IT-INNOVATION AND TECHNOLOGIES TRANSFER TO HERITAGE SITES: THE CASE OF MADABA, JORDAN

Monther M. Jamhawi[1], Zain A. Hajahjah [2]

[1] *Department of City Planning and Design, College of Architecture and Design, Jordan University of Science and Technology, Jordan*
[2] *International Graduate School: Heritage Studies, Brandenburg University of Technology Cottbus-Senftenberg, Germany*

ABSTRACT

Using information and communication technologies (ICT) in tourism planning enhances sustainable tourism and better management, analysis, and decision support in the tourism industry. This study assessed the use of ICT in the promotion of tourism and the management of Madaba city in Jordan. The approach of this study addressed eleven indicators for the assessment such as: the type of organization, the organization's activities, the ICT and community involvement, the ICT usage within heritage sites; online availability, the training and skills, sharing of information electronically, E-Commerce, the ICT applications, and technology for heritage interpretation. The study targeted ten main stakeholders related to the field of heritage and tourism in the historical core of Madaba including eight destinations and two management organizations. The results show that using ICT technologies in the city of Madaba are abundant, and are not seen as a tool either in the tourism management or in the tourist's visits. Accordingly, an interactive Virtual Tour 360° HD was designed including an online website and mobile application to offer new ways of visitor interaction with the visited sites in Madaba. In addition, a web GIS Map was produced for the downtown of the city to transfer the use of advanced technologies in the integrated management of the city.

1. INTRODUCTION

In 1992, the World Summit of Rio de Janeiro stressed on the need for a more balanced approach in development planning in which economic, socio-cultural and environmental aspects are equally important for a sustainable future (Gebhard, et al., 2009; UN, 1992). The United Nations Environment Program (UNEP) and the World Tourism Organization (WTO) define sustainable tourism as a "Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities" (UNEP and WTO, 2005). Indeed, tourism demands the participation of stakeholders in a continuous process to achieve sustainable tourism supported by constant monitoring of impacts (Ibid), therefore, a proper management system in the sector of tourism is crucial.

With the rapid technology, Information and Communication Technologies (ICT) usage in tourism and cultural domains evolved revolutionary to be visible tool for destination competitiveness and sustainability (Sheldon, 1997; Brizard, et al., 2007; ALI, 2009; Ali & Frew, 2010; Veltman, 2005). In addition, ICT also become a key concept in the destination management including information management, interpretation, marketing, tourist satisfaction, and enabling partnerships (Brizard, et al., 2007), see Table I.

Table I: ICT use in Tourism (Source: United States Agency for International Development 2006)

Area	ICT Use
Site selection and tourism development	Geospatial information technologies
Marketing	Inbound market research
	Outbound advertising
Customer relationship management	Home-destination-home
	Turn prospects into customers
	Book-travel, lodgings, tours etc.
	Trip management: pre, during, post
Operations	Buying, managing services and supplies Managing value chains
Managing and monitoring tourism site	Geographical information systems and global positioning systems

ICT first adopted as a digital documentation for libraries and archives of museums (Veltman, 2005), then started to take more leading role in creating links between tangible and intangible heritage. New software and applications were developed to support these technologies, such as augmented and virtual reality, holography, 3D modelling, and mobile applications (USAID, 2006; Veltman, 2005; Schieder, et al., 2014). This is in addition to the Geographical Information Systems (GIS), which now accounts for 12% of the world's Gross Domestic Product (GDP),

and is the single most important source of income in the G7 countries[1] (Veltman, 2005, p. 9).

Moreover, ICT plays a vital role in the involvement of different stakeholders in heritage planning and decision making; especially that stakeholders issues is became an important and critical consideration that need to be incorporated while planning for heritage contexts (Uysal, Perdue and Sirgy, 2012). The application of ICT can facilitate easier communication and networking, which leads to breaking down barriers to effective collaboration among heritage stakeholders (e.g. scenario based design "SBD" that can engage stakeholders in innovative technology-based tourism services in heritage destinations) (Benckendorff, et al, 2014). Besides, tourism industry in heritage sites is information-intensive and creative, where ICT and internet can bring the integration between heritage and tourism (Valčić & Domšić, 2012). This collaboration should support the appreciation of world and national heritage, and the sustainable community economic development.

In particular, Buhalis (2002) suggests that ICT can assist in these aims by dissemination of customs and traditions, promoting visibility of cultural resources, monitoring tourism impacts, and building partnerships between cultural and tourism operators (Benckendorff, et al, 2014).

These huge potentials in ICT enabled it to mitigate the negative impacts of tourism in destinations, as a non-destructive tool that can help in promoting and enhancing tourism experience in tourist attractions without threatening their sustainability. The use of these ICT technologies in planning and management of tourism in Jordan is becoming essential.

The main aim of this paper is to assess the availability and usage of ICT in Madaba as one of the main tourist urban centers in Jordan. The motivation of this framework is to have more accurate understanding for the use of multimedia and ICT innovations and how far visitors and online users use these technologies while exploring the city due to its availability.

2. STUDY AREA

Madaba city is located in the mid-southern region of Jordan about 30 kilometres from Amman, with a population number of about 130,000, and an area of 2,008 km^2, see Figure 1. Madaba has a promising future in the tourism sector generating a considerable source of foreign currency, the infrastructure development, and opportunities for new management and educational experience, which contributes positively to the social and economic development of the city.

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[1] Industrial countries include: Canada, France, Germany, Great Britain, Italy, Japan, and the United States.

The city of Madaba is characterized by its urban morphology that attracts tourists. Its geographical location in the mid-southern region enables it to be accessible from different directions and close to other popular tourism destinations such as; Mount Nebo, Mukawir, Hammamat Main, Um Al-Rasas, and the Dead Sea. Historically, Madaba was the cradle of many civilizations; Moabite, Nabatean, Roman, Byzantine and Islamic. Its heritage is dated to at least 4500 B.C. It flourished as a city during Moabite and Ammonites times (ca. 800 B.C), and the Hellenistic periods (ca. 300 B.C.).

3. MATERIALS AND METHODS

Eleven indicators have been identified to be measured to assess the ICT usage by the concerned organizations and agencies in the historical core of Madaba. These indicators are: the type of organization, the organization's activities, the ICT and community involvement, the ICT usage within heritage sites; online availability, the training and skills, the ICT support of heritage attraction to employees in ICT related work, the ICT availability in heritage sites, sharing of information electronically, E-Commerce, the ICT online applications, and technology for heritage interpretation.
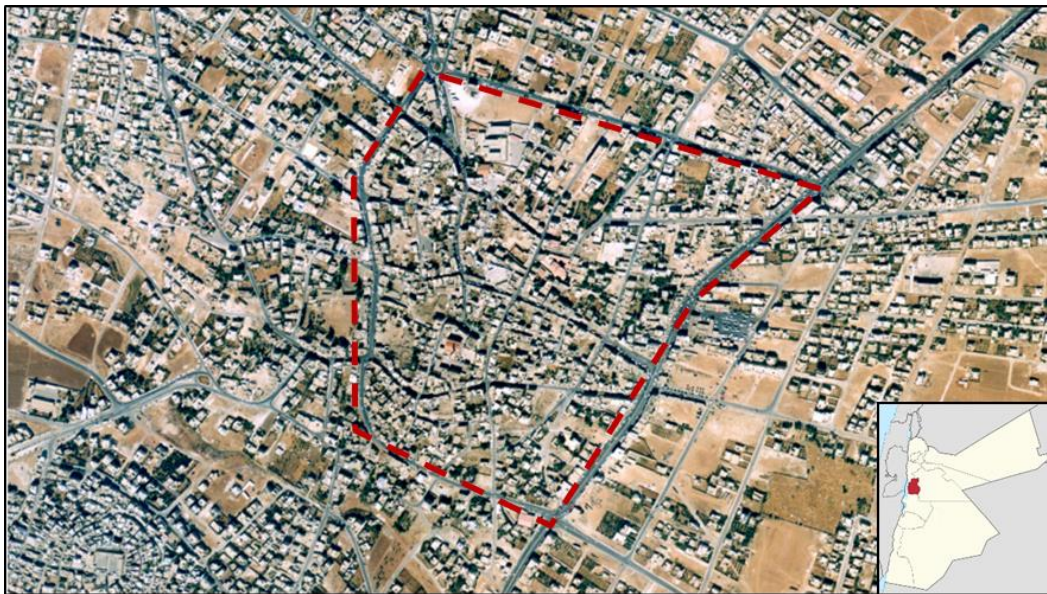

Figure 1: Aerial Photo of the Historical Core of Madaba

The collected data was qualitative and quantitative. The qualitative was coming out of non-structural interviews, while a questionnaire was designed and distributed to get the quantitative data. The questionnaire targeted main stakeholders related to the field of heritage and tourism in the historical core of Madaba including 8 destinations and 2 management organizations, those are: St. George's church and mosaic Map, John the Baptist catholic church, Madaba tourist centre, the archaeological park, Madaba museum, church of Apostles, Madaba institute for mosaic art and restoration (MIMAR), Tell Madaba, Madaba tourism directorate, and Madaba antiquities directorate. The field work was carried out during January 2015.

4. RESULTS AND DISCUSSION

Analysis of collected data showed that almost 75% of the organizations in the historical core of Madaba are active in preservation and archaeological work of their monuments and artefacts. The tourists' basic services are not available in all destinations; only 38% of these organizations have a cafeteria and souvenir shop.

Regarding the social events in Madaba, these events usually include some cultural exhibitions, where it is found that only 38% of these exhibitions are published and integrated with the public through ICT Apps, see Table II.

The promotion strategy of these organizations using ICT to attract more visitors to Madaba is not active and lack of valid networking with other museums and tourism attractions. This is due to the fact that managers see ICT as a way to manage the organization but no to foster communication or enhancing exhibition presentation. Although, not all of these organizations are aware to the importance of the ICT Apps (38%) in delivering a best experience and services for visitors, the access to Internet and sufficient infrastructure for ICT Apps is available at more than 50% of these organizations, see Table III and IV.

Table II. Social aspect of heritage site and link to ICT

Indicator	Question	Answer	%
Community involvement and social aspect of heritage site and its link to ICT	Type of social activities	Exhibitions	75%
		Dance Performances	38%
		Fundraising	50%
		as a meeting place	75%
	Frequency of social activities	Daily	0%
		Weekly	13%
		Bi Weekly	0%
		Monthly	75%
		Whenever there is another major festival/event in Madaba	50%
	Type of audience for these social events	Foreigners (including tourists)	50%
		Locals (Residents of Madaba)	50%

Moreover, only 13% of these organizations believe in the importance and need for having ICT services for the use of marketing the site, its products, and activities. Even more when this service is available, it is limited either for website services, traditional design work for a media such as posters and brochures, or setting up IT internal infrastructure, see Table V.

Table III: ICT for delivering experiences & services for visitors

Indicator	Question	Answer	%
ICT Training/Skill	Opinions about the skills that will deliver the best visitors experience within the site	IT Skills	38%
		Marketing Skills	25%
		Organization Skills	75%
		Enthusiastic Aptitude	25%
		Entrepreneurial Attitude	0%
		Digital Skills	13%
		Mobile broadband connection (via at least 3G modem or handset)	0%
		No Internet	38%

Table IV: ICT availability within attractions in Madaba

Indicator	Question	Answer	%
Usage within heritage site; online availability	Heritage attraction network with the following:	Local museums heritage attraction network	25%
		Foreign museums heritage attraction network	0%
		Network with other tourism attractions	38%
	Within the heritage attraction, IT viewed as:	a way to enhance exhibitions design and the presentation of artefacts (e.g.: audio guides, interactive displays)	38%
		a way to foster communication and marketing activities to engage engagement with audience (e.g. social media networks and webpages)	13%
		a way to manage the or-	50%

	ganization (such as organization of artefacts and internal systems)		
Availability of external connection to the internet	ADSL Broadband Connection	63%
	Other fixed Broadband Connection (e.g. fixed wireless connections)	25%
	Mobile broadband connection (via at least 3G modem or handset)	0%
	No Internet	38%
Percentage of the employees who have access to internet	10 – 25 %	0%
	25 – 50 %	13%
	> 50 %	50%
	No need for employees to have access	38%

In these organizations, all employees lack the modern and innovative technologies such as holograph, 3D presentations and virtual reality, see Table VI. While only 25% of them had training courses to support their knowledge in this field. These courses usually are part of EU funded projects that aims at upgrading the level of professional development of employees in ICT. Also the results showed that 75% of the attractions sell tickets directly in the site without making use of ICT, while the remaining (25%) have free entry.

Table V: ICT online availability

Indicator	Question	Answer	%
ICT ONLINE	Primary purpose of the attraction website	Better branding of the site/product	50%
		e-commerce	0%
		to supply information about the cultural value of the site	50%
		communication tool with tourists/clients	50%
		Others? Please Specify	0%
	Website updating period	weekly	13%
		bi weekly	0%
		monthly	13%
		2 months - 6 months	25%
		6 months - 1 year	0%
	Website in-house updating	Yes	50%
		No	50%

Table VI: Type of technologies utilized in the Madaba heritage attractions

Indicator	Question	Answer	%
Technology for heritage interpretation	Availability of the following technologies	Interactive screens	13%
		3D	0%
		Holography	0%
		Virtual Reality	0%
		Self-guided tours	0%

Generally, the use of ICT Apps in the interpretation and presentation of the tourist destination in

Madaba is varied between the signage (40%), publications (30%), and through Guides and personal contact (30%). While heritage artefacts are presented through specialists and technical staff to ensure delivering a clear message to the target visitor.

5. RECOMMENDATIONS

Although the use of ICT helps in achieving better management in the tourism industry, most of the concerned organizations in the region of Madaba use modest technologies, which in turn slow the process of management including promotion, and marketing of their products and communication with their clients and similar agencies. The modern invocative technologies such as virtual reality and GIS are still no incorporated.

Therefore, an interactive virtual tour 360° HD for the historical core of Madaba was designed. The virtual tour includes an online website and mobile application. This tour was developed to cover both urban landscapes and the most important attractions in the city including the internal spaces of buildings with focus on artefacts and main objects. It allows the users to navigate and to listen to the background sounds and narration, as well as to read brief information about each destination. The aim of this tour is to offer new ways to interact with the target groups that are the tourist that visit this region, meanwhile, to transfer of advanced technologies (GIS, augmented reality, 3D) for the cities integrated management.

Four Semi-aerial views (night and day panoramas) for the city was also created. Each panorama contains hotspots that enable the users to further explore the surroundings, and since the photos used were high in quality, the panoramas remain clear and consistent while the user zooms in, see Figure 2. A variety of types of hotspots were used to connect the whole digital documentation to the site, including videos, sound recordings, and pictures.

The website was designed in two languages (Arabic and English) and includes an interactive Web-GIS Map with points to access to the virtual tour of each touristic destination in the city. The user can switch between the map and virtual tour easily, while displaying the information database in form of layers such as circulation roots, services, attractions, tourists' facilities and others. More details about this ICT App can be found in the following link: http://heland.just.edu.jo/.

Two workshops were organized to gain user feedbacks towards the virtual tour and to make refinement to the prototype, in addition to measure its usability in terms of user satisfaction and effectiveness. The virtual tour received positive feedbacks and all participants agreed that it could attract more tourists to visit Madaba.
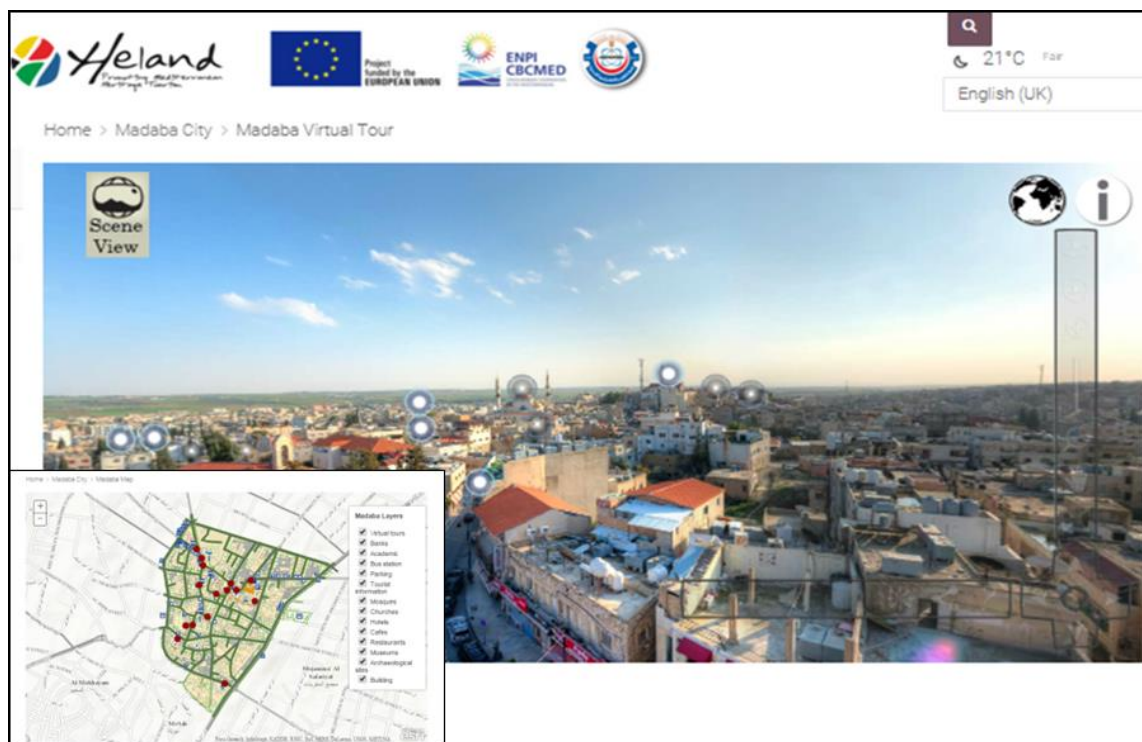

Figure 2: Screenshot from Madaba Virtual Tour App.

6. CONCLUSIONS

This study aimed at making an assessment for the use of ICT in the management and promotion for tourism in the city of Madaba in Jordan. The results showed that the usage of ICT Apps in Madaba is week and not sufficiently adopted, and that most of the concerned organizations in Madaba lack the modern and innovative technologies.

The dynamic capabilities of ICT in this domain were demonstrated by developing a Virtual Reality App that can be used as a tool to promote and manage tourism in Madaba. This tool will enable tourism planning authorities and Government to have electronic record of each touristic destination, and facilities such as hotels, restaurants, and in Madaba. On the other hand, enable Tourists have an overview of Madaba as to the tourism resources and facilities it has to offer. The App will also increase tourist's ability to make choice using the Web GIS which helps in ascertaining shortest route, nearest facilities from their current location.

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