

Computer in the Information Age

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Abstract: There is no field more challenging than information processing and computers. The field change significantly almost every month, it is a field that combines all other disciplines, and almost everybody needs a working knowledge because virtually everybody now uses computer either for office or personal applications, managing household finances, writing, learning, entertainment and even shopping. In this paper we review the importance of computer in the information age and the benefit and detriment it brings to our world.

Keywords: Computer, Information age, Programming Language, Jet age, intelligent machines, High-tech revolution

1. Introduction

Computer Technology is a wonderful invention of the 20th century. During a very short span of time it has acquired an important place in almost all aspects of human life. A computer is a device that accepts information (in the form of digitalized data) and manipulates it for some result based on a program or sequence of instructions on how the data is to be processed [1]. In the past few decades there has been a revolution in computing and communications, and all indications shows that technological progress and use of computer technology will continue at a rapid pace [2]. Accompanying and supporting the dramatic increases in the power and use of new information technologies has been the declining cost of communications as a result of both technological improvements and increased competition. These advances present many significant opportunities but also pose major challenges. Today, innovations in computer information technology are having wide-ranging effects across numerous domains of society, and policy makers are acting on issues involving economic productivity, intellectual property rights, privacy protection, affordability and access to information. Choices made now will have long lasting consequences, and attention must be paid to their social and economic impacts. The subsequent sections focus on the impacts of computer technology on business commerce, market structure, workplace, labour market, education, private life and society as a whole.

2. Social-Economic Impact of Computer Technology

2.1 Commerce and Market Structure

One of the most significant outcomes of the progress of computer information technology is electronic commerce over the Internet, an innovative way of conducting business. Though only a few years old, it has radically altered economic activities and the social environment. Already, it affects such large sectors as communications, finance and retail trade and has expanded to areas such as education and health services. The information technologies have facilitated the evolution of enhanced mail order retailing, in which goods can be ordered quickly by using telephones or computer networks and then dispatched by suppliers through integrated transport companies that rely extensively on computers and communication technologies to control their operations. Nonphysical goods, such as software, and electronic books can be shipped electronically, eliminating the entire transport channel. Payments can be done through secure online system. The result is disintermediation throughout the distributed channels, with cost reduction, lower end-consumer prices, quick delivery and higher profit margins. It also brings openness, global reach, and lack of physical clues that are inherent characteristics of e-commerce. New technologies have been developed to protect the use of credit cards in e-commerce transactions, but the need for greater security and user verification leads to increased costs. With the Internet, e-commerce is rapidly expanding into a fast-moving, open global market with an ever-increasing number of participants. The open and global nature of e-commerce has increased market size and change market structure, both in terms of the number and size of players and the way in which players compete on international markets. Digitized products cross the border in real time, consumers shop 24 hours a day, seven days a week, and firms are increasingly faced with international online competition. The Internet is helping to enlarge existing markets by cutting through many of the distribution and marketing barriers that

can prevent firms from gaining access to foreign markets. E-commerce lowers information and transaction costs for operating on overseas markets and provides a cheap and efficient way to strengthen customer-supplier relations. It also encourages companies to develop innovative ways of advertising, delivering and supporting their product and services. While e-commerce on the Internet offers the potential for global markets, certain factors, such as language, transport costs, local reputation, as well as differences in the cost and ease of access to networks, attenuate this potential to a greater or lesser extent.

2.2 Global Interaction

Computers and communication technologies allow individuals to communicate with one another in a way complementary to traditional face-to-face, telephonic, and written modes through video and teleconferencing using the webcam, speaker and microphone embedded in the computer as a medium. They enable collaborative work involving distributed communities of actors who seldom, if ever, meet physically. These technologies utilize communication infrastructures that are both global and always up, thus enabling 24-hour activity and asynchronous as well as synchronous interactions among individuals, groups, and organizations. Social interaction in organizations is affected by use of computers and communication technologies. Peer-to-peer relations across department lines are enhanced through sharing of information and coordination of activities. Interaction between superiors and subordinates has become tenser because of social control issues raised by the use of computerized monitoring systems. E-commerce is certainly driving the demand for IT professionals but it also requires IT expertise to be coupled with strong web service business application skills, thereby generating demand for a flexible, multi-skilled work force. There is a growing need for increased integration of Internet front-end applications with enterprise operations, applications and back-end databases. Web Service through cloud computing is an example [3]. Many of the IT skill requirements needed for Internet support can be met by low-paid IT workers who can deal with the organizational services needed for basic interactive web page programming. However, wide area networks, competitive web sites, and complex network applications require much more skill than a platform-specific IT job. Since the skills required for e-commerce are rare and in high demand, e-commerce might accelerate the up-skilling trend in many countries by requiring high-skilled computer scientists to replace low-skilled information clerks, cashiers and market salespersons

2.3 Education

Advances in computer technology have affected the craft of teaching by complementing rather than eliminating traditional classroom instruction. Indeed the effective instructor acts in a mixture of roles. In one role the instructor is a supplier of

services to the students, who might be regarded as its customers. But the effective instructor occupies another role as well, as a supervisor of students, and plays a role in motivating, encouraging, evaluating, and developing students. For any topic there will always be a small percentage of students with the necessary background, motivation, and self-discipline to learn from self-paced workbooks or computer assisted instruction. For the majority of students, however, the presence of a live instructor will continue to be far more effective than a computer assisted counterpart in facilitating positive educational outcomes. The greatest potential for new information technology lies in improving the productivity of time spent outside the classroom. Making solutions to problem sets and assigned reading materials available on the Internet offers a lot of convenience. E-mail vastly simplifies communication between students and faculty and among students who may be engaged in group projects. Although distance learning has existed for some time, the Internet makes possible enlarge expansion in coverage and better delivery of instruction. Text can be combined with audio/video, and students can visualize and interact in real time via e-mail and discussion groups. Such technical improvements coincide with a general demand for retraining and up-skilling by those who, due to work and family demands, cannot attend traditional courses. Distance learning via the Internet is complementing existing schools for children and university students; it could have more of a substitution effect for continuing education programmes. For some degree programmes, high-prestige institutions could use their reputation to attract students who would otherwise attend a local facility. Owing to the Internet's ease of access and convenience for distance learning, overall demand for such programmes will probably expand, leading to growth in this segment of e-commerce. High level skills are vital in a technology-based and knowledge-intensive economy. Changes associated with rapid technological advances in industry have made continual upgrading of professional skills an economic necessity. The goal of lifelong learning can only be accomplished by reinforcing and adapting existing systems of learning, both in public and private sectors. The demand for education and training concerns the full range of modern technology. Information technologies are uniquely capable of providing ways to meet this demand. Online training via the Internet ranges from accessing self-study courses to complete electronic classrooms. These computer-based training programmes provide extensibility in skills acquisition and are more affordable and relevant than more traditional seminars and courses.

2.4 Privacy and Society

The rapid increase in computing and communications power has raised considerable concern about privacy both in the public and private sector. Decreases in the cost of data storage and information processing make it likely that it will become practicable for both government and private data-mining enterprises to collect detailed dossiers on all citizens. Nobody knows who currently collects data about individuals, how this data is used and shared or how this data might be misused. These concerns lower the consumers' trust in online institutions and communication and, thus, inhibit the development of electronic commerce. A technological approach to protecting privacy might be by cryptography although it might be claimed that cryptography presents a serious barrier to criminal investigations. It is popular wisdom that people today suffer information overload. A lot of the information available on the Internet is incomplete and even incorrect. People spend more and more of their time absorbing irrelevant information just because it is available and they think they should know about it. Therefore, how people assign credibility to the information they collect in order to invent and develop new credibility systems to help consumers to manage the information overload must be studied. Increasing representation of a wide variety of content in digital form results in easier and cheaper duplication and distribution of information. This has a mixed effect on the provision of content. On the one hand, content can be distributed at a lower unit cost. On the other hand, distribution of content outside of channels that respect intellectual property rights can reduce the incentives of creators and distributors to produce and make content available in the first place. Information technology raises a host of questions about intellectual property protection and new tools and regulations have to be developed in order to solve this problem.

3. Positive Impact

The Jet age have revolutionized the way computer works. For instance, the fifth generation computers concentrate on advances in the way computers are used, not on the electronic refinements that characterized the previous four. Rather than the processors of data, computers are now an intelligent processor of knowledge [4]. Already a number of computer programs called expert systems are widely in use [5]. Physicians use computers to help diagnose disease, lawyers plan litigation and scientists and engineers simulate biological growth, astronomical events and social behaviours. We have seen the dreams of the computer pioneers fulfilled as computers evolve the ability to learn from their own experiences. These pioneers saw the computer as a heuristic device, that is, a machine that controls its own behaviour based upon the results of its past activities [6]. This intelligent machines link information together, much as the human mind does, to arrive at logical conclusions [7]. The perfection of artificial intelligence devices requires new concepts in

processing and memory design. Scientists are already experimenting with computer processors that are grown biologically rather than manufactured as electronic components. Using living molecules that function as electronic components, a computer with the power of today's largest model would be microscopic in size [8]. Our civilization has the potential for creating a life-form vastly superior to that which has produced it. Currently, researchers have perfected a microcomputer storage device that store billions of characters. This is enough room to store the names and addresses of 200 million people which is more than the population of Nigeria. The present jet age computer can be consider as a "monster computer" because they tap into data storage devices thousands of time larger than their predecessors. The cost of computing and computers are now much lower. Computers are now given away as promotional items. The drastic decline in computer hardware costs has continued for some time as new technology development occurs. Computer is now increasingly available; they are now as common as the telephone GSM. Already, communications devices like iPhone, iPad that combine the functions of television set, video, telephone, data terminal web services, office applications and other desktop computer capabilities are being marketed. Computers are now programming themselves. The user enters specifications for a job to be done, and the computer will write its own program to do it [9]. A great deal of work has already been done towards this end. Program generators (programs who write other programs) has been perfected, lay person can now develop specialized programs to satisfy unique needs [10]. The propriety data banks that serve the public have now been consolidate into information utility. Electronic communications including electronic mail and teleconferencing have now replaced the paper mail systems [11].

Computer now exercise an ever-increasing influence on human affairs, our economy has evolved from a national one to an international one. Keeping track of international business transactions and monetary flow is done largely by computer systems. The computer's ability to communicate financial data around the world almost instantaneously makes it a powerful force for bringing people closer together. It is my personal believe that, to be successful in the near future, one should be skilled in one particular language: Computer! More people throughout the world are now conversant with C, Java or Visual Basic programming language than Spanish, English and German language combined. Another significant trend that has accompanied the high-tech revolutions is the so called high touch trend towards increased human-to-human contact. The computer offers us the opportunity to tailor working, studying and shopping arrangements to our personal needs and tastes. Increasing numbers of employees are working at home, using

computers to transmit their day's production to the main office [12]. Increasing numbers of students are taking high school and college courses over the internet and communicate with their school and instructors. More and more consumers are purchasing goods and services electronically, using computers to send in their orders and payments.

4. Negative Impact

One of the negative sides of this glamorous revolution is electronic fraud. The opportunities for creative fraud are vastly greater than they used to be before the advent of electronic computer and internet. Computer crime can be enormously profitable, many computer fraudsters are not caught, if they are, it is usually by chance (especially in the third world countries). Those that are caught usually escape prosecution because the institutions they rob prefer to avoid the unfavourable publicity of a public trial; this lead to the question of privacy and trust. When will new technology come out with new programmes to perfectly protect citizens of fraud and give them a sense of privacy and security?

There are some people who think computers are overpowering and afraid to approach and try using it. Computer scientists are presently designing software tools that take human factors into consideration (usability) [13]. Simulating human behavioural thinking and incorporating this to software tools will attract these set of users to accept computer and its growing technological tools without tears.

A question that is more difficult to answer is the impacts that computers and communications might have on employment. The ability of computers and communications to perform routine tasks more rapidly than humans leads to concern that people will be replaced by computers and communications. The response to this argument is that even if computers and communications lead to the elimination of some workers, other jobs will be created, particularly for computer professionals, and that growth in output will increase overall employment. It is more likely that computers and communications will lead to changes in the types of workers needed for different occupations rather than to changes the total employment scenario.

Technological progress inevitably creates dependence on technology. Indeed the creation of vital infrastructure ensures dependence on that infrastructure. As surely as the world is now dependent on its transport, telephone, and other infrastructures, it will be dependent on the emerging information infrastructure. Dependence on technology can bring risks. Failures in the technological infrastructure can cause the collapse of economic and social functionality. Blackouts of long-distance telephone service, credit data systems and electronic funds transfer systems and other such vital communications and information processing services would undoubtedly cause widespread economic disruption. However, it is probably impossible to avoid technological dependence. Therefore, what must be considered is the exposure brought from dependence on technologies with a

recognizable probability of failure, workable substitute, and realistic cost of failure.

The increase in electronics communication have engendered rising expectation for increase in opportunities to communicate directly with people, as opposed to machines. Electronic funds transfer systems, which relieve us from the need to go to the bank, have disappointed the banking industry. It appears that many prefer visiting a bank if for no other reason than to say hello to someone. People enjoy going to a shopping center. It has become a form of family entertainment that electronic shopping will have a tough time replacing. Taking college courses electronically is fine for some, but most students prefer the campus experience. Going to college is a matter of human contact. For younger students, it is part of the transition to adulthood, as well.

5. Conclusion

The high tech revolution can liberate us from travelling to distance job sites, reduce difficulties in communication, and repetitive, manual tasks. But it is the accompanying high touch revolution that speaks most directly to our new sense of freedom, the freedom to use our newly found time to intensify our human-to-human contacts and seek new experiences for personal and social growth. Today the Internet has become the ultimate platform for accelerating the flow of information and is, today, the fastest-growing form of media, and is pushing many, if not most, other forms of media into obsolescence. Therefore, we offer one last prediction: that the high tech revolution will result in a society more human, not less, more responsive to individual needs, not less, and more personally fulfilling, not less. The future holds exciting prospects indeed, and the information revolution is still in its infancy. Changes in human and technical activities will become revolutions in as much as they lead to solutions of the problems of the present and the future. As we cope today with the menace of computer crimes, abuses of privacy, and threats of depersonalization, we are learning to apply these solutions to the larger, more complex problems promised by the decades ahead. The assertion that all human knowledge is encodable in streams of zeros and ones- philosophically is very hard to swallow; there is a whole world of real problems, of human problems, which is essentially ignored. The future belongs to the problem-solvers, to those people who are able to combine knowledge and action in creative efforts to improve the quality of life for all.

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