THE ROLE AND IMPACT OF INFORMATION SYSTEM AND SOCIETY IN INFORMATION AND COMMUNICATION TECHNOLOGY

Lanloye, D.O and Oloruntoyin S. T.
Department of Computer Science
Emmanuel Alayande College of Education, Oyo
adex197@yahoo.com; olanloyeo@yahoo.com

ABSTRACT

The term information system refers to information technology that is used by people to accomplish a specified organizational or individual objective. The technology may be used in the gathering, processing, storing, and/or dissemination of information and the users are trained in the use of that technology, as well as in the procedures to be followed in doing so. The specific technologies that collectively comprise information technology are computer technology and data communication technology. Computers provide most of the storage and processing capabilities, while data communications-specifically networks-provide the means for dissemination and remote access of information. Advances in computer hardware, software, and networking technologies have spurred an evolution in the structure, design, and use of corporate information system.

INTRODUCTION

When computers first began moving into the business world in the late 1950s and early 1960s. The computing environment was best described as centralized, host-based computing. In this environment, the typical organization had a large mainframe computer (the centralized host) connected to a number of "dumb "terminals scattered throughout the organization or at remote sites. These terminals were labeled "dumb" because they had no native "intelligence" (i.e., they had no built-in central processing units (CPUs) that were capable of processing data). The mainframe did all the data processing for all the user terminals connected to it. In the mid-1960s, Digital Equipment Corporation (DEC) announced the development of the minicomputer, smaller than the mainframe, the minicomputer ushered in the era of distributed data processing (DDP). In this new processing environment, an organization could connect one or more minicomputers to its mainframe. Typically, the minicomputers were located in an organization's regional offices, from which they were connected to the mainframe in corporate headquarters. Thus, the organization's data-processing function was no longer localized in a single, centralized computer (the mainframe) but, rather, distributed among all the computers.

The commercial introduction of the personal computer by IBM in the early 1980s revolutionized organization data processing. The personal computer carried the distributed processing concept even further within organizations-it brought data processing to the desktop. Also, it eclipsed the dumb terminal as the terminal of choice by users. The commercial success of the IBM personal computer led other computer manufacturers to develop their own personal computers that were compatible with the IBM PC (these are

usually described as IBM clones or IBM-compatible computers). One notable exception is apple and Macintosh line of computers. The all-inclusive term microcomputer is sometimes used to encompass all makes and models of desktop computers, including the IBM PC (and its clones) and the apple/Macintosh computers. it is important to note that, despite their proliferation and ubiquity, personal computers have not replaced minicomputers or mainframes. A large number of organizations still rely on these larger computers for significant aspects of their day-to-day operations.

Computer software is the set of programs and associated data that drive the computer hardware to do the things that it does, such as performing arithmetic calculations or generating and printing a report. Software typically comes in one of two forms: custom-written application programs or off- the –shelf software packages. Custom-written application programs are usually written by an organization's own programming team or by professional contract programmers to satisfy unique organizational requirements. Off-the-shelf software packages are produced by software development companies and made commercially available to the public. They usually fall in one of two main categories, namely system software or application software. The former includes such specialized programs as operating systems, compilers, utility programs and device driver. While these programs are important and necessary to the overall performance of an information system (especially from the 'machine' perspective), they are not the primary focus of corporate information systems. Their basic functions are more machine oriented than human oriented.

Application software is designed to more directly help human users in the performance of their specific job responsibilities, such as business decision making, inventory tracking, and customer record keeping. From a software perspective, this is what corporate information systems are primarily concerned with. One of the very important information systems function is systems analysis and design, that is, analyzing a client's business situation (or problem), with respect to information processing, and designing and implementing an appropriate usually computerized solution to the problem. Information systems professionals who specialize in this area are known as systems analysts. The process begins with a detailed determination of the client's information requirements and business processes. The solution frequently involves some programming, as well as the use of an appropriate application software packages such as a database management system (DBMS) for designing and implementing a database for the client. It may also involve some networking considerations, depending on the user's requirements and goals. Some typical organizational information systems that can result from a systems analysis and design effort include the following.

Transaction processing systems: These record and track an organization's transactions, such as sales transactions or inventory items, from the moment each is first created until it leaves the system. This helps managers at the day – to – day operational level keep track of daily transactions as well as make decisions on when to place orders, make shipments, and so on.

Management information and reporting systems: These systems provide mid-level and senior managers with periodic, often summarized, reports that help them assess performance (e.g., a particular region's sale performance in a given time period) and make appropriate decision based on that information.

Decision support systems: These systems are designed to help mid-level and senior managers make those difficult decisions about which not every relevant parameter is known. These decisions, referred to as semi structured decisions, are characteristics of the types of decisions made at the higher levels of management. A decision on whether or not to introduce a particular (brand new) product into an organization's product line is an example of a semi structured decision. Another example is the decision on whether or not to open a branch in a foreign country. Some of the parameters that go into the making of these decisions are known. However, there are also many unknown factors, hence the "semi structuredness" of these decisions. The values of a decision support system (DSS) is in its ability to permit "what-if" analyses (e.g. what if interest rates rose by 2 percent? What if our main competitor lowered its price by 5 percent? What if import tariffs are imposed/increased in the foreign country in which we do, or plan to do, business?). that is, a DSS helps the user (decision maker) to model and analyze different scenarios in order to arrive at a final, reasonable decision, based on the analysis. There are decision support systems that help groups (as opposed to individuals) to make consensus based decisions. These are known as group decision support systems (GDSS). A types of decision support system that is generated primarily toward high-level senior manager is the executive information system (EIS) or executive support system (ESS). While this has the capability to do very detailed analyses, just like a regular DSS, it is designed primarily to help executives keep track of a few selected items that are critical to their day- to- day high-level decisions. Example of such items includes performance trends for selected product or customer groups, interest rate yields, and the market performance of major competitors.

Expert system; An expert system is built by modeling into computer the thought processes and decision making heuristics of a recognized expert in a particular field. Thus, this types of information system is theoretically capable of making decisions for a user, based on input received from the user. However, due to the complex and uncertain nature of most business decision environments, expert system technology has traditionally been used in these environments primarily like decision support systems that is, to help a human decision maker arrive at a reasonable decision, rather than to actually make the decision for the user.

Together with computer technology, data communication technology has had a very significant impact on organizational information processing. There have been tremendous increases in the bandwidths (i.e., signal-carrying capacities) of all data communications media, including coaxial cables, fiber-optic cables, microwave transmission, and satellite transmission. Wide area networks (WANs) provide access to remote computers and databases, thus enabling organizations to gain access to global markets, as well as increase their information source for decision making purposes. The internet in particular, the

worldwide network of computer networks has greatly facilitated this globalization phenomenon by making it possible to connect any computer to virtually any other computer in any part of the world. Advances in networking technologies have also enabled organizations to connect their in house personal computers to form local area networks (LANs). This greatly facilitates organizational communication and decision-making processes
The combination of computer and networking technologies has also changed the way basic work is done in many organizations. For example, telecommuting and virtual offices are common place in several organizations. Telecommuting refers to the practice of doing office work from home (i.e., without physically being in the office). The term "virtual office" acknowledges the fact that a person's office does not necessarily have to be a physical location. A person can do productive "office work" (including the making of managerial decisions) on the go, for example, at the airport while waiting for a flight, on the airplane, or from a beach half-way around the world. These practices are made possible through modem-equipped computers that can access a remote computer (the office computer) via a data communications network.

An organization's overall performance can be greatly enhanced by strategically planning for, and implementing, information systems that optimize the inherent benefits of information technology to the benefit of the organization. This requires effective leadership and vision, as well as knowledge of both information technology and the organization's (business) environment. In general sense, the term information system (IS) refers to a system of people, data records and activities that process the data and information in an organization, and it includes the organization's manual and automated processes. In a narrow sense, the term information system (or computer-based information system) refers to the specific application software that is used to store data records in a computer system and automates some of the information-processing activities of the organization. Computer-based information systems are in the field of information technology. The discipline of business process modeling describes the business processes supported by information systems.

INFORMATION SOCIETY

At one level, the label "information society" only very poorly encapsulates the essence of an era. For information is to be found at the core of all societies, everywhere and throughout time. It is difficult to conceive of meaning itself without at the same time evoking information. The capacity to fix ideas in information is a sine qua non not just of all societies but even of individual social existence. At another level, most users unconsciously believe they understand what information society means. They see it as derivative of "information technologies" or more recently of "information and communication technologies" (ICT). It is the era in which ICTs have become a major driving force in social and economic change, so much so that the entire epoch derives its nomenclature from it. Just as the 'industrial society' was defined by the technology of heavy industry and manufacture, the information society is characterized by the technology of information and communication. Neither, however, achieves a satisfactory definitional level. The first fails for the obvious reason that it is too abstract and general- the concept of the information society is vacuous if information is

everywhere and always at the centre of social development. The second- technological determinism; the idea that successive technologies compel society to mould itself in their image, driven by inexorable internal imperatives- has long been unacceptable as a theory of social and economic changes. It may be useful descriptive shorthand for what appears on the surface and is thus probably adequate for many practical actors in the information society- but it does not proffer the needed deeper understanding of the dynamics of this society and of the role of information in it.

In this paper, we elaborate an argument concerning some critical functions of information in the information society. These functions are not derived from ICTs; through ICTs do have a key part to play in the story, in their proper role as enablers and catalysts. These functions are also linked inextricably to communication, for (paralleling the shift in usage from IT to ICT) information per se lacks a social dynamic until activated by communication. Thus we depart from the conventional approach and displace technologies from the starring role. In so doing, we can bring into play more fundamental role of information in society, and thereby instill some historical depth into the notion of the information society.

INFORMATION SYSTEM AND INFORMATION SOCIETY

Information technologies are a very important and malleable resource available to executives. Many companies have created a position of chief information officer (CIO) that sits on the executive board with the Chief Executive Officer (CEO), Chief Financial Officer (CFO), Chief Operating Officer (COO) and Chief Technical Officer (CTO). The CTO may also serves as CIO, and vice versa. The Chief Information Security Officer (CISO), who focuses on information security within an organization, normally reports to the CIO.

In computer security, an information system is described by the following components

- Repositories, which hold data permanently or temporarily, such as buffers, RAM, hard disks, cache, etc. often data stored in repositories is managed through a database management system.
- Interfaces, which support the interaction between humans and computers, such as keyboards, speakers, scanners, printers, e.tc
- Channels, which connect repositories, such as routers, cables, wireless links, etc.

The vital statistics program is generally regarded as a successful program, providing full counts of births and deaths at the local, state, and federal geographic levels. Except for the important issue of timeliness, the reports emanating from the vital statistics program have done an excellent job of meeting the demands of users. The availability of data electronically has helped to improve the timeliness of vital-statistics data, thereby enhancing the usefulness of the data.

E – BUSINESS IMPLEMENTATION

This study underlines two particular issues in e-business implementation. The first concerns whether to follow Autocorp's "big bang" approach, in implementing e-business extensively and intensively, or to take a more leisured, incremental approach. Autocorp's strategy, propelled by the CEO's enthusiasm and fuelled by the dot-com revolution, was always going

to be risky. Furthermore, the evident lack of e-business (and organizational change) competence within EBD Europe was likely to handicap any initiative, especially a large-scale one. On the other hand, too small an effort runs the risk of not gaining a critical mass. Nevertheless, an incremental approach permits learning and allows the interaction between agency and structures to play itself out. While a "big bang" might work in simpler organizations and, even in autocorp's, it might have worked had the initiative been better aligned with Autocorp's structures, in terms of domination, signification and, especially legitimation.

Secondly, should e-business be set up as a separate division, like EBD Europe, or integrated within the traditional organization? Much depends on the structures within the organization; for Autocorp's one could argue that the corporation was accustomed to reorganizations, following the globalization initiative and its reversal. On the other hand, perhaps this was one reorganization too many for the confused and disoriented staff. This justifies the treatment of e-business as a major organizational change. The study shows the difficulties of implementing e-business within the complex contradictory structures exhibited by large multinational organization like Autocorp's. One can also see the effect of the dramatically changing business context as the dot-com hype fuelled the urgency of the initiative, leading to the risky "big bang" approach, while the dot-com bust helped to seal EBD Europe's downfall. Building on other studies, we demonstrate that, although technical issues play a role in e-business implementation, organizational and social issues are more significant. The theoretical framework adopted, structuration theory, proved to be useful in understanding the interaction between the e-business imitative (agency) and the organizational structures. It facilitated the examination of the heterogeneous systems of meaning, power relations and norms of the different stakeholder groups. The interaction of agency and structure was easy to apply, providing a simple yet flexible way to conceptualize a complex, fast-moving situation. It also helped us understand the complex structure that guide, facilitate and constrain people's working lives while the notion of duality show how these structures are themselves constructed, maintained and sometimes changed by the people concerned.

The theory allowed us to show how agents mobilize structures of domination to execute their particular purposes and how agents refer to the structures of legitimating to make judgments of people's behavior and events. Gidden's dimensions of structure are closely interlinked; e.g., the symbolism of EBD Europe's prestigious location echoed the exercise of power through the facility of resources and corresponded to the new norms of the organization. Had EBD Europe been able to communicate better, with a more reliable resource base and with fewer contradictions, perhaps the story would have ended differently. However, any theory illuminates some elements of particular case situations and is relatively silent on other (walsham, 2002) and structuration theory is no exception. It requires a significant investment in time and effort in order to understand and apply, which is exacerbated by the lack of a detailed methodology for empirical research. Furthermore, the different dimensions of structure are so interwoven (scheeper & Damgaard, 1997), that it can be difficult to attribute specific issues to one dimension. For example, the arrogance of EBD Europe staff had its

roots in domination but was arguably felt in signification, through its transgression of the norms of behavior. Furthermore, the theory does not adequately cover the emotional aspects of change or the existence of "ad hoc" personal relations.

In terms of limitations, this study suffers from the endemic problem of generalizing from a single case study (walsham, 1995), but it is likely that similar issues occur in other similar organizations. Because of time limitations, we were only able to study one of the Autocorp's e –business initiatives, but we believe that the others suffered similar problems. The story of EBD Europe unfolded relatively quickly and we only had a small window of opportunity to capture a real-time snapshot of a complex interaction. This together with the highly charged political atmosphere constrained our empirical work but did not prevent us from talking to many key actors. Nevertheless, the examination of this e-business change episode through Gidden's concepts provided rich insights into why e-business aroused such structural contradictions, why it was so difficult to integrate within Autocorp's and how the context in (spectacularly violent) motion exacerbated EBD Europe's vulnerabilities and led to its downward spiral. We would hope that, by operationalizing structuration theory, our case study has contributed to the further use of the theory within information system.

HEALTHY

A relatively recent and important development in monitoring the health of the nation has been the identification of broad goals and detailed objectives, described in healthy people 2000: national health promotion and disease prevention objectives, published by the U.S Department of Health and Human Services in 1991, and in subsequent reports. The targets contained in healthy people 2000 were developed between 1987 and 1990 through an extensive consultative and hearings process conducted and managed by the U.S Public Health Service in partnership with the Institute of Medicine of the National Academy of Sciences. To provide guidance to the effort, a national consortium was formed that included the principal health officials in the fifty states and representatives of more than three hundred professional and voluntary national membership organizations.

Three broad goals were identified for the program:

1. Increase the span of healthy life for Americans,
2. Reduce health disparities among Americans, and
3. Achieve access to preventive services for Americans.

A variety of health data and information systems are now available in the United states to monitor the health of the nation. This information base must continue to be available to allow the monitoring of trends and the detection of changes or aberrations in the economic, social, or health characteristics of the nation. The appropriate federal role is to produce national data useful for these purposes as well as to provide norms to which state and local data can be compared. The data must be of high quality, produced in a timely manner, and relevant to issues of the day.

As the nation moves closer to the objectives of a national, systematic approach to meeting the information needs for monitoring the health of the nation, an effort must also be made to

coordinate data-collection activities, both within the federal establishment and between the government and the private sector. This will avoid unnecessary and costly duplication and encourage comparability of information collected by different systems. These health information systems are essential to meet the multiple needs of many programs and organizations in the twenty-first century.

PUBLIC HEALTH SURVEILLANCE

Public health surveillance is defined as the "ongoing systematic collection, analysis, and interpretation of data on specific health events affecting a population, closely integrated with the timely dissemination of these data to those responsible for prevention and control" (Thacker et al. 1996, p.633). A feature of surveillance is the ability to identify individuals and groups of individuals for further action on prevention and treatment. The CDC and other federal agencies are involved in the collection of surveillance data, including, but not limited to the following:

- The CD operate the National Notifiable Disease Surveillance System Physicians Laboratory personnel, and other health care providers are required by state law to report weekly all cases of health condition mainly infectious in origin, that are specific as being Notifiable. The council of state and Territorial Epidemiologists determines which Notifiable conditions should be reported from state health departments to the CDC.
- The National Institute of Occupational Safety and Health has maintained the National Traumatic Occupational Fatalities Surveillance system, a sentinel health event verification system for occupational risk. It is based on information taken from death certificate.
- The Food and Drug Administration conducts post-marketing surveillance of adverse reactions to drugs.
- The National Cancer Institute conducts the Surveillance, Epidemiology, and End-Results (SEER) program that includes eleven population-based registries in the United States. It provides data on all residents diagnosed with cancer during the year, as well as follow-up information on all previously diagnosed patients.
- The CDC conducts the Behavioral Risk Factor Surveillance System (BRFSS), a telephone survey conducted in each of the fifty states that provides data on health behaviors. Questions can be added to the survey by individual states.
- The CDC has developed the Pregnancy Assessment Monitoring System (PRAMS) to collect information on maternal behaviors that occur before, during and shortly after pregnancy.
- The consumer product safety commission conducts surveillance on product-related injuries.

Surveillance data vary in their quality, are often incomplete and unrepresentative, and they may vary in sensitivity and specificity. Although the current programs provide essential data to monitor the incidence of communicable diseases and some chronic diseases, the system also relies on voluntary physician reporting, which has been demonstrated to be variable and inconsistent. States differ in their authority to require

physician reporting. Development of greater standardization in reporting from state to state and obtaining improved physician cooperation are both areas that need further exploration.

SYSTEM IN SOCIETY

There are various types of information systems, for example: transaction processing systems, decision support systems, knowledge management systems, database management systems, and office information systems. Critical to most information systems are information technologies, which are typically designed to enable humans to perform tasks for which the human brain is not well suited, such as: handling large amounts of information, performing complex calculations, and controlling many simultaneous processes.

TYPES OF INFORMATION SYSTEMS IN SOCIETY

As new information technologies are developed, new categories emerge that can be used to classify information systems. Some examples are:

- Transaction processing systems
- Management information systems
- Decision support systems
- Expert systems
- Business intelligence

PILLARS OF THE INFORMATION SYSTEM IN SOCIETY

Our lives are surrounded by a taken-for-granted, apparently limitless, stockpile of knowledge. We find it in everything from daily life and advanced scientific, social and engineering feats, to the relatively orderly, open and peaceful existence a few have the privilege of living in and the rest of us aspire to. All these embody human information and knowledge accumulated layer upon layer over generations and eons. The strata in this geology of human insight are demarcated by great events, bursts of creativity and explosions of knowledge generation still clearly visible today; but the great bulk is composed of an accrual of incremental improvements, tiny acts of practical, social and mental creativity achieved amid and despite lives busy with the practical chores of existence.

Creative ideas and their use are infinitely reproducible; they do not wear out. And the more people use them, the better, since each user gains at no loss to another. They thus have what economists call the character of non-rival public goods. But they do not come from nowhere- no idea is entirely original, or even largely so. The most astounding breakthrough depends hugely on all that goes before it, not just in content but in the instruments for expression and conception. And each is also fashioned within, and extrudes from, the specific context and experience of the time and the author, who adds the creative spark. But once a good idea is let loose on the world it cannot easily be forced back into the bottle. It can spread by word of mouth, in written form, and be put to good use by demonstrating technique, by fashioning tools, by putting it into action, by using it to build effective social

and political movements and structures. It can be suppressed or locked away for a time. But only in exceptional cases, the most extreme being the destruction of an entire civilization, can ideas and knowledge be eliminated altogether. Even then, history shows then arising again from the ashes, nurtured by humanity's common needs and drawing on the deepest recesses of ancient shared knowledge. Distinctions must be made within the huge body of humanly generated knowledge, lines drawn in different places in different societies. Two types of knowledge are of concern to us here: Information and knowledge used in the material reproduction of our world, its application to concrete human needs; and specifically the means by which we encourage and promote the flow of human creativity and innovation that in turn constantly recreates and transforms our material world; information and knowledge used in constructing and sustaining social and political institutions, and in how we organize ourselves into relationships, including the relations between people that govern the differential access of each to the material world. In particular, we are concerned with the role of information and knowledge in how we build and sustain fair, equitable and democratic social and political interactions, forums and institutions.

CONCLUSION

Each is constituted by concerned with knowledge; the fist in cultivating and rewarding the creative spirit in producing knowledge for material reproduction; the second through the privileged role of knowledge and information in creating and sustaining our social and political existence. The former is destined for the economic arena and the arrangements made there regarding access and use; while the latter is destined for the social and institutional context. But each is of such importance to society that immense effort has historically been devoted to codifying and legislating for them, a necessary process, but one that has also tended to obscure their simple and basic rationale behind walls of legal volumes and legislative and court proceeding. The means by which each of these uses of knowledge is governed and organized, the specific regime adopted in each type of society, is what we call the two pillars of the information society.

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