INFORMATION TECHNOLOGY (IT) AS AN INNOVATIVE TOOL IN TOURISM DEVELOPMENT

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ABSTRACT

Many innovative tools have been invented to assist humankind in their daily life. One of the great inventions is information technology (IT). IT has changed many aspects of humankind and their lifestyle today. Ever since its inception, man's reliance on information technology is vital to his existence. Those who have not used IT are being left behind. The Internet as the catalyst of IT has made transfers of information faster than anyone could imagine just a decade ago. Information technology innovations have improved man's quality of life, in work and leisure. In the tourism sector of Malaysia, information technology and the Internet are two main elements in prospering the country. The country is rich in diverse tourism products which are available nationwide. The numbers of international and domestic tourists visiting are consistently increasing yearly. IT and the Internet have played a major role in facilitating this surge in visitations. Today many Malaysian tourist attractions are available on the web. However, IT usage is not limited to promoting tourists' attractions and disseminating information but also in planning, development and assessment. Furthermore, the current tourists' attractions need to be managed and assessed regularly and IT together with the Internet can assist in achieving this goal. Thus, the purpose of this paper is to suggest what IT and the Internet has contributed and continues to contribute in different phases of the tourism sector. The study views different approaches in which IT and the Internet can play in moving towards sustainable tourism development.

INTRODUCTION

The world evolves and everything that exists does so similarly. Almost one hundred and thirty years ago in 1876 Alexander Graham Bell invented the "electrical speech machine" or the telephone to assist people who had hearing problems. He never imagined that today his creation has turned into something so vital to human existence namely, data transmission through the Internet[1]. Figure 1 shows the evolution of communication.

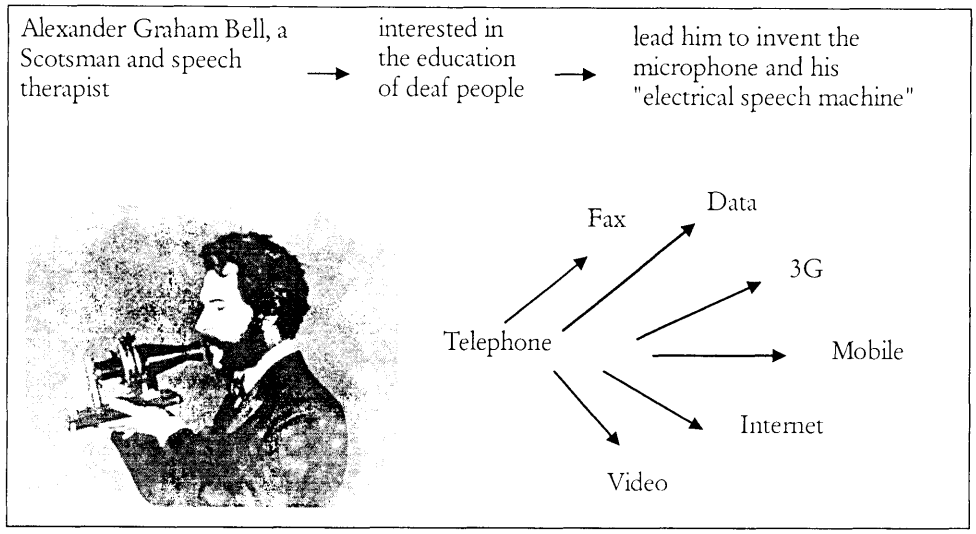


Figure 1: Evolution of Communication

The same goes with the size of a personal computer. In 1946, 20,000 vacuum tubes occupying a big room were required to run a computer.[2] Figure 2 shows the first computer called ENIAC I built in 1946. Sixty years later the size of a personal computer is miniaturised that it can be carried on the palm of your hand. Figure 3 shows a personal computer of 2005.

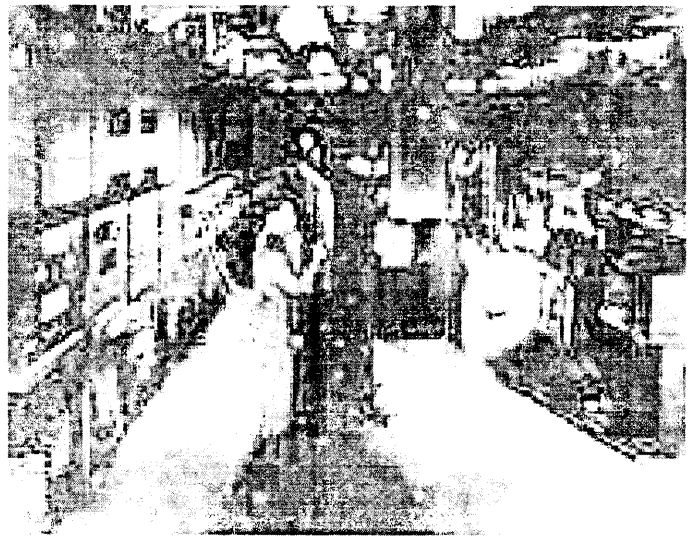


Figure 2: ENIAC I Computer[3]

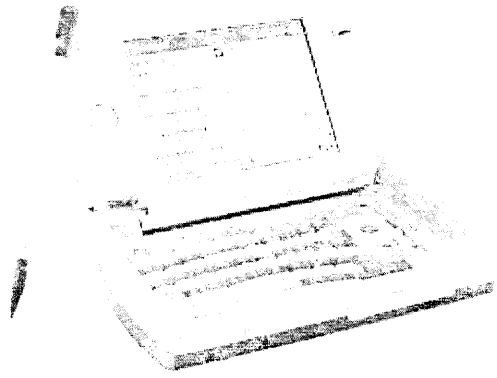


Figure 3: Personal computer in the year 2004 (Pocket PC PDA Phone)

In addition, advancements in LCD technology are beginning to replace the older CRT monitors. Humankind being the dominant species of this planet has survived due to inventiveness and creativity in creating tools to improve the quality of life.

COMPUTER, INTERNET AND INFORMATION TECHNOLOGY

Computing technology was first developed to assist humankind in processing mathematical problems.[4] As it developed, man has enhanced the computer hardware from a gigantic size into miniature size. Then the idea of sharing of information via collaboration came into picture.

The precursor to the Internet, ARPANET was a large wide-area network created by the United States Defence Advanced Research Project Agency (ARPA). Established in 1969, ARPANET served as a test bed for new networking technologies, linking many universities and research centres.[5] The first two nodes that formed the ARPANET were UCLA and the Stanford Research Institute, followed shortly thereafter by the University of Utah. As technology improved, mankind continues enhancing Internet usability. The marriage of computing technology and the Internet, Information Technology, which is also known as IT, came into the picture. [6]

Information technology has proven its capabilities as reflected by its definition. As defined by San Diego State University, information technology,

> "includes all matters concerned with the furtherance of computer science and technology and with the design, development, installation, and implementation of information systems and applications. Information technology architecture is an integrated framework for acquiring and evolving IT to achieve strategic goals. It has both logical and technical components. Logical components include mission, functional and information requirements, system configurations, and information flows. Technical components include IT standards and rules that will be used to implement the logical architecture."[7]

Today, information technology plays major roles in many areas which include management, business, commerce, education and tourism. It has assisted mankind in decision making and enhanced human capabilities in completing his tasks sooner than expected.

The Internet has expedited the progress of the information technology. Originally designed as an alternative communication and a tool for collaborative efforts between selected universities, it has flourished to be source of information and collaboration in the world societies today. A society without the Internet is an isolated society. The Internet which originally promoted the use of open communication tools via ftp (file transfer protocol), and open communications protocol i.e. TCP/IP (transfer control protocol/ internet protocol) and telnet, was further enhanced technology-wise by Tim Berners Lee by creating the World Wide Web[8] popularly known as "www".

The World Wide Web is equipped with multimedia technology and has attracted many sectors to use it for marketing purposes. Not only that, it has also created the world to be a borderless world, also known as cyberspace. In the last decades of the 19th century, inventors were busy inventing machines to assist man kind in their lives. Today information and knowledge sharing is the key to living in the 21st century.

BENEFITS OF INFORMATION TECHNOLOGY

There are many benefits that can be obtained from information technology. Thousands of years ago, the world experienced the Metal Age, Ice Age, and Industrial Age. Today, it is Information Age. Information is vital today and every society in the world requires it for survival. Knowledge can be disseminated through information. Therefore sharing information is vital in today's society. Information technology promotes information sharing. With the availability of the Internet, information can be shared beyond boundaries.[9]

Malaysia with the foresight of its leaders embraced information technology in the late 90s with the setting up of Jaring as the first internet service provider (ISP). The service was opened for public use in 1998 with 405,000 users. The increasing number of Internet users in Malaysia for example, has shown that Malaysians are not left behind in the Information Age. According to Malaysian Communications and Multimedia Commission,[10] the number of Internet users in Malaysia has increased ten fold. Table 1 shows the increase from the Internet inception in Malaysia until the third quarter of the year 2005 through dial-up Internet access.

Table 1: Internet Dial-up Subscriptions [11]

Internet dial-up subscriptions					
Year	Quarter		Internet dial-up		
		Total ('000)	Growth rate	Penetration rate	Estimated number of users ('000)
1998		405	97.6	1.8	1,215
1999		668	64.9	2.9	2,004
2000		1,659	148.4	7.1	4,977
2001		2,113	27.4	8.8	6,345
2002		2,614	23.7	10.5	7,842
2003		2,881	10.2	11.4	8,643
2003	1	2,679	2.5	10.8	8,037
	2	2,729	1.9	10.9	8,187
	3	2,842	4.1	11.3	8,526
	4	2,881	1.4	11.4	8,643
2004	1	3,139	8.7	12.4	9,417
	2	3,117	0.7	12.2	9,351
	3	3,171	1.7	12.3	9,513
	4	3,293	5.6	12.7	9,879
2005	1	3,439	4.4	13.2	10,317
	2	3,570	3.8	13.7	10,710
	3	3,621	1.4	13.8	10,863

Source: Malaysian Communication and Multimedia Commission.

With the current knowledge possessed by Malaysians in IT, information about Malaysia can be disseminated to the world. New ideas will emerge and Malaysians with different background combined with knowledge in IT, will be able to produce creative web-sites in promoting Malaysia as tourist destination.

Table 2 shows the subscriptions through broadband. The number of subscribers has increased tremendously.[12] With the availability of broadband facilities, multimedia presentations can be wired to the audience. This shows that Malaysians' technological knowledge can be leveraged with those from the developed countries.

Table 2: Broadband Subscriptions

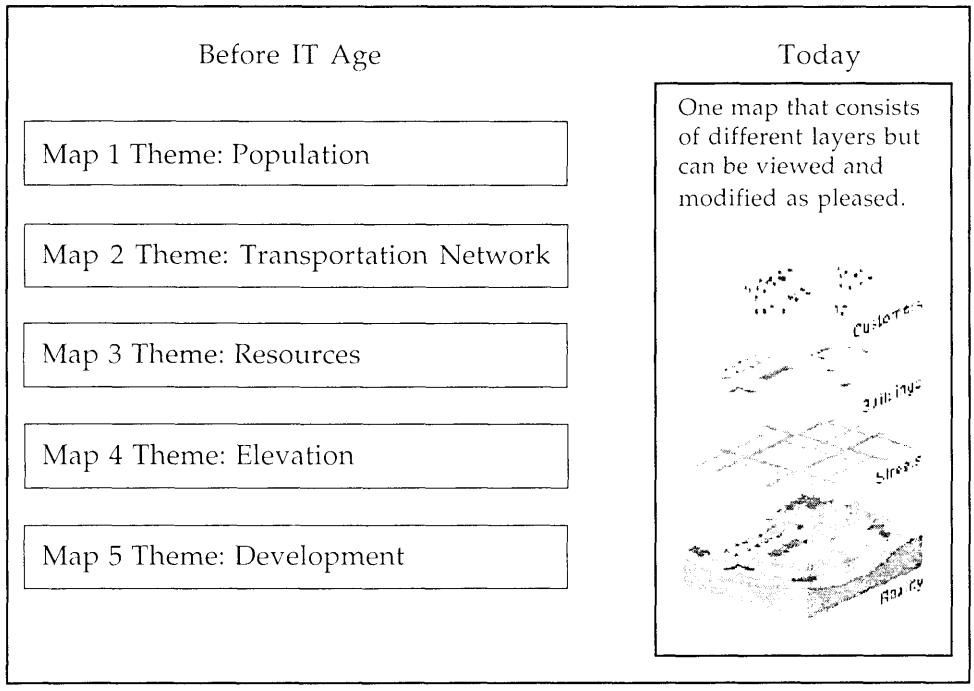
Estimated number of broadband subscriptions by technology						
Year	Quarter	Number of Subscriptions				
		ADSL	SDSL	Others	Total	Penetration Rate
2002		18,511	542	249	19,302	0.08
2003		108,173	1,931	302	110,406	0.45
2004	1	139,862	2,168	302	142,332	0.56
	2	170,516	2,432	1,286	174,234	0.68
	3	213,589	2,616	1,799	218,004	0.85
	4	247,802	2,834	1865	252,501	0.98
2005	1	288,673	2,995	5,300	297,177	1.15
	2	344,412	3,257	5,549	353,218	1.35
	3	420,611	2,651	6,299	430,561	1.64

Source: Malaysian Communication and Multimedia Commission

Information technology promotes paperless systems. It has the capability to eliminate paper waste and has made mankind to be more concerned about the natural environment. Less garbage, less storage of papers, more space, and more environmental friendly scenario promotes healthier society. Therefore it fits the drive in promoting sustainable tourism development.

Information technology promotes efficiency.[13] Centuries ago, map making was done manually. Every map drawn was for a specific purpose. With IT, maps can be drawn and produced digitally and shared by many. Figure 4 shows the evolution of map drawing. From a paper-based, maps can be redrawn into digital system. The latter enables cartographers to modify maps and keep them digitally. These have made cartographers more efficient and produce more maps at a shorter period of time.

Figure 4: Evolution of Map Mapping



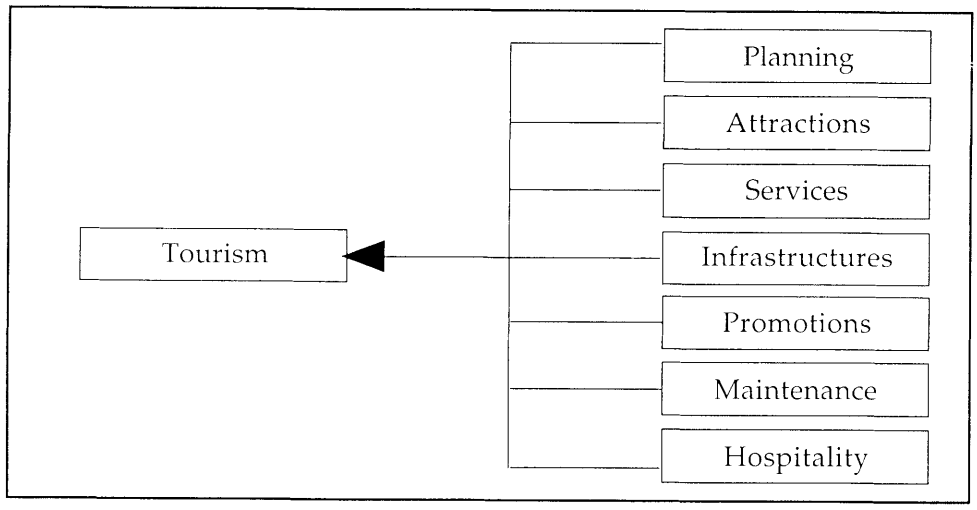
INFORMATION TECHNOLOGY IN TOURISM DEVELOPMENT

Tourism is a complex and dynamic sector. It evolves in tandem with the current needs of the people and their experiences. Tourism sector has always been a sector that crosses the boundaries of disciplines and application areas.[14] Land-use planning, business, marketing, infrastructure and transportation are among the disciplines that are directly and indirectly concerned with tourism.[15]

In the previous centuries, promotions on any country in the world were conducted via brochures, pamphlets and road shows. Pictures shown on these media were static. Maps shown on these media are rigid and not user friendly. Furthermore, changes to any tourist destinations incur cost as more money is needed to print new brochures and pamphlets. New rounds of road shows need to be organized in order to make new products known. Printing new brochures means cutting more trees and wasting more man's energy unwisely.

Tourism industry can be broken down into several components. Among the components include planning, infrastructure, construction, promotions and maintenance.[16] These components work as one. Figure 5 shows the components of tourism development. Each of them play important role on tourism development.

Figure 5: Components of Tourism Development



Information technology can be implemented in many of these components if not all. Among the components include planning and promotions. Planning component decides the areas to be developed as tourism area. One of its tasks is to be able to locate resources which consist of natural and manmade resources to be developed as tourist attraction sites. Designs of new sites are also vital to the planning task. Geographic information system also known as GIS is a perfect tool to be utilized to carry out the task. Maintenance task can also be conducted using GIS. Likewise, in promoting tourist attraction sites, multimedia applications would be suitable.

GEOGRAPHIC INFORMATION SYSTEM (GIS)

GIS has several definitions. In simple term, it is defined as,

system of computer software, hardware and data, and personnel to help manipulate, analyze and present information that is tied to a spatial location.[17]

Alternatively, it is defined as,

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 visualization 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.[18]

Both definitions describe almost the same thing. Generally, GIS is about using software system as a tool to assist mankind to carry out analysis using spatial data efficiently. Spatial and aspatial data are kept in databases for easy accessibility. Spatial data are important due to its features of being digital and geo-referenced.[19]

Tourism planning requires resource locations, people, and infrastructure. By plotting resources available at a specific location and giving appropriate priority, a planner will be able to decide whether the resources are suitable to be exploited. Environmental and social impacts are additional criteria that planners have to take into account too. Using GIS as a tool, these data can be digitized.[20] Infrastructure component need to be included in this analysis. With GIS capability in analyzing the best suitable location with minimal impact on environment and local people, a tourist attraction site can be specified. That's the beauty of GIS.[21]

Tourism sector deals with information sharing. The digital map can be shared by local authority which may consist of several departments, developer and consumer. However the information needs of these components are of different levels. Local authority may require the most data. These data include local plan and infrastructure plan. Furthermore local authorities need to carry out maintenance on every tourist site efficiently. Abbas Abdul Wahab et.al[22] identified data sharing in the Malaysian Federal Department of Town and Country Planning. This department which is also known as JPBD[23] has started using GIS application in its day to day operation since 1993 and has advanced to using web-based GIS in promoting knowledge and data sharing. There are more than 1000 layers of data of all plans developed by the department. With web-based GIS, land-use data on 128 local plans can be distributed to all the 128 local governments with ease. This method of data sharing is to be extended to cover all the other plans in JPBD.[24]

Abdul Nasir Matori has identified that GIS application has significantly reduced time consumption in entertaining client who requires information on local plan. Ipoh City Council normally required approximately 4 hours to entertain 10 clients. With GIS application, time required to serve the same number of clients is reduced to approximately 1.5 hours.[25]

In tourism development, GIS application can be utilized in providing information to tourists. An excellent example of a GIS map can be viewed at http://www.tourismperak.com/main.cfm.[26] User is able to manoeuvre through the map of Perak to access all the tourists' attraction sites in Perak. Figure 6 and 7 shows the interfaces of GIS map in Tourism Perak website.

Figure 6: GIS Map at smaller scale

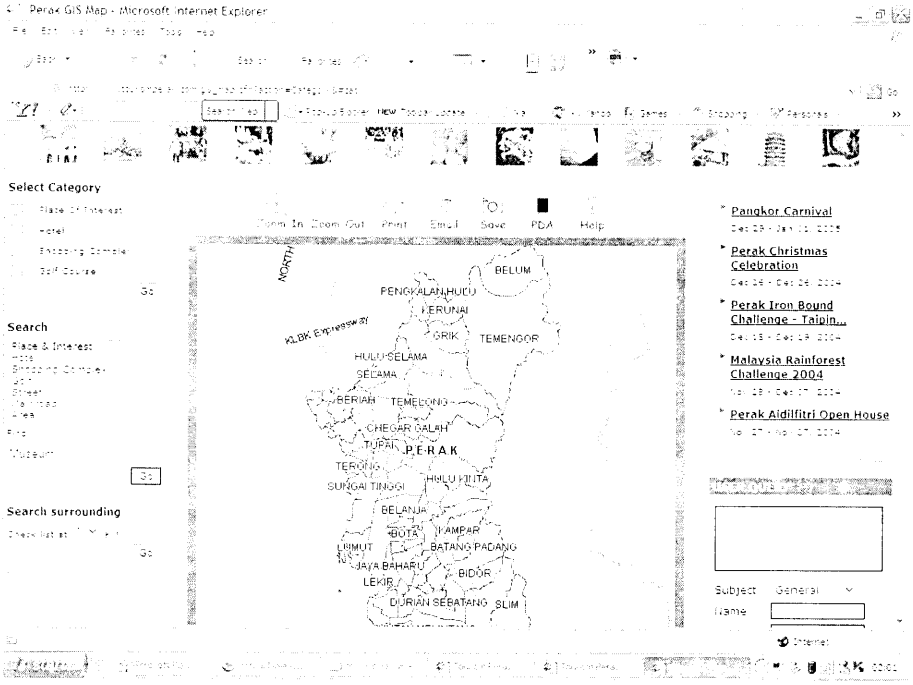
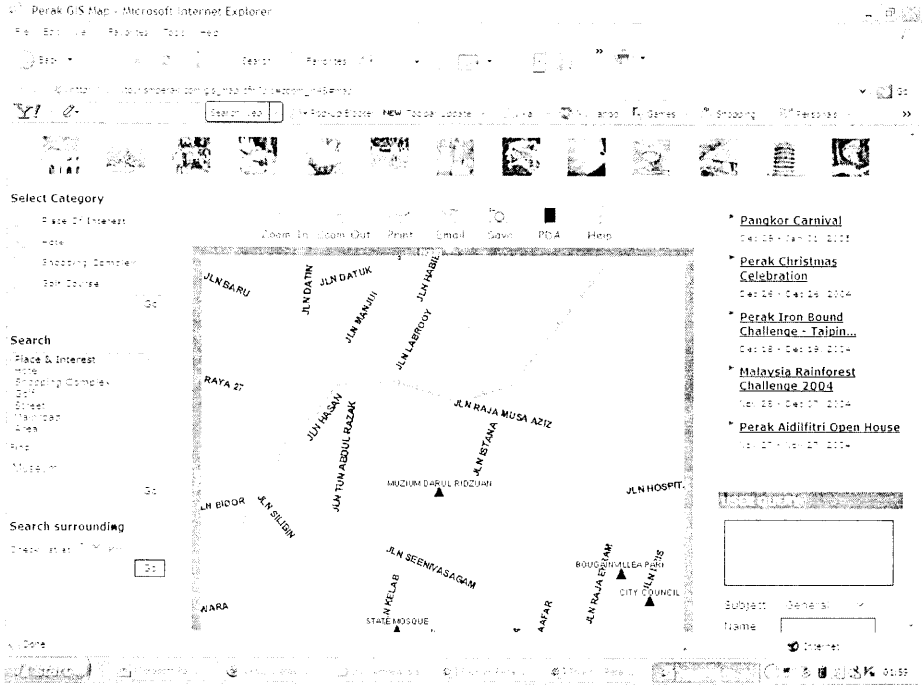


Figure 7: GIS Map of Figure 6 in detail



GIS map is able to be viewed on a web browser with the advancement of internet GIS. Advancement in technology has also enabled GIS Map to be viewed on a personal digital assistant (PDA). Figure 8 shows source of map data on the Internet. GIS data has to be downloaded from any site that offers map data. The data will then be synchronized to PDA through a personal computer.[27] Figure 9 shows an example of GIS map being displayed on a PDA phone.

Figure 8: Source of GIS map data on the Internet

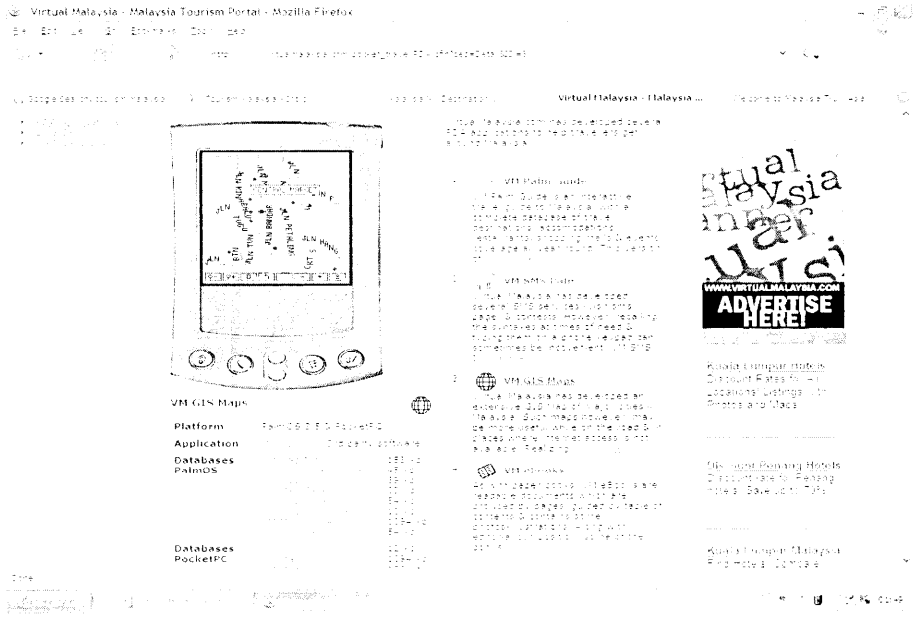
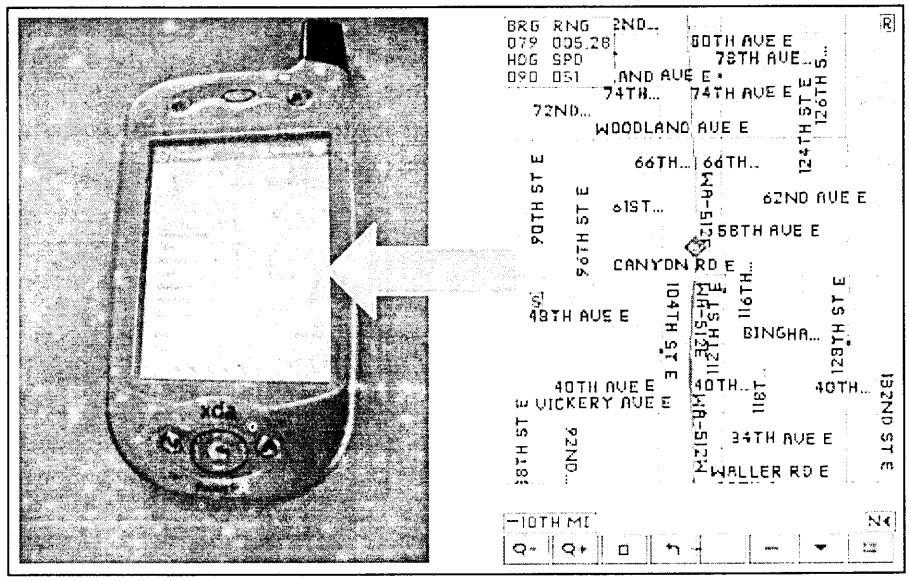


Figure 9: GIS Map displayed on a PDA



Today, web-based GIS or also known as online GIS are being studied thoroughly due to its ability to display GIS maps via web browsers.[28] Web-based GIS uses client-server technology architecture. Several software that can be used to develop web-based GIS include ArcIMS and MapExtreme. Web-based GIS has given a chance to users who do not have GIS software to view and manoeuvre GIS maps easily.

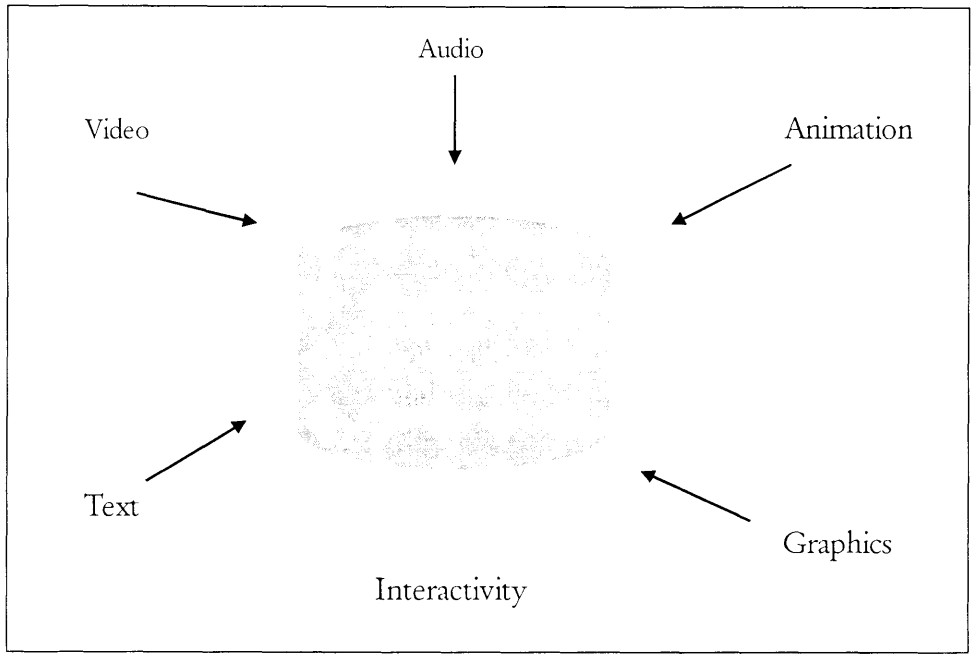
MULTIMEDIA APPLICATION THROUGH THE INTERNET

Globalization has changed the way people do things. Political boundaries merely refer to the management of a country. Other activities such as banking operations, buying and selling and business decisions are conducted beyond political boundaries. Tourism industry transcends boundaries. To sustain a competitive advantage in this era of globalization, tourism industry must limit its focus to three major areas: product innovation, new production process and marketing strategies.[29] Therefore in order to be successful, improvement in delivering information is needed. Global demands increase the importance of strategic learning in organization. International competitiveness demands new technologies and ways of doing things.

Information, the Internet and multimedia are three vital components to tourism industry. If information is considered as blood in tourism industry then the internet becomes the heart that controls the flow of the blood.[30] Multimedia will then be the nutrition in assisting the blood flow smoothly. Studies have shown that majority of tourists today refer to the internet, in this case, the world wide web for information on places they would want to visit. The Travel Industry Association of America has identified that 67% of American tourists refer to the world wide web to retrieve information on their tour destinations and travel costs.[31]

Multimedia application consists of six components which include video, text, graphics, animation, interactivity and audio or in any combination of these components. Figure 10 shows the component of multimedia application. With developments in World Wide Web, multimèdia application can now be presented on the Internet. The use of multimedia in publishing information on any destination is able to provide interesting experience. Viewers will be attracted to get more information on the said destination.[32]

Figure 10: Components of Multimedia

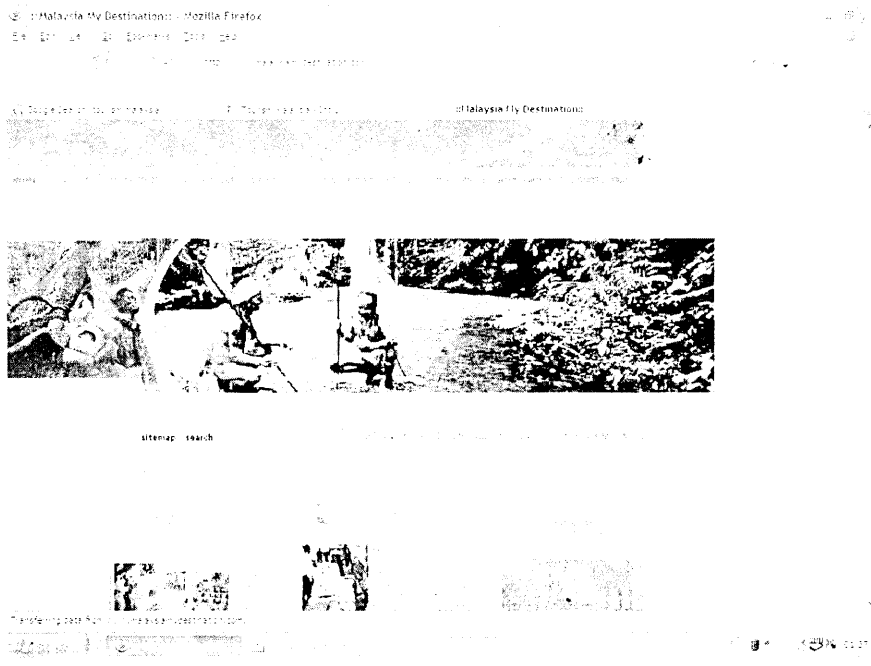


Promoting tourist sites on the Internet requires multimedia application. A good example can be found at http://www.tourismmalaysia.gov.my/.[33] Tourism Malaysia website. On clicking the identifier or uniform resource locator (URL), the tourist will be able to view and hear the multimedia application on the web site. Furthermore, by clicking "enter", one will be able to view more information. Interactivity enables users to browse through the web site easily. Figure 11 shows the interface of Tourism Malaysia website.

Figure 11: Tourism Malaysia home page

These multimedia applications were created using html editor and authoring tool. Html editor is used to create mainly the layout, text, and inserting graphics and animations. Authoring tool such as Macromedia Flash is used to create animations. Advancement in internet technologies has also enabled users to communicate with web site's host through form submission. This communication is handled by server scripting language such as PHP, ASP and JSP. Software such as Visual Basic can be used to create user interface and later incorporate GIS map into a website. Figure 12 to 14 show some of the websites promoting Malaysian tourist destinations using multimedia application.

Figure 12: Malaysia MyDestination home page [34]



Today, promoting tourist attractions can be conducted easily through the Internet. Furthermore with the myriad of technologies available, tourism web sites are no more static pages. Web sites are more lively and attractive. Today holiday packages, hotel, air flight ticket booking and payments can be made online and on real time. Normaliza and Amir Hashim have indicated that Thailand has used multimedia as her key success factor in boosting tourism products as compared to Malaysia. Foreign tourists' arrival in Thailand is double than that of Malaysia. The major factor that caused Thailand to be better-known than Malaysia is contributed by the use of multimedia in promoting Thailand as a preferred destination.[37] Normaliza and Amir Hashim argued that most tourists felt that Malaysia's multimedia is rather slow in promoting tourism although the country has almost the entire infrastructure

needed to carry out the mission.[38] Malaysia is inevitably on par with other nations when technological advancement and utilization is concerned. However, ways and means need to be determined in order to exploit tourism products to the fullest in order to enhance tourism industry in Malaysia.

Figure 13: Malaysia Truly Asia home page [35]

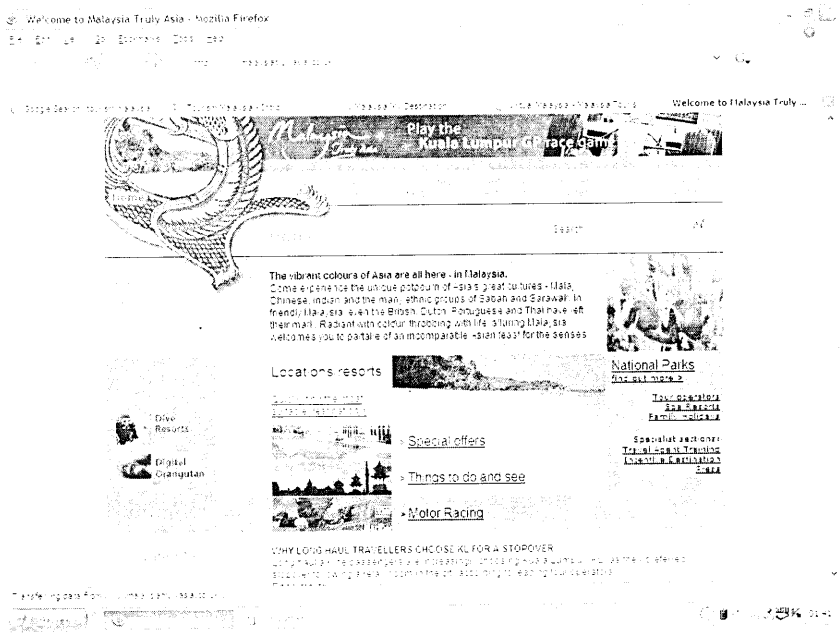
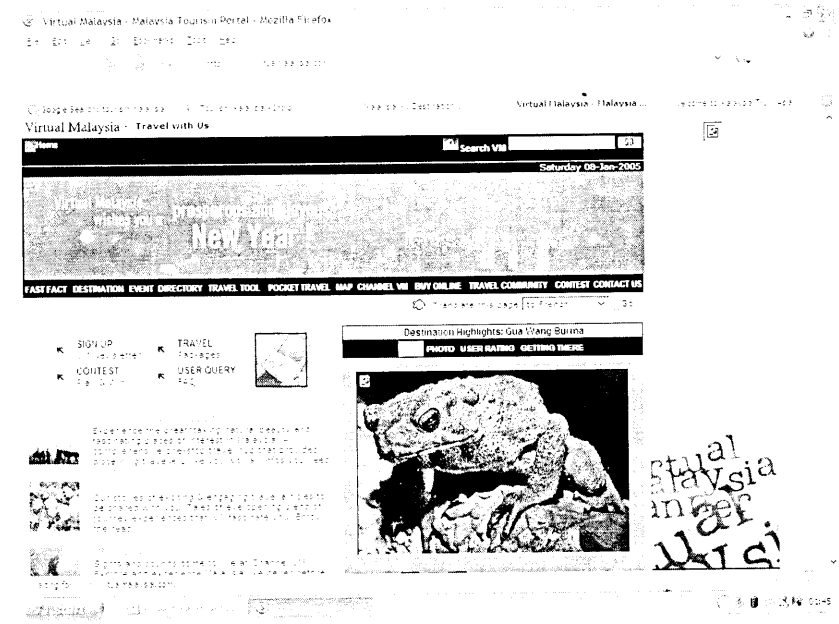


Figure 14: Virtual Malaysia web page [36]



CONCLUSION

Information is vital to a society in order to survive in the twenty first century. Travellers need information before starting their journey. Tourist promoters need to promote tourist attraction sites. They too need information. Planners and the authority need information to carry out their tasks. Tourism is a sector that always needs to be updated with the most current information. Therefore, GIS and multimedia applications can be the media to this information. Updating GIS data is much easier than creating a new one. Information on web pages can be updated easily using the html editor. Web-based GIS will make web pages become more dynamic. Thus, information technology has cut short the journey in promoting tourist attractions.

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