of the dinosaurs?

J. Interoperability

Users and customers are more demanding of the products on their desktops and mobile devices. It all comes down to communicating with each another. Systems need to send and receive data that will be compatible on all user platforms.

K. Creating value

This is a recurring IT issue. It's now a priority. IT departments must focus on improving service to the organizational user and to the organization's departmental needs. To do so, IT managers must remove any non-essential activities that are in the way.

THE ROLE OF IT IN STRATEGIC MANAGEMENT

1. **Innovative applications.** IT creates innovative applications that provide direct strategic advantage to organizations. For example, Federal Express was the first company in its industry to use IT for tracking the location of every package in its system. Next, FedEx was the first company to make this database accessible to its customers over the Internet. FedEx has gone on to provide e-fulfillment solutions based on IT and is even writing software for this purpose (Bhise et al., 2000).
2. **Competitive weapons.** ISs themselves have long been recognized as a competitive weapon (Ives and Learmouth, 1984, and Callon, 1996). Michael Dell, founder of Dell Computer, puts it bluntly: "The Internet is like a weapon sitting on the table, ready to be picked up by either you or your competitors".
3. **Changes in processes.** IT supports changes in business processes that translate to strategic advantage (Davenport, 1993). For example, Berri is Australia's largest manufacturer and distributor of fruit juice products. The principal goal of its enterprise resource planning system implementation was "to turn its branch-based business into a national organization with a single set of unified business processes" in order to achieve millions of dollars in cost-savings (J.D. Edwards, 2002a). Other ways in which IT can change business processes include better control over remote stores or offices by providing speedy communication tools, streamlined product design time with computer-aided engineering tools, and better decision-making processes by providing managers with timely information reports.
4. **Links with business partners.** IT links a company with its business partners effectively and efficiently. For example, Rosenbluth's Global Distribution Network allows it to connect agents, customers, and travel service providers around the globe, an innovation that allowed it to broaden its marketing range (Clemons and Hann, 1999).
5. **Cost reductions.** IT enables companies to reduce costs. For example, a Booz- Allen & Hamilton study found that: a traditional bank transaction costs \$1.07, whereas the same transaction over the Web costs about 1 cent; a traditional airline ticket costs \$8 to process, an e-ticket costs \$1. In the customer service area, a customer call handled by a live agent costs \$33, but an intelligent agent can handle the same request for less than \$2 (Schwartz, 2000).
6. **Relationships with suppliers and customers.** IT can be used to lock in suppliers and customers, or to build in switching costs (making it more difficult for suppliers or customers to switch to competitors).
7. **New products.** A firm can leverage its investment in IT to create new products that are in demand in the marketplace. According to Vanden Bosch and Dawar (2002, p. 38), "The redefinition of ICI's role not only generated much higher margins for the business, it also gave ICI a much more defensible competitive position".

8. **Competitive intelligence.** IT provides competitive (business) intelligence by collecting and analyzing information about products, markets, competitors, and environmental changes (Guimaraes and Armstrong, 1997).

STRATEGIES FOR COMPETITIVE ADVANTAGE

1. **Cost leadership strategy:** Produce products and/or services at the lowest cost in the industry. A firm achieves cost leadership in its industry by thrifty buying practices, efficient business processes, forcing up the prices paid by competitors, and helping customers or suppliers reduce their costs.
2. **Differentiation strategy:** Offer different products, services, or product features. By offering different, “better” products companies can charge higher prices; sell more products, or both.
3. **Niche strategy:** Select a narrow-scope segment (niche market) and be the best in quality, speed, or cost in that market.
4. **Growth strategy:** Increase market share, acquire more customers, or sell more products. Such a strategy strengthens a company and increases profitability in the long run. Web-based selling can facilitate growth by creating new marketing channels, such as electronic auctions.
5. **Alliance strategy:** Work with business partners in partnerships, alliances, joint ventures, or virtual companies. This strategy creates synergy, allows companies to concentrate on their core business, and provides opportunities for growth.
6. **Innovation strategy:** Introduce new products and services, put new features in existing products and services, or develop new ways to produce them. Innovation is similar to differentiation except that the impact is much more dramatic. Differentiation “tweaks” existing products and services to offer the customer something special and different. Innovation implies something so new and different that it changes the nature of the industry.
7. **Operational effectiveness strategy:** Improve the manner in which internal business processes are executed so that a firm performs similar activities better than rivals (Porter, 1996). Such improvements increase employee and customer satisfaction, quality, and productivity while decreasing time to market. Improved decision making and management activities also contribute to improved efficiency.
8. **Customer-orientation strategy:** Concentrate on making customers happy. Strong competition and the realization that the customer is king (queen) is the basis of this strategy. Web-based systems that support customer relationship management are especially effective in this area because they can provide a personalized, one-to-one relationship with each customer.
9. **Time strategy:** Treat time as a resource, then manage it and use it to the firm’s advantage. “Time is money,” “Internet time” (i.e., three months on the Internet is like a year in real time), first-mover advantage, just-in-time delivery or manufacturing, competing in time (Keen, 1988), and other time-based competitive concepts emphasize the importance of time as an asset and a source of competitive advantage. One of the driving forces behind time as a competitive strategy is the need for firms to be immediately responsive to customers, markets, and changing market conditions. A second factor is the time-to-market race. By introducing innovative products or using IT to provide exceptional service, companies can create barriers to entry from new entrants.

10. **Lock in customers or suppliers strategy:** Encourage customers or suppliers to stay with you rather than going to competitors. Locking in customers has the effect of reducing their bargaining power.

CONCLUSION

Many of these same challenges have made lists like this before. Some probably will make next year's list as well. IT managers and staff will continue to face issues brought to them by users, customers and departmental managers while they continue to work toward providing IT solutions that best support organizational priorities.

This article provides a light on the challenges and, hopefully, will encourage IT and organizational management some guidelines for prioritizing issues. Presenting them in this way may also show providers areas that they can help IT managers overcome them.

Because information has emerged as an agent of integration and the enabler of new competitiveness for today's enterprise in the global marketplace and because strategic IS supports or shapes competitive strategies, the concepts of ISs is so important, IT can be used to support a variety of strategic objectives, including creation of innovative applications, changes in business processes, links with business partners, reduction of costs, acquiring competitive intelligence, and others. In this article we consider the opinion of some of ISs scientists and reviewed the literature of strategic ISs, competitive advantage and porter's model for competitive situations.

According to above subject we can say one of the important factors in new challengeable business environment is emphasis on strategic ISs and this is no ended research topic. We believe for achieving successfulness, organizations must establish all aspects of their planning structures based on strategic planning and otherwise only word that can communicate of results is failure.

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