Information and Communication Technologies for Public Use and Interactive-Multimedia City Kiosks

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ABSTRACT

This thesis provides framework for consideration of the potential of information and communication technologies for public events and performances for the developing usage of new products, particularly information public kiosks. In the theoretical framework, the concepts and terms of information and communication technology are generally introduced along with the identification of number of major factors such as elements, diversity, necessity and evolution. Moreover, the importance of ICT technologies in urban settings and human behavior in response to this type of technology are investigated through the history of ICT. The concept of the usage of information and communication technology by actual people is particularly emphasized. Not only the utilization of information and communication technology in public space is described but also effective usage of ICT in the public space and information access provided by public products are identified.

Figures of ICT systems and related products, their roots in design differences and new tools and products that are common examples of ICT, particularly the use of the information city kiosk, are presented and discussed. Design principles of the public information kiosk, which play a prominent role in the public use of ICT, are established. The analysis of design factors and human-product relations based on user profile, material choices, form, function and location are discussed. Finally, the thesis includes a conclusion that argues that the information city kiosks and their increased public use will designate the new images of the cities.

Keywords: information and communication technologies (ICT), interactivity, city kiosk, public use

ÖZ

Bu çalışma bilgi ve iletişim teknolojilerinin kamusal alandaki kullanımını ve çalışma performansını, gelişen yeni ürünlerin özellikle kamusal bilgi kiosklarının kullanımını gözönüne alan bir çerçevede sunulmuştur.Teorik çerçevede, bilgi ve iletişim teknolojilerinin konsept ve terimleri; bileşenlerinin yanısıra, çeşitlilik, gereklilik ve değerlendirme gibi birçok ana etkenin tanımı doğrultusunda genel olarak sunulmuştur. Dahası, kentsel yerleşimlerdeki bilgi ve iletişim teknolojilerinin önemi ve bu teknolojilere karşı insanların gösterdiği tepki ve davranışlar tarihsel süreçte incelenmiştir. Bilgi ve iletişim teknolojilerinin aktif bireyler tarafından kullanımı kavramı ise özellikle vurgulanmıştır. Yalnızca bilgi ve iletişim teknolojilerinin kamuya ait mekanlardaki kullanımının betimi ortaya konmamış, bilgiye ulaşımı sağlayan kamusal ürünler ve bu ürünlerin etkin kullanımı da tanımlanmıştır.

Bilgi ve iletişim sistemlerinin ve ilgili ürünlerin şekli ile bu ürünlerin tasarım farklılıklarını yaratan özellikleri sunulmuş, bunun yanısıra özellikle kent bilgi kiosklarının kullanımı ve sıkça rastlanan örneklerinden yeni araç ve ürünler arasındaki tasarım farklılıklarının ana temaları tartışılmıştır. Bilgi ve iletişim teknolojilerinin kullanımında önemli rol oynayan kamusal bilgi kiosklarının tasarım prensipleri tespit edilmiştir. Tasarım kriterlerinin yanısıra, kullanıcı profili, materyal seçimi, form, fonksiyon ve yer seçim gibi kriterler temelinde incelenen ürün-birey ilişkileri de tartışılmıştır. Sonuç itibariyle, tez kentsel bilgi kiosklarını ve yeni kent imajında artan kullanım biçimini ortaya koymaktadır.

Anahtar Kelimeler: bilgi ve iletişim teknolojileri (bilişim teknolojileri), interaktivite, kent kioskları, kamusal kullanım

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INTRODUCTION

1.1 Definition of the Problem

Responding to the need for information of individuals who today live in urban settings and participate in contemporary life, has increasingly become a particular, albeit interdisciplinary, field of research and invention. Current studies are engaged not only in meeting such demands as they arise, but also aim at exploring future possibilities of the public use of information artifacts and services, and its urban environmental design. The simultaneous globalization of the world, its convergence and fragmentation, together with the development of increasingly faster and all-embracing information and communication technologies, are changing the world of design. In this socio-economic framework, the requirement of the *usability of technology* is emphasized in products. New technical tools and devices are developed to achieve the information flow increasingly needed by people. The ability to adapt to the environment created by the ever-evolving technology and to command technology in one's everyday life have therefore too become an essential requirement: in order to be compatible with this era, the city person is face to face with the challenge of utilizing such information tools and the new designs in which they one delivered. Among all frontiers of technology, information and communication systems experience the most radical pace of change. The wider framework of the essential problem this thesis addresses is the appropriation of ways of utilizing information and communication technology within products and services in an urban setting. Thus, this thesis in its general outlook, is geared toward design of communication technology for the city. Specifically, this study addresses the topic of the urban venue of communication technology, namely the 'city kiosk'.

Besides individual products, the designer's input in design for public products could be very valuable in adding to the public well-being particularly with reference to enhancing the functionality and aesthetic features of the environment. The argument of this thesis is that solutions for the city kiosks in public spaces used by people, and applications of information and communication technology in our everyday environment constitute vitally important fields of work. Design skills today are needed

in corporate governance in design management work, above all because the attention paid to the designed public city kiosk and their details in the public space help to improve the image of the city. Solution for better-designed city information kiosks that are defined as 'information service providers' in this thesis will be taken up with reference to the 'information point images of public spaces' such designs tend to create. Particular attention will be paid to the aesthetic values the kiosk creates in the urban environment as well as to criteria of better-location assignments.

1.2 Aims of the Study

The necessity of information for the human being exists independently of high technology and cultural difference. One proof of this fact is that information, as well as the communication of in formation, existed in early history, long before the emergence and development of today's technologies. Throughout history, achieving the venue of vital information has been an aim in any society and has been a component germane to the proper functioning of that society (Havelock, 1982). In time, with increasing population and ever-evolving technology, the person's life too has become more complex. Even greater changes have been wrought in the character of ordinary life by technology. More relevant to the context of this thesis, the mode of the presentation of information has changed. Therefore, one of the aims of this study is **to define and trace the major shifts that have occurred in the contemplation of information in the course of history through the technological framework.**

The history of technological change is accompanied by changes in the ways information is transmitted. The latter derives from considerations of what is necessary information, in each culture, to be provided and disseminated by new tools and devices. The concept of information and communication technology (ICT) is thus redesigned in line with this transfer of information. Therefore, today, people are confronted with new devices and products generated in accordance with dominant design principles. The living environments of people have changed, and the social impact of ICT has been playing a profound role therein. In this respect, the second aim of the study is **to identify and underscore human behavior in response to this type of technology. However this thesis does so with respect to the use of a particular ICT design product, the city kiosk.**

Advanced information and communication technology have also restructured the ways in which public information is presented. There are many ICT-based tools and systems extant that impact and even change human behavior. Moreover, governments, institutions, and similar public establishments have chosen these tools and systems for the purpose of providing their own services. From this point of view, the third aim of the study is **to define the mode of utilization of information and communication technology in public spaces**. Analyzing effective ICT in the public space has paved the way for **discussing information access of public products with a special emphasis on the public domain**.

The information kiosk appears as a concrete device through which persons endeavor to obtain vital information within a given physical surrounding. A device is capable of providing required information through contents and forms in public spaces and the city. Therefore, the term, concept and object of the 'kiosk' are at the heart of this thesis. The fundamental aim of the thesis is thus **to establish the design principles of the public information kiosk in so far as it plays a prominent role in the public use of ICT.**

1.3 The Method of the Study

The study is comprised of five chapters: the first, introductory chapter has defined the aims and means of the study. The second chapter introduces a series of fundamental definitions, including those of 'information' and 'communication' set into the framework of a public utilization in the context of the developing digital technology. In the second part of the same chapter, debates concerning the theoretical framework of information and communication technology are introduced and some major factors, such as elements, diversity, necessity and evolution are identified. This chapter equally covers the human perception of technology that is employed within the subjective value system of persons in the course daily life. Finally, the concept of the usage of information and communication technology by actual people is a theme that is integrated in, and runs through, the other chapters. In Chapter 3, moreover the objective systems of values of information and communication technology are investigated, and ICT-related concepts and terms are defined. The chapter includes figures of ICT systems and related products. These are included for concretizing ICT and in order to

materialize the design aspect of the abstract issue of ‘information’. Textually and pictorially, the chapter undertakes a history of ICT. The second part of this chapter includes discussion of the roots of ICT products with their design differences. The new tools and products which are common examples of ICT (such as PDA and the interactive-multimedia kiosk) are discussed at the conclusion of the chapter. Deriving from the final part of the preceding chapter, the kiosk constitutes the framework of Chapter 4. The term ‘kiosk’ and its public use are defined herein. An alternative classification of the kiosk is offered as street furniture whose functioning is contingent on the information point in the city. The property concept, user’s participation in the public space, and related functions are discussed. The analysis of design factors and human-product relations based on user profile, material choices, form, function and location are presented in the last part of the chapter. The final part of Chapter 4 concludes with a project proposal for the Izmir city-center. Chapter 5 comprises the conclusion of the thesis.

Chapter 2

INFORMATION AND COMMUNICATION TECHNOLOGIES

Something is happening to information, to its role and status, its form and structure that suggest developments of an entirely different order. Information has become the most important symbol of future applications. While this chapter will focus directly on the subject of information, others will reinforce this general theme with a range of contexts valid today – technological and social. The overall aim is to consider the wider role of information in the modern world and, in particular, to look at evidence of the emergence of information society. Nevertheless, the structure of this section also includes some definition of terms such as data, knowledge, and bit, which are based on realizing Information and Communication Technologies, which have in turn become components seamlessly merging with our daily life. The overall point is that providing such definitions may lead to the clarification of the consequences of the interweaving of ICT and human social life.

2.1. Information

'Information' has become one of those words that have a wide range of references about which we can no longer be certain. In different contexts the word 'information' may represent varied situations. In its underpinnings, there are, in fact various extant definitions and descriptions of information, but these largely take up the term in the context of social sciences. There are, however a few definitions and descriptions related to information and communication technology and the new media. Because the topic of information in this thesis is discussed in relation to practical purpose, viz. both as an object to be looked at and in terms of its public implementation, the latter series of definitions are more relevant. William J. Martin answered in his book *The Information Society*, the question of what is information:

> In a sense this is a question, which anybody could answer. Information is all around us. Information is the staple diet of the readers of newspapers and the mass audiences of broadcasting media and the cinema. It is directed ceaselessly at those millions of consumers so relentlessly targeted by the advertising industry, and is dispensed around the clock from any number of enquiry desks at railway stations and airports, libraries and

> similar public service institutions. In this popularly understood sense of term, therefore, information is that which adds to our awareness or understanding of some topic, problem or event. It is variously perceived as facts, intelligence, data, news and knowledge (Martin, 1998, p. 1).

On the other hand, MIT Professor Emeritus Claude E. Shannon, known as the father of modern digital communications and information theory, defined information as "a measure of how much a signal reduces uncertainty about which signal has been received out of all possible messages that might have been sent" (Martin, 1998, p. 5). Most views of information involve messages and the human mind which assemble and consume messages. In the 1940s, Shannon moved information from the realm of the philosopher to that of the physicist, demonstrating that the term could in fact be given a clear definition: "One of the ideas that Shannon established is that any information can be represented by a sequence of the elementary particles of information, which we now call 'bits'**"** (Raskin, 2000). 'Bit' is short for 'binary digit'. It is the smallest unit of information a computer processes. It may represent on or off, high or low, yes or no, one or zero. It is the digit in the word 'digital' (Green, 1997, p. 59). Information is represented as a sequence of bits, or, equivalently, as a sequence of characters in a text or string of numbers in base ten. Moreover, Jef Raskin, creator of Apple's Macintosh, the Canon Cat, the click-and-drag selection and other inventions, and the author of *The Humane Interface*, coined in his book the term and the concept of 'information appliances'. According to this coinage, information is an abstraction from any meaning a message may have and from any particular form a message may take (Raskin, 2000).

In this context, information can be delivered orally or it can come in visual form as data, text or graphics. To a considerable extent, moreover, the production and delivery of information is electronic in nature. In such cases, the end product does not consist simply of words on a page or even images on a visual display unit. Seen thus, information is an ingredient common to all areas of human endeavor, be they current affairs of business or matters of life. Surely the vast majority of people know about information and what makes it important. Therefore, information truly is around us. It is a social constant, something that is to be found in the most unlikely and unexpected of settings. Meanwhile, more technical manifestations of the term 'information' constitute its other aspects, which include, for example, the interrelationships and differences among information, data and knowledge, which will be considered below.

2.1.1. Data, Information and Knowledge

The word ‘information’ and its soulmate ‘data’ are rather neutral, technical terms that often have superseded the term ‘knowledge’ as referents to our preserved cultural lore in the contemporary era. These terms also suggest our ambivalent attitude toward many of the symbolic artifacts produced in the late twentieth century. Data and information are frequently treated as equivalents, although there is also a tendency to regard data as unevaluated facts, as the raw material of information. Information, by extension, is data processed into some useful form. In this context, the basic feature of the following distinctions can be made regarding the basic features of ‘information’:

Data are bits of information such as lists (e.g. a telephone list) or records in a database or spreadsheet. Data can exist in many forms, usable or not. They do not have meaning in and of themselves. **Information** is organized and communicated data. It is data that has been given meaning by way of relational connection. This 'meaning’ can be useful, but does not have to be. In computer parlance, a relational database generates information from the data stored within it. **Knowledge** is the appropriate collection of information so that its intent is to be useful. Knowledge is a deterministic process. When someone ‘memorizes’ information they are considered to have amassed knowledge. This knowledge has useful meaning to them. It can be used to achieve some kind or other of a result. The relationships between these concepts may be visualized as in the following figure (see Fig. 2.1):

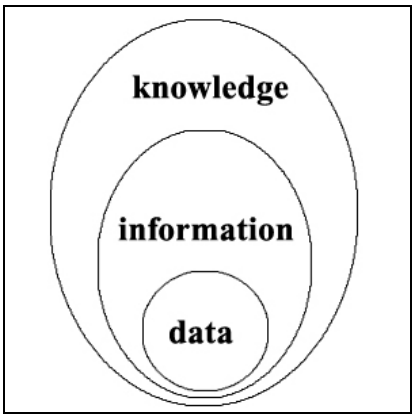


Fig. 2.1. Hierarchy of data, information, and knowledge

2.1.2. Generation of Information

The passion for counting, measuring everything, and analyzing the obtained data, which is the important characteristic of the present age, dates back to the nineteenth and the beginning of the twentieth century. Composition settings such as the map and the dictionary existed even long before then. However, as a result of the materialized progress based on the mechanization of information, service impacts have been shaped according to intentions. The main point is the organization, transportation, presentation, and transmission of the information. This systematic assumption makes up the necessary steps for humans to reach information. People always need as well as use information. An example is in ancient times, water and sun clocks; on the other hand, in medieval times, the mechanical clock; and eventually, the printing houses. However, ownership of individual digital tools such as the mobile phone, computer or invitation device, which provide information for or help us interact with anyone anywhere at anytime, is the reality of the information age. By means of the complexity of the society and rapid interactions, reaching information has become increasingly more important. Requesting more knowledge and requesting it in a form that is more applicable, accessible, and comprehensible, make for progress in information systems by producing and improving these systems. Moreover, these information systems constitute the structural bedrock of the information age.

During the 1960s and 1970s the so-called ‘information explosion’ was the object of considerable attention, not least in the information science circles (Martin, 1998, p. 2). The outstanding example of the time was the exponential growth rate of scientific literature, reported to be doubling in volume once every 15 years. However, little attention was paid to other, nonprinted sources of information provision, such as the cinema and the broadcasting media. Today, with fears of information inundation if anything more acute, the focus of concern has broadened to include oral and electronic as well as print-based media. The information comes in the form of computer software, electronic mail, videotext or video, compact audio or optical digital disk and, of course, print on paper. These forms of information may reach us in all sorts of spaces, public as well as private, alike at home and airport. Common uses of these devices that are based on applying information and communication technology and its infrastructure (such as the wireless) will be described in the following chapters in detail.

2.1.3. Digital Representation of Information

Any use of the term 'digital' when that term is used to imply that the digital nature of some information affects its content or impact, falls under the designation of 'the digital representation of information'. Regardless of whether we call it a digital revolution, an information superhighway, or a grand convergence of media, something is happening to our world that is protean and profound. It was in the 1960s that Marshall McLuhan, a Canadian professor of English and media theorist, taught us to think about "media not so much in terms of what they delivered -content- but in terms of how their presence changed the way we live" (Green, 1997, p. 7). It took the Internet to clarify McLuhan's insight, but every time we send electronic mail or log onto a World Wide Web site, we are witness to the transformation in daily living that computers have created. In Gilster's words:

> Digitization runs deeper than today's World Wide Web. We've learned that a voice, an image, a book, or a song can be turned into the binary 1s and 0s of digital information as readily as the data on an old style reel-to-reel tape. Suddenly the communications network, which encompasses our fiber-optic long-distance connections, undersea cables, satellite downlinks, and microwave relays, becomes a vast facilitator. We click with a mouse from disc-based encyclopedias, and we journey through 3-D digital environments to play games and analyze data (Gilster, 1997, p. 6).

Wire-based telephone traffic takes through the air ever increasing cellular options, while formerly broadcast media like television burrow into coaxial cable connections. Nevertheless, Internet telephony challenges conventional dial-up calling, while cable television companies try to become cyberspace providers. Movie studios link with data carriers to build tomorrow's hybrid media.

"Putting these trends in order is not a task for the timid, for it requires an understanding of technologies as diverse as telephones, mainframe computers, satellite dishes, modems, virtual reality, and artificial intelligence" (Gilster, 1997, p. 6). All electronic media are evolving rapidly, converging with other media, and becoming increasingly interactive. Although interactivity has become inexorably linked to personal computing and the Internet, other communication technologies provide interactive options, too. At this level, there is a virtual revolution in the packaging and presentation of information

as this information moves faster and in greater quantity with new technologies. This structure of information is based on the interaction, which appears as digital image. In the development of technology day by day, we see that information appears digitally on any display unit in visual form. This form is based on applying ICTs and its infrastructure, which will be discussed in the next sections.

2.1.4. Public Use of Information

The popular perception of information revolves around the meaning and content conveyed by the information transaction. Information is sought and provided on the assumption that the person receiving it will be better informed. In comparison with the generation of this everyday information, and with some of the usage, we see that not only is the generation of information something which occurs right across the social framework, but also the sources from which these various forms of information are provided and distributed have themselves multiplied. These range across a spectrum which stretches from the individual citizen or a one-person firm at one end, to government and its agencies at the other, with an enormous mass of commercial and nonprofit information producers, distributors, and coordinators in between.

People can use some devices or services for access to information in cities. This information, as a public service would in the great majority of cases have been provided free of charge to the end user. Some areas such as entertainment, education, government and the like, choose new technologies to convey information to the user. As a result, some usage behaviors have increased in order to be informed. This is an informal activity outside the home, school or any other specific kind of place. Examples are not just television receivers but, increasingly, computers and information kiosks appearing in life as well as informative establishments. In the sphere of entertainment as such, moreover, there is a sizeable element of information content. Entertainment-based information such as sports, news, cinema, and so on would be available without a considerable amount of technical backup and support, much of it in the form of new electronic technologies. In that case, people use information in its everyday sense; the technological advances allow people to access a common computer database and often electronic mail facilities via terminals in public places as well as with private personal computers. These and related matters are considered in greater detail in Chapter 4.

2.2. Communication

Communication is not as essential an element as information in this thesis. Nevertheless, the existence of a communication system is necessary for all communication and an information system is necessary for all information exchanges. Therefore, information and communication are, for all practical purposes, inseparable, and in the strict technical sense of both terms, communication would not be possible without information. Like 'information', 'communication' is a category word, there being many kinds of communication in different subject fields and in different physical form (e.g. visual communication). Communication involves writing and speaking, as well as nonverbal communication (such as use of facial expression, body language or gesture), visual communication (the use of images or pictures, including photography, video or motion pictures), and electronic communication (telephone calls, electronic mail, cable television, or satellite broadcasts):

> In the popularly understood sense of the term, 'communication' can mean anything from the exchange of news or information between two friends in face-to-face conversation, to the transmission of live television broadcasts via communications satellites. In more formal circumstances it has been defined as the mechanism by which all human relations exist and develop; all the symbols of the mind together with the means of conveying them through space and preserving them in time (Schramm, 1972, pp. 31-32).

Communication is an outgrowth of methods developed over centuries of expression. Humans have developed complex systems of language that are used to ensure survival, to express ideas and emotions, to tell stories and remember the past, and negotiate with one another. To give *brief* of the development of human communication and related with tools is putted together the following table:

APPROXIMATELY WHEN DEVELOPED	METHOD OF COMMUNICATION
About 30,000 years ago	Drawings
About 5000 years ago	Cureform/Hieroglyphics
tba	Alphabet
1400's	Block Printing
1450	Typesetting
1939	Computers
1844	Telegraph
1876	Telephone
1901	Radio
1923	Television
1939	Computers
1960's and 1970's	Word Processor & PC's and Networking (Internet)

Table. 2.1. History of Communication and related with tools
Source: Laudon, K. C.; Traver, C. G., *Information Technology and Society, 1994*

Truly, communication is a process. According to William J. Martin, "the communication process requires at least three elements: source, message and destination" (Martin, 1998, p. 15). In the communication process these elements are used to exchange messages between two or more people. Known also as the sender or the initiator, the source is the point at which the message originates. This may be an individual or an organization, a human being or a machine: "The message may be in audible, visual or tactile form, as any signal capable of meaningful interpretation. The destination or recipient, which again can be a person or a group of persons, is the final link in the communication chain, the intended target of the message" (Martin, 1998, p. 17).

As the technology and interactivity emerged, they were accompanied by new communication concepts and methods such as 'electronic' or 'digital' communication. In this framework, even basic communication technology such as the telephone requires the user to interact with the system−by dialing−before communication can take place.

"Users of the telephone view it as a communication system. Yet the public switched telephone network, with its sophisticated electronic computers and databases that route network traffic, track every local and long distance call, and provide end-user features 'Call Waiting' to 'Caller ID' is clearly an information system as well" (Aydın, 2003, p. 23). More importantly, every electronic communication system requires some of the behaviors from users which the information system requires. For example, when making alterations to a web site, we navigate the system and we manipulate information. In this approach, "the use of every electronic communication system requires information system manipulation" (Finn, 1998, p. 4). In a word, information requires the transfer of knowledge, and that requires reproduction, communication and the means with which to communicate. Alongside the means now in existence, like television, mail, and telephone, the emphasis on new forms of communication−like fax machines, e-mail, interactivity and virtual reality−required new tools of life.

2.3. Information and Communication Technologies (ICT)

'Information', 'communication', and 'technology' are the keywords of ICT. In this case, we may claim that ICT could express so as to communicate the information through technology. Contemporary technology has brought about facilities such as the Internet, which enabled humanity to communicate with the remotest parts of the world:

> Watching a war or sports event broadcast live on international television networks or drawing money from your account thousands of kilometers away, making your own ticket reservation by your personal computer at home or entering information sources by clicking the mouse button, are deemed usual and ordinary matters in our daily life (Aydın, 2003, p. 27).

It is obvious that all of them are dependent on the computerized media that is based on an ICT infrastructure. Therefore, it seems that everyone is talking about the information and communication technologies these days. As a concept, information technology exerts universal appeal in the world of today. Identified in many countries as perhaps the single most important means to the attainment of economic, social and political ends, it has also become an issue, the focus of debate and connection.

In other words, ICT may be broadly defined as the set of technologies that enable the collection of information, processing of the collected information, storage of this information, and the automatic transfer of this information to a destination somewhere else or reaching this information from somewhere else upon need by use of techniques like electronics, optics, and so on. ICT cover office machines and equipment, data-processing equipment, data communication equipment, software platforms, software technologies, fixed and mobile telecommunication networks, local access networks, and all related service industries. Not surprisingly for a term of such widespread currency, ICT is something of a moveable feast frought with a shifting complex of meanings and interpretations. At once the most mundane of domestic appliances and the least marvels of space travel, information technology spans a definitional spectrum that includes microprocessors, cable access television, fiber optics, satellites, teletext, word processing, electronic mail, video, robotics, and much more. This diversity has been captured quite effectively in a United States Department of Trade and Industry definition of ICT, which encompasses information use and content as well as the technology itself: "ICT is the acquisition, processing, storage, dissemination and use of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications" (Great, 1982, p. 1). Conventionally, ICT include and refer to computers and computerization, telecommunication, multimedia, and data technologies and their interdependencies.

In addition, Penzias states that three elements emerge in today's technology: "overwhelming use of digital information storage, the growing interconnection of the world's computers and the emerging dominance of electronic information sources" (Penzias, 1997, p. 1022). On the other hand, Sawhney regards two fundamental dimensions regarding what is new about contemporary ICT. The first dimension is 'interactivity', which will be explained in detail in Chapter 3. Formerly, most communication systems have tended to be one-way technologies that offered users little control. The convergence of telecommunications and computer technologies is allowing for far greater flexibility than it was foreseen as possible before. Users can more actively participate in the configuration of the communication systems in ways that may be most useful for them. The second dimension is the convergence of 'time-space' and 'cost-space' convergence' in the sense that geographical distance is increasingly becoming a factor of lesser and lesser importance in terms of the time required to

establish lines of communication and the costs incurred. The time-space has already been achieved for telephone service (Sawhney, 1996, p. 301).

These technologies and the advances of digital electronics allow the creation of new multimedia telematic services (telematics: interconnection between computer and telecommunication systems, which will be defined in detail in Chapter 3) and applications that combine sound, image and text and for which all means of communication such as telephone, telefax, television and computers are used in a complementary way. The Internet already offers an example: "The high level of interactivity possible on the Internet makes it more of a 'fetch' technology rather than a 'deliver' technology that extends control to user" (Sawhney, 1996, p. 302). With its huge and unrestricted access, it is already well on the way to becoming a major feature of organizational and professional as well as public communications. The development of these new means of communication represents an element of increased competitiveness for enterprises and opens up new perspectives in terms of both work organization and job creation. The informational sector itself, including manufacturing, software, service and content provision, has become the sector that is most rapidly growing, generating the highest added value, and possesses the highest utilization ratio of non-exhausting resources instead of exhausting resources. Throughout the rest of the section, ICT is used to include these multimedia technologies and their increasing, organizational and technological convergence.

2.3.1. Information Technology Framework

The terms of ICT encompass both computer and telecommunication technologies. Information and communication technology has four basic functions:

1- to archive information;
2- to provide access to archived information;
3- to argue for human intelligence and capabilities;
4- to facilitate communication among humans and machines.

An information-technology system has numerous components, including applications, hardware, and the physical infrastructure. Popular applications include web browsers,

word processing systems, database systems, spreadsheets, and financial transaction systems. Hardware includes personal computers, wireless cell phones, servers, and routers. The physical infrastructure includes copper and fiber optic cables, cell phone towers, and satellites. This is a very simplified version of the 'telecosm', as described by George Gilder in his book by the same name (Gilder G., 2000, p. 56). In Nath's words:

> ICTs do not include only the Internet but a gamut of other tools which could be used individually or in convergence with each other to catalyze the process of change in a manner which reduces the skew in knowledge distribution between rich and poor, educated and uneducated, rural and urban, and men and women. The convergence technologies include community radios, Internet radio, local area networks, tele-centres, information kiosks, mobile phones, WAP applications etc. They often enhance the reach and penetration of the ICTs. The development of advanced ICTs has created new kinds of usage activities in daily life. Nevertheless, exponential growth of the Internet and the increase in the use of computers has had profound effects on public activities. In fact, as digital technology is rapidly deployed throughout city places and as that technology becomes more important to social life (Nath, 2001, p. 320).

In the future, information technology will continue to improve the delivery of the four functions listed before. Already, we are close to the day where one can communicate with someone else anywhere on earth 24 hours a day, seven days a week. Most new information being generated in the developed world is finding its way into one database or another and much of this information is available on the web. Handheld devices and powerful search engines, combined with intelligent object-oriented database systems and intelligent agents, are steadily improving access to information. With respect to augmenting human intelligence and capabilities, the future holds the promise of highly intelligent systems capable of providing expert advice on every subject, building custom-made products through the directed use of nanotechnologies, and translating conversations among hundreds of languages in real time.

2.3.2. Humans and Uses of ICT

We live in an information age. It appears that ICT is set to change everything that human beings do in an advanced society. The new technological goods and services are a defining feature of the modern world. The convergence of ICT and media is opening

up a vast platform for multimedia products and its usage. Therefore, one is increasingly focusing attention on combining practically the use of new products with their usage idiom. In addition, there are new descriptions and concepts that have appeared such as the 'mobile information society' (see Fig. 2.2). These descriptions are related to ICT and their physical devices. For example, the cell phone and the computer are known as common devices constituting the tools of ICT for communicating and obtaining information across many miles. In this case, ICT help us see and visualize the world around us and communicate that information to a wide variety of computing devices that then help us analyze and understand the information.

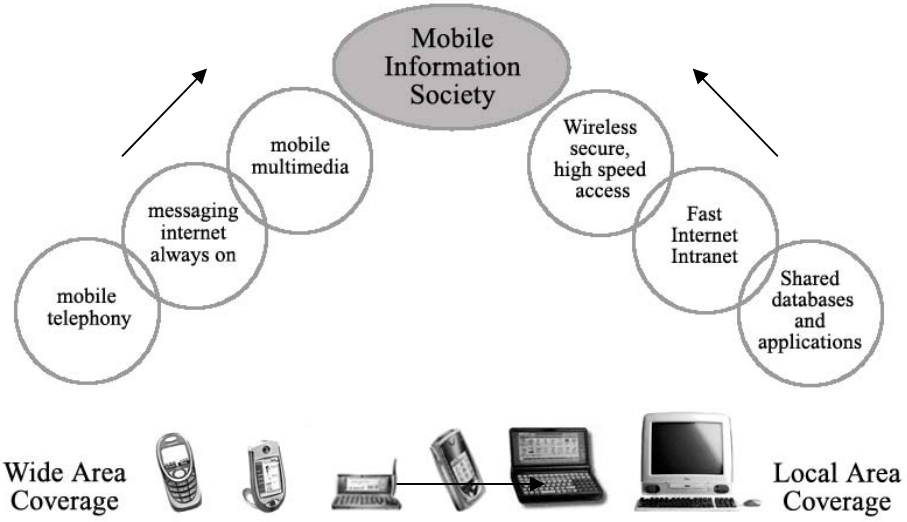


Fig.2.2. Mobile Information Society (MIS)
Source: Heikki Huomo, 2001, p. 338

Information and communication technologies are simply those mechanisms that are used to organize, present, store, and retrieve information. When discussing this topic in today's world, one spontaneously thinks of computers, the Internet, electronic mail, cellular phones, and so forth, but clearly this is only one historical moment in a vastly longer process of information technologies that have been part of human affairs. Indeed, if we understand the full and generic meaning of the concept, it is readily seen that

speaking, writing, print, music, and any other means of human communication intrinsically involves and functionally uses technologies.

It would be pleasant to believe that human beings are totally in control of all technologies. However, the reality is that, once developed, every device has its unique set of features that, at least in part, determine how it will be used. Consider, for example, as has it Norman, "the case of the hammer, acknowledging that it is true that a hammer or a screwdriver can be used with equal effectiveness to hang a picture, a nail, when used with a hammer, would certainly be a more effective fastening device than a screw; in other words, the hammer and the screwdriver each comes with a propensity can be found in the devices that are used in human being" (1993, p. 15). Elsewhere, the same author points out that, "This especially important today, as our information technologies affect all aspects of life, where the products will look as unlike computers as the kitchen blender, clock, and dishwasher look unlike electronic devices" (1993, p. xiii).

Companies and homes are inundated with new artifacts and thus, new technologies. The last decade has been witness to significant change across broad areas of our physical, social, and cultural systems. These changes are clearly reflected in the growth and development of computer technology with applications in such diverse areas as credit cards, mobile phones, cars and cameras as well as the ubiquitous PC. Also, the enabling characteristic and effects of the Internet and the World Wide Web, as currently designed, create a scope for everyone to become sophisticated and innovative technology users:

> The good news is that technology can make us smart. In fact, it already has. The human mind is limited in capability. There is only so much we can remember; only so much we can learn. But among our abilities is that devising artificial devices-artifacts- that expand our capabilities. We invent things that make us smart. Trough technology, we can think better and more clearly. We have access to accurate information (Norman, 1993, p. 3).

Increasingly, information and communication technology is incorporated in products to make them 'smart' in order to provide the user with improved information about and control over performance, greater automation, and enhanced features, functions, and capabilities. Apparently, society is changing under the influence of rapidly evolving

ICT. The key feature of that society is that access to the service shall and will be independent of the actual devices and/or the networks which the user has at his/her disposal in a given moment.

Figure 2.2 above shows the key messages of the ICT use and the Human. The range of terminal devices is shown from the simple computer, through desktop computers and PDAs to mobile phones. In a restricted mobility environment, local area coverage of typically about 100m, more bandwidth is available and thus the screen size is larger than in the devices supporting the wide area coverage of cellular networks with coverage start ranging from the single base station typically spanning several kilometers.

Also, the content shall and will be scalable in such a way that it may be enjoyed with devices terminals and networks. In other words, the technical complexity of the systems needs to be concealed from the users. This is necessary in order to enable as large a user group as possible to utilize the information content. An example of the seamless services could be access to stock exchange information, which in local area coverage would be reached through web browsing on a PC in the Internet, and in the wide area coverage environment, but with less graphical presentation, will be accessible through cellular handsets. The same analogy is valid for, e.g., email where only the subject or the text body of the message is available at the wide area of the coverage environment without the graphically rich attachments, which would be automatically shown in the office/home environment where more bandwidth is available.

It is already clear that the social impacts of ICT are profound. The technology in particular, of the ICT of artifacts is essential for the growth of human knowledge and humans' usage behavior. Technological trends influence all human affairs. The electronic networks of the world have brought thousands of mail messages and electronic bulletin boards daily to computer screens or ICT-based devices. Humans have been communicating for hours a day with friends they have never met. Well, then, homes not only have computer, they have computer networks. The final result is that technology aids our thoughts and civilized lives.

The first generation of these products that provided information and communication services usually demanded and was used by select people in more protected, discrete environments. With the evolution of technology, increase in consumerism and, the globalization of the economy, the products came out into the open and appeared in public spaces. The telephone machine is a good example: throughout the 1890s, the telephone continued to be a communication device used by a very few people. Not only did its availability and use spread in time, but it entered into the public sphere where, eventually, it developed its own 'furniture': as mentioned above, the public telephone booth emerged as a familiar sight of city streets. Particularly worth repenting is the example given above: the red British telephone booth has become one of the foremost symbols of Britain and its culture (see Fig. 2.3). This itinerary of the telephone from rare novelty for the privileged few to evocative symbol of an entire country, it may be argued, is typical for the itinerary of devices of communication technology in the twentieth and twenty-first centuries.

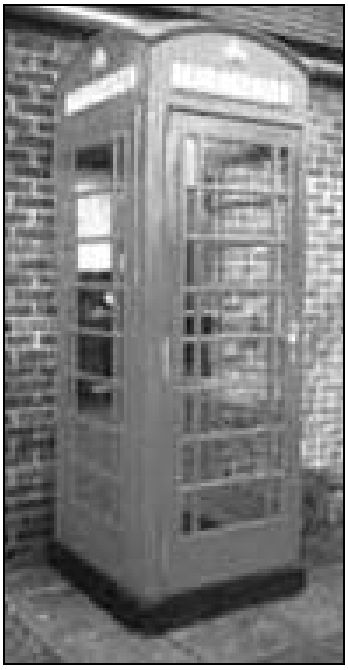


Fig. 2.3. A specific example of the Public Telephone Booth

On the other hand the concept of public /private relationship appeared along with different design tasks. All kinds of product and services have being used for public, besides this some of them for private property in spite of the have different design tasks in the beginning. For example formerly an automobile vehicle was an individual product that had two or four sitting for limited persons, afterwards it has different attributes and design characteristic for mass transportation that has a lot of sitting for the common people.

The design and production of these products have evaluated and become prevalent goods though the concepts of ‘individualized’, ‘personalized’ and ‘public sector’. Many of individualized products and services that reflect personalized technology, as technology becomes more capable of accommodating our individualities. For example, today most of people appropriate using of ‘PIN Code’, or ‘smart card’ these are kinds of personal identification for themselves to obtain determined services that they need. Therefore, having only a variety card, such as bank account cards helps people to obtain services without ‘bank’. There is an only one machine (Automatic Teller Machine); people may attain their goal that they need. In this respect, the ATM is a common example used by personalized technology with a card, toward occurred to public product in public space. On the other hand, the common example is known ‘cell phone’ that individualized product uses personalized technology accordingly. Besides this, increasing the public sector to improve the products and services of public use. As making public use of telephone, the advent and increasing use of public products to the citizen change life for everybody.

Chapter 3

PUBLIC USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES

Most people in the contemporary life actively use technology yet they are surrounded by it in almost all aspects of their personal and professional lives. Social possibilities offered by ICT are in large part products of deep design, characteristic and properties. Given the obvious potential of ICT for using ICT-based devices and systems, and the rich virtual environments, it is natural to discuss how people might use them for daily life. This chapter is concerned with the adoption of ICT into contemporary life as inseparable elements of that life the application of whose tools is wielded by people. The concepts and systems concerning the utilization of ICT will be described with examples and figures.

3.1. Utilization of ICT

As we are entering a new century, old ideas and assumptions about social life and the modern city seem less and less useful. Prevailing notions of the organization of space, time and city life are changing. In fact, ICT have become so pervasive a force in modern life that belief in the inevitability of a network society of inter-connected virtual communities of interest has attained the status of global urban mythology. It has become the most important factor of our age bearing effect on human lives. ICT comprise the products that provide the means to communicate and to be informed.

These technologies have very rapidly redesigned living environments of people and brought about products in accordance with this new design. One example, which has very recently entered our lives is the cellular phone which does not require a fixed settlement. Besides this, the interactive multimedia systems and the Internet technologies provide an advanced level of design of systems and functions of everyday life. Most importantly, “we are confronted with a continuously rising information and communication technology composed of old-fashioned books, journals and newspapers

as well as of web sites, DVDs, VCRs, video games, databases, hypertexts and informative ads" (Headrik, 2002, p. 12).

The means to access mass communication devices, which help people be informed or communicate among themselves, are now more pervasive and versatile than before: multimedia systems, electronic communication webs, cyberspaces for everyone, virtual reality and the Internet. All these devices bring us to face interfaces that provide the flow of information. Information and communication systems have taken the task of exhibition and communication of information to a completely new level, a few examples thereof being cellular phones, kiosks and electronic maps on control panels of cars. The idea behind information and communication systems is to support the ability of people to think, speak, remember, and the like. By bringing the information perception and flow to a visual level, these technologies and interfaces have brought new utilization patterns to the city and people living in it. Interactive-Multimedia devices (i.e. the personal digital assistant) and interface designs of these devices are the most concrete examples of this utilization pattern. However, before moving on to the interaction between technology and people's behavior in daily life, we should first analyze the diffusion of information over the world and its relation with technology.

3.2. ICT and Related Concepts

Through ICT, an entire network of new words participates in our knowledge such as multimedia, interactivity, and the like. If we regard the prominent features of ICT utilizing, it becomes immediately evident that ICT-based concepts, which play an important role in information processing, must be explored. The major feature of using ICT is captured by these concepts of internality. Because of this, tools have come to comprise unifying contacts and services.

3.2.1. Interactivity

There is a fundamental dimension regarding what is new about contemporary ICT. It is interactivity. Generally, the technological definition of interactivity includes the view that it makes up a process-related, variable characteristic of communication settings. Like face-to-face communication, computer-mediated communication has the capacity of enabling high interactivity. One postulated outcome of interactivity is engagement.

Interactivity is not a characteristic of the medium. It is a process-related construct about communication. It is the extent to which messages in a sequence relate to each other, and especially the extent to which later messages recount the relatedness of earlier messages. Interactivity starts with having a policy in relation to how quickly one is going to respond to e-mails he/she receives. It is presupposed that these computer created environments will be highly interactive. However, interactivity does not only require a particular technology. It can occur between people regardless of whether or not they have a computer or other technology between them:

> Webster defines the verb to interact as to act mutually; to perform reciprocal acts. If we consider examples of interactivity in daily life, our clearest examples come from social contexts: a conversation, playing a game of tennis, dancing a waltz, dressing a child, performing as a member in a quartet, reacting to the audience in improv theater. All these highly interactive recreations teach us something about the nature of interaction (Kirsh, 1997, pp. 4-5).

On the other hand, Packer defines interactivity as the ability of the user to manipulate and affect his/her experience of the media directly, and to communicate with others through media (Packer, 2001, p.17). Preece bases his definition of the interaction between the human and the computer on the visibility and affordance concepts of Norman, who in turn identifies these qualities as essential for good interaction with everyday objects (Preece, 1996, p. 6); (Norman, 1999).

With respect to the definitions provided above, our understanding of the impact of interactivity and related attributes is still quite limited, though amply discussed during the past two decades, both as a function of computer activities, especially games, and as enhanced forms of television. However, "interactivity is not a simple, one-dimensional concept" (Mundrof & Bryant, 2002, p. 666). Fortin has cited close to twenty researchers who have identified underlying dimensions of interactivity, in order to conclude that, "interactivity implies the shift from one-way communication prevalent in a traditional media to interchangeable roles of senders and receivers (which can be human or machines). The end-user has a high level of control over access, timing and sequencing of information, entertainment, or services" (Fortin, 1997, p. 113).

3.2.2. Multimedia

'Multimedia' usually is an interface that depends on a visual form of the medium. It is more than one concurrent presentation medium (for example, on CD-ROM or a Web site). Although still images constitute a different medium than text, multimedia is typically used to mean the combination of text, sound, and/or motion video. It has typically meant one of the following:

- Text and sound
- Text, sound, and still or animated graphic images
- Text, sound, and video images
- Video and sound
- Multiple display areas, images, or presentations presented concurrently
- In live situations, the use of a speaker or actors and props together with sound, images, and motion video

Multimedia can arguably be distinguished from traditional motion pictures or movies both by the scale of the production (multimedia is usually smaller and less expensive) and by the possibility of audience interactivity or involvement (in which case, it is usually called interactive multimedia). Interactive elements may include voice command, mouse manipulation, text entry, touchscreen, video capture of the user, or live participation (as in a live presentation). Depending on this vision, the multimedia world and interactivity are new forms of communication. Simple digital tools on screens for editing, changing, and manipulating media offer everyone the ability to work quickly with sound, text, music, voice, video, art, photography, and graphics.

3.2.3. Interactive New Media

"The etymologically plural form *media* is often used as a singular to refer to a particular means of communication, as in *The Internet is the most exciting new media since television.* Many people regard this usage as incorrect, preferring *medium* in such contexts. People also use *media* with the definite article as a collective term to refer not to the forms of communication themselves so much as the communities and institutions behind them. In this sense, *the media* means something like 'the press' " (Source: www.dictionary.com). New media is sometimes used as a synonym for interactive

digital multimedia. “The ideas of Marshall McLuhan, writer, educator, and pioneer communications theorist, who believed that the biggest story of the twentieth century was the hidden powers of media, have had a recent resurgence” (Green, 1997, p. 78). This is perhaps because in the digital age the power and proliferation of the media are becoming more apparent to the rest of us. For some, the computer and computer-mediated communications have become the central feature of their lives. For example, film and TV bring people onto screens in the theater or in our homes but it is a one-way communication. They not bring *us* into *their* lives. Our experience with these media is also that of a relatively passive consumer, and we watch the movie according to the schedule of the screening or broadcast. Interactive new media or interactive multimedia increases our level of choice. Even videotape gives us new options: we can play it at our leisure, watch parts of it again, or fast forward through boring portions. But even the most advanced interactive new media are about “what it will be when” as much as what it is now: better sound, higher resolution graphics, and more immediacy. Therefore, interactive media can allow people to use the media as a substitute for sociability. The human need for interaction, when satisfied, allows people to use interactive media to bolster their favorable disposition toward interacting with others.

‘Interactive new media’ is a catch-all term for all forms of electronic communication that have appeared or will appear since the original mainly text-and-static picture forms of online communication. Interactive new media usually includes any and all of these: person-to-person visual communication, one-to-many visual communication as with micro devices with embedded systems programming, live Internet broadcasting as on the Mbone, special audiovisual effects of any kind, larger than 17-inch displays, streaming video and streaming audio, 3D and virtual reality environments and effects, highly interactive user interfaces (possibly including mere hypertext or not), mobile presentation and computing capabilities, any kind of communication requiring high-bandwidth, CD and DVD media, telephone and digital data integration, and online communities.

3.2.4. Accessibility

The word ‘access’ is defined as the right to entry. However, by means of the technological approach, it has come to mean obtaining or retrieving from a storage

device, as of information on a computer. Generally, providing accessibility means removing barriers that prevent people with disabilities from participating in substantial life activities, including the use of services, products, and information. Technologically, accessibility has been defined as a useful channel for people to obtain information and services such as the daily news and online shopping.

We see and use a multitude of access-related technologies in everyday life, many of which we may not recognize as disability related when we encounter them. The fast adoption of ICT has rendered access to information easier and less expensive especially through the Internet. As more and more information and services are delivered to the public through the Internet, the 'accessible' web site improves service to people with disability as it also caters for readers with slow modems and less sophisticated browsers. Improving the accessibility of web pages not only addresses people with disability, it also helps improve the general usability of a website. From the business point of view, accessible web sites help companies enlarge their customer base and render their product information available to people with disability and other customers through easy-access services.

3.2.5. Internet

The Internet is generally defined or considered as a global platform connecting thousands of networks around the world. Internet users access the information sent by either people or by the computer itself from the network. The Internet allows users to connect their computers either directly via applications protocols like Telnet, FTP, etc., or via an access system (defined as dial-up connection). "The Internet consists of a global network of computers that are linked together by 'wires' telecommunications technologies (cables of copper, coaxial, glass, as well as radio and microwaves)" (Dodge & Kitchin, 2001, p. 2). The Internet provides a useful channel for people with disability to obtain information and services such as the daily news and online shopping. It helps expand the education and career opportunities of people with disability and in turn helps them live independently as full members of the community.

The last decade has seen a shift in the nature of computer systems with the development of a new set of network-based applications. The merging of computing and

communication systems has in combination with the maturing of distributed computing techniques altered the way in which computers are now seen with a growing focus on the information infrastructure rather than the devices that access it. The rapid development of Internet usage represents the most dramatic example of this shift in the nature of computer systems with the popular acceptance of massively interconnected computer systems. This transformation in the nature of computers has seen a shift in their public perception with computer and the communication systems being seamlessly interwoven within the everyday life of the general public. This transformation has not only resulted in the emergence of a new economic sector, it has also come to serve as an illustrative example of current trends in the nature of computer and communication systems.

The type of information available on the Internet includes directories, statistical databases, universities' prospectuses, company profiles, product information, libraries' on-line catalogues, weather charts, census data and many other categories of information. The Internet has been considered as a forum for users to share worldwide information resources. We can also define the Internet as a computer network, which provides information services or resource sharing services to a large number of users worldwide. Dodge and Kitchin describe the relations of users to networks as follows:

> Within each network space users are normally presented with different modes of interaction, varying in their sophistication and immediacy. Users can browse information stored on other computers, exchange electronic mail (e-mail), participate in discussion groups on a variety of topics, transfer files, search databases, take part in real time conferences and games, explore virtual worlds (both textual and visual), run software on distant computers, and buy goods and services (2001, p. 2).

A discussion of the basic Internet services is given through different advances and tools defined to provide security, interconnectivity and other related issues. The extension of the most commonly used four basic Internet services are the following:

Electronic mail (e-mail): By far the most common form of Internet activity is sending communication via e-mail. E-mail allows network users to send messages to each other via their network and in most cases across the Internet. The electronic mail (e-mail) service deals with the transmission and receiving of the messages between nodes across

global networks (defined by interconnecting public network hosts and local networks). This resource service is available on mail systems like the Internet, CompuServe, MCImail and many other systems which have connections with the Internet. It allows users to send and receive messages (any type of data: text files, graphical pictures and programs, images, video images, pictures, etc.), electronic magazines, announcement, access newsgroups, and so on.

Telnet: The Telnet service provides a session link (logical connection) between our computer systems (PCs, terminals, workstations, etc.) and remote computer systems (mainframe, workstations, servers, etc.) across the Internet. "Telnet allows a user to log-on (connect) to a host computer outside of their immediate network" (Dodge & Kitchin, 2001, p. 2). In effect, the computer becomes a terminal of the remote host allowing the to user explore the files stored there.

File Transfer Protocol (FTP): In general, most host computers require a log-in name and password before entry is gained but there are some open access sites including many bulletin boards. FTP allows the user the option to 'download' or copy files from a remote computer host. This is different from the functioning of Telnet, which makes a user's computer a terminal of the host: "FTP only allows external visitors to look at, and download, the files" (Dodge & Kitchin, 2001, p. 2). The File Transfer Protocol allows users to transfer files from one computer to another across the Internet. The files from a remote computer may be copied on our computer (using downloading options) and the files from our computer may be copied onto the remote computer (using FTP uploading options). It is also possible to transfer the files from one remote computer to another remote computer and this may be done from our local computer. It is important to know that this service protocol is one of over 100 service protocols defined by TCP/IP.

World Wide Web (WWW): This application software was developed as a WWW project at The European Laboratory for Particle Physics, Geneva, Switzerland (CERN), in 1989 for defining a distributed hypertext and hypermedia system. It is based on hypertext, which allows the users to select a particular word, which may be linked to other documents and in this way, a large logical link of the word data across the documents may be defined. The concept of hypertext offers the advantage that we can thereby obtain more information about a particular topic or subject simply by clicking on it. The

documents can also be linked to other documents, which may be in the same topic or subject but with a different author or source. “The WWW consists of multimedia data (mostly text and static graphics but also sound, animation, movie clips and virtual spaces) that are stored as hypermedia documents (documents that contain links to other pages of information) (see http://www.MappingCyberspace.com)”(Dodge & Kitchin, 2001, p. 3). Using a browsing program such as Netscape Navigator or Microsoft Explorer, users can connect to a remote computer host and explore and interact with the information stored there. For example, it is now possible to shop and bank online, find out about educational establishments, play interactive games, research places that might be visited in ‘real life’ and book the trip, keep abreast of local, national and global news, and much more besides. “Thus, the WWW provides a powerful medium in which to explore related subjects, allowing users to easily ‘jump’ between, and search for, other relevant documents, without concern for their specific location in the network or in geographic space” (Dodge & Kitchin, 2001, p. 3).

On the other hand, the second main form of digital, networked spaces are called Intranets. Dodge and Kitchin describe Intranets in the following paragraph:

> The Intranets have the same functional forms of Internet, but are private, corporate networks linking the offices, production and distribution sites of company around the world. These are closed networks, using specific links leased from telecommunication providers, or they employ new virtual private networking technologies, with no, or very limited, public access to files (company employees with knowledge of the correct password might gain entry from a public network).. For example, most banks and financial institutions have national, closed Intranets connecting up all its branches, offices and ATMs (automatic teller machines) to a central database facility that monitors transactions. Other systems might monitor orders and bookings, allow e-mail to be sent between different sites, and allow teleconferencing (Dodge & Kitchin, 2001, p. 4).

3.2.6. Cyberspace

The term cyberspace literally means ‘navigable’ space and is derived from the Greek word *kyber* (to navigate). In William Gibson’s 1984 novel *Neuromancer*, the original source of the term, cyberspace refers to “a navigable, digital space of networked computers accessible from computer consoles; a visual, colorful, electronic” (Gibson, 1984). “Cartesian dataspace known as ‘The Matrix’ where companies and individuals

interact with, and trade in, information Since the publication of *Neuromancer,* the term cyberspace has been reappropriated, adapted and used in a variety of ways, by many different constituencies, all of which refer in some way to emerging computer-mediated communication and virtual reality technologies" (Dodge & Kitchin, 2001, p. 1). According to Oliver, "Cyberspace is a computer, communication, and database networks that perceived as a new space for human interaction and actions, which is connected each other" (1997, p. 56).

On the other hand, digital information and other networks are defined as cyberspace. Therefore, cyberspace is intersection with digital information and human perception. For example, it is the place where conducting a telephone conversation, extracting money by ATM or obtaining most kinds of information with information kiosks is possible. Moreover, according to Mitchell, "cyberspace is urban conservational site. There are special for city activities that located in cyberspace. Each thing is done in city, also can be done in cyberspace digitally. Related to these arguments each activity may become a concrete form on screens by graphic interfaces" (Mitchell, 1998, p. 23). At present, the cyberspace does not consist of one homogenous space. It is a myriad of rapidly expanding cyberspaces, each providing a different form of digital interaction and communication. In general, these spaces may be sub-categorized into those existing within the technologies of the Internet, those within virtual reality, and conventional telecommunications such as the telephone and the fax, because there is a rapid convergence of technologies that have emerged as new hybrid spaces.

3.2.7. Virtual Reality

Virtual reality (VR) was a formidable topic of conversation in the 1990s. The concept has altered the way people think and view the world of computing. The key word in the definition of VR would have to be interactivity. The heart of VR is based on interactive principles between the real and the virtual world:

> Virtual reality technologies create visual, interactive computer-generated environments in which the user can move around in and explore. It currently takes two forms. First is the totally immersive environment: a user wears head-mounted goggles to view a stereoscopic virtual world that phenomenologically engulfs him/her. When the user moves, the virtual

> world that surrounds him/her is continuously updated by the computer, providing the illusion that the user is fully immersed in a three-dimensional, interactive space (Dodge & Kitchin, 2001, p. 5).

Figure 3.1 shows the head-mounted goggles dot Dodge and Kitchin are referring to. Access to this space is currently limited, as it requires specific hardware that can be expensive and cumbersome. The second form is screen-based and allows the user to interact with a responsive 'game space'. Both forms of virtual reality have three essential attributes: they are inclusive; they are interactive; and the interaction takes place in real time. The aim of both is to create a sophisticated conceptual space where the experiences are the same as in the real world, to make "cyberspace into a place" (Lajoie 1996, p. 158). Although, at present, both forms are mainly visual, developers are working on including total sound effects and, in the case of immersive environments, touch. Currently, immersion VR machines are mainly limited to the military, academia, and the arcade entertainment industry, but it is the potential of screen-based VR to provide three-dimensional hypermedia environments, accessible over the Internet, that excites commentators and analysts alike: from their own home, users will be able to enter a virtual world as envisaged by William Gibson. As a result of this display and imaging technology, there has been an explosion in the advent of new VR tools. Since interactivity is a key word in the VR world, input/output tools have been pondered and experimented with. Probably the most widely known VR tool is the sensory glove (see Fig. 3.2).

Fig. 3.1. Head-mounted Goggles

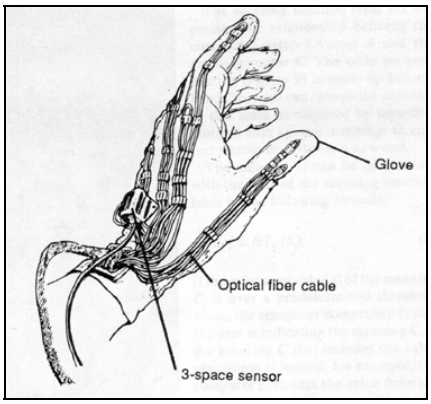


Fig. 3.2. Data Glove

The system shown above, in Figure 3.1, consists of a head-mounted stereoscopic display that allows the user to 'step into' a scene and interact with it. The display may

be an artificial computer-generated environment or a real environment relayed from video cameras. Examples of how VR can be used are the following: a design engineer can 'get inside' a rocket engine and become part of the fuel flowing through the engine. The engineer can see how smooth the fuel flow is. An architect can walk through a building and see how it looks, before it is even built. Robots exploring another planet may be controlled from Earth as if a human were inside the robot, controlling its every move.

3.2.8. Telematic-Based System

The term *telematics* is a derivative of the French word *telematique*, which in turn is a compound of *telecommunication* and *informatique*. "The first step toward telematics was taken when printing machines were attached to telegraph receiving units in 1859 to make printouts. Facsimiles of configurations were transmitted in 1865. The linking of electronic telecommunication procedures to computer-processed information in the 1960s ushered in modern telematic procedures" (Couch, 1996, p. 165). The term refers to the interconnection between computer and telecommunication systems.

Telematic procedures transmit information far more rapidly and at far less cost than traditional telecommunication ones. For example, "the contents of a large book can be transmitted halfway around the world very rapidly at very little cost" (Blatherwich 1987, p. 4). "Telematic procedures have also extended how communication between dispersed persons can occur. For example, the merger of telephonic networks with recording procedures has produced the hybrid known as voice mail. Answering machines, like mail, preserve information as well as facilitate the transmission of information across space" (Couch, 1996, p. 165). Today Electro-Telematic Systems play a primary role in a wide range of applications and represent a huge potential for business in the future. Telematic is the application of computer technology in modern telecommunication. According to urban theorists, "Telematics have been far more important so far in underpinning new ways of organizing and managing physical flows of goods and physical retailing spaces in city centers and out-of-town malls than it has totally substituting these with 'virtual' types of shopping based totally on electronic mediation" (Graham and Marvin, 1996).

Telematic-based systems are being used to capture the flow of goods in real time, creating a picture of the products sold and the socioeconomic profile of customers. In Sainsbury's, a major UK supermarket, for example, "the use of scanning technology at the checkout in 95 per cent of Sainsbury's stores, together with in-store inventory checks using hand-held data terminals, provides information which is used to calculate the replenishment requirements of each store on daily basis" (Graham and Marvin, 1996, pp. 108-109). This is linked into wider telematics-based systems of logistic management, and electronic fund transfer with suppliers, creating a kind of 'extended conveyor belt' between productions, distribution and consumption that is integrated via telematics (Graham and Marvin, 1996, p. 111). Telematic applications are also especially used in mobile status. Therefore, telematics allow vehicles and even personnel to be treated as 'mobile premises' that can be monitored in the same way. A lot of automotive companies use the telematic system in their cars. This provides an opportunity for drivers for a unique telecommunications service, whose benefit forms a wideranging network of information sources (see Fig. 3.3). By supplying carefully selected traffic information directly to the cockpit, telematics help drivers on roads to reach their destination quickly and without becoming caught up in traffic congestion (see Fig. 3.4).

Fig. 3.3. Telematic Application

Fig. 3.4. Telematic in Vehicle

3.3. ICT Systems and Infrastructure

The integration of powerful handheld or wearable computers with always on, wireless, broadband data, Bluetooth and voice telecommunications and the like, characterize the new breeds of mobile technologies. In this framework, mobile computing and

communications will augment the user's ability to function in professional and social settings by providing supplemental information gathering, processing, and storage functions, which to a large extent will be cued to the user's geographic or location context.

Within cities, mobile technologies are quickly becoming more prevalent than the desktop Internet and the personal computer (PC). Furthermore, "490 million of the world's 1.3 billion telephones are now mobile" (ITU, 2000, p. 1). "Mobile terminals will overtake PCs as the most popular devices for Internet access by 2003" (IDC, 2000). Unlike the desktop Internet, voice-driven information portals can serve the billions who cannot read or write. In short, "the mobile handset is coming to define our global society in the way that television and the automobile defined earlier generations" (Townsend, 2001, p. 2). Everyday the world seems to be moving at a faster and faster pace with new technological advances occurring constantly. Nowhere is this pace faster and technology more exciting than in telecommunications. In order to deliver new services such as video conferencing and video on demand, as well as provide more bandwidth for the increasing volume of traditional data, the communications industry introduced a technology that provided a common format for services with different bandwidth requirements. The capacity of optical cables and the number of connections are increasing. There has been an explosive growth in cellular mobile telephony, in particular where they offset the deficiencies of fixed networks. In the field of satellite communication, geostationary technology is in full development. Internet and WWW technology provide a platform for integrating other technologies, including ISDN lines and ATM servers. These technologies are combining to create new information services that are location-based. While these visions are elaborated, those technologies, which will be presented below, are working together to create such usage.

3.3.1. Wireless Technology

"'Wireless' is a term used to describe telecommunications in which electromagnetic waves (rather than some form of wire) carry the signal over part or the entire communication path" (see: http://www.wireless.com). Some monitoring devices, such as intrusion alarms, employ acoustic waves at frequencies above the range of human hearing. These are also sometimes classified as 'wireless'. The first wireless

transmitters went on the air in the early twentieth century using radiotelegraphy (the Morse code). Later, as modulation made it possible to transmit voices and music via wireless, the medium came to be called radio. With the advent of television, fax, data communication, and the effective use of a larger portion of the spectrum, the term wireless has been resurrected. Today, most people in contemporary life actively consider wireless connectivity. This relationship, which is a variety of a network, includes a large number of products (see Fig. 3.5).

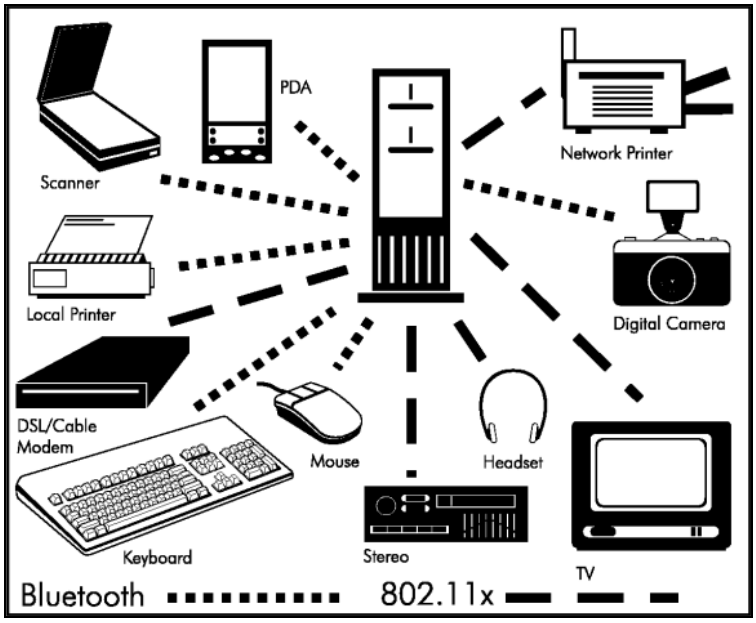


Fig. 3.5. User Model with Wireless Connectivity

Wireless technology developed by Ericson, Intel, Nokia and Toshiba specify how mobile phones, computers and PDAs interconnect with each other, with computers, and with office or home phones. The technology enables data connections between electronic devices in the 2.4 GHz range. Personal mobile computing devices such as laptops and PDAs are connected through a wireless local area network. Common examples of wireless equipment in use today include (for figures see next pages):

cellular telephones and pagers, which provide connectivity for portable and mobile applications, both personal and business (see Fig. 3.6 and Fig. 3.7);

GPS devices with wireless connectivity that allows drivers of cars and trucks, captains of boats and ships, and pilots of aircraft to ascertain their location anywhere on earth (Fig. 3.8 and Fig. 3.9);

cordless computer peripherals: the cordless mouse is a common example; keyboards and printers can also be linked to a computer via wireless (Fig. 3.10);

cordless telephone sets: these are limited-range devices, not to be confused with cellular phones. They only use limited-range space, e.g. within the home (Fig. 3.11);

home-entertainment-system control boxes: the VCR control and the TV channel controls are the most common examples; some hi-fi sound systems and FM broadcast receivers also use this technology (Fig. 3.12 and Fig. 3.13);

remote garage-door openers: one of the oldest wireless devices in common use by consumers; usually operates at radio frequencies (Fig. 3.14 and Fig. 3.15);

baby monitors: these devices are simplified radio transmitter/receiver units with limited range (Fig. 3.16 and Fig. 3.17);

satellite television: allows viewers in almost any location to select from hundreds of channels;

handheld scanner: is used for inventory tracking, shipping/receiving, tool tracking, gage tracking, labor time and other areas that are commonly called the bar coding system (Fig. 3.18 and Fig. 3.19).

Fig. 3.6. Cell Phone

Fig. 3.7. Pager

Fig. 3.8. GPS Handheld Device

Fig. 3.9. GPS in Car

Fig. 3.10. Cordless Keyboard and Mouse

Fig. 3.11. Cordless Telephone

Fig. 3.12. Home Entertainment System

Fig. 3.13. Remote Controller

Fig. 3.14. Usage of
Remote Garage-Door Opener

Fig. 3.15. Remote Controller

Fig. 3.16. Baby Monitor

Fig. 3.17. Baby Monitor Handheld Device

Fig. 3.18.Handheld Scanner

Fig. 3.19.Usaging the Bar Coding System

3.3.2. Bluetooth Wireless Technology

Bluetooth is a cable replacement technology for passing information among devices, which is based on communications central to one's own personal space. Fundamentally, Bluetooth operates within the Industrial, Scientific and Medical (ISM) band at 2.4 GHz. It is a short-range wireless communication standard defined as cable replacement for a Personal Area Network (PAN). Thomas Zimmerman and other researchers at MIT's Media lab first developed the concept of PAN. In a research paper, Zimmerman explains why the concept might be useful:

> As electronic devices become smaller, lower in power requirements, and less expensive, we have begun to adorn our bodies with personnel information and communication appliances. Such devices include cellular phones, personal digital assistants, pocket video games and pagers. Currently there is no method for these devices to share data. Networking these devices can reduce functional I/O redundancies and allow new conveniences and services (Zimmerman, 1996, p. 4).

Bluetooth Wireless Technology revolutionizes the personal connectivity market by providing freedom from wired connections, thereby enabling links between mobile computers, mobile telephones, portable handheld devices, and connectivity to the Internet (See Fig. 3.20). Body mounted devices (e.g.; watches, wallets) that digitally communicate through the human body using electric fields. Using Bluetooth PC cards for notebook PCs, compactFlash card for cameras and PDAs and USB dongles for desktops, allow one personally to tap in the power or wireless use.

Fig. 3.20.Bluetooth Personal Area Network

When Bluetooth Wireless Technology connects devices to each other, they become paired. Device pairings are constantly evolving, simplifying familiar tasks and developing new possibilities. Bluetooth Wireless Technology is now poised to enhance industrial automation, expand gaming possibilities and propel delivery-tracking innovation.

3.3.3. ATM Technology

The Asynchronous Transfer Mode (ATM) is the world's most deployed backbone technology. This standards-based transport medium is widely used within the core at the access and in the edge of telecommunications systems to send data, video and voice at ultra high speeds. ATM technology is a digital transmission and switching technology that most of the world's manufacturers of computer and telephone equipment have agreed to use. "ATM allows very high-speed, efficient, and flexible use of the network capacity. Instead of holding a line or signal path open during a phone call or transmission, and tying up space whether or not anything is being transmitted, ATM avoids this by breaking the transmission into discrete 'chunks' of data" (Green, 1997, p. 61). The technology converts the signal, regardless of whether voice, text, graphics or video, into 53-byte (=424bits) packets or cells, each of which has an address and information identifying what is in the cell and how and when it needs to get where it is going (see for details: http://www.atmforum.com).

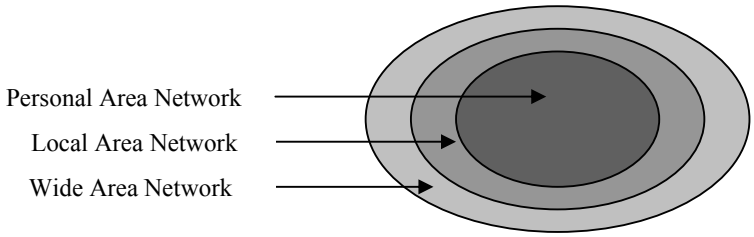


Fig. 3.21. Positioning of PAN, LAN and WAN

ATM is best known for its easy integration with other technologies and for its sophisticated management features that allow carriers to guarantee quality of service. Sometimes referred to as 'cell relay', ATM uses short, fixed-length packets called cells for transport. Information is divided among these cells, transmitted and then re-assembled at their final destination. ATM is used as the backbone for other networks,

which are Local Area Network (LAN), Wide Area Network (WAN) and Metropolitan Area Network (MAN).

These networks are built to provide communication solutions for organizations or people who need to exchange digital information between two distant places. Especially with use of technologies such as Bluetooth, PAN can be created in public places, in the home, in the office, or in a car. This network enables everyday devices to communicate wirelessly. For example, a PAN allows PDA users the ability to access e-mail or the Internet wirelessly with a desktop device.

3.3.4. ISDN

"ISDN stands for Integrated Services Digital Network and was invented ages ago (in 1978) at Bell Labs. ISDN was designed to be the digital replacement for conventional analog telephone service, using the same infrastructure of standard (copper) phone lines, but offering new capabilities like simultaneous transmission of voice and data**"** (Green, 1997, p. 60). A growing number of companies use ISDN to enable telecommuters—employees working part-time or full-time at home from computers— to tap into the company's local area network (LAN), communicate with colleagues at the office, and use all of the LAN's other broadband features. Lawyers can send and receive large briefs at home and utilize the firm's legal on-line information services. They can also speak with other attorneys or paralegals while viewing the same file and making changes in it. Hospitals transmit digitized x-rays and other diagnostics to service providers and specialists. A composer who creates music and sound effects for a nightly news show can send CD-quality transmission of his work each day in time for editing at the studio.

The rise of the Internet's World Wide Web has also spurred the growth of ISDN because it allows the transmission of data at 128,000 bits per second, more than four times the speed of the fastest modem. That is an enormous difference if you have a serious need to download—or upload— high-resolution graphics, sound, or video. Green enumerates further features of ISDN as follows:

High-fidelity voice. The low bandwidth, low-quality telephone voice we're used to is but a shadow of what it could be-improving the intimacy and clarity of phone conversations.
Call waiting, caller ID (you see the number of the person calling), and e-mail.
Collaborative computing: You can simultaneously talk and work on a single document with one or more colleagues.
Desktop videoconferencing- the long-heralded videophone may finally be within reach. Talk and see one or more colleagues on your computer screen while a small camera mounted on your screen sends your image over wires (Green, 1997, p. 61).

3.3.5 Geographic Information System (GIS)

A geographic information system (GIS) is a computer-based tool for mapping and analyzing things that exist and events that happen on Earth. GIS technology integrates common database operations such as query and statistical analysis with the unique visualisation and geographic analysis benefits offered by maps. These abilities distinguish GIS from other information systems and make it valuable to a wide range of public and private enterprises for explaining events, predicting outcomes, and planning strategies. A GIS stores information about the world as a collection of thematic layers that can be linked together by geography (see Fig. 3.22). This simple but powerful and versatile concept has proven invaluable for solving many real-world problems from tracking delivery vehicles to recording details of planning applications, to modeling global atmospheric circulation (see for detail: http://www.gis.com) .

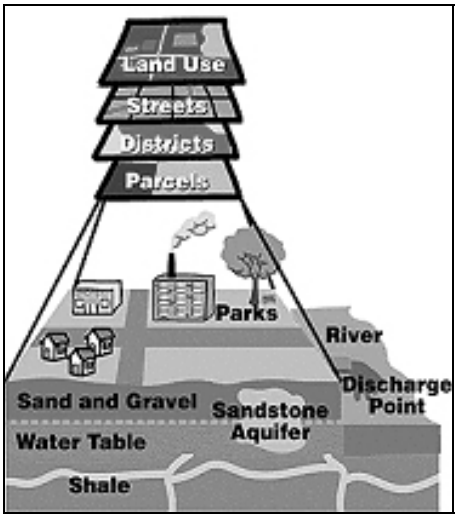


Fig. 3.22. GIS Layers

A GIS combines layers of information about a place to offer better understanding of that place. What layers of information one combines depends on one's purpose: finding the best location for a new store, analyzing environmental damage, viewing similar crimes in a city to detect a pattern, and so on.

3.3.6. Global Positioning System (GPS)

Since the early 1960s the satellite system has expanded to carry most of international telephone traffic. Satellites are also a major and growing relay source of television for developing countries and remote areas of the world. The Global Positioning System is a Satellite Navigation System, the only system today able to show one his/her exact position on the Earth anytime, in any weather, anywhere. GPS satellites, 24 in all, orbit at 11,000 nautical miles above the Earth. Ground stations located worldwide continuously monitor them. The satellites transmit signals that can be detected by anyone with a GPS receiver. Using the receiver, one can determine one's location with great precision. A kind of information can be delivered to the user with GPS technology such as location-based information. However, users obtain the information from the display unit of their own handheld device (see Fig. 3.23).

Fig. 3.23. GPS Handheld Device

Fig. 3.24. The driver's route is shown on the screen

GPS and its network of satellites allow boats, airplanes, wilderness adventurers, and anyone else with the right equipment (a hand-held unit) to verify their exact location on Earth. For example, a computer in your car, equipped with map software working in conjunction with a GPS unit, shows one an icon of his/her car moving along the map toward the destination address that has been entered (see Fig. 3.24). The software

calculates and highlights the ideal route. Making a wrong turn, one can see it instantly, as well as receive an update on the new best way to get to the destination. To help one keep one's eyes on the road, some systems feature a synthesized voice that alerts the driver with messages like 'turn ahead' or 'you are off route'. This system may eventually come as optional or even standard equipment in all cars.

3.3.7. Cellular System

A cellular mobile communications system uses a large number of low-power wireless transmitters to create cells—the basic geographic service area of a wireless communications system. Variable power levels allow cells to be sized according to the subscriber density and demand within a particular region. As mobile users travel from cell to cell, their conversations are handed off between cells to maintain seamless service. Channels (frequencies) used in one cell can be reused in another cell some distance away. Cells can be added to accommodate growth, creating new cells in unserved areas or overlaying cells in existing areas.

This thesis discusses the basics of radiotelephony systems, including both analog and digital systems. In this sense, generalized use of the Internet and more specifically, of the WWW, offers a framework which would have been unimaginable only a short time ago, to the extent that the different elements that make up what we might call the communications and telephone access system (catalogues, communications infrastructures, WWW site, etc.) represent elements of vital importance for the system.

The integration of these technologies and systems are built to provide global communication solutions for organizations or people who need to exchange digital information between two distant places. But these remain limited discussions as the wide range of technology is developing daily. As a result, new and improved networking technologies have become an essential way of obtaining information anywhere. In addition, ICT with their infrastructures support spatial and material relations of the social, political, and economic life.

3.4. ICT-Based Devices and New Media Products

"The world has arrived at an age of
cheap complex devices of great reliability;
and something is bound to come of it."
Vannevar Bush, 1945
(Green, 1997, p. 37)

These technologies and concepts, which have been discussed above, designate today's media-oriented life. The evaluation of this life is based on the evaluation of technology. If we look at the past, we see that the devices and services were unwieldy and different than today's communicating and obtaining information one. They also lacked power. Pencil, paper, telegraph, and likes of them were sufficient for acquiring any communicative information. These equipments were used until the advent of the electronic age and the developments of computers. Today, we are using a lot of equipment and devices in our homes and on the street. Technology-based information devices surround our life anywhere, anytime.

3.4.1. The Roots of New Media Devices

Today's information age began with the telegraph. The telegraph machine, the first major invention to use electricity for communication purposes, made it possible to transmit information over great distances with great speed. The usefulness of this invention was further enhanced by the development of the Morse code in 1835 by Samuel Morse, an American from Poughkeepsie, New York. Morse devised a system that broke down information (in this case, the alphabet) into bits (dots and dashes) that could then be transformed into electrical impulses transmitted over a wire, just as today's digital technologies break down information into zeros and ones (see Fig. 3.25). Subsequent major developments in communication occurred around the end of the nineteenth century with the invention of the telephone by Alexander Graham Bell in 1876, followed by the discovery that electrical waves traveled through space and would produce an effect far from the point at which they had originated, which in turn led to the invention of the radio by Marconi in 1894 (see Fig. 3.26). These technologies do make up the basis for the modern-day telecommunications systems. Nevertheless, the television provides the biggest story of all, as both in the past and today, most people around the world own television sets as the new media device (see Fig.3.27 and Fig. 3.28).

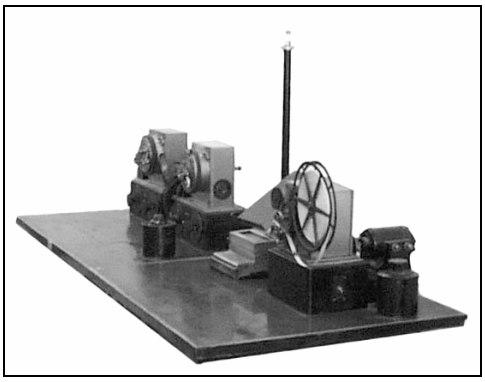


Fig. 3.25. An Advanced Model of Morse's Telegraph Machine

Fig. 3.26. Bell on the telephone in New York (calling Chicago) in 1892

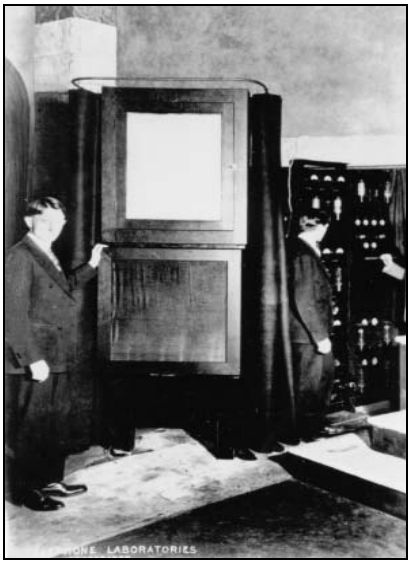


Fig. 3.27. Bell Lab. TV, April 1927

Fig. 3.28. Television, 1950-1951

The abundance of information in conjunction with the human lack of adequate mental storage capacity sparked new methods and forms of media. Only recently have we seen the digitization of media based on the computer apparatus, allowing for the complete customization and random access of various features. The dependence on the new media as a vital component of daily life further reinforces the interconnectedness created by new forms of communication, media events, and digitized mediums allowing for hybrid forms of cultural exchange and social interaction.

Today technological advances such as the Internet and ICT have opened up new paths for persons and companies that constitute contemporary forms of media culture. McIntosh argues that,

> The telephone technology in the first half of the twentieth century did not cause the dispersal of population, but accelerated the polarization of employment into certain geographic areas. The advent of the Internet and the information superhighway will also polarize urban activity. Programs in the future will run on any computed platform via Intranet or Internet and will eventually link up with television (McIntosh, 1997, p. 59).

3.4.2. Computer

Nowadays computer usage involves the main and characteristic purpose to build and to revolutionize the way information is distributed in the media conception of such distribution. Clearly, computer technology and provision of services such as the Internet make up new forms of human activities integrated in daily life. Computers provide human beings with great accuracy and rapidity. Those who use computers to manage quantitative information can add, subtract, multiply, and divide so much more rapidly than can be done manually, with the result that the two activities seem to have little in common. In a similar manner, when computers are used as word processors, information can be manipulated so rapidly and in such complex ways that the activity seems to have little in common with handwriting.

In the beginning, the computer was perceived as a machine. However, it is a part of the world and has become a life style for most of the users today. Moreover, systems extending from individual computers to ATMs have become a component in daily life. According to Negroponte, who has researched the means of digitalizing for life, “computing is no longer about computers; it is about the living” (Negroponte, 1996, p. 6). Mitchell, on the other hand, who determines the computer as a symbol of the postfordist production type, carries the meaning of the computer quite far. From the 1960s to the 1990s, the concept that has helped us understand the means a computer machine provides has changed by the computer development technology, he claims: “Firstly they are communication machines. Then they have become a smart device, which is capable to organize, explain, filter, interpret and present lot of information

components. Actually their main mission produces the cyberspace for human interactions and operations" (Mitchell, 1998, p. 109).

The computer was originally designed to be a mathematical tool for manipulating abstract symbols, but it was not until the television monitor was added that the results of computations could be seen. This visual, rather than written, result gave birth to the electronic image, which was eventually claimed by the artistic community as a new form of artistic expression. If we look at the early history we can see that there are some computer-based designs:

In 1882, designed a mechanically operated Difference Engine. This was the first 'computer'. A modern construction of it has been made: it contains 4000 components, weighs 3 tons, and calculates up to 31 digits accurately (see Fig. 3.29). In 1946, John W. Mauchly and J. Presper Eckert, Jr., built ENIAC at the University of Pennsylvania. This weighed 30 tons, and contained 18,000 vacuum tubes. It could do 100,000 calculations per second (see Fig. 3.30). The first machine known in history as an electronic digital computer was ENIAC, and it consisted of a big house (see Fig. 3.31). This behemoth ran from 1946 to 1955, when it was retired to the Smithsonian. Ever since, computers have been shrinking in size and growing in power. The year 1978 saw Cray-1, the first commercially produced supercomputer. Cray-1 contained 200,000 integrated circuits and ran at 150 million floating point operations per second (see Fig. 3.32).

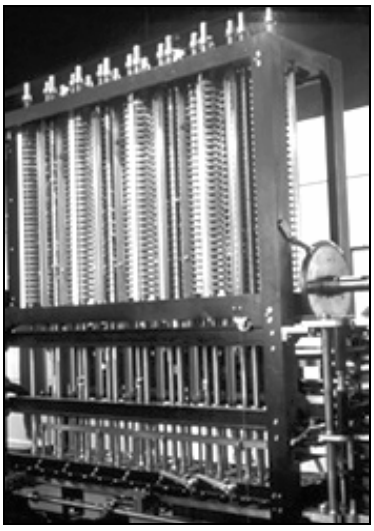


Fig. 3.29. Charles Babbage's Difference Engine, 1882

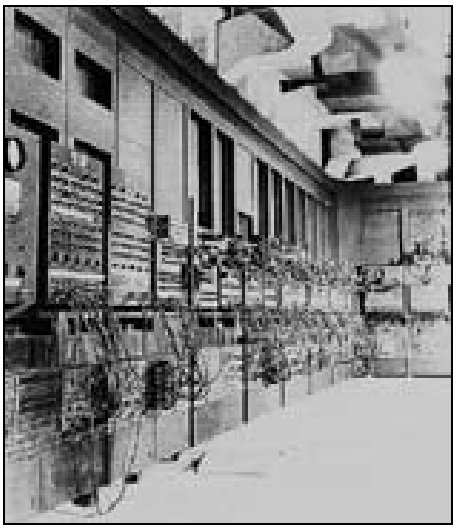


Fig. 3.30. The ENIAC, 1946

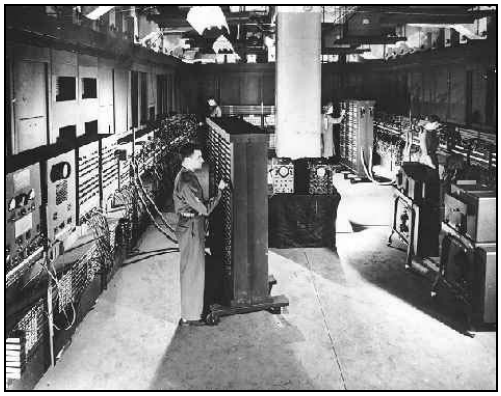


Fig. 3.31. ENIAC, was a big house

Fig. 3.32. Cray-1, 1978

In 1980, the first office-based computer was developed (see Fig. 3.33). In 1981, IBM released the PC model 5150 which boasted 64 kilobytes RAM and a single-sided 5 1/4" floppy disc. It employed a 4.77 MHz Intel 8088 processor (see Fig. 3.34). Computer technology has advanced since 1944 with the invention of the first programmable computer by a scientist from MIT. Today, the concrete manifestation of progress is that the services personal computers (PCs) provide have become most an essential part of daily life. They include ICT-based technologies to provide personal or official usage. As electronic devices become smaller, movable, less expensive, and multifunctional, we have begun to use them a lot of personal and business information and communication appliances (see Fig. 3.35 and Fig. 3.36).

Fig. 3.33. Computer, 1980

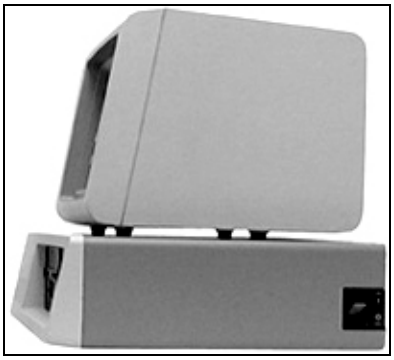


Fig. 3.34. IBM PC Model, 1981

Fig. 3.35. Present Desktop Computer

Fig. 3.36. A Movable Computer

3.4.3. Interactive Interfaces

Apparently, companies and homes are inundated with new artifacts and new technologies. The artifacts come with buttons, lights, and display screens. The old days of audiovisual presentations have given way to the new days of interactive multimedia in which the computer merges with television and the telephone. New forms of media are being invented, new methods of communication, education, entertainment, and doing business. New consumer goods invade the home. All the ailments of the past, it is claimed, will disappear once these new approaches are in place.

The majority of artifacts (e.g. cellular phone, car, control room, kiosk) require some kind of interaction with people. “Usually,” Faulker writes, “an artifact has an interface, which is assumed to function as a means of interpreting intention and action between the user and the artifact” (Faulker, 1998). In that sense, the artefact is assumed to posses some kind of communicative and intelligent ability.

As far as can be seen, multimedia technology offers instructional designers an unprecedented opportunity to create a rich interactive learning environment. With greater design freedom, comes complexity. The standard answer to the design problems of products has become a complex structure that must involve interactivity, human-computer interaction, interface design, and so on. However, the present arguments and observational data show that humans have several ways of interacting with their own or public computer-based devices. Conceived of in this way, computer-based interfaces offer new environments for users and designers. If we regard the prominent features of interactive devices, it becomes immediately clear that one device complements the other

and each is supported by one or more systems and technologies out of those that were discussed above (wireless, GPS, LAN, etc.).

Among other things, measurements of these new interfaces have evinced differences. They have an extensive product-design diversity that extends from skimpy handheld devices to wall-sized displays. For instance, the handheld have a display that is very small and hard to read and that is unsuited for showing most kinds of information, while the wall-sized display's main purpose and strength are obviously to display information to at least one person, probably more. In this case, it is clear that the hand-held devices provide individual usage as opposed to the biggest one which is for public usage. An example for wall-sized display unit, the interactive-multimedia city kiosk from which to obtain most kinds of information. For example, a watch is an individual product to know time in the same way an electronic time signs on the streets provide (see Fig. 3.37 and Fig. 3.38).

Fig. 3.37. Individual Use

Fig. 3.38. Public Use

On the other hand, a handheld device such as the PDA, usually boasts a multitude of interaction possibilities with more than one modality: users can interact with a set of hard-keys; they can operate on the touch display with their fingers or special pens, and for many devices there is even the possibility of using speech (although the voice-recognition and processing capabilities are usually very limited) (see Fig. 3.39 and Fig. 3.40). The wall, however, offers only limited ways of interacting. If it has a touch surface, the user usually controls a mouse pointer with her/his fingers. This is not

practical, especially for large surfaces, since ordinary mouse movements require quite long distances for the fingers to move over the surface (see Fig.3.41 and Fig.3.42). In fact, the dimensions of the wall display are equal to the maximum finger translation on the wall necessary to get the mouse cursor from one corner of the screen to the other–a lot more than what is necessary with a real mouse that implements relative mouse movements and simple acceleration mechanisms. Common examples of interactive interfaces are explicated below.

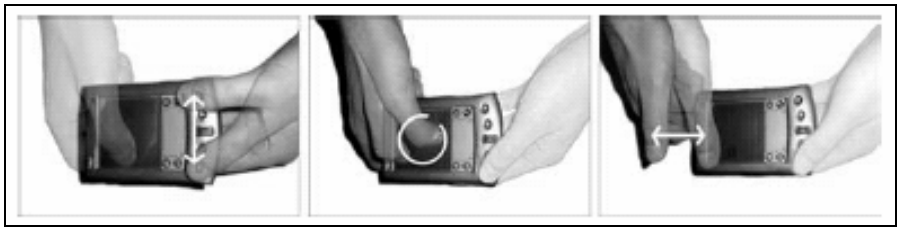


Fig. 3.39. Interacting with the mobile device with fingers

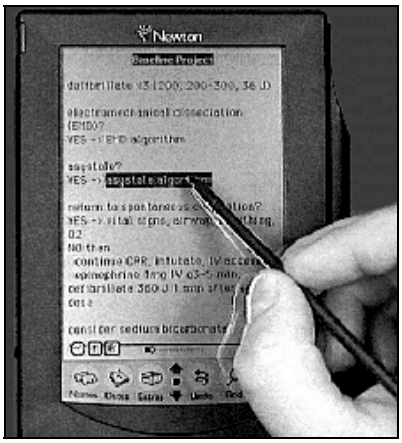


Fig. 3.40. Interacting with the special pen

Fig. 3.41. Entering information with a mouse

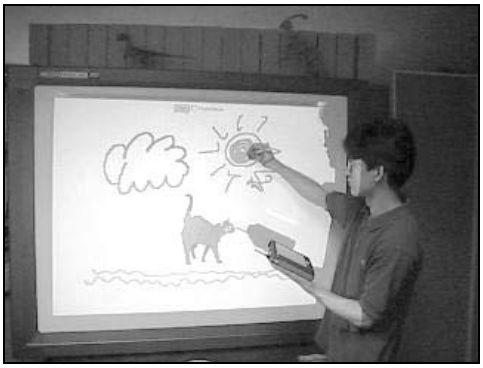


Fig. 3.42. Interactive Large Surface

3.4.3.1. Personal Digital Assistant (PDA)

PDA (personal digital assistant) is a term for any small mobile hand-held device that provides computing and information storage and retrieval capabilities for personal or business use, often for keeping schedule calendars and address book information handy. Many people use the name of one of the popular PDA products as a generic term. It is a personal interactive device. Some PDAs have an electronically sensitive pad on which handwriting can be received. Typical uses include schedule and address book storage and retrieval and note entering. However, many applications have been written for PDAs. Increasingly, PDAs are combined with telephones and paging systems. PDA even allowed the user to access most of the information that is displayed (see Fig. 3.43).

Fig. 3.43. Some PDA Models

3.4.3.2. Interactive –Multimedia Kiosk

Like personalized computers, interactive-multimedia kiosks allow people more easily to interact with access information and services they need. Emerging from the same roots of reasoning as the above-discussed PDA technologies, kiosks have evolved to accompany the requirements of a changing world. Interactive kiosks offer users access

to the Internet, where they can pay bills, obtain local news, maps, and driving directions. The interactive-multimedia kiosk is a standalone device that provides information storage for public use in airports, libraries, schools, banks, etc. (see Fig. 3.44, Fig. 3.45, Fig. 3.46).

Fig. 3.44. A kiosk Model

Fig. 3.45. Usage of Kiosk

Fig. 3.46. Standalone structure of interactive-multimedia kiosk

Chapter 4

PUBLIC INTERACTIVE-MULTIMEDIA CITY KIOSKS

We live in an information-access technological world. Consequently, the problem is that this is an invisible technology. Information is invisible, but it appears and is available for use with a few devices like kiosks in daily life. This chapter addresses the major points of concern in the design process of the information station kiosk that is intended for use in a public space. The profile formed for the kiosk, and major factors contributing to overall concepts, are categorized. Media, in the shape of interactive and multimedia city kiosks, have bred a matter that provides public service which is information terminals in public spaces. Therefore, design and user criteria of kiosks are to a certain extent to be conceived like those of street furniture. From this point of view, some suggestions and evaluations will be effort for comparison at the end of the present chapter. The objective is to discuss the interactive-multimedia city kiosk as an industrial product.

4.1. Definition of the Kiosk

The term *terminal* usually makes us think of a device or place where any distribution and collecting takes place. Terminal is a device capable of sending, receiving, or sending and receiving information over a communications channel. A simple example is the desktop computer system where a home terminal provides the same procedure in personal areas. However, as a place, the terminal is generally defined as a public one and is related to the provision of such transportation, including passenger platforms, designated waiting areas, ticketing areas, rest rooms. A public entity providing transportation owns the property. In this context the terminal is a place. From this point of view, interactive-multimedia kiosks, like public information access terminals, have become popular ways of delivering and/or collecting public information as venues located in strategic locations throughout the city. By incorporating information terminals with newsstands and bus shelters, the device serves to improve both the aesthetics and the functionality of these vital public facilities. They could also be used in helping other local business as well, allowing

shoppers easily to locate area businesses and services through the information terminal (see Fig. 4.1).

Fig. 4.1. Information Terminal

In this context, for the purpose of clarity, a statement on the difference between a terminal and a kiosk is in order: a terminal is simply a PC running the Windows operating system with public access software. It is usually located on a desk in a semi-attended area where vandalism is not highly expected. The public access software has features to stop malicious destruction of the operating system and there is most likely enough security around to halt anyone walking away with the PC or its peripherals. However, a kiosk usually is a metal or fiberglass unit not unlike a games machine which has an inbuilt monitor sometimes with a touch screen, a PC running the Windows operating system with public access software, and a bolted down industrial style keyboard which is tough enough to stop prevent breaking the keys. Kiosks may be located in areas where there is less supervision and are usually secured to the floor or wall (or are too heavy to lift easily), and have sufficient security to stop the casual vandal from stealing them or the money contained within them. The aforesaid concepts about the kiosk will be discussed in the sections below in this chapter.

4.1.1. The Term 'Kiosk'

The use of the term *kiosk* in daily life does not date too far back. It has been used and is still being used to designate a wide variety of devices ranging from the classical red British telephone stands to standalone structures used as newsstands, brandstands, or stands of other commercial enterprises. On the other hand, some street furniture, such as telephone booth, point-of-sale, public sanitary unit, an advertisement panel or standalone structure, bus stop, and the like one, are called kiosk (see Fig. 4.2, Fig. 4.3, Fig. 4.4 and Fig. 4.5). The term derives from the Turkish word *köşk*.

Fig. 4.2. Telephone Booth

Fig. 4.3. Newspaper City Kiosk

Fig. 4.4. Public Sanitary Unit

Fig. 4.5. Advertisement Standalone Structure

Actually, the interactive-multimedia kiosk is based on the automatic teller machine (ATM) model (see Fig. 4.6). If we look at the history of the type, we see that the first ATM predecessor was installed in 1960 in New York. New York's First National City Bank (now CitiBank) installed a Bankograph in several branch lobbies. The

concept of this machine was to enable customers to pay utility bills and obtain a receipt without the aid of a teller (Harper, 2003). After this year, in 1967, 1968, 1969, 1971, 1973, and 1974, the use of the ATM and its functions in grades came to acquire different characteristics and forms. The ATM model nowadays is based on Docutel's model, which was the first true full function bank-ATM introduced in 1971. About the same time, Diebold installed its first TABS machine at a bank branch in the U.S., and Fijitsu installed one in Japan (see Fig.4.7).

Fig. 4.6. ATM Model

Fig. 4.7. Diebold's ATM

According to Webster's, a *kiosk* is:

1. An open summerhouse or pavilion
2. A small structure with one or more open sides that is used to vend merchandise or service

The definition is currently evolving to include computer, multimedia, and Internet systems found in open and closed public places providing a technologically improved way to reach information and services, which may be considered technological street furniture (see Fig. 4.8). Kiosks have become popular venues of delivering information in public places such as airports, hospitals, shopping malls, streets, and museums. The user is presented with an attractive structure, which has been designed to provide a simple, friendly interface to novice computer users. A kiosk performs a task, which is easily automated, freeing the person from tedious labor (see Fig. 4.9).

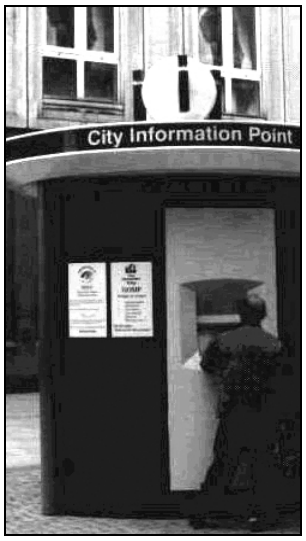


Fig. 4.8. City Information Point

Fig. 4.9. Indoor Information Kiosk

4.1.2. Street Furniture and Public Kiosks

The term *furniture* usually makes us think of the objects at home: beds, sofas, tables, chairs, armchairs, and cupboards. Eventually the term started to cover similar objects for similar or extra functions outside the home environment as witnessed in the term *office furniture*. Like office furniture, the concept of street furniture also brings about new functions and expands the product range of the concept of with furniture functions peculiar to city life and structures. "Street furniture includes all of the non-moving elements introduced into street and highway corridors as adjuncts to the basic surface paving and the utility structures and enclosing buildings, fences or walls" (The Design Council, 1983).

Fig. 4.10. City Kiosks

Street furniture today are industrial design products that have a content over and above the lexical meaning of the basic term. They also increasingly vary more, especially in light of the possibilities which technology contributes to everyday life and contain different points of view on different levels.

The definition of street furniture includes structures ranging from the communication board, trashcan, and stairway to a statue, the public fountain and telephone cabin, which may be designed for functional or aesthetic purposes. Taking into account their functions, street furniture may be analyzed under headings such as the street furniture taken as functional object, as art object, and as communication object. In this respect, urban furniture, as well as functionally carrying two or all of the above-mentioned definitions, also may serve for a different purpose from that of its original sense. In this context, ATMs and public kiosks are defined as 'service objects' in the city. From the points of view of production and use, like street furniture, city kiosks are industrial products with respect to their basic characteristics. They have been produced in large quantities by using industrial methods to perform certain functional aspects and have been put to use to the benefit of the general public, that is to say, of everybody. Distinct from other industrial products, street furniture and city kiosks do not belong to a person or a group of people. On the basis of the relationship between street furniture and city kiosks, design and location criteria of a kiosk must be realized like those of street furniture in a public area.

On the other hand, many objects in the city or public space in urban environments, including equipments such as lights, signals, newspaper-sale-points, public sanitary unit enter into interaction with city people. City people and people in the city are no exception in their interaction with the city. They have parallel connections with the multi-dimensional system of that city, even if they are not existing within. We can act within a city if we have been informed of the physical, social, economic aspects of it, as well as given hundreds, even thousands bits of information like transportation and accommodation facilities. Information and communication technologies are to form a new interface between cities and city people through devices called kiosks.

4.1.3. Interactive Public Kiosks and Applications

City kiosks function as interfaces for people to interact with the complexity of the city as a high organism. In this respect, city kiosks are described as amenities of daily life. Highly intuitive interfacing makes kiosks an ideal public marketing tool. Resembling, on occasion, automatic teller machines, they are usually found in malls, convenience stores, point-of-purchase locations, and trade shows. Kiosks integrate video, audio, graphics, text, and touch screen interactivity to entertain users and guide them along information paths. They may also gather valuable databases of information on customers and prospects. Regardless of whether it dispenses tourist information, job listings, tickets, catalogue items or music sound samples, a typical kiosk can serve five times as many people per day compared to its human counterparts. Basically there are two different types of city kiosks that can be combined in one terminal as well.

a. Information Kiosks: Information kiosks as street furniture can be used to automate information access or to collect information. These kiosks are found in high pedestrian traffic areas like airports, stores, and train stations. User input is normally through a touch screen or, less frequently, with a keyboard. Hard copy output—for maps, coupons, or other desired information—is normally available through a printer. Information kiosks should be designed to be visually conspicuous to attract the attention of anyone looking for it without being confrontational to the senses of others. The physical security for these systems is at risk because they have no local owner.

b. Interactive Service Providers: Such kiosks work in a more complex system and organization. Local and governmental tax payments, buying tickets for cinemas and concerts in the city are technologically possible through these machines. Accessing and operating on the interactively updated databases of different organizations are the most popular among such kiosks: buying tickets, reaching updated information on flights and train schedules, uploading city cards or electronic tickets. ATMs may be considered to be the successful pioneers of such kiosks on the organizational level rather than on a city-based scale. The acceptance and use of ATMs by the majority

and variety of the social population is an enlightening experience to be analyzed with respect to the interaction between technology and society.

Such kiosk systems have turned out to be a functional and effective part of everyday life in metropolitan cities like New York, Los Angeles, Atlanta in the USA, and London and Paris in Europe. By the end of 1998, the number of kiosk terminals were about 110 thousand intended to have been reached by 1 million persons by the year 2003. Research by an international online service, The Center of an Interactive Self Service World, has shown that the number of self-service kiosk units has increased by the day during the 2001, and by the end of 2001, 600 thousand units were operating as part of an information network for public service (www.kiomag.com/reports/2002) (see Fig. 4.11).

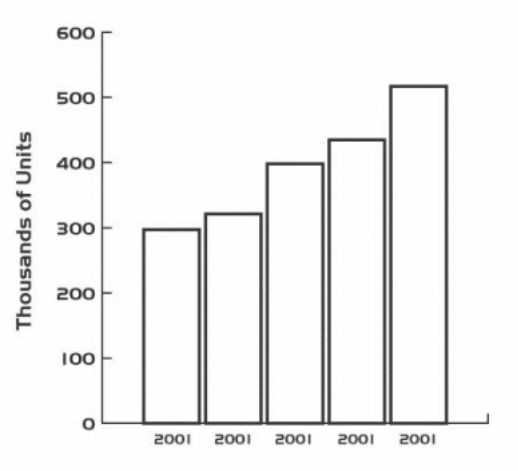


Fig. 4.11. Worldwide Kiosk Growth
Source: Summit Research Associate, Inc., 2002

Interactive public kiosk technology and the Internet allow people more easily to interact with public information and services they need. Interactive kiosk technology provides 24-hour access to information in the city. Such kiosks are ideal for many applications in different areas of the industry. The research of The Center of an Interactive Self Service World has also shown that by the end of 2002, Internet-integrated kiosk growth was remarkable for kiosk business. As a result, usage of Internet kiosks will be increased by the end of 2005 and thousands of units will be operating in many sectors (www.kiomag.com/reports/2002) (see Fig. 4.12).

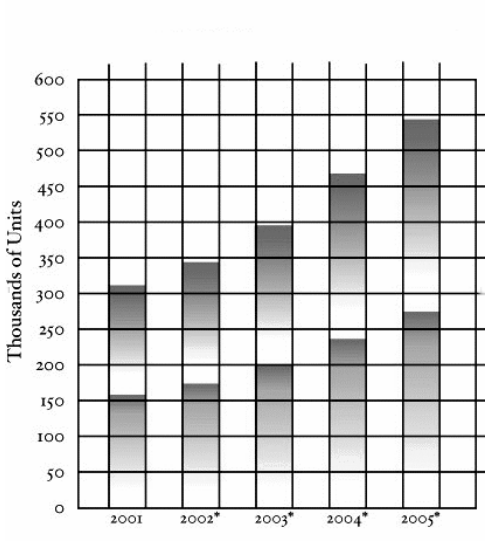


Fig. 4.12. Worldwide Internet Kiosk Growth
Source: Summit Research Associates, Inc., 2002

Tourism, expo services, promotional activities were the pioneering areas for kiosk applications. Local and governmental authorities were to follow such applications by providing their services through these devices. In Ireland people can apply for driving licenses or passports or some tax and other payments can be made through kiosk terminals. 1000 An-Post kiosk terminals throughout Ireland are serving 1.26 million people a week. Other such examples of kiosk application and field of kiosk usage in the world are presented below in detail.

With new government and commercial applications developing every day, the kiosk business is maturing into one of the twenty-first century's primary missions and critical public platforms. Today's terminals need to meet the needs of increasingly more demanding users who expect to carry out e-commerce transactions, gain secure access to government services and obtain personalized, real-time news and travel information on demand. Many agencies and departments in the world, particularly at the state and local levels have already begun reinventing their service delivery approaches with information technologies and kiosk technology. A report CSPP (Computer Systems and Policy Projects), information technology industry's leading advocacy organization, entitled *Information Technology's Contribution to Improving Access to Government Information and Services,* kiosk applications have spread around the world. For example:

The United States, State of California: Info/California: To meet the increasing needs of its large and very diverse population, the State of California in the US is implementing Info/California, a "one stop shopping" approach to service delivery. A multilingual, intelligent touchscreen system, Info/California is a multimedia kiosk network, which provides statewide transactional services 24-hours a day, seven days a week. The kiosks, which are placed in shopping malls, grocery stores, retail stores, and other public locations, offer a variety of services. Residents have access to the state's "Job Match" that allows the users to match their qualifications with available jobs free of charge. Users can also order copies of birth certificates and pay for the service using a credit card or debit card, and renew their automobile registrations with the same system. California will expand the system to include additional services in the near future (http://www.cspp.org/reports/report8, Nov. 1993).

The United States, State of Hawaii: The State of Hawaii in the US operates two information service networks—"Hawaii FYI" and "Hawaii Access." Hawaii FYI allows residents anywhere in the state the opportunity to access a broad array of international, national, and state government databases and information services. The network and its electronic gateway allow residents to use a home computer and modem, or a terminal at any one of the state's public libraries, schools, or state information offices to access a multitude of services, most of which are free. The services range from reports on the latest legislative action to restaurant guides and chat lines.

Hawaii Access, an island-wide network for information and referral services, allows the public to access the state's health insurance program services from multilingual kiosks located on several islands in the state. Individuals can conduct their own interviews for the State Health Insurance Program with the kiosks' expert systems helping to determine their eligibility and transmitting the electronic application to program administrators at the Department of Health. Hawaii Access was recently expanded to include "ALEXIS," an island-wide network for employment. On this network, individuals can complete and submit job applications using the same system (http://www.cspp.org/reports/report8, Nov. 1993).

The United States, Department of Motor Vehicles: States' Departments of Motor Vehicles (DMVS) in the United States are beginning to use digitized imaging for driver's licenses and improved information delivery systems to revolutionize the way DMV business is conducted. These emerging technologies enable the provision of high quality, tamper-resistant digitized driver's licenses and identification cards and allow the public to access DMV services on a seven-day a week, 24-hour a day basis from remote locations such as home, library computers or shopping mall kiosks. Six states have already implemented digitized driver's licenses and are beginning to realize the benefits of using the digitally stored images. For instance other government agencies such as Law Enforcement Social Services, and Secretaries of State can use the image databases for identification purposes. In California the new digitized image system dramatically improved the information flow between DMV and law enforcement agencies reducing the time needed to make personal identification from days to minutes. Additionally, multiple agency services can be provided easily, such as voter registration at the same time as driver's licenses are issued. Individuals benefit from the implementation of the new technologies by having to spend less time in line obtaining licenses, and even being able to do it from more convenient locations (http://www.cspp.org/reports/report8, Nov. 1993).

4.2. Types of Kiosk

Kiosks are being used as a primary tool in efforts to improve the effectiveness of limited personnel and provide easy and convenient access to a wide range of services. Most of these kiosks are built to perform one of the following functions:

to advertise a commercial product;
to collect or dispense specific information;
to exchange information, funds, and/or services.

4.2.1. Advertisement

Kiosks used to advertise products are the least complex type of kiosk. The advertisement kiosk promotes products by providing information in a pleasing, interactive environment. This family of kiosks is often used at trade conferences and showroom floors and they are designed to assist customers in choosing products and

features best suited to their needs via screen. Advertisement kiosks most commonly take input from a touch screen monitor and use video animation and sound to convey information. Proximity detectors may be used to start an advertisement sequence on the kiosk when a potential customer is near, typically using sound and video. Ordinarily located indoors, these kiosks rely on humans for security and maintenance. Limited access to the kiosk makes both physical and system security a low risk (see Fig. 4.13, Fig. 4.14 and Fig. 4.15).

4.2.2. Information

Information kiosks are used to automate information access or to collect information. Although the amount of information is very limited, ticket dispensers at parking lots fit into this category because the information flow is one way: the user requests and receives a time-stamped ticket. Proximity detectors are rarely used with these systems, because noisy or flashing displays prompted by proximity detectors can become a distraction for business concerns or staff members in the same area. Informational kiosks are designed to be visually conspicuous to attract the attention of anyone looking for it without being confrontational to the senses of others. The system may be in full view of the public, but none of the people responsible for it are nearby (see Fig. 4.16, Fig. 4.17 and Fig. 4.18).

4.2.3. Transactional

The transactional kiosk, used to sell goods and services or to exchange information, is the most complex type of kiosk. This family of kiosk is found in stores, malls, public transit terminals, and other high pedestrian traffic areas. Touch screens, simple buttons or keyboards are all used to obtain instruction and information, along with some method of fund collection, and possibly identity verification. Proximity detectors used to trigger kiosk activities and designed to attract customers may be used. The physical security of these kiosks is at risk since money and goods are involved. A kiosk that accepts cash must be designed differently from a kiosk that takes only credit cards or debit cards. The extra room needed to store the cash, the room needed to store change, and the physical security measures needed to protect both add to the kiosk cost (see Fig. 4.19, Fig. 4.20 and Fig. 4.21).

Fig. 4.13. Kiosk in Showroom

Fig. 4.14. FILA's Kiosk

Fig. 4.15. KIA's Kiosk

Fig. 4.16. Outdoor Information Kiosk

Fig. 4.17. Indoor Information Kiosk

Fig. 4.18. Web phone information kiosk

Fig. 4.19. Kiosk in store

Fig.4.20. Transactional Kiosk

Fig. 4.21. Kiosk to sell ticket

Many companies and government prefer kiosk application for their services in the world of industry. For instance, the tourism sector, health services, hotels, transport industry, universities and other sectors choose kiosk technology (see Fig. 4.22).

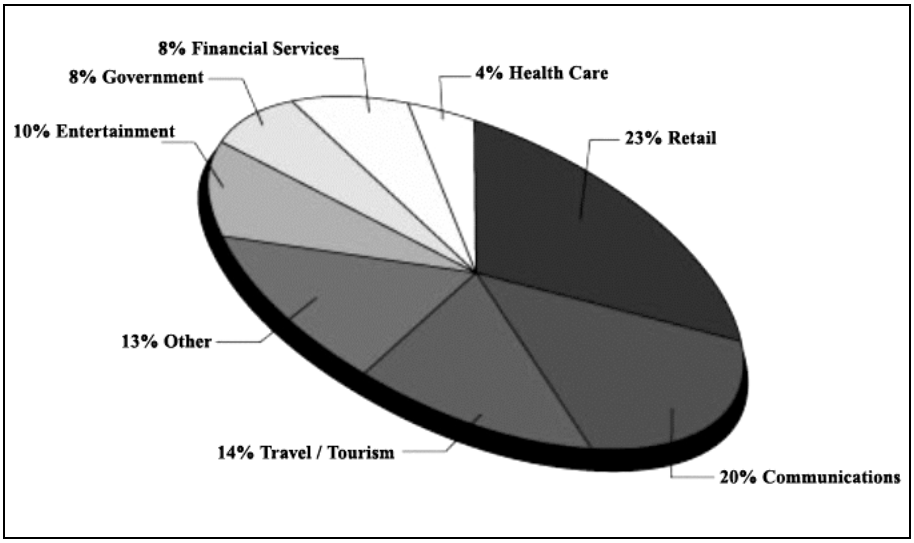


Fig. 4.22. Sector Distribution of Types of Kiosks
Source: Summit Research Associates, Inc., 2002

4.3 Technological Overview

This section discusses the selection of components for constructing kiosk systems. It will present each of the typical kiosk components and describe in detail both its function and what parameters may be used to evaluate that component.

4.3.1 Kiosk Basics

The interactive-multimedia kiosk system is formed of two basic elements like any computer-based product: Hardware and Software basics, besides the location and presentation basics, complete the structure of the kiosk. Despite the fact that kiosks can be designed in various shapes and sizes and are capable of delivering a range of information, the technology that goes into them is relatively simple. Most of it is similar if not less complex than a typical desktop computer. And in some cases an actual desktop computer is used. The technology that goes into a kiosk can be broken down into viewing, input, output, interface, and processing components. A

breakdown of possible kiosk technology that could be utilized for a kiosk design follows below:

Hardware Basics: Generally, computer-based kiosks consist of a multimedia PC, a monitor, and some sort of pointing device- usually a touch screen. The various kiosk hardware available may include one or more of the following components: printer, card reader, scanner, keyboard, video camera, trackball, coin acceptor, motion sensor, overhead monitor, communication link, bill acceptor, touch pad.

Software Basics: Most every kiosk has a basic algorithm: attract sequence, welcome to the kiosk, and action sequence. The 'attract sequence' in this case bespeaks the simple necessity for action, and then the welcome and menu options are presented. The menu options comprise the action sequence. When the transaction is complete, it is back to the attract sequence. These steps are commonly used in ATMs for cash withdrawals.

At the core of the kiosk implementation is the software application. This piece of software monitors user interaction, the status of the available hardware, and produces the presentation to the user. As with hardware, the application of the kiosk will more than likely dictate the type(s) of software one should select to implement one's solution. For example, if one's application requires a certain hardware component such as a bill acceptor, then the software development tool better have the ability to interface, whose components are just as important as the software tools used (see for detail http:// www.rockmedia.com).

Below is a list of some industry standard software development packages that can be used to create an interactive kiosk application (http:// www.rockmedia.com):

1- Non-Programming Packages
- PowerPoint/Astoud/Similar
- Kiosk-in-a-Box
- Web Kiosk Commander
- NetShift
- NetKey

2- Programming Packages
- Macromedia Director
- Asymetrix Multimedia Todbook II
- Visual Basic
- VisualC++

4.3.2. Components

The standard components found in most kiosk housing include the one or more input interfaces, a computer, and output devices (see Fig. 4.23). The input interface is typically a touch screen monitor, a keypad, or a keyboard, but hand or fingerprint readers and video and sound recorders could also be used. For many applications a keypad is used, consisting of only a few buttons for selection of services. The choice of computer will already be determined in large part by the choice of the operating system platform. The monitor, which can be the primary input interface, is also the chief output device as it displays information on the screen. Many kiosks have sound capability, but in most cases sound is found to be an annoyance to others nearby who are not using the kiosk. Most kiosks have some ability to give out hard copies of any transactions, normally with a thermal or laser printer. Truly, at first side the standard components in kiosk refer to familiar components of ATM (see Fig. 4.24).

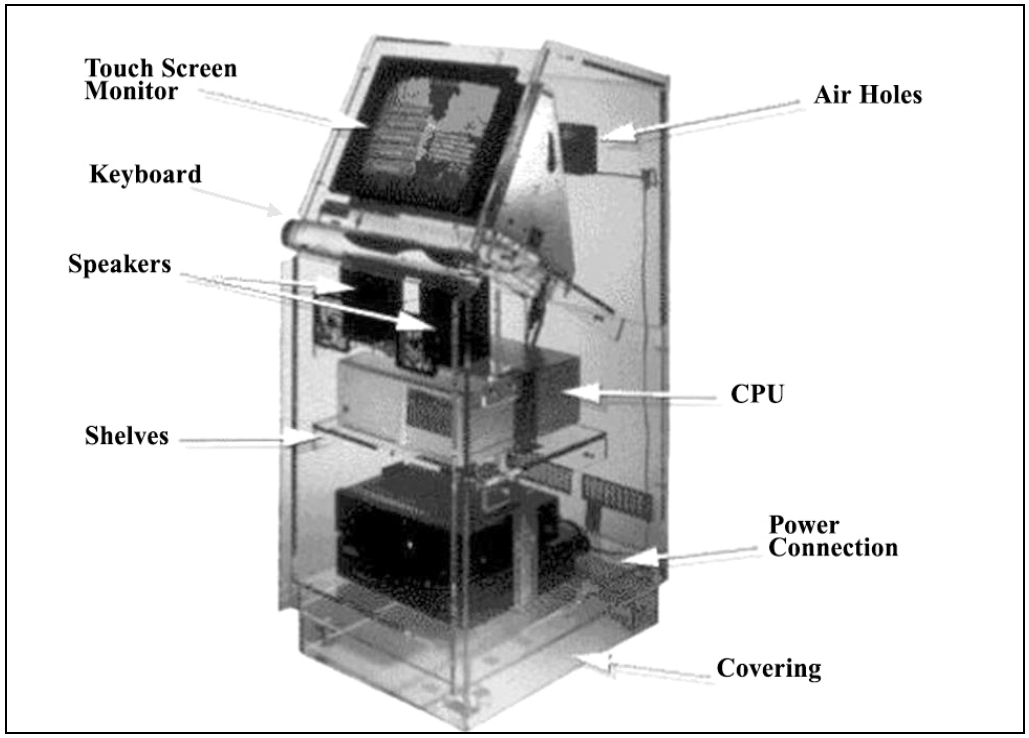


Fig. 4.23. Basic Kiosk Components

Fig. 4.24. User Components of ATM

4.3.2.1. Input Components

The kiosk users interact with the kiosk through some sort of input devices. The input device converts the user's response to the kiosk (mouse movement, touch, keystrokes, sound) into a phenomenon to which the kiosk can respond. The kiosk interprets the phenomenon into the proper programmed response.

Many kiosks use **touch screens** as the primary user interface. A touch screen is usually a clear, touch-sensitive screen placed over a monitor. The monitor uses pictures and text to prompt the user for the required touch input. This input normally requires the user to select an option by pressing a button displayed on the monitor. When the user touches the screen, the coordinates of the position touched are used to determine which option the user is selecting. There are five basic types of touch screens used for kiosks: resistive, capacitive, surface acoustic wave, infrared, and force vector. The first three touch screen types use a screen over a monitor. The fourth type uses sensors mounted in a frame around the monitor and the fifth type uses sensors mounted in a base upon which the monitor sits. Touch screen is the primary, and often the only, interface and stands up to wear and tear better than mice, track balls or standard keyboards. There are some advantages to touch screens:

they are the most intuitive user interface that work by simply touching the display screen;

they have a long track record of proven reliability;

touch-enabled software creates flexible applications with greater functionality;

they can be used to save space;

they can eliminate the need for mouse or keyboard input.

Magnetic card reading systems are other basic components of the kiosk (see Fig. 4.25). The system consists of two basic parts. The first part is the magnetic card reader that reads the magnetic card. The second part is the software that verifies the magnetic card after it is read. There are two types of magnetic card readers, namely manual and motorized. Both types of reader communicate with the controlling system using the serial interface. The manual magnetic card reader requires the user to insert and remove the magnetic card or pass it through a slot, which reads the magnetic stripe on the card. The motorized card reader accepts the card, reads it, and then returns it. The motorized card reader has the ability to take and intercept a card which is not valid. The mechanical card reader is more likely to get contaminated with dirt. Magnetic card software is normally a Terminate Stay Resident (TSR) program running on the platform. When this type of software works, it works good. When it does not work one has real problems that are difficult to troubleshoot.

Keyboards are the other standard input devices for most computers. On the other hand, **mice**, **trackballs**, **microphones**, and **cameras** are also kiosk input devices. Computer mice, like the keyboard, come in various configurations. Both **mouse** and **trackball** use a ball to track position. There are many other types of pointing devices, which use sensors to determine the which direction one wants to go (see Fig. 4.26).

Fig. 4.25. Magnetic Card Reader

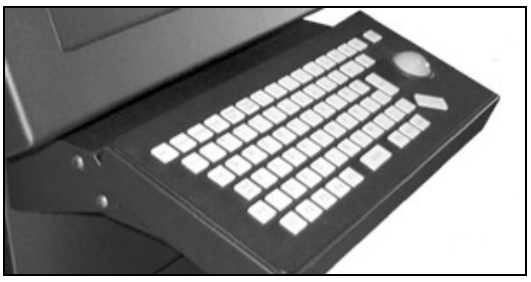


Fig. 4.26. Keyboard and Trackball

Microphones may be used at kiosks for several purposes. One use is simply to record audible data that may be used as input for a particular application such as a two-way audio communication, or voice recognition. In general, the microphone chosen for a kiosk should have several quantities.

Cameras for kiosks are used for security, communication, or both. Security-oriented cameras are used to survey the kiosk environment for the purpose of protection of the kiosk, its internal components, and the user. Communication oriented cameras can be used to perform two-way communication between kiosks and other computers.

4.3.2.2. Output Components

Kiosk output devices are used to output information in a number of different formats. The information is often written to a monitor or a piece of paper. Audio information can also be output through speakers. There are four basic kiosk output components:

The **monitor** is the other basic output device of the kiosk. A kiosk's monitor is usually its most important hardware component because it is the focus of the kiosk and is usually the primary (or only) interface. It is selected on the basis of several criteria. First the monitor must work with the video card being used by the computer. If a touch screen is being used, one must ensure that the touch screen's monitor will work with the selected monitor. Touch screens are normally purchased already installed on a monitor.

The kiosk **speaker system** is extremely vital where consumer communication requires sound in addition to pictures. Some speaker models come with interfaces specially designed for MIDI synthesizers or CD-ROM software. The size of the speakers, their particular traits and the dimensions of the kiosk enclosure will be major factors in making a purchase. **Printers** for kiosk use must be small and easy to operate. There are three types: laser, thermal, and dot-matrix. In selecting a printer, three major areas should be considered: print quality, printer performance, ease-of-use features, and how it will mount in the kiosk. **Ticket printers** and **encoders** are usually small impact printers. Often the ticket is pre-printed in color and loaded into

the ticket printer. When a ticket is dispensed, validating information is printed onto the ticket to validate it (See Fig. 4.27).

Fig. 4.27. Ticket Printer

4.3.2.3. Interface Components

The interface is responsible for taking the inputs from the individual so the kiosk can display, output, or prompt the user for additional information. Typically, the interface is a computer program written specifically for the application, which could be proprietary and require a licensing fee. However, in some instances a kiosk could also utilize Hyper-Text Markup Language (HTML) and an Internet Browser. The cost of a browser is inexpensive compared to creating new software. On the other hand, interface is an independent design area which reflects all the content to the user. Kiosks have been shown to be useful tools for providing people with the information they need to make informed decisions. They are typically used to display information that is also frequently presented in an interactive or passive form on the screen (see Fig.4.28).

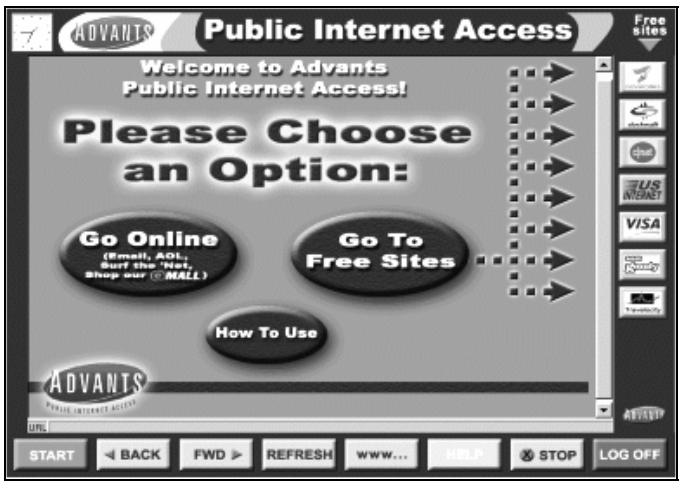


Fig. 4.28. Touchscreen Interface Design

4.3.2.4. Processing Components

There are two ways of processing information: central and local controlled. In central-controlled processing, design information requested at one kiosk would require retrieving information from a remote centralized location. The central location fields request from one or more devices and respond with the appropriate information. It is easiest to think of the central-controlled process designed kiosk as a portal to the information sending request and waiting for replays. In a locally controlled process, most if not all of the information that could be requested by an individual is stored at the kiosk. Unlike a central-controlled process in a locally controlled configuration, if communication is lost the kiosk can continue to function.

4.3.2. Standards of Care and Security

Kiosks are not closed but open and 24 hours a day alive systems requiring constant monitoring, care and update operations. Kiosks out of service, misinformation, and service errors are not acceptable for such a human and city interaction. Standards of care and security should be provided by the project owner and system administrator just at the beginning. Generally kiosk is to fixed or replaced within one and two days time. Software errors can be handheld through Internet.

4.4. Designing a Kiosk

In designing an information city kiosk, the object to be designed must be considered as an industrial artifact. An artifact is anything made or used by people, and the kiosk here is an artifact. In the vision of industrial design there are a number of approaches and methods for designing an artifact. Design criteria in every industrial product such as user profiles, choice of material, environment-user relationship, production, and so on are objects determined before the design. On the other hand, defining the design methodology is the most important object in the design process. Therefore, the information city kiosk as an industrial product implies certain design decisions. Also city kiosk should be considered like street furniture along with industrial artifact, because the kiosk is located in a public space in the city. Hence, the design

methodology for the kiosk necessity involves design studies aspects of which are familiar from those of street furniture.

4.4.1. Industrial Design Studies for City Kiosks

For the design of an interactive-multimedia city kiosk, a specific methodology has to be pursued. The steps of this study are briefly as follows:

1. Identification of the problems deriving from the use of existing objects is the first step for any design problem. Following this step, objectives of the design problem are identified. There are several techniques to identify the relevant problems, such as observations and interviews with users.

2. Collection of the social and the cultural data related to the attitudes and behaviors of the users with respect to the city kiosk is the second step for identifying problems.

3. Collection of examples of goods for kiosks designed helps designers to apprehend the design situation. Books, journals and visiting foreign countries are sources for finding good examples.

4. Then a search procedure starts in order to solve the identified problems. Materials, production techniques and technology are other design variables that have to be determined at this stage. Research is required on the new designs that can be produced. The uses of resources for new designs that can be produced with the existing materials and technologies are important.

5. Preparation of the design catalogue for the city kiosk with the possible and required degrees of modularity can facilitate the creation of adaptable kiosk alternatives for different locations with different characters.

6. Like street furniture, city kiosks face hard environmental conditions as well as damage (vandalism) incurred from users. Building prototypes or mock-ups

and testing them are necessary to help select the right designs with respect to these conditions.

7. Preparation of a framework for regulations of the city kiosk is the initial step for the preparation of regulations. Identification of the basic principles is required for the appropriateness to health conditions, preventive measures against vandalism and for product safety, and adaptation to the environment.

Industrial products are produced in the factory and transported to the place where they are consumed or used. The parts of this product are designed and prepared for montage. They can be mounted and made ready for use. For that reason, these studies for the information city kiosk that will be designed and produced as an industrial product.

4.4.2. Design Factors

The principal challenge in designing a kiosk application is to go beyond just providing information. Technically, the design goal must aim at improving communications by utilizing multimedia to obtain information and ensure that the kiosk enclosure, location and media elements are relevant (i.e., lighting, signs, voice, graphics, language, size of text, etc.). On the other hand, defining the kiosk's purpose, target users, functions, operating platform, and kiosk parameters, i.e., type and size of kiosk, options (card readers, printer, cameras, etc.), and the ever-important location of the kiosk comprise the parameters of the kiosk design. The design of a kiosk is fundamentally dependent on what services the kiosk will provide, who will use the services, and the location of the kiosk. Kiosk terminals are assumed to be going to be active 24 hours a day, 365 days a year. A complex system depending on young and high technology requires a serious planning process to be activated and kept alive. Design factors presented here focus on kiosk content, its structure, and location. These factors help shape the different elements that go into designing a kiosk.

4.4.2.1. Content Factors

Content factors deal with how information is presented, controlled, and with various audience issues. A list of content factors to consider when designing a kiosk includes the following:

What information does the user want or need?
How will that information be presented or displayed?
How is it anticipated the information will be utilized?
Will the information be passive or interactive?
How often will information be updated?
How will the timeliness of the information be displayed to the audience?
Who controls the information and what are their concerns about sharing it with the audience?

4.4.2.2. Structural Factors

Structural factors involved in the kiosk design are concerned primarily with stability and accessibility. However, there are other, lesser factors, which should be evaluated as well. A list of factors to consider when determining how to design the kiosk structure includes the following:

Will the structure be custom or pre-fabricated?
What equipment must the structure hold? (PC, speakers, printer, monitor, etc.)
Is information to be viewed by a single or multiple individuals at once, and how will the structure accommodate them?
How will the structure be prevented from tipping?
How will changing technology be handled?
Is the structure easily visible and recognizable in and from its surroundings?

4.4.2.3. Location Factors

Location factors involved in locating the kiosk are meant to evaluate the proper placement of the device. Factors for selecting a site to place a kiosk include:

Is the site located near pedestrian traffic areas?

Will the site cause a distraction or interfere with pedestrian traffic?

How will the site be secured against vandalism?

Does the site allow for easy viewing?

Does the site allow for easy audio listening?

There are other factors which a designer could, and even should, consider when designing a kiosk. These include public/private partnerships and how the kiosks will be marketed to the public. Accordingly, once all the above-enumerated design factors of the kiosk application are determined, the kiosk design principles may be presented. Each answer will include one or more design steps for the application of the kiosk. These factors also help define other design assignments, which are user profiles, the choice of material, interface design, its function, and so on.

4.4.3. Design Assignment

A genuine information city kiosk is a kind of man-machine system. Any man-machine system includes man-product relationships that are the subject of various design studies and their results. Although the city kiosk is a man-machine system, it has to be negotiated so as to allow for understanding and use by everybody, because this is a product to perform and provide public service and it is to be used in public spaces. The quality of this 'human interface' between product and landscape and the buildings is crucial for an efficient service product. In this context, the product in the city implies a specific area of problems. For example, its aesthetic feature, harmony with the environment, ergonomic style, as well as a number of other characteristics are of necessity design features that must be considered simultaneously. Thus, the design problem of the city kiosk requires teamwork, which includes the industrial designer, urban designer and planner, architect, and engineer (see Fig. 4.29).

The role of the industrial designer in kiosk design implies a great deal of attention that must go into developing the so-called service products. In any case, industrial designers, with their practical, technical and creative knowledge, and in cooperation with urban designers and planners and architects, can contribute to the quality of life

in the city, simply because, as the saying goes, ‘design is a path to the good use of service products in the city’.

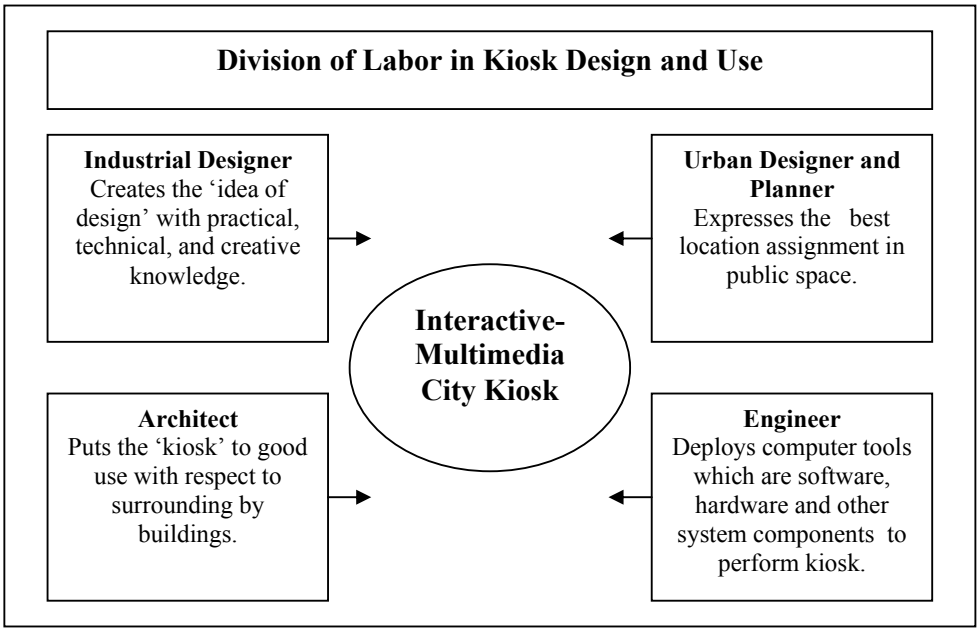


Fig. 4.29. Division of Labor in Interactive-Multimedia City Kiosk Design and Use

The information city kiosk is a service product into which go many design tasks that are determined before the actual act of designing is performed. Product definition, research, analyses, test, redesign, and implementation make up the basic principles of industrial product design. On the other hand, user profile, material choice, form and function, and location criteria also be must determined in kiosk design. Accordingly, the following sections also include some descriptions and analyses of kiosks in different contexts that are concerned with selected examples. Examples concentrate on number and situation of the public kiosks though detailed observations.

4.4.3.1. User Profiles and Usability

The design of such products needs to include the requirements of users. Otherwise they will be excluded from service facilities which most people will find useful and consider to be a natural part of their daily life. For nearly all industrial design products, there will not be a single user or user role. Although the end user may be the primary person affected by a design, there will also be secondary users—persons

who have requirements that must be taken into account in the design and who are affected by the design even if they do not actually press the keys. The task of identifying the users and their different requirements is known in the field as 'stakeholder analysis'. Thus when, in May 2001, a design team was beginning the design process toward a city kiosk to be implemented in the city of Izmir, Turkey, and intended for installing at the city center in Konak, the team started out by asking the following questions regarding potential users:

Will the users be familiar with the components such as the keyboard?

What age's group or groups will user belong to?

Will they all speak the same language or must the kiosk provide for several languages?

Will the kiosk accommodate wheelchair users?

As they must for nearly all products of industrial design, kiosk designers and service providers need to define the target population for the services that will be provided. The target population is used to define the needed functionality of and constraints on the design of the kiosk. In this context, the physical, educational, social, and national characteristics of the user population will be employed to determine and constrain kiosk hardware and interface choices. Therefore, user needs determine the interactive kiosk design in the process. The essential components of these needs comprise seeing, hearing, speaking, touching/manipulating, and understanding. If Interactive kiosks possess most of these abilities completely, they can address users in more comprehensive fashion (see Fig. 4.30).

Fig. 4.30. Comprehensive Kiosk User Profile

Because of the selected location for this particular city kiosk, it is not rational to limit the answers to the above-asked questions. Konak is the hub of the city and all ages will pass through there and transact all manner of business. Not every member of the wide demographic group represented in Konak will be familiar with, say, the keyboard. Hence the touchscreen ought to be used in order to accommodate users with lesser or no computer skills, and the design should appeal to all age groups. Since Konak is also an area traversed or visited by international tourists who will seek information and services, the kiosk must offer multilingual service. As regards handicapped accessibility, it is one of the most dire problems of Turkish cities, including Izmir, that city streets simply have no handicapped accessibility, least of all Konak. If one were to include in this kiosk the feature of handicapped accessibility, this would be more to make a statement than for actual handicapped use. The kiosk presented below does not make that statement.

4.4.3.2. Material Choices

When deciding upon the city kiosk, one must ensure that the chosen material has the largest potential for success. The prime purpose of design concerned with the material is to guarantee choice of material possessing the quality of physical resistance and sometimes, though only secondarily**,** appearance. It is important that an environment (inside/outside) is the most characteristic and determinant factor when it comes to choice of material. There are differences between indoor and outdoor designs. For example, the indoor environment such as an airport, a bank office or a shopping mall provides a limited number of constants to kiosk designers and users. Designers can here count on clean environment (limited air-borne dust/dirt), limited environmental exposure (it does not rain inside), normal lighting (normal overhead lighting), and controlled temperatures. As a result, indoor kiosk designs can address private or stylish needs with material choice.

In contrast to indoor design, the outdoor design puts up considerable challenges with reference to the actual kiosk packaging. The vast majority of materials, which are used in indoor environments, cannot be used in an outdoor environment. The primary reasons are temperature, severe weather, and limited supervision against vandalism. In this respect, outdoor designs comprise strong material such as metal design with

industrial powder coat finish. Most indoor materials will not survive outdoors and will be subject to cracking under sun and varying conditions. On the other hand, all connections, openings, doors, panels into the outdoor kiosk must be designed with watertight gasketing, latches and fittings. Otherwise water will seep into the unit. Outdoor kiosks will take more physical abuse than indoor versions so that all electronic components such as keyboard and touchscreen need to be shock-mounted to prevent damage owing to temperature and other outdoor conditions. The touchscreen technology must be such that it can be fully sealed against direct rain and it should have safety glass in front that resists breakage and cannot be disabled by the user. The computer, display and other electronics must be designed for industrial, high temperature use, and pointing devices and keyboard must be suitable for use in wash-down environments and made robust for severe usage.

Fig. 4.31. An example of Indoor Design

Fig. 4.32. An example of Outdoor Design

In terms of choice of material for the Konak kiosk, all the outdoor conditions apply which were enumerated above, from the climatic to the human factor. Therefore, the Izmir city kiosk project includes the typical materials of the outdoor environment. However, the materials are chosen with also vandalism in mind. Steel and aluminum covering and chrome-plated metal are used in this case design.

4.4.3.3. Form and Function

Industrial design, usually referred to as product design, is the design of things that people use. Industrial designers concern themselves with several aspects of a product's design: its form, function, and user interface. Considering the interactive-multimedia city kiosk, evidently the form determines the way it looks and feels, as well as its weight, dimensions, ergonomics, the chosen material, and other physical considerations. In any case, the better form of kiosk may be defined and presented with a consideration of user profile and its location decision. Especially location choices, i.e. whether it is on pedestrian route for example, and the appearance of the kiosk yield its form. This form is to be interesting for the user or viewer and harmonious with the environment. Varieties are observed in product design with some of them designed openly as a whole while others are designed to fit in close places. They can provide, moreover, a constant advertisement opportunity for the firms or municipalities to which they belong. Therefore, the kiosk should have one or more flat surfaces. In this way, it could provide revenue for associations and firms (see Fig.4.33).

Fig. 4.33. Kiosk design
with flat surface that
allows commercial enterprise.

At the same time, the functions of kiosks are the most important features in relation to its task. The function is what the product is expected *to do*. Interactive-multimedia city kiosks are expected to transfer information over a distance. In other words, the

content determines the kiosk's function, and the components such as the keypad, touchscreen, microphone, speaker, headphone, and so on, are the interface designs that provide these functions. For example, the audio-performance of the kiosk, which is a kind of function, takes place only thanks to the speaker, thus enabling the user to get the task done. In order to ensure that the kiosk functions properly, the designer must be concerned with how the user interacts with it.

In the design project for the Izmir city kiosk, one important role or detail comprises the form and function. The design team decided that the form of the kiosk would be directly determined by its function and location, namely by the fact that the kiosk offers information on the city of Izmir and enables the citizen to interact with the city government. Thus the form of the kiosk is an 'I' sign (or letter) wrapped around itself. The I form indicates the Information point of Izmir. Therefore the 'I kiosk' becomes effective as a series of strong information-access points in the city space. Through its dimensions and the illuminated spherical upper surface, people may perceive it across a distance. On the other hand, the rear surface of the Izmir city kiosk is offered to commercial enterprises for advertising. Attempting to reach information about transportation, cultural activities, fair installations, archaeological locations, touristic sojourn sites, city life, and emergency number and addresses, one goes to the Izmir city kiosk. These functions also include information on government services which are dispensed by printer. Through Internet access, one reaches the government web site and can send electronic mail to relevant people and offices. The benefits of these functions are described in terms of establishing the relationship between city government and citizens.

4.4.3.4. Interface Design and Information Architecture

Interface design is an independent design area which reflects the entire content to the user. The term 'interface' according to Laurel (1990, p.1), is the contact surface of a thing; for instance, a doorknob is the interface between a person and a door, the steering wheel, accelerator, clutch, and other dashboard instruments are the interface between a driver and a car; a space suit is the interface between an astronaut and the void. In computer-based products, as with respect to kiosks that service providers and

include a display unit, should discuss the concept of the human-computer interface. Basically, users wish to be confronted with the 'enter', 'cancel' and 'clear' buttons and familiar interface components as they do in the interface design of the ATM in computer-based products. Therefore the touchscreen kiosk may include similar buttons which are familiar keys for users. For example, color coded keys should be red- cancel, yellow- clear or correct, green- enter or proceed. Also, function keys should be clearly separated from the numeric keys (see Fig. 4.34).

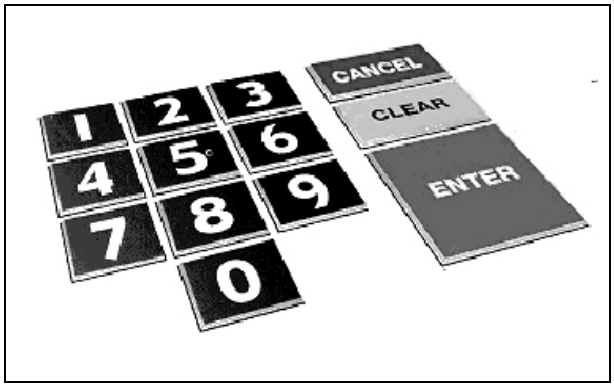


Fig. 4.34. Basic keys of user interface for public service providers

The form refers to the interaction between these products and the human beings who use them. When the concept of the interface first began to emerge, it was commonly understood as the hardware and software through which a human and a computer could communicate (Laurel, 2000, p.xi). As to this relation, the user's experience with the interface is termed 'user interface'. User interface is more than software; it includes every interaction into which a user enters with a product (Laurel, 1990, p. 57). User interface of the interactive-multimedia kiosk can take on many forms, but always accomplishes two fundamental tasks: communicating information from the machine to the user, and communicating information from the user to the machine.

The kiosk offers information, transactions, and e-mail access. Using the kiosk, a user can send an e-mail, buy tickets for an event, plan which sights to visit, find a job, get the least public transport updates, and discover community and council information. A simple series of buttons on the interface allow the user to select one of these activities. Information is then organized under the specific headings. For example Izmir transport information provided includes: travel news (such as new subway

station's), bus route list, bus service guide and contact information. At various points on the interface the screen displays items to support the selection of stations and bus routes. Touching on available key sites — e.g., the 'A' metro station is available— the user may obtain information or buy a ticket. Information may consist of a paragraph of text or be in map format. Also the map or ticket may be printed and issued through the print-out slot.

The interface may support animation with moving pictures. The moving pictures appear at the background or each one may engage a button by itself in the kiosk. Under special offers, one button is used for each content provider. Interface design is influenced by the need to support data entry for communication or commerce. The availability of an interface is essential for a number of these applications. On the other hand, the interface has the basic structure for Internet application of the kiosk. For example, send and receive e-mail options allow access to the Internet. This type of page has many stages that are in the dialogue are:

1. Please enter your name
2. Please enter your e-mail address
3. Please enter the recipient's e-mail address
4. Please enter the subject of your message
5. Please enter your message
6. Please check that you have entered all your details correctly
7. The final screen offers the user the option to send now, or the change details.

4.4.3.5. Location and Accessibility in Public Space

Interactive-multimedia city kiosks are public products. They are there to provide a service as discussed in the previous chapters. The location decision of the kiosk is a different design task than for design of the private space. Truly, public space in the city is the city's collective space. In this respect, it might be said that the location decision of the kiosk is the design collective's main spatial task. Designing collective space indicates above all designing a space in which people are best encouraged to interact and transact, where people can comfortably and safely communicate information, or pursue a desire to find out about a public input in the midst of others.

From this point of view, the kiosk is located in the city's collective space, as well as being a specific product. Kiosks can only function if they can attain, even from a given distance, some sort of relationship with their potential users. As this is an integral part of the function provided by the product, the position in which the kiosk is placed within the public space is important.

4.4.4. Comparison of Kiosk Designs for the City

Each assignment for kiosk design, such as those reviewed in the previous sections, are typically features of kiosks in more general use. However, the common kiosks that are now making an appearance represent a significant change of perspective in the role and nature of kiosks. For example, citizen service kiosks design to support the activities of the 'citizen in context'. Context embraces many factors such as environment, but also includes other dimensions of user experience. These include the activities and purpose of users when they confront the kiosk, and even social and emotional factors. Accordingly, comparison of kiosk designs in different contexts for the city center with kiosks in other busy public spaces is in order here, such as detailed observation of the state of a number of information kiosks located in Los Angeles, London, Boston, Manchester, and elsewhere.

4.4.4.1. Kiosk for Airports and Subway Stations

Users of these kiosks are in transit between the airport or subway and their final destination. They may be interested in an activity that can enliven their waiting time and also help them to find out directions to, or information about, their destination. They belong to socio-economic group that can afford their travel, and many will be international travelers. Many of the users will travel in family or other groups and may be engaged in both business and leisure activities. Nationalities and native languages will be mixed.

Airports and subways are the places constitute the indoor environment for the kiosk. There are limited environmental exposure, normal overhead lighting and controlled temperature. The material might comprise a variety of different alternative such as

steel or plastic cover because of ensuring high levels of security system against erode and vandalism.

The main screen shows six options which are directions, hotels, dining, weather, entertainment, and promotions. Simple touchscreen buttons and scroll bars allow movement up and down and left and right in the display. A touchscreen unit is available when the user chooses an option that requires an alphanumeric input. Searches for specific information, such as the location of a known restaurant, use a data entry box. This is apparent on the tourism option for maps and directions, and also on the weather option.

Airports and subways are crowded places because of mass transportation occurred the public area. There are car rental offices, waiting areas, restrooms, gates and orders for entry halls. Hence, kiosk is located in public thoroughfares, entrances and centrally positioned in these public places in this way they are clearly visible within the places.

The kiosk is located in Southern New Hampshire in an area that has experienced a large population increase over the past 15 years, driven by the absence of personal income taxes and close proximity to the greater Boston area. The kiosk designed by MontegoNet to create an interactive, kiosk-based system that would ″perform ridesharing matches for daily commutes or single trips, provide information on intra-city bus schedules and fares, airport and airline schedules, inter-city bus schedules, and roadway construction projects.″ The goal of this project was to facilitate the flow of information relating to alternate commuting options, and help reduce car traffic in the affected communities.

4.4.4.2. Kiosk for City Centers

The kiosk is designed for the citizen. Since the hub of the city is located in a socially and economically mixed area, it is reasonable to expect that the activities and services, and background of the audience will vary widely. Most citizens will be regular users and can therefore be expected to become familiar with the kiosk. Due to the importance of the city center as the commercial center for the city, there will also

be business people, but also tourists and leisure travelers. Nationalities and native languages will be mixed.

This kiosk is commonly comprised of a variety of material such as iron or some other type of metal, resistant to the outdoor environment and damage from the human. Also many components such as the keyboard might be steel, which would render the artifact durable as the user touches it time and again. On the other hand, the kiosk is located at many different points of the city; in other words there are further locations far it than the center such as airports. Therefore, the kiosk for the city is commonly an industrial product which is produced by the method of mass production, and the material is suitable for the steps in the production process.

The main page for the kiosk displays the following categories:

city information- directory of the events, short history, restaurants, accommodations, current agenda, shopping malls, social activities, movies, and cultural activities.

city map- traffic road, bus stops, train and subway stations, governmental centers, historical areas, banks and exchange offices.

The main mode of interaction is through buttons on the touch screen. Even a full touchscreen keyboard is displayed as a series of buttons. For the e-mail application, a form with boxes to be completed by the use of this keyboard is employed. A similar interface is used for ordering ticket, and getting the latest public transport updates a finding a job. Directions might provide telephone numbers for emergency and information about other needed telephone numbers such as a taxi rank. Also the other page provides the citizen with interactive means for public surveys concerning government performance.

The city center includes such circulation of traffic and pedestrians, hence the kiosk is located in a central position that observes many accessible points of urban space. The corner of the pedestrian crossing or traffic road, right next to the central building such as hospital, school, bank, or municipal building, should be the best location points for the kiosk for public use.

The KIS outdoor kiosk is designed in the shape of a bus stop for use in the extremes of an outdoor environment. The purpose of the kiosk is to enable race fans to order souvenirs and promotional material at the race itself. The kiosk design is 100% waterproof, with interchangeable signage space, a 27" TV monitor, credit card reader and telephone for direct access to a citizen service representative for assistance. The kiosk has pneumatic tires for easy mobility over various outdoor terrain.

The KIS KW-610 model is an in-wall kiosk that is designed specifically to be a public service machine. It has an attractive appearance that is suitable in malls, stores, pedestrian crossing and other public venues where the kiosk must be mounted into a wall. Within its compact and robust design are all the components needed to support public service access. Its elegant design hides the fact that its cast aluminum front door assembly makes it extremely durable and ideal for use in unsupervised public areas.

4.4.4.3. Kiosk for Museums and Hotels

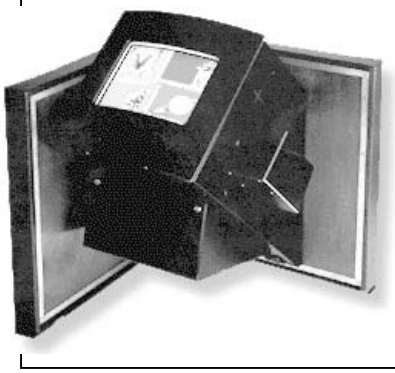
This is the kiosk designed for tourists and hotel guests. Potential users may come from different countries. Accordingly, tourist information is displayed in one of six languages. Users are all away from home, and include both business and leisure travelers. Nationalities and native languages will be mixed.

The, 'kiosk in airports and subways' is a kiosk located in the indoor environment. Yet there are many different alternatives for material choice for kiosks museums and hotels. Especially in a large hotel that is part of an international chain, the kiosk ought to be particularly stylish and attractive. For this reason the structure of this kiosk is formed by custom design and accordingly an interesting option is the material which may be determined by the management of the hotel. Outer covering of the kiosk must be harmonious with the interior design of the hotel.

The main screen offers information, transactions, and e-mail access. Using the kiosk a user can send an e-mail, buy tickets for an event, and plan which sights to visit, get the traffic road and city map that indicates historical places, museums, and

accommodations. All interaction is through a simple touchscreen and buttons. Information is organized under the specific headings and multilanguage choices. The other pages have a number of choices: parks and fairs, theme parks, zoos and gardens, attractions, night life, shopping, conference facilities. Again, by clicking on an option the address and phone number can be addresses together with a map and directions. The kiosk also provides the free e-mail service, which is allows to the guest or tourist to enter short e-mail messages, using keyboard on the touchscreen.

Kiosk is located in a central position for each hall and floor of building that occurred many activities. In hotel, there is a large room such as waiting room, which is the public part of the hotel for customer; hence the kiosk is located in there. In the museum, the kiosk is located right next to 'entrance' for providing main information about museum, or each exhibited work of art for providing specific information about its values.



The American Museum of Natural History Welcome Kiosk enriches the experience of museum visitors. It allows them to preview special displays, find their way through the museum and locate exhibits of particular interest. KIS designed, engineered and manufactured this kiosk to meet the highest of aesthetic standards. This unit is constructed of materials that include bronze trim, textured metal and thermally formed Corian. It is modularly designed to support a wide variety of configurations.

The Charles Hotel in Cambridge, Massachusetts; the kiosk offers a high-tech solution to enhance their customer service and improve their ability to deliver guest information. In particular, the hotel wanted to better address the information needs of two groups: walk-in visitors to the hotel's restaurants and conference facilities, along with hotel guests looking for dining and entertainment options.

It has been designed by MontegoNet designers who created a guest information application that allows users to learn more about the hotel's restaurants, bars, jazz club, spa, and meeting facilities, including schedules, maps, menus and more. The kiosk content was designed to be intuitive, eye-catching and consistent with the Charles Hotel's branding.

4.4.5. A Comparative Analysis for Future Kiosk Design

The above examples offer a number of examples of kiosks in different context with a framework for analyzing both design and use. Each of these kiosks is necessarily different as they seek to serve the user in a different context. Nevertheless the features listed below in Table 4.1 may be used to characterize this new generation of kiosks. These 21 st kiosks support numerous multifunctional information and communication opportunities.

	Early Kiosks	**21 st Kiosks**
Physical characteristic	Uninteresting boxes, static displays.	Eye-catching housing, consistent with corporate image. Moving images.
Dialog design	Menu-based access to a limited number of screens. Touchscreen.	Web/Windows-like interfaces, with data entry dialog boxes, dropdown lists, scroll bars, pointer and hyperlinks. Touchscreen supplemented by keyboard.
Location	In-store, in a corner.	In public thoroughfares, entrances, centrally positioned.
Philosophy	Task based.	User service based.
Originator	Service provider or retailer.	Infomediary or assembler.
Transaction	Single transaction.	Multiple transactions, communication and information provision.
Connectivity	Stand alone or connected to one proprietary database.	Internet enabled for real time information provision and communication.

Table. 4.1. Comparing early kiosks to 21 st kiosk.
Source: Slack & Rowley "Kiosk 21: a new role for information kiosks?" *International Journal of Information Management*, 2002.

Today, 21 kiosks are produced with the various design options for different markets like other industrial products. These design options of kiosks such as color and graphics designate also their field of usage. While the kiosk is produced by mass production for a determined place such as an airport, it may have a design appearance rendering it deployable other sites of usage. Therefore, these public kiosks occur as customizable products with their forms and design options. For example, the kiosk design which includes a familiar appearance and components such as 17"-monitor,

keyboard, magnetic card reader and ticket printer, is transformed by the designer to comprise a specific service product for the customer. The kiosk below is for selling movie tickets in remote locations so customers may avoid waiting in line at the ticket window. It presents a transformed design from the standard product line into a highly visible, recognizable and branded kiosk by using advanced thermal formed plastic to create the popcorn box look.

Fig. 4.35. The transformed kiosk
design to sell ticket at the movie center.

Each industrial product design process includes a step to arrive at the popular version of the product as if is to be used by people. Today, design-wise has not the kiosk yet become a standard product. Besides, the input and output components of the kiosk such as monitor, keyboard, touchscreen, and printer used in kiosk design are familiar since they are produced by mass production on the market. By using these standard component options, the kiosk may attain customizable design to service in public spaces and performing various tasks. On the other hand, the other design options of the kiosk such as color and graphics, help to determine the task of the kiosk. Indeed, covering the popular version of the kiosk which is selected at the final step of the design process, is the most important point of designing a kiosk. In this way, the real kiosk design, which ultimately is 'covering' with respect to a specific function, should be located in various public spaces in the city. Its structural appearance including dimensions, components, and form, will be familiar. Function, material, color, and graphic options will be different.

Today, kiosk manufacturing is owned by some companies such as “KIS”, “NetKey”, and “MontegoNet” . The kiosk models of these companies performed in any and all sectors which have been exemplified in the above pages. The companies have created the some kiosk design solutions for covering the kiosk. The KT-125 model of KIS Kiosk will serve us as specific example to understand these design options which are discussed above (http://www.kis-kiosk.com).

The kiosk is a standalone, walk-up kiosk that also provides a small light box in the top-front area. It is suitable for stores, malls, campuses and other public spaces. Its design and durable construction make this kiosk design for most any kiosk application.

Fig. 4.36. Popular model of KIS Kiosk

The kiosk design is available in a variety of finishes to perform different service providing together with design options such as material and color. For example, the design runs to wood, brushed, bright colors and metal covering of this kiosk to blend right into location’s décor and environment. Whether the design has one of them appearance, the kiosk will be perceived as information service provider by people.

Fig. 4.37. The kiosks which are covered with different materials.

Fig. 4.38. Component options of the kiosk

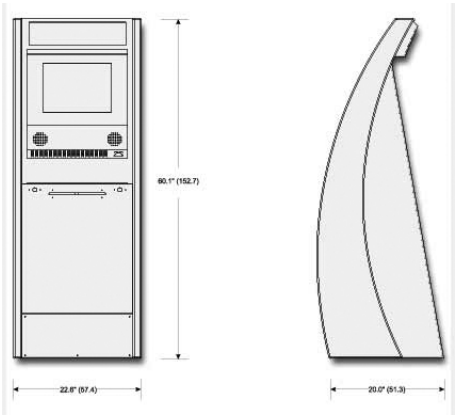


Fig. 4.39. Dimensions of the kiosk

Also, the output and input components of the kiosk are used in familiar designs to service providing like ATMs. On the other hand, the finished design can be painted or paneled to make for specific design. For example, by the application of plate panels, custom colors and signed blend, the kiosk design will be the customized version for visitors at the Ford Exhibit.

Fig. 4.40. Customizable version of the kiosk

As pointed out in the beginning of this chapter, information is invisible. The task of the designer of the city kiosk is to render visible both content and function of the structure as the urban venue of vital information. Moreover, designing a kiosk and its final visual presentation require a combination of industrial design, engineering and art principles.

In summary, it is clear that a city information kiosk is the terminal to obtain information by people who live in the city. The terminals such as subways, airports, and bus stops are located in specific points in the city which are landmarks on the city map. From this point of view, in the future, relation of information city kiosks with key urban location markets should be evidenced in urban plan (Fig. 4.41). Therefore, information city kiosks should be an important key in the creation of city identity with harmonious environmental design as well as street furniture.

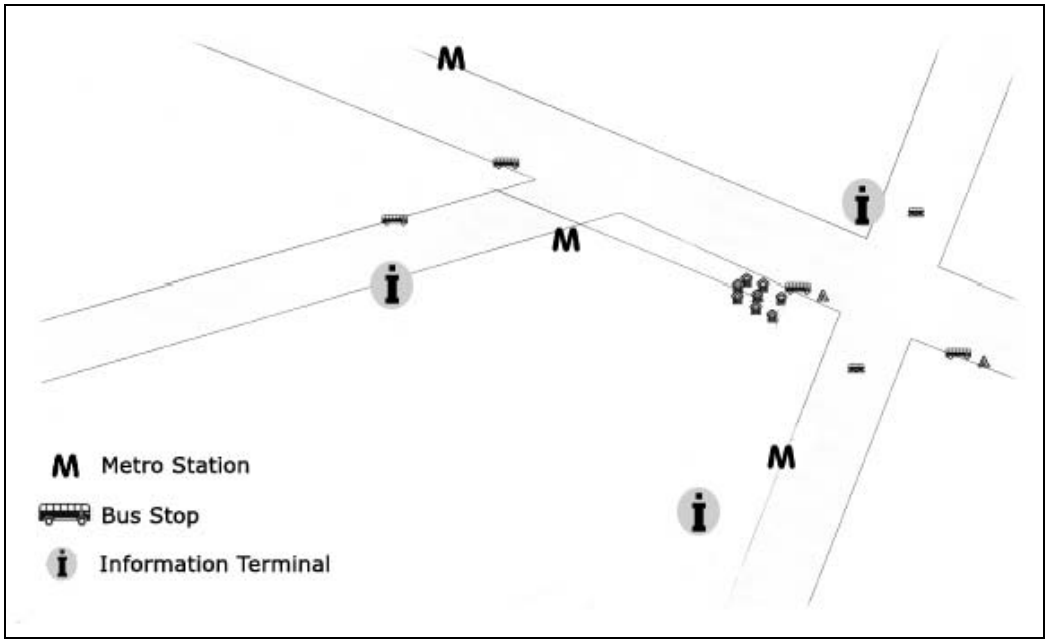


Fig. 4.41. Location of information terminals in urban plan.

However, there is not a regulation for city kiosk design at present. Preparation of a regulation of information city kiosks which would include the principles of appropriateness to the health conditions, for vandalism and product safety, public safety, adaptation to the environment, and standards of care is necessary to keep new products in usable and good-looking condition. Therefore, commonly, the existing information kiosks are used for indoor applications such as airports, banks, and subways. In this respect, in developing cities, information city kiosks for the present should be performed for indoor application until effecting a regulation of outdoor applications, or existing kiosk designs may perform with physical shelters in the shape of ATM cabins, or should be in-wall.

Fig. 4.42. Sheltered information city kiosk in Berlin.

Fig. 4.43. ATM cabin examples from Turkey

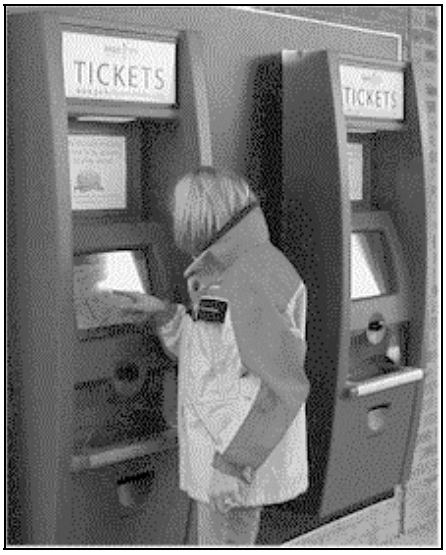


Fig. 4.44. In-wall Kiosk on pedestrian crossing.

Chapter 5

CONCLUSION

This study has attempted to emphasize that information and communication technologies actually continuously rise with, and are redesigned living environments of people. An advanced level of design of systems and functions is increasingly being produced together. Thus the power to function technologically and link socially is increasingly supported by information and communication related tools. The means to recognize and control mass communication devices within a physical environment that helps people to use amenities through technology. On the negative side the technology, may become an important factor of our age for having negative effect on human lives. Nevertheless, technology in general, but particularly information and communication technology are a necessary tool for societal transformation and contemporary life. Therefore, dominant trends surrounding the current extension of information and communication technologies are far from being geographically or culturally neutral.

By bringing the information perception and flow to a visual level, these technologies and related tools have brought new utilization patterns to the city and people living in it. Also an improvement in digital information processing and infrastructure, including the interconnectivity value of the ICT and related devices, have stressed the importance of information superhighways and multimedia to tomorrow's city inhabitants. At this point interactive-multimedia city kiosks are the most concrete example of this utilization pattern from a product related point of view. Above everything, the city kiosk system has a role of simplifying the city life. They have an important role in providing information in the public space. Both with their own physical design and functions, and by directing human behavior, they gain importance in the formation and use of city space. The city kiosk that is located in public space can be defined as a public product that has been presented for common usage, that may provide various services in information access, and that is visual and functional.

At this point in history, the city kiosk has become the critical subject of product design that belongs to the public. To design of the city kiosk, as with other industrial products, has many steps. Its determining needs pertain to user profile, human-machine interface

criteria, aesthetic values, and role and function, which will constitute an information point in the city. With this classification, the variety of city kiosks and their purposes can be seen in detail, and so can the positions they take within the city.

Moreover, the interactive-multimedia city kiosk, like other new multimedia-based products, is generated by ICT and related with interactivity. Technological innovation is increasingly concerned with multifunctionalism and is becoming complex. Besides this, usually the smaller product, which includes lights, buttons, and interactive surfaces, is a composite of services multiple. There is no office person who may apply or organize her/his work by these products. These multimedia-based products are indeed the computer, the rely especially on the ability of the computer that is based on the software and hardware technologies. Also, the kiosk that is based on this idea is designed with similar basic components including software and hardware, and a high level of technological knowledge.

To integrate the kiosk design in the process of the idea of public use that will be located in public space, the designer should well recognize the importance of the balance between the requirements of the public product, the design profession and the technical knowledge about computers. If is not in command of these first-hand, should obtain professional aid and work in a team. Therefore, the teamwork that occurs by the collaboration of the industrial designer, urban designer, architect, and engineer, may create the better-designed interactive-multimedia city kiosk. The assignment of the better design of the kiosk includes, along with its case and functions, also the relationship between aesthetic values and environments.

Considering the kiosk design, it is aimed at designing an interface of public service, in a certain region of the city or point of public space where specifically it must be presented/ located. It is also aimed at designing a kiosk model that will be mass-produced and that will be easily and reliably used against vandalism and climate/environment exposure all around the city in mass circulation.

This image is determined along with the developing information and communication technologies, changes of life habits and hence, requirements. Therefore, the form, usage, design of services and products change, too. With the technology, people, in

public spaces, may meet their needs without coming face to face with other people, with the help of interactive and friendly interfaces. This factor increases the number of interactive-multimedia city kiosk in public space.

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