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Assessment of the Urban Planning System in Historic Jerash with GIS: Achievements and Challenges for Sustainable Tourism

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ABSTRACT  Tourism based on urban heritage in Jordan represents one of the major income sources that contribute to about 12% of the national income. Cities containing such urban heritage are witnessing a rapid development process with its positive and negative aspects. This paper discusses these aspects in details to assess the current achievements for the city and local community as well as major challenges for sustainable tourism in Jerash. Urban planning issues such as infrastructure and the transportation system, modern and ancient land-use interaction and the addressing of Geocoding, that reduce the efficient use of such heritage in the tourism industry in the city are discussed. A comprehensive survey is designed and distributed in selected areas of the historic site in the city to study some of these issues, as related to tourism industry development, the current urban system and threats to a heritage city, as viewed by the local community. Detailed analysis of the survey is performed in the social and spatial domains that highlight a number of important conclusions. Quality GIS maps are produced to study different variables of interest. Results indicate that the existence of urban heritage in Jerash improved the economic level in the city. However, there are still many obstacles, as related to the urban system and infrastructure in the city, toward achieving sustainable tourism.

Introduction

Urban heritage tourism is an important source of income in many countries in the world that are characterized by a rich heritage. This is always associated with an excessive urban development nearby such heritage sites and raises the need for assessment and evaluation of the heritage and tourism management strategies adapted, in term of urban planning, in order to achieve the sustainable tourism concept. This is even more valid in developing countries where such strategies need to be integrated within the master development plans for efficient integration between the heritage and modern landscapes fabrics. The need for strategies that help merging development issues into tourism, such as social issues, within the “masterplanning” approaches has been an urgent demand (Burns, 2004).
Regional tourism planning attracts a lot of attention by researchers in order to develop an efficient systematized spatial concept as related to managing the tourism aspects within the region of interest as a part of the global regional development plan (Vera et al., 1997; Vera and Marchena, 1998). Based on Getz (1987), Ivars Baidal (2004) highlights four approaches for tourism planning: boosterism, economic, physical-spatial, and community-orientated approaches, concluding that to achieve tourism sustainability a balance between economic growth, environmental preservation and social justice needs to be achieved (Butler 1993; Coccossis 1996; Hall 2000). This emphasizes the necessity to design effective coordination mechanisms among the different administrations to ensure the sustainable interaction between tourism and land-use plans (Ivars Baidal, 2004).

Substantial literature on heritage management, urban planning and tourism highlights the previous experience achieved by researchers in many countries in this field to study the role of tourism in relation to trends in regional planning and development. Along this line is the work of Travis (1980), focusing on eastern Mediterranean countries’ case studies of regional planning and tourist development, concluding that sustained success in the tourism industry depends on the adoption of a conservationist ethic, and that the preservation of natural and cultural heritage are vital in regional planning. The advanced experience of some developed countries in tourism–urban development planning can help developing countries to adapt better management policies (Hall, 1987). An example of this can be seen in the effort to develop resource-based and urban-based tourism development strategies for the state of Tamil Nadu, India (Hyma and Wall, 1979). The selected urban planning polices as related to tourism and heritage resources management is mainly dependent on the location of such resources, i.e., located in rural or urban areas (Chow, 1980).

Urban heritage management, as a part of the global tourism planning strategy, witnesses substantial investigation to create a balance between the preservation of the character of existing heritage and the changes brought by the urbanization process (Nasser, 2003). Some sustainable approaches to the management and planning of heritage places based on a community and culture-led agenda are developed. Other approaches (e.g., Arthur and Mensah, 2006) focus on the integration between tourism, socioeconomic and ecological factors for sustainable development where urban management must respect and incorporate human practices and actions of the local community into its professional approach to urban development. The implementation of these approaches emphasizes the need for actions to deepen stakeholder participation, urban management and good governance for sustainable heritage development (Arthur and Mensah, 2006).

Today, factors of change, transforming materials and development of towns, are increasingly international, rapid and complex. To achieve a balanced transformation of environment, activators of local and national management of urban heritage need to be involved with new partners and various processes. Integrating heritage management with urban planning polices is a key solution toward sustainability. This will help in directing the development process in a way that preserves such heritage sites. For example, in The Netherlands an approach is being developed by which cultural heritage is integrated into physical planning and the development of new functions (Vervloet et al., 2003). This also includes studying the effect that tourism strategies can have in managing the development of tourism in historic cities such as in the case of tourism planning and management in Cambridge, UK (Maitland, 2006). These attempts to integrate cultural history and spatial planning have become known as “cultural planning” (Vervloet et al., 2003; Bloemers and Van der Valk, 2004). The link between heritage management and spatial planning has been recorded in formal documents at the European and national
level. The European Landscape Convention, for example, in 2000 emphasizes historical values in landscape management (Bloemers and Van der Valk, 2004; Antrop, 2005).

Urban planning in Jordan is an important issue that is getting increasing attention as a result of the fast economic growth the country is witnessing, especially in the tourism sector. Review and assessment of the adapted urban polices represent a major task to evaluate the effectiveness of such strategies. This is more vital for Jordanian cities that have valuable heritage parts such as Jerash where the integration of the urban landscape planning and heritage management concept becomes a necessity. A holistic Cultural Heritage Tourism and Urban Development Project has been initiated in Jordan with four main components in mind; 1) revitalization of historic city centres, urban infrastructure improvements and cultural landscape regeneration in and around the historic cores of the cities of Jerash, Karak, Madaba, Salt and Ajloun (the Project Municipalities); 2) construction of a new visitor centre at the Petra Sanctuary; 3) provision of financial and technical support to local entrepreneurs and community groups to encourage the creation and/or expansion of environmentally appropriate and financially viable small and medium enterprises in the civic core areas; and 4) technical assistance for capacity building and project management (World Bank Project, 2007). The significance of this work comes from its importance as an initial effort to develop a methodology for evaluating the effect of current urban planning strategies on urban heritage management using Jerash as a case study. Through assessing the existing urban-heritage landscape fabric in the city, important conclusions can be made for enhancing the adapted management polices. This paper has attempted to outline the development of Jerash management policies for supporting of tourism development, and the role of that support in the development of our present approach to archaeological resource management in Jordan in general and Jerash archaeological site in particular. The paper first addresses, after presenting a short description of the city and the most valuable urban heritage existing, the importance of such urban heritage in the development process of the city and improving the local community economic situation. Then, a comprehensive assessment of the challenges the existing urban and infrastructure system introduces to the tourism industry are discussed. This includes studying different urban planning issues affecting tourism, such as the efficiency of the transportation system in terms of traffic levels and circulation, road network conditions, accessibility and related services; modern and ancient landscape interaction and mixed land uses; issues related to conservation practices and modern uses of urban heritage and tourism planning and marketing. In the final phase of this work, a detailed survey to investigate the tourism sector, from the point of view of the local community near the heritage site, in terms of tourism development, improvement of income levels, needs of the tourism sector and some urban planning issues, is carried out. Geographic Information Systems (GIS), a computer-based mapping system that integrates geographic locations with their attributes in a multi-layered system of different data sources, is very useful in expressing the spatial relationships between urban heritage as integrated with urban and landscape simulations (Yang and Lo, 2003; Batty et al., 1999). GIS is used in this work to produce digital maps that help in studying different spatial and non-spatial parameters related to our case study.

Urban Heritage in Historic Jerash City

Jerash or Gerasa is one of the most preserved ancient cities in the world that was built by the Romans in the early second century BC, most likely under the Hellenistic Seleucid kings that became one of the Decapolis cities in 63 BC at the time of Pompey. Jerash is located in the northern part of Jordan (Figure 1 shows a GIS map of the Jerash historic
city location with respect to other Jordanian governorates, supported by an aerial image of the city) and is characterized by a mountainous topography and pleasant Mediterranean climate.

The Jerash landscape contains both the heritage part (ancient public buildings) and the modern city (which is built on the ancient inhabited area) side by side and the two parts are connected directly only with an ancient Roman bridge built over Jerash river. Figure 2 shows the extent of historic Jerash side by side with the modern part of the city where the historic part occupies an area of about 1.5 km x 1.0 km (Al Bayari, 2005). Jerash is particularly valuable for both its many splendid monuments and its intact city layout (Khouri, 1985). The most important Roman ruins in the historic part of the city are summarized in Table 1 and geographically distributed on the GIS map in Figure 2A and 2B.

The existence of urban heritage within the frame of the modern city brings an advantage for the local communities as presented in the tourism activities based on such heritage. However, the condition of the urban planning system in the modern part as connected with the ancient part plays an important role in achieving sustainable tourism industry in the city. Improper systems may lead to major threats for the urban heritage and subsequently the source of tourism in the city, which may end with severe degradation and destruction for this heritage site with time. These main concerns will be covered in coming sections to make a realistic assessment of the urban system in the modern Jerash city and its interaction with its archaeology to end up with important recommendations for the improvement of the current system.

**Jerash Urban Heritage and Tourism Industry**

The existence of urban heritage within the modern city of Jerash plays a major role in the development of the tourism industry that can be seen these days in the city. The governmental and international efforts, even they are still not enough, help to a large extent in preserving the city heritage.

Thousands of local and international tourists come to visit the city every year to enjoy its unique heritage landscape. This active tourism movement in the city benefits the local community in terms of both economic and sociocultural values (Throsby, 1999; Morato, 2000). On economic levels, all business aspects related to tourism development in the city have been improved. This is clear in the large number of handcrafts and general stores,
supermarkets, restaurants, taxi offices and other touristic accommodations established near the heritage part of the city. This helps to create many job opportunities in the area which reduces considerably the unemployment rate in the city. Other sectors benefit as well from this active tourism, such as the construction, transportation and communication sectors.
Table 1. Major Roman ruins in the historic Jerash city

<table>
<thead>
<tr>
<th>SN</th>
<th>Monument name</th>
<th>Description</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hadrian Gate</td>
<td>Built to commemorate the visit of the Emperor Hadrian to Gerasa in 129 AD, this splendid triumphal arch was intended to become the main southern gate to the city but the expansion plans were never completed.</td>
<td><img src="image1.jpg" alt="Image" /></td>
</tr>
<tr>
<td>2</td>
<td>Hippodrome</td>
<td>The massive arena, 245 m long and 52 m wide (only part of which has been restored) could seat 1500 spectators to watch athletic competitions, horse races, chariot races, and other sports.</td>
<td><img src="image2.jpg" alt="Image" /></td>
</tr>
<tr>
<td>3</td>
<td>South Gate</td>
<td>A Roman gate that represents the southern entrance to the main archaeological area. Close to the gate, a modern visitor centre and other accommodations are located.</td>
<td><img src="image3.jpg" alt="Image" /></td>
</tr>
<tr>
<td>4</td>
<td>Zeus Temple</td>
<td>Constructed in 162 AD, this temple stands on the ruins of earlier sacred sites. From the Oval Plaza a staircase leads up to an esplanade (in front of the temple), which was a Temenos, or sacred precinct.</td>
<td><img src="image4.jpg" alt="Image" /></td>
</tr>
<tr>
<td>5</td>
<td>Oval Plaza</td>
<td>The spacious plaza is surrounded by a broad sidewalk and a colonnade of first century Ionic columns. There are two altars in the middle, and a fountain was added in the seventh century AD. This square structure now supports a central column, which was recently constructed to carry the Jerash Festival flame.</td>
<td><img src="image5.jpg" alt="Image" /></td>
</tr>
</tbody>
</table>
South Theatre seats more than 3000 spectators and serves today as the primary venue for the Jerash Festival of Culture and Arts. The first level of the ornate stage, originally two stories, has been reconstructed and is still used today. The remarkable acoustics allows a speaker at the centre of the orchestra floor to be heard by the entire auditorium without raising his/her voice.

Still paved with the original stones; the colonnaded street was remodelled in the late second century AD, probably after 170 AD. The Ionic columns were replaced by more elaborate Corinthian columns.

Further up the Cardo on the left is the monumental and richly carved gateway of the second century Roman Temple of Dionysus. In the fourth century, the temple was rebuilt as a Byzantine church, now called the Cathedral, although there is no evidence it was more important than any other church.

This ornamental fountain was constructed in 191 AD, and dedicated to the Nymphs. Such fountains were common in Roman cities, and provided a refreshing focal point for the city. This fine example was originally embellished with marble facings on the lower level and painted plaster on the upper level.
<table>
<thead>
<tr>
<th>SN</th>
<th>Monument name</th>
<th>Description</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Artemis Temple</td>
<td>This Temple was a place of sacrifice dedicated to Artemis and built in 150 AD. Although small, the temple’s Corinthian columns soar impressively from the hilltop site; 11 of the 12 front columns are still standing.</td>
<td><img src="image1.jpg" alt="Artemis Temple Image" /></td>
</tr>
<tr>
<td>11</td>
<td>North Theatre</td>
<td>The North Theatre was built in 165 AD. In the front is a colonnaded plaza where a staircase led up to the entrance. The theatre originally had only 14 rows of seats, and was used as a performance stage as well as the city council chamber.</td>
<td><img src="image2.jpg" alt="North Theatre Image" /></td>
</tr>
<tr>
<td>12</td>
<td>North Gate</td>
<td>At the end of the Cardo, the North Gate was built in 115 AD. Its odd wedge shape was probably necessary to align the gate on the inside with the Cardo.</td>
<td><img src="image3.jpg" alt="North Gate Image" /></td>
</tr>
<tr>
<td>13</td>
<td>Baths</td>
<td>The massive West Baths, on the right, covered an area of 50 × 70 m and now lie where they fell after the earthquake of January 749 AD. Typical of the second century, the Baths were an imposing complex of hot and cold rooms and other facilities</td>
<td><img src="image4.jpg" alt="Baths Image" /></td>
</tr>
</tbody>
</table>
Achievements and Challenges for Sustainable Tourism

Figure 3. Jerash Festival and the Roman fighting shows are two types of modern use of Jerash urban heritage.

through the increasing demand on such sectors from the increasing city population and tourists. Another advantage of the urban heritage in the city is represented by the modern use of this heritage (Haddad, 2007) such as the Jerash festival event (Figure 3) that takes place on a yearly basis mainly using the north and south ancient theatres. This event brings thousands of tourists to attend a variety of musical concerts, arts galleries and poetry which increase the economic value of the heritage. The existence of such heritage in the city has sociocultural values as well; where the people that have visual communication, i.e. living near the heritage area, with such heritage, enjoy an amazing landscape that increases the spiritual value as well as the economic value of their property.

These aspects will be further explored in the coming survey design and analysis section to get some quantitative and qualitative measures about the role of urban heritage in tourism industry and local income in the city.

Assessment of the Existing Jerash Urban Planning System

This section discusses the current conditions of the urban and infrastructure system in Jerash historic city that represent major challenges toward achieving sustainable tourism industry in the city. Other issues related to the social system in the city are discussed as well. The issues of concern include; unplanned excessive urban growth and mixed land use, transportation system evaluation, planning of infrastructure services, heritage conservation and safety. Each issue is discussed in details in the coming subsections.

Unplanned Excessive Urban Growth and Mixed Land Use

As a result of the economic development related to urban heritage tourism, Jerash city has encountered accelerated rates of urbanization mainly in the horizontal direction (city spread). Figure 4 shows this with two images captured in 1928 and 2006 (images source: Bewley and Kennedy, 2001 and Google Earth, 2007), where the maximum urban growth took place towards the northwest. This comes as a response to the accelerated population growth in the city that has been increasing steadily with no sign that the urbanization process is slowing down. This increase in population is associated with aggressive urban expansion. City boundaries continue to sprawl over time, consuming more and more rural areas that might contain valuable heritage sites, forests, and other non-urban areas.

Most of the urban growth is unplanned because of low enforcement polices on land use in the area, which leads to a number of negative impacts as related to mixed land use and threats to urban heritage in the city. As can be seen in Figure 4 (2006 image), the urbanization is very close to the heritage part and is directed to an area (northwest) that has still not been fully explored and excavated for potential archaeological sites. Such construction movement may destroy important urban heritage. Site sensitivity to urban growth can be
easily indicated in Figure 5A where even a buffer area of three zones of 20 metres each, can show the urban expansion around the archaeological site. Therefore, there has to be a stronger policy applied by the municipality and other agencies for giving construction licences in these areas. Such licences should not be given until teams of experts check the area for potential heritage resources. Furthermore, there is a real need to implement spatio-temporal urban growth dynamic models (e.g., Al-kheder and Shan, 2006) to explore the geometric and non-geometric factors controlling the urbanization process using artificial intelligence, GIS and remote sensing technologies. This represents our future research direction to study the dynamics of the urban process in the city and its future perspective as integrated with the heritage site.

Mixed land uses can be clearly seen in the area where people tend to use part of the heritage site for agricultural purposes (Figure 5B) or other urban activities that represent a challenge for conserving the identity of the heritage site.

Overall, there is a real need for land use maps of the city, heritage and modern parts, that organize the urbanization process to satisfy the people’s demand for new construction while preserving the heritage landscape. Rigid enforcements laws should support this for those who threaten the urban heritage by any type of urban use. Availability of multi-temporal satellite images at low prices as well as advanced GIS technology make such a mission achievable.

Transportation System Evaluation

An effective transportation system, in terms of high quality roads, proper traffic control and safety measures, is a key issue in any successful tourism development project. Such a system enhances the mobility and accessibility for tourists and citizens to different infrastructure services with a minimal effort and cost. The Jerash transportation system, given that all the development took place within the past few decades, still introduces many challenges and threats to the sustainability of the tourism sector in the city. First, most city road networks have a poor geometric design with very narrow highway widths. The main roads are passing through the Central Business District (CBD), that results in a low traffic capacity and mobility (Figure 6A). This fact, supported by poor parking practices on the roadsides (Figure 6A) and large traffic volumes (reaching jam density at rush hours) makes mobility within the city a very slow and time-consuming process. A need exists for new road projects with high quality service and interpretation standards to serve the
Figure 5. (A) Buffer zones map of the archaeological site; (B) Mixed land use problem as a result of unplanned urban activities.
increasing traffic volumes in the city and improve the heritage site interpretation and presentation. In addition, providing special places for car parking with minimal cost at suitable locations, such as organized on-road parking and constructing multi-story parking buildings, will help in solving such problems. Secondly, the traffic circulation system on the existing roads is insufficient to accommodate the traffic to reach the desired destination especially during the high seasons. The authorities should adopt better traffic planning strategies, such as proper coordination of signalled and unsignalled intersections and sufficient use of direction signs, to ease accessibility of services by tourists and citizens. Third, a number of safety problems exist on the current roads that need immediate action by authorities. Among these are absence of safe pedestrian paths (resulting in dangerous pedestrian–traffic interaction), existence of disorganized small business activities on roadsides (Figure 6B) and lack of road accident studies (traffic and pedestrian) to evaluate road safety. Fourth, among other challenges related to transportation is the need for a better local transportation network that connects the modern and heritage city parts to reduce car usage for a better environment. This includes the need for a comprehensive plan to cover the city’s need for buses as well as relocating the current bus stations that represent a threat to the heritage area (as they are located near the heritage area which threatens the environment and landscape). Fifth, a complete engineering assessment of the road pavement management system (i.e., road surface condition) is needed to prepare a maintenance plan for road sections in urgent need of repair (e.g., deteriorated utility hole, Figure 6C). This will improve road conditions, and hence driving comfortability, temporarily until major reconstruction is done. Finally, an important threat represent by the road

Figure 6. Transportation related planning problems in Jerash: (A) Jerash road system, (B) Disorganized business activities on roadsides, (C) Poor road maintenance, (D) Major road near the site.
system to the heritage site is the existing of major roads that pass by the site boundary (Figure 6D). The pressure resulting from the passing traffic on such roads may affect the structural stability of archaeological monuments in the site. A structural analysis of these monuments needs to evaluate such pressure impact in order to have alternative protection solutions (e.g., stop using such roads except by tourists and for special types of vehicles).

The existing road system in Jerash is still lacking many improvements to accommodate the increasing tourism movement in the city. A priority actions list needs to be drawn up by the authorities in order to produce a timetable for a complete maintenance of the road system.

Planning of Infrastructure Services

Proper planning and development of the existing city infrastructure services and assessment of the needs for other future services is an important strategy in the tourist industry which will lead to integrated economic development. Proper planning and development of infrastructure services (Button, 2000) will allow a more efficient use of resources and the potential for the realization of higher living standards. Moreover, it allows for a higher level of touristic exploitation of the region’s and country’s comparative advantages.

There is a need to develop complete tourist plans for Jerash using advanced mapping technologies such as GIS to provide detailed maps, hardcopy and digital, of all infrastructure services at minimal costs. These maps should be easily available to tourists at different places in the city. Jerash historic site also needs more efficient marketing strategies through media, magazines and Internet to attract local and international attention.

Furthermore, Jerash city lacks some important services such as high quality hotels and geocoding of city addresses (i.e. matching addresses with map locations), which should be taken into consideration in any coming development plan of the city. Another planning issue of concern is the need for stricter enforcement laws to forbid people urban activities at sites of potential historic value before experts survey the area. Finally, communication facilities, especially Internet services, should be easily available to tourists at hotels and other selected areas.

Heritage Conservation Issues

As we discussed earlier, Jerash urban heritage is the main attraction for tourism in the city. So, in order for this tourism to be sustainable there must be a very articulated conservation strategy for the heritage site. Looking carefully at what is taking place on the ground can show clearly that there are many parts of the heritage site which still lack maintenance and suffer from severe degradation (Figure 7 shows some examples). The area still lacks enough funding to perform a complete restoration of the ancient monuments. Real efforts are needed to attract international interest for such an important preserved city. Furthermore, since there are still many parts of the historic city unexplored there must be strict policing to manage the urban activities in the area that, if not controlled, may lead to the loss of important human heritage that can never be recovered. Plans for increasing public awareness need to be designed and implemented. Such plans should focus on involving local communities in the protection process of the heritage area.

Another issue of concern is the modern use of the heritage site in festivals and other modern uses. Even though such activities are important for the tourism industry in the city, there should be close monitoring from the authorities about the impact such activities might cause to the monuments. This includes continuous testing and monitoring of their structural stability and the environmental conditions within the site to ensure sustainability.
All in all, the assessment and evaluation of the current urban planning strategies in Jerash highlight a number of issues that need to be prioritized according to their importance in order to include them in future development plans. To take the work presented in this paper further; a number of future research methodological steps need to be carried out. These include the urgent need to start working on designing a sustainable land use plan that integrates both planning issues related to the modern part of the city as well as the heritage parts to preserve the historic character of the city. Another improvement can be achieved through taking the designed urban GIS system to perform advanced spatial analysis such as detailed buffer zoning studies for different land use classes and multicriteria evaluation to study the effect of different planning strategies on heritage management issues. Designing and applying a complete road network assessment plan for their surface and geometrical conditions to serve tourism in the city is needed as well to prioritize the rehabilitation actions within the boundary of limited budget available. Environmental impact assessment is an issue of concern in the city to study different environmental conditions at and near the historic parts that may result from different urban planning aspects. Finally, there is a need to prepare detailed reports and maps about the current urban heritage fabric condition as related to the adapted urban polices to be submitted to the involved parties in the development process to ensure a better distribution of the information and higher level of coordination between the authorities.

Jerash Urban Heritage and Sustainable Tourism Survey

This section presents the design and analysis phases of a small-scale survey (Table 2 shows the survey format) studying the urban heritage and tourism industry in the city. The purpose of the survey is to obtain up-to-date information about the role of urban heritage in the economic development of Jerash city as well as identifying the main challenges for achieving sustainable tourism in the city. The survey is distributed at specific locations near the heritage site to test the direct interaction between the site and people who are considered part of the site including: restaurants employee, workers at tourist services shops, tour guides and site employees working in jobs related to the heritage site such as security and ticketing personnel (including retired personnel). The survey covers different social levels and genders. The questionnaire included a total of 20 questions and was distributed to a total 150 participants from which 36 responses were obtained. The survey covers topics related to the role of urban heritage tourism in economic development in the city, some challenges to tourism sustainability such as urban growth near the heritage site, safety issues, tourism related issues such as fluctuation in tourism seasons and availability of tourism related services. The survey analysis looks at the public view (with
special attention to people living in the area close to the heritage site) in these issues of interest to draw important conclusions about the tourism sector situation in Jerash city. A plan exists to expand the survey distribution in the future to include all Jerash city and other similar cities in Jordan with close urban structure to Jerash to form a comprehensive view about the tourism sector in such cities.

Discussion and Analysis

Important questions in the survey are analysed and interpreted in this section to draw a general view of the tourism sector situation in the city. Of the total 36 responses received, there are 27 male and 9 female of which 12 are working as souvenir shopkeepers, 3 as tour guides, 19 as site employees and 2 as retired site employees.

Economic Aspects

Economic aspects are presented in questions 4 to 7 in the survey. Figure 8 shows the survey result of questions 4 and 5. It is clear that as the working experience in tourism

<table>
<thead>
<tr>
<th>Q</th>
<th>Question</th>
<th>Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>○ Male ○ Female</td>
</tr>
<tr>
<td>2</td>
<td>Age (years)</td>
<td>○ &lt; 20 ○ 20–30 ○ 30–40 ○ &gt; 40</td>
</tr>
<tr>
<td>3</td>
<td>Job type</td>
<td>○ Souvenir ○ Tour guide ○ Site employee ○ Retired</td>
</tr>
<tr>
<td>4</td>
<td>Years of work</td>
<td>○ &lt; 10 ○ 10–20 ○ &gt; 20</td>
</tr>
<tr>
<td>5</td>
<td>Annual income ($)</td>
<td>○ &lt; 3000 ○ 3000–6000 ○ &gt; 6000</td>
</tr>
<tr>
<td>6</td>
<td>Income improved in past 5 years</td>
<td>○ Improved a lot ○ Little improvement ○ Not at all</td>
</tr>
<tr>
<td>7</td>
<td>Is there useful tourism investment projects in Jerash</td>
<td>○ Many ○ Few ○ None ○ Future plans</td>
</tr>
<tr>
<td>8</td>
<td>Increase of the population nearby heritage site</td>
<td>○ Excessive ○ Slow ○ None</td>
</tr>
<tr>
<td>9</td>
<td>Is there an urban expansion affecting the heritage site</td>
<td>○ Excessive ○ Slow ○ None</td>
</tr>
<tr>
<td>10</td>
<td>Type of crimes that took place near the heritage site</td>
<td>○ Cheating* ○ Thievery ○ Killing ○ None</td>
</tr>
<tr>
<td>11</td>
<td>Any effect of such crimes on tourism</td>
<td>○ Strong effect ○ Little effect ○ No effect</td>
</tr>
<tr>
<td>12</td>
<td>Tourist impression about heritage site</td>
<td>○ Fascinated &amp; return again ○ Not interested ○ Never come back ○ Undetermined</td>
</tr>
<tr>
<td>13</td>
<td>Construction history of touristic shops</td>
<td>○ &lt; 5 years ○ 5–10 years ○ 10–20 years ○ &gt; 20 years</td>
</tr>
<tr>
<td>14</td>
<td>Do you agree with tourism seasons once or twice a year (e.g. Jerash festival)</td>
<td>○ Agree ○ Disagree ○ Undetermined</td>
</tr>
<tr>
<td>15</td>
<td>Do you believe that the urban heritage contributes to the city’s development</td>
<td>○ Strongly agree ○ Agree ○ Disagree ○ Undetermined</td>
</tr>
<tr>
<td>16</td>
<td>Do tourist have adequate info about the site before their visit</td>
<td>○ Strongly agree ○ Agree ○ Disagree ○ Undetermined</td>
</tr>
<tr>
<td>17</td>
<td>Does the tourism season continue at the same strength during the year</td>
<td>○ Strongly agree ○ Agree ○ Disagree ○ Undetermined</td>
</tr>
<tr>
<td>18</td>
<td>Most crowded time of year (in term of tourist numbers)</td>
<td>○ Summer ○ Winter ○ Spring</td>
</tr>
<tr>
<td>19</td>
<td>Do you like to work with local and international tourists</td>
<td>○ Strongly agree ○ Agree ○ Disagree ○ Undetermined</td>
</tr>
<tr>
<td>20</td>
<td>Do you see your self part of heritage site</td>
<td>○ Strongly agree ○ Agree ○ Disagree ○ Undetermined</td>
</tr>
</tbody>
</table>

* Illegal selling of faked artifacts as if they were original.
increases, there is an increase in the income level as well. The income level (majority, 66.7%, of annual income is less than 3000 $) is still somehow low. This might be related to the lack of tourism development projects in the city that once established, larger number of tourists will be attracted and hence income level will improve. This result can be supported by the question 6 results (Figure 9) where people are divided equally to think that income has only little improvement (44.44%) than it was 5 years ago and no improvement at all (44.44%) happened since that date. This cannot be generalized since we are talking about specific surveyed people’s incomes and not the overall income and the result of the political situation in the region. The overall income of the city is positively improved in terms of larger markets, more work opportunities and services. However, results indicate that there still a need to focus on improving the economic situation of tourism workers.

Another economic aspect the survey focused on is whether there are any useful tourism investment projects in Jerash (question 7, Figure 10). Most people agree that there are either few tourism projects (36.11%) or no projects at all (25%). However, people are talking about large projects to come (33.33%) that they are hoping to reform the tourism industry in the city.

Urbanization and Urban Heritage

The survey, as appears in items 8 and 9, focuses on the urban and population growth issue discussed earlier in the paper. Results (Figure 11) indicate the belief that urbanization and associated population growth rates near the heritage site are increasing over time which presents a threat to the site and the unexcavated area of potential heritage value.
Due to the importance of site safety and security in the tourism industry, where tourists are looking for a joyful and safe trip at the same time, the survey through questions 10 and 11 investigate the safety level in and around Jerash heritage site. Question 10 identifies three types of possible crimes including; cheating (illegal selling of faked artifacts as if they were original), thievery, killing and none option. Survey results for this question (Figure 12A) show that safety levels in the city are very high, where most responses
(77.78%) mentioned that they don’t know of any crimes happening within and around the heritage site, while the few responses that represent random accidents happening in the area were mostly cheating (11.11%) followed by thievery and killing (5.56%, only 2 cases for each type). Police records support this high security standard in the city (Table 3) where only 6 crimes of types related to the heritage site (mostly cheating) are recorded. Such a safe environment encourages more and more people to visit the site over years. The survey also tests, through question 11, whether those few crimes left any effect on the tourist.

The results (Figure 12B) indicate that there is almost no effect (80.56%) of such random cases on the tourism in the city.

**Jerash Tourism Sector**

The rest of the survey questions focus on the current situation of the tourism sector in terms of the role of urban heritage, tourism seasons, tourism marketing and other related issues. This section analyses the most important aspects that appear in the survey. First, according to question 15 results, 88.89% of the surveyed people think that the existence of urban heritage in the city contributes significantly to the tourism industry. Secondly, in term of tourist impression about the heritage site, items 12 and 16 of the

**Table 3. Heritage related crimes in police records (years 2005 and 2006)**

<table>
<thead>
<tr>
<th>Case name</th>
<th>Case date (D/M/Y)</th>
<th>Case place</th>
<th>Type of artifact found</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheating</td>
<td>19/1/2005</td>
<td>Jerash city (outside heritage site)</td>
<td>Statues and metal objects</td>
</tr>
<tr>
<td>Illegal trading of ancient coins</td>
<td>30/3/2005</td>
<td>Jerash city (outside heritage site)</td>
<td>Ancient coins</td>
</tr>
<tr>
<td>Cheating</td>
<td>23/9/2005</td>
<td>Town close to Jerash</td>
<td>Two coffins and golden jewellery</td>
</tr>
<tr>
<td>Fabricated ancient artifacts</td>
<td>8/9/2006</td>
<td>Jerash city (inside heritage site)</td>
<td>Ancient artifacts presented as Iraqi artifacts</td>
</tr>
<tr>
<td>Illegal trading of ancient artifacts</td>
<td>8/9/2006</td>
<td>Jerash city (outside heritage site)</td>
<td>Small statues</td>
</tr>
<tr>
<td>Finding new artifacts without filing a case to police</td>
<td>14/9/2006</td>
<td>Town close to Jerash</td>
<td>Stone in the shape of bull head plus ancient valuable basalt stones</td>
</tr>
</tbody>
</table>

Figure 13. Tourist impression about heritage site.
Achievements and Challenges for Sustainable Tourism

Figure 14. Tourists’ information about the site before their visit.

Figure 15. Tourism seasons frequency (item No. 14).

Figure 16. Strength of tourism season during the year (item No. 17).
survey, people do think (72.22%, Figure 13) from their experience with tourists that heritage fascinates tourists to the degree that they repeat their visit. This may be related to the fact that many tourists have adequate information about the site before their visits, Figure 14 for item 16 shows a result of 50% strongly in agreement and 11.11% in agreement, from different sources. However, as discussed before there is still a need for better marketing strategies for the site as the survey shows that 22.22% think that tourists lack enough information about the site.

Finally, this part of the survey focuses on the tourism season taking place in the urban heritage area, such as Jerash festival mentioned earlier, as highlighted in questions 14 (see Figure 15), 17 (see Figure 16) and 18 (see Figure 17). According to Figure 15, people do agree (23 out of 36 responses) with tourism seasons being held once or twice a year, while a moderate number disagree (10 out of 36). This can be due to their understanding that holding such festivals once or twice a year at scheduled dates, mainly during spring and summer holidays, will attract more people than if they were held more frequently. Actually this understanding is supported by results of question 18 (Figure 17) where the most active seasons/times of year in term of tourists number are spring and summer.

The same fact is shown in Figure 16 that proves that the tourism season does not continue at the same strength during the year. This emphasizes the importance of selecting proper times of the year to organize tourism activities to attract the largest number of tourists.

Conclusions

Most previous research directed to Jerash city focuses on the heritage site without taking into consideration the integral relation with the modern part of the city. This paper states that in order to achieve sustainability of the Jerash urban heritage, a careful consideration of the urban planning system in the modern part is needed. The paper presents the importance of urban heritage in generating an active tourism business in the city which is reflected in the economic development as a whole. This is represented in the flourishing of all tourism related business that improves the job market in the city. However, there
still a need to attract large scale tourism development projects to ensure a compatible urban heritage environment. On the other side, challenges to sustainable tourism in the city as related to the urban planning system are discussed in detail. The paper emphasizes the urgent need to improve the existing transportation system in the city in all aspects including geometric design of new road projects to accommodate the increasing tourism activities, enhancing the traffic circulation and parking system, assessment of the pavement management system and performing specialized studies to evaluate the road safety levels in term of traffic and pedestrian accidents. The unplanned urban expansion of the modern city toward the heritage part represents another challenge. This uncontrolled growth taking place mostly in unexcavated areas may lead to the destruction of unexcavated archaeological remains. Also, urban activities taking place close to the heritage area such as traffic passing near to the site and construction work are other threats. Such unplanned growth affects the identity of heritage site through composing a new matrix of mixed land uses in the region. Considering the adapted conservation strategy at the site, the paper concludes that the current one is still insufficient and there is a real need for a better conservation strategy to protect and maintain the existing monuments.

An important conclusion of this paper emphasizes the need for integrating heritage management principles within the master development plans for efficient integration between the heritage and modern landscape fabric toward sustainability. This will help to direct the development process in a way that preserves such heritage sites while accommodating the excess demand on land for urbanization activities. There is a need as well to design effective coordination mechanisms among the different administrations within the city to ensure the sustainable interaction between tourism and land use plans.

The survey results emphasize the early findings related to urban planning issues, such as excessive urban and population growth near to the heritage site. Other results highlight the needs of the tourism sector in the city such as establishing tourism development projects and the need for better strategies for tourism marketing. The survey results related to safety indicate the high security levels within the city as an attractive factor for tourism. This paper presents future directions of research where each issue discussed can be the core interest of a development project. Our future work will take each of these issues and develop a research methodology to cover them in a comprehensive manner. This includes performing research regarding proposing a sustainable land use plan that integrates both the heritage management concepts within the frame of the city urban planning to ensure the proper conservation of the historic site. On-site field investigation experiments to assess the quality of infrastructure systems, such as road surface and geometric conditions of the road, is another issue of concern.

References


Urban Heritage Facing Global and Local Challenges (2007), Scientific Symposium of CIVVIH and ICOMOS Finland, April 17–21, Helsinki, Finland.


