

ICT for fostering global best practices in the business environment

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Abstract: It is common knowledge that the use of appropriate Information and Communication Technologies (ICTs) has come to revolutionize the 21st century business environment, hence becoming a most pertinent metric of global best practice assessment in recent times. This paper traces the origins of ICTs in business practices along a developmental timeline that highlights specifically, the needs for, sources, and status of technologies that have significantly revolutionized business best practices through the years. Evaluations from surveys of industry response and perception are also reviewed as determinants of future direction for best practices in the business environment with a focus on developed and developing economies. The authors are able to further substantiate evidences of the fact that ICT could be a very pertinent benchmark for best practices adoption by various firms in the 21st Century business environment, as well as a key component for economic growth of the nations.

Keywords: ICT, Best Practice, Business Environment, Benchmark

1. Introduction

Globalization and technological changes have created a new global economy “powered by technology, fuelled by information and driven by knowledge [1]. [2], affirms that ICT occupies a complex position in relation to globalization. The emergence of this new global economy has serious implications on the nature and purpose of organizations and institutions in a business environment.

The new age business environment is very dynamic and undergoes rapid changes as a result of technological innovation, increased awareness and consumer demands. Business organizations of the 21st century operate in a complex and competitive environment characterized by these changing conditions and highly unpredictable economic climate. Information and Communication Technology (ICT) is at the centre of this global change.

Archimedes (287 – 212 BC) said, “Give me a lever long enough and a fulcrum on which to place it and I shall move the whole world”. We opine that the fulcrum he talked about

could be understood to be Information and Communication Technology (ICT).

The application of information and communication technology concepts, techniques, policies and implementation strategies to the business environment has become a subject of fundamental importance and concern to all organizations and indeed a prerequisite for local and global competitiveness. ICT directly affects how managers decide, how they plan and what products and services are offered in the business environment. It has continued to change the way organizations and their corporate relationships are organized worldwide and the variety of innovative devices available to enhance the speed and quality of service delivery.

As we advance towards the frontiers of the coming digital revolution, the level of ICT adoption and participation in the workings and operations of various organizations is unarguably becoming a key benchmark in rating the level of incorporation of global best practices in the way these organizations run and a major index for measuring the

relevance of these organizations in competing on the global scene with regards to their current ranking and survivability in the coming years.

The term '*business environment*' connotes external forces, factors and institutions that are beyond the control and affect the functioning, of a business enterprise. The external forces include customers, competitors, suppliers, government, and the social, political, legal and technological factors, etc. (see figure 1). While some of these factors or forces may have direct influence over the business firm, others may operate indirectly. Thus, business environment may be defined as the total surroundings, which have a direct or indirect bearing on the functioning of business [3]. Fundamentally, the success of a business endeavour has proven to be explicitly linked to a proper understanding of the forces and factors at play in the intended business environment.

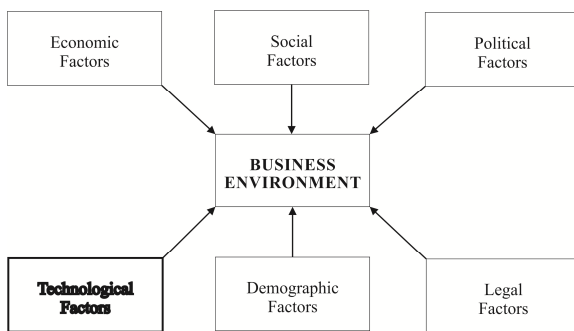


Figure 1. The Business Environment and Forces that act on it [3]

According to [4], "it is important for companies [businesses] to determine when and how a technology is changing an industry, and to understand the strategic influence of the new technology [on the industry]." This re-emphasizes the importance of understanding and adapting to various emerging technological trends in the modern business environment, because in the view of most authors, ICT is often viewed merely as a tool for cutting costs, but in reality it is the innovation potential opened up by ICT that determines an enterprise's future competitiveness in the global market

The technological environment is a very significant external factor determining the destiny of business organizations. Supported by computerized operations, modern business organizations have succeeded in analysing customers, minimizing the defects in products, ensuring service at the right time and place, etc. While communication was prone to undue delays ten year ago, business communications are instantaneous in our world today, thanks to modern satellite technology. Organizations have come to realise that research and development are the cornerstones for organizational growth and stability. They have thus become more pro-active and remain as change catalysts of the economy. Governments have also become more technology reliant with the adoption of various forms of ICTs in their operations, from robust government websites and portals to police controls, registration of title deeds, etc. Customer servicing through call centres is the latest necessity of

organizations. New technologies can be used very effectively to counter inflation and recession. New machines can reduce production costs. Advances in information technology have also made it possible to plan global supply chains, enabling companies to make better products at lower costs and distribute them efficiently.

1.1. The Relationship between "Benchmark" and "Best Practice"

Originally, "*benchmark*" as a term was used to refer to measured performance metrics/indices based on which different products from different manufacturers were assessed. Today, benchmarks are used to enhance business processes with the goal of achieving better products and services, thereby gradually evolving from being "a continuous and systematic process of evaluation of products and services" [5], to becoming "a continuous process of identification, learning and implementation of best practices in order to obtain competitive advantages, be it internal, external or generic" [6], [7]

The term "*best practice*" can be seen as "a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark." It is a term used basically to describe the process of developing and following a standard way of doing things [drawn from that which has worked best in the past] which multiple organizations can use. This definition tends to further suggest that a "best practice" can evolve to become better as improvements are discovered and implemented. In identifying best practices, [6] developed a method called Best Practices Specification that has been widely used in defining and specifying best practices. They opined that in order to characterise as best practices, a given [business] process or technique, a functional relationship should be established between the binding principles of customer expectations, internal expectations, functions of the process/technique, means of the process/technique and the practices specifications; and seeking to intersect these principles. ICT is becoming one of relatively few business practices that synergizes and intersects these principles in such a seamless way that is quite difficult to break apart. This is summarized in figure 2.

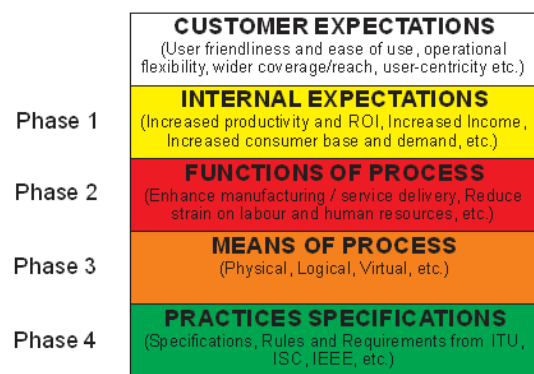


Figure 2. Principles of Best Practices Specification (BPS) [6]

In most cases when the application of ICT in Business is being discussed, what easily comes to mind for many is whether or not their companies or organizations have a working access or connection to the Internet; whereas the Internet comprises just one of the fundamental utilities / resources that facilitate global best practices in business.

Information and Communications Technology (ICT), a term that is often used interchangeably with Information Technology (IT), is a term that stresses the role of unified communications (achieved by synergizing telephone and computer networks) and the integration of telecommunications (cable and wireless communication media), computer systems and enterprise software, middleware, storage, and audio-visual systems, in enabling users [or clients] to access, process, store, transmit, and manipulate data and information. [8]

1.2. Humble Beginnings

The humble beginnings of ICT can be traced back to the invention of the historic counting frame – *The Abacus*. This little wooden frame, believed to have been developed by the Chinese around 3000BC is known to be one of the earliest calculating tools that came into use many long centuries before the advent of our modern written numeral system. It was the only calculating tool back then that was available for merchants, traders and clerks, and is still widely used in parts of Asia and Africa [9]. This famous manual counting device was used and underwent many improvements, transformations and reformations until about 1624 when Wilhelm Schickard, a German professor of Hebrew and Astronomy invented the first four-function calculator-clock at the University of Heidelberg. This was the beginning of a new era because unlike the abacus that was just a counting device (basically for use in addition and subtraction functions), this new calculator possessed an implementation of multiplication and division functions [10]. This was a breakthrough and very welcome invention for business because accounting and other related business operations could now be more easily done. Following these, many other mechanical calculators were developed, each having some improvement as compared with its predecessors.

The electrical and electronic calculators as we now have them could not have been developed before the year 1780 when Benjamin Franklin, by experimentation, discovered electricity. Following this period, there became an emergent desire for single computers that were capable of doing more (i.e. computers with more functionalities). This era saw the invention of various other calculating devices until around 1837 when Charles Babbage, an English mathematician, inventor and engineer developed the first full-fledged general purpose computer. The computer is the Analytical Engine, which was an improvement to his previously designed (though partially completed as at that time) Difference Engine. This was a new dawn for computing and business because before now, it was impossible to use as inputs the results of preceding computations for new calculations [11]. Despite still having some mechanical parts, it became the

first machine to possess some form of storage / memory and what is generally considered the borderline between mechanical and electronic computing as it exists today.

About a century later, in 1931, the German inventor, Konrad Zuse built the first electronic calculator which he named *Z1*. And about a decade later, he went on to produce the world's first fully functional programmable computer, the *Z3*, which started operation in May 1941. This was a dream come through for businesses because various businesses and organizations could now write custom programs to meet their own specific business needs. That same year (in 1941), he started the first computer business, and went on to produce the world's first commercial computer, the *Z4* shortly after [12]. Zuse became known as the founder of IT business. It was at this point that the dividing lines between IT and business began to blur.

In 1971, Intel Corporation released the first microprocessor (the Intel 4004), thereby opening a doorway to immense processing power for business computing, in that the invention of the microprocessor literally meant that for businesses and organizations, so much more could now be processed and done in much less time. The computer as it is today came to be at about 1981 when the PC Company, International Business Machine (IBM) produced a computer with the first (text-based) operating system – the PC-DOS (Personal Computer Disk Operating System).

The creation of the World Wide Web (WWW) by Tim Berners-Lee and the first Web Server by CERN (Conseil Européen pour la Recherche Nucléaire i.e European Council for Nuclear Research) meant that one or more of these computers could now communicate and share information. On the 15th of June 1995 when Worldwide Internet Connectivity was first declared, it became clear that businesses could now overcome locational and geographical boundaries and explore the world from any point on the globe, being able to transact on the frontiers of the global marketplace from the convenience of their various business locations. All these formed the bedrock and foundation of what we praise today as Information and Communication Technology (ICT) [13].

One undeniable truth is that with each of these new advancements, the business environment of that era was opened to newer insights, exposed to novel opportunities, availed with immensely potent resources, transformed by the capabilities of these inventions and reformed by exciting hopes of limitless future prospects and advancements; and those businesses that were able to tap early enough into these new emerging trends of computing and ICT inventions became the leaders of the global market of the era.

Some organizations and businesses around the world still retain some of these early calculating and computing devices as parts of their operations infrastructure. What remains a fact though is that despite the legacy status that has been assumed by most of these devices, they all still possess their various capabilities as they did in those early years; even though they may now seem incomparable in features, functionalities and capabilities to the computers we have

today.

At about the middle of the 19th Century (around the 1950s and '60s) a surge in the invention of various computing machinery came about. It was during this period that the first supercomputer was built, capable of calculations that are considered too complex for the average computer, such as processing and predicting weather conditions from thousands of individual, ever-changing files of information pulling from thousands of locations across the globe. An example of a modern supercomputer is IBM's ASCI Purple. It costs about 250 million dollars and was built for the Department of Energy (USA). This computer harnesses a peak speed of 467 teraflops and could be used for complex computing such as to simulate aging in various forms of matters and organisms, or for the operation of nuclear weapons.

Because the Supercomputers were very expensive, pretty large and quite complex, they were not the first choice when it came to everyday calculations and computing as it could only be afforded by governments and large multinationals and could only be used efficiently for large scale nationwide or international projects. This meant that the super computer had to undergo some transformations, during which it would be scaled-down to be able to fall within the budget and computational needs of the everyday business and user. This brought about the mainframes, the minicomputers and then the microcomputers.

2. Past, Current and Emerging Trends and Capabilities

Simply put, a microcomputer is a smaller scaled type of an actual computer. It has its central processing unit (CPU) on one or more built-in microprocessor chip(s), as well as a built-in memory, storage and input/output capability. It is much smaller in size [and cost] when compared with the minicomputers, mainframes and supercomputers. The term "microcomputer" is no more as widely used as it was in the early years of computing history and is now most commonly used to refer to "personal computers" as is known today [14].

The advent of the microcomputer brought a lot of style and dynamics to the business world. The operating systems and applications that were built to run on these computers meant that businesses could now carve out unique niches for themselves in the business environment using various custom-made and off-the-shelf applications to streamline their operations and services in ways that are either unique to them or generally known to maximize returns and minimize costs [14].

Ubiquity and mobility also came to bear as miniaturization progressed giving birth to laptops, palmtops and handheld devices.

The constant increase in the speed and of the Internet, coupled with the growing number of devices connected to the internet annually on the global scale further meant that communication could now be carried out in real-time. Email services and Chat client applications made this easier [15].

Business projections, accounting, analysis, surveys and various activities associated with office management and record keeping were also made easier with various office end-applications (word processors, spreadsheets, desktop publishers, etc.) such as those offered by Microsoft, Apple and Open-office.

Advancements in mobile technology also brought about remarkable changes in business operations as the Short Message Service (SMS), the Multimedia Message Service (MMS), the Voice over Internet Protocol Service (VoIP), and advancements in Mobile Internet: the Wireless Access Point (WAP) and the Enhanced Data rates for GSM Evolution (EDGE) all emerged to further enhance the mobility of business operations and service delivery.

Video conferencing also emerged to add the possibility of remotely scheduling and attending business meetings with participants from anywhere on the globe, thereby making extending the mobility of the business executive.

Various Cloud Computing and Online Data Centres also surfaced in the modern business environment to further minimize the risks associated with owning and deploying physical computing, storage, data and server infrastructure and thereby breaking the boundaries of the physical office (creating the virtual organization) and making it completely mobile on a global scale.

The desire to be able to initiate and complete personalised (one-to-one) trade and commercial activities over the Internet gave birth to what is now known as e-commerce, and this has become a reckonable commercial and financial framework for most businesses today [16].

The above highlights of past, current and emerging trends in ICT for businesses and organizations further accentuate the various roles of ICT in modernizing the business environment of the 21st Century.

3. IT and Business – The Industry's Perspective

A very comprehensive survey by [17], sponsored by Deutsche Telekom AG, and involving 1,559 ICT executives, 1,009 IT users and 1,336 consumers from five countries (Great Britain, France, USA, Spain, Germany) was done to survey opinions on various ICT related issues in order to emphasize the various roles of, and importance played by ICT across various sectors. The study provided some insight into the positive impact of ICT in firms in terms of revenue, cost reduction, innovation/growth drive, strategic relevance, and competitiveness. Refer to it for a more detailed report on industry perspective in those countries.

Empirical findings from past researches have proven that ICT also holds the key to building and sustaining competitive relevance for organizations on the global scale. One such empirical studies is as carried out by [20]. It was opined that competitiveness relates to the ability of firms to consistently and profitably produce products (and services) that meet the requirements of an open market in terms of price and quality;

and a firm is said to have a sustained competitive advantage when it is creating value in such a manner that is not simultaneously being implemented by any or potential competitors. ICT is revealed as one of the factors that come to play in this regard.

3.1. The “Developing Countries” Scenario

Despite a shortage, and in some cases, a lack of detailed quantitative data needed to study ICT as it affects the economies of developing countries, governments of these are awaking to the fact that ICT is having a significant impact on the operations of business enterprises and has been proven to be an essential ingredient in the survival and growth of the nations’ economy. A survey carried out by [18] involving the African countries of Botswana, Cameroon, Ethiopia, Ghana, Kenya, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Tanzania and Uganda, it was discovered that ICT is a very key input factor and kick-starter for Small and Medium

Enterprises (SMEs) in these economies, not forgetting the fact that SMEs are the bricks and pebbles that hold together a nations’ economy, thus fostering economic growth within these countries.

The government of Botswana recently also came to terms with the need to diversify their economy from total reliance to diamond mining to being more ICT centred and driven, thus creating the necessary framework for ICT skills development strategies that can enable developing countries to participate competitively in the emerging digital economy [19].

An empirical survey of SMEs in Rwanda revealed that ICT has added significantly to greatly to the enterprises in terms of their penetration of new markets, prompt response to market changes, exploitation of network opportunities, enhancement of operations and customer services, increase in sales and creation of new products and services amongst others [20]. This is shown in figure 3:

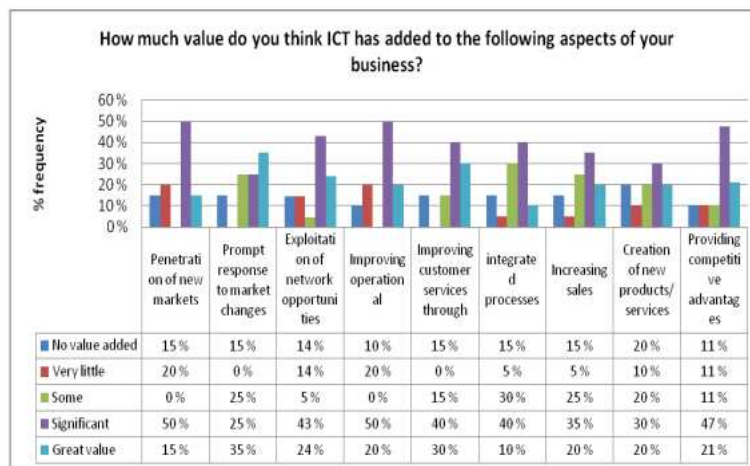


Figure 3. Values added to businesses by ICT [20]

[20], also revealed the benefits which ICT adoption is perceived to have added to companies and SMEs in Rwanda. These were discovered to include: increased customer satisfaction, increased quality of products and services

rendered, efficiency of business processes and tasks, enhanced communication and interaction with partners, enhanced customer relationship and customer base amongst others. This is shown in figure 4:

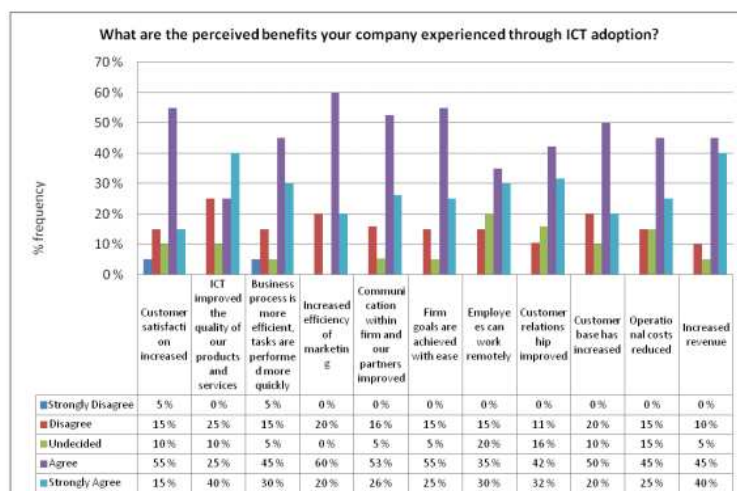


Figure 4. Perceived Benefits of ICT adoption [20]

4. Future Trends

There are high hopes and anticipations for the future of ICT. And from the industry, ICT executives have been able to point out some general trends to which should be paid attention concerning ICT in the near future. These general trends include IT security (54%), business intelligence (31%), green

IT (29%) and strategic IT alignment (15%). In Germany particularly, the issue of IT security is a focal topic for executives, with two-thirds (66%) viewing IT security as one of the top 3 topics for the coming years. In the United Kingdom and the United States alone, around 50% of respondents listed IT security as a top topic for the future [17]. These and other future trends are summarised in figure 5.

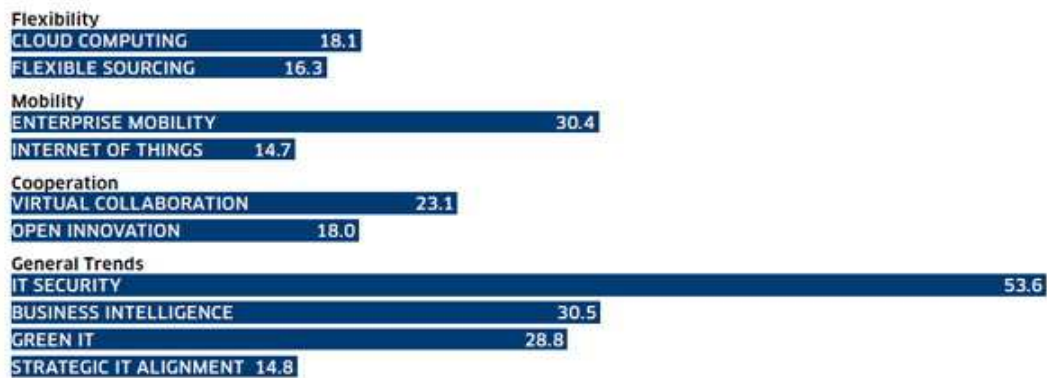


Figure 5. Importance of ICT - key IT trends [17]

As has been shown, advancements in telepresence and cloud computing are hoped to enhance mobility and flexibility in the business environment while virtualization would open new doors for collaboration in the coming years. Green IT would also become a major point of focus as more countries are expected to legislate more policies and regulations for the enforcement of “green” practices in business operations. Also, robotics and artificial intelligence is expected to emerge with renewed force in manufacturing, analysis and business virtual reality as organizations would be able to create, live and operate in a virtual future they would have created for themselves from specifications and conclusions drawn from market and economic analysis and consumer surveys. Thus they would be better informed in decision making processes, having a clear picture of what the coming years hold in terms of competition, market situations, etc.

The manufacturing process of firms in the manufacturing industry is expected to become more simplified as well with advancements in Computer Aided Manufacturing (CAM) and Computer Aided Design (CAD) when product designers would be able to test run products at conception in a virtual market and study the response consumers and performance of the new product on the market before the actual design and release of the product.

Furthermore, and on the developing countries scene, as can be seen in figures 3 and 4, the benefits that ICT has brought to SMEs and businesses in the developing world is expected to increase in the coming years as ICT is expected to open up new opportunities and resources that would help to increase the global relevance of 21st century businesses and enterprises.

5. Conclusion

This study has been able to establish by extensive review that ICT is becoming a major benchmark and determinant capable of fostering global best practices in the 21st century business environment, capable of generating large profits, remarkable savings and returns on investment to businesses both now and in the coming years. This is proven from Best Practices Specifications (BPS) as put forward by [6]. ICT has been revealed to be able to synergize and intersect, in a collaborative relationship, all binding principles required to define and characterize best practices as it relates to the business environment.

With the exciting statistics showing that industry executives, consumers and users alike are in high hopes regarding what lies in wait for the future as regards ICT for business, it has further confirmed the fact that in the coming years, businesses and organizations may be constrained to align with modern practices in ICTs or risk becoming less competitive within the business environment. Whatever the case, it is no gainsaying the fact that ICT has come to permanently revolutionize and transform the business practices of the 21st century.

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