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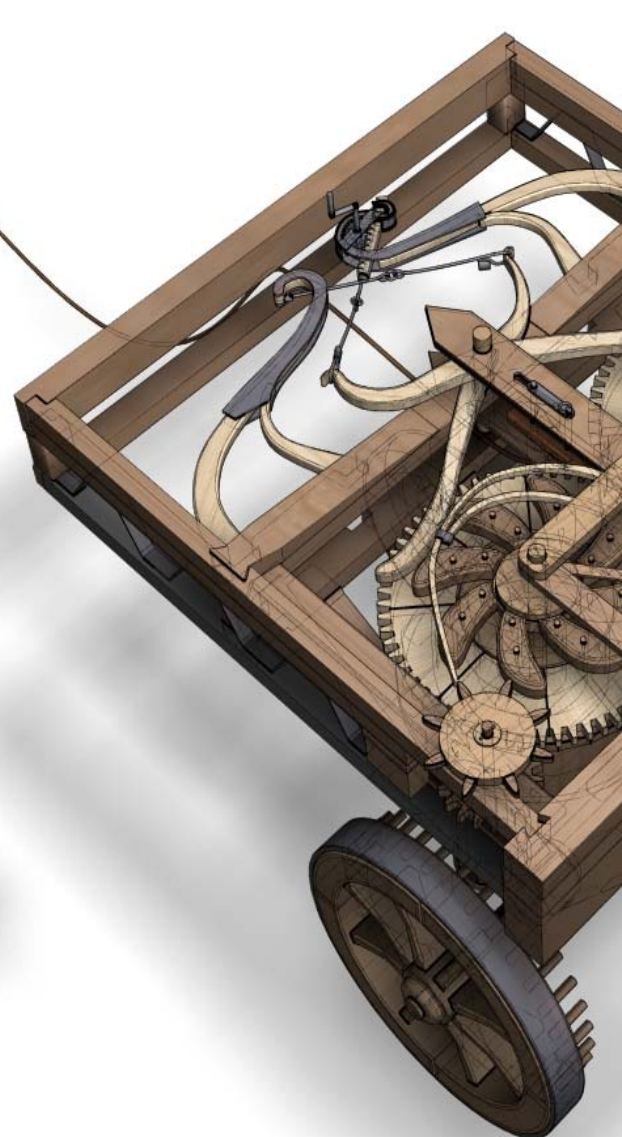
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Pattern of the Spread of Archaeological and Touristic Sites in The City of Nablus and Easily Accessible Analysis Using Geographic Information Systems

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Abstract

The study showed a mechanism to apply methodology to access the spatial distribution of archaeological and tourist landmarks in the city of Nablus, through spatial analysis tools available within an environment, which have the capacity to analyze metadata in order to identify the spatial characteristics through a study of the spatial geographic phenomena, in order to identify the spread of the distribution of the archaeological and tourists sites in the city. The study adopted a descriptive approach analytical work in data processing, and hired some statistical methods, and cartography within an environment of Geographic Information System (GIS); for the most prominent archaeological spatial characteristics of the feature. The study showed that there is a clear disparity in the geographical distribution of archaeological and tourist sites; they distributed the touristic and monumental differently on the city, the results of the spatial analysis showed that the pattern of geographical distribution of archaeological sites, tourism is the distribution of the thin pattern (the distances are not regular), heads to random distribution pattern of spatial analysis showed that the direction of the geographical spread of the places studied, the prevalence of most of the archaeological sites throughout the city, especially the actual average takes into account the actual locations of each archaeological centers, and could be access to all the sites of during the course of the 52.6 km in length and the time it takes to follow this path on a vehicle speed of 30 km/hour is 1:45, and the vehicle speed is 40 km/hour is 1:19, and the speed of the vehicle 50 m/h is 1:03, and the speed of a vehicle 60 km/hour is 53 minutes.

Keywords: analysis of archaeological sites; tourism aspect; easy access; geographic information system; Nablus city.

Jel Classification: Z32; Z39; L86.

Introduction

The center of Nablus is the Arabic city which has a signifiantce value during the era of the British mandate and became the center of the brigade of Nablus in the West Bank after 1948. In the mid 1960s, the city was established as a center of Nablus Governorate. In 1967, it exposed to the Israeli occupation and maintained its position as a center for the province.

The Geographic Information System (GIS) is relatively recent. It helps researchers conduct spatial analysis of the distribution of phenomena on the earth's surface. This technology also helps in data collection, storage, analysis, and graduation, in such a way that interpretation and analysis of its engagements, were not available by conventional tools (Hussein 2007). The most important advantage of these systems is the ability to link the various information, and employ them in providing solutions to the problems posed. This allows researchers to determine the best solutions that fit to the subject of research and study (Salman 2005).

1. Literature Review

Tourism in Palestine an overview

Palestine has many places of historical and religious significance which justifies its "holy land" (Suleiman and Mohamed 2011). Al-Rimmawi (2003) stated that Palestine also has a cradle of civilization and has many of archeological, cultural and natural attractions. Furthermore, Palestinian cities such as (East Jerusalem, Bethlehem, Jericho, Ramallah and Nablus etc.) have diverse tourism suppliers that enable it to receive different tourists from all over the world.

On September 1993, Palestinian Liberation Organization (PLO) and Israel signed Oslo Accord. Both sides agreed that Palestinian Authority would be established and assume governing responsibilities in the West Bank and Gaza Strip. Later, permanent status talks on the issues of borders, refugees, and Jerusalem would be held. Then, tourism and hospitality were growth and tourist trips expanded to include Palestinian places and Arab-owned tourism related industries, especially hospitality services (Al-Rimmawi and Butcher 2015). However, on September 2000 tourism industry declined due to collapsed of peace process between both sides. Later, from Second Intifada in 2000 until 2009, several hospitality and tourism markets took a downturn in Palestine. However, since 2009, tourism sector has revealed upward trends. Al-Rimmawi and Butcher (2015) stated that overall tourism sector has slowly recovered due to the return of a partial stability in the region. Only few studies using GIS to evaluate the tourism and archeological sites in Palestine. For instance, Abahre and Radadd (2016) used GIS to show the impact of the political factors on the tourism development in Palestine by using Sabastya village as an example and showed the geopolitical situation in this area. Some of literature used GIS system and focus on the distribution of health centers and assessed of the efficiency of services to the population in the East Jerusalem (Raddad 2003).

Archaeological and tourist sites in Nablus city

According to Taha and *et al.* (2010) showed that Nablus or Neapolis, the new city, was founded in 72 AD by the Flavian Emperors, as part of the Roman dynasty. Nablus city was built between mount of Ebal and mount Gerizim, close to around Ancient Tell Balata; it was marked on Madaba map as early as the sixth century. Main buildings were started, including the theatre, hippodrome, and a Roman temple dedicated to Zeus was erected on Mount Gerizim during the reign of Antonius Pius (Taha *et al.* 2010). The city of Nablus or Neapolis grew during the Byzantine period and became the chair of a bishop. In the sixth century, Justinian (530 AD) fortified some religious building and a colonnaded street runs west to east, and seems to be crossed by a shorter street running from north to south. In 7th century, the city was conquered by the Arabs of the Umayyad Dynasty. In 10th century it was called as little Damascus, as the growing city found itself in the province of Damascus when that city was made the seat of Umayyad power between 661 and 750 (Taha *et al.* 2010). The city centre features a bustling market with impressive mosques, Turkish baths, and traditional soap factories. At the end of the eighteenth century, the city began to expand outside its original walls. At present, Nablus is considered the main industrial, commercial, and agricultural centre in the northern area of Palestine. It is known for its olive oil soap, talented goldsmiths, and traditional sweets. It is considered to be the best place in Palestine to eat *knafeh*, a beloved Palestinian dessert made from cheese and semolina flour and dripping with sweet rose water syrup (Taha *et al.* 2010).

In cooperation with the Ministry of Tourism and Antiquities in Nablus city; we were able to confine the archaeological tourist places in the city of Nablus (Table 1), which had numbered (19) A MILESTONE. These sites were monitored on the ground using GPS and ARCGIS 10.1 program and utilizing the Palestinian coordinate system (Palestine_1923_Palestine_Grid). The geographical locations were then rated by an archaeological instructor according to the geographical location (Figure 2).

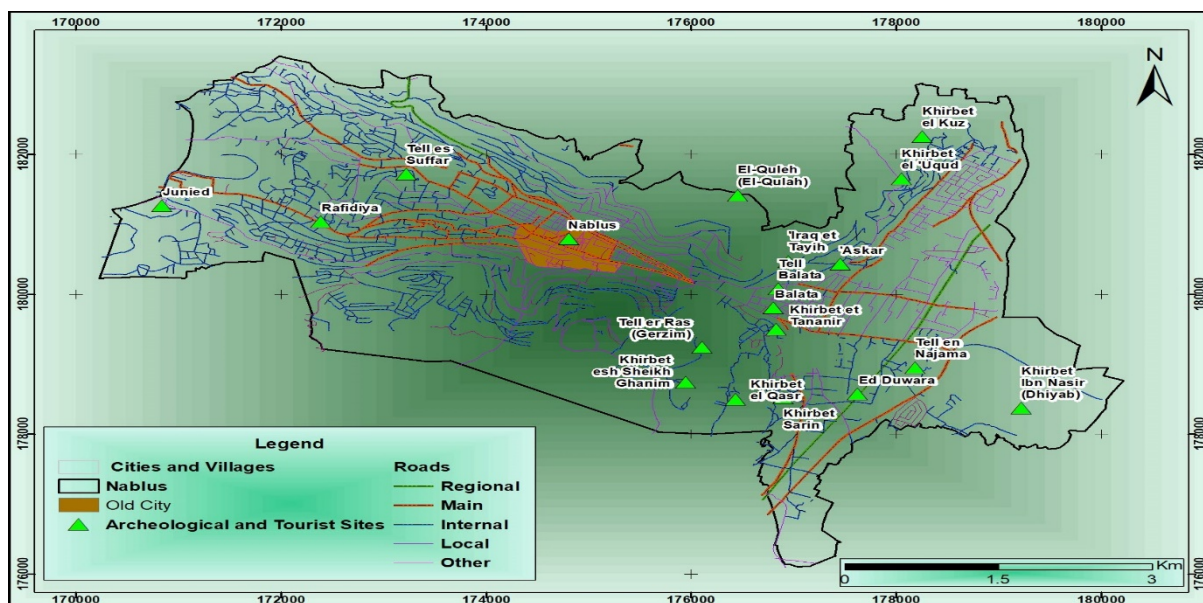
The disclosure of the existence of pattern of spatial distribution is what counts in a geographical study as a geographic phenomenon; where the pattern of distribution takes many forms, including: the indiscriminate use, and heat sink, and communities.

Table 1. Archaeological and tourist sites

The number	Name of Site	X	Y
1	Juneid Shrine	170844	181258
2	Rafidiya "Old Town"	172393	181033
3	Tell Sofer Archaeological Site	173222	181712
4	Nablus "Old Town"	174809	180787
5	The Shrine of Sheikh Ghanem	175949	178735
6	Tel Ras	176107	179241
7	Khirbat El Qaser	176435	178492
8	Qolah	176459	181404
9	Balata	176807	179801
10	Khirbat el Tananir	176831	179499
11	Tell Balata Archaeological Site	176855	180070
12	Khirbat Sarin	176904	178513
13	Iraq Tayah	176948	180465
14	Askar "Old Town"	177458	180427
15	Ed Duwara	177627	178570
16	Khirbat el Uqud	178056	181640
17	Tel enNajama	178191	178943
18	Khirbat el Kuz	178254	182249
19	Khirbat Ibn Nasser (Dhiyab)	179222	178369

Source: Compiled by authors.

Figure 2. Archaeological and tourist sites in the study area



Source: By authors.

2. Methodology

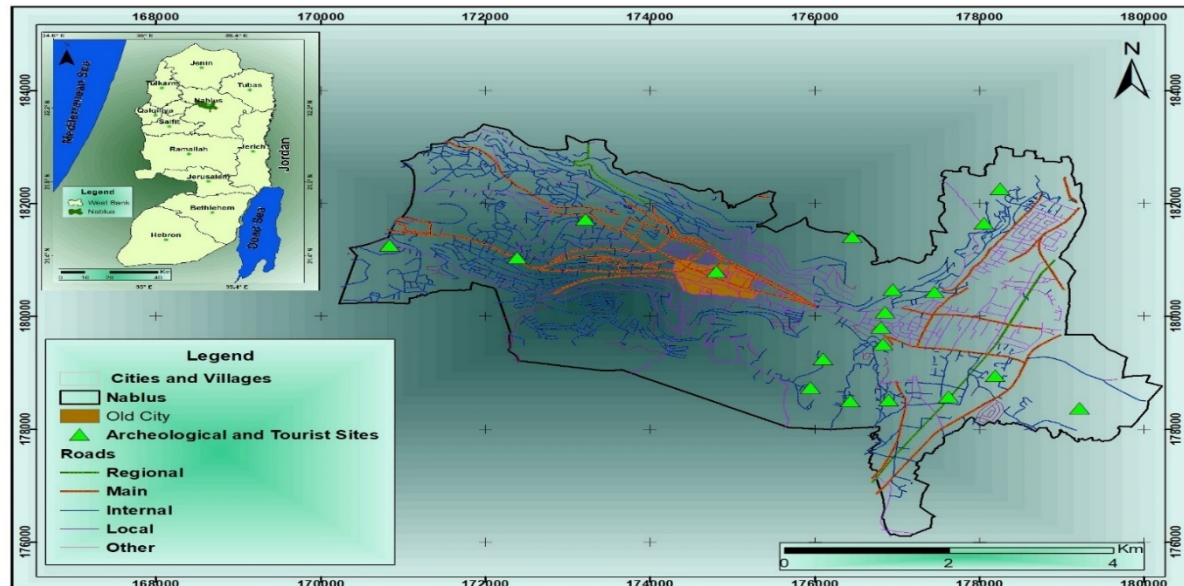
The study used a descriptive analytical work and digital data, based on analytical and statistical quantitative methods to highlight the spatial characteristics of archaeological and tourist sites in the study area. Data was collected by several approaches that included:

1. Data on tourist sites was included number of visits to those sites was obtained from the directorate of tourism and antiquities in the city of Nablus.
2. Maps of the study area such as topographic maps, a map of the public transportation network in the city of Nablus, and a map showing the distribution of tourist attractions and archaeological sites in the study area.
3. The Global Positioning System (GPS) to monitor the coordinates of touristic and archaeological sites that have been dealt with in the study area.

Study area

The city of Nablus, an important geographical location, mediates the Palestinian territory of the mountain heights in general and mountains of Nablus in particular. It is a link in the chain of the mountain towns of rearing the line dividing water along the mountain peaks of the north to the south. It is located on the causeway that stretches from Safed and Nazareth in the north to Hebron in the South (Palestinian Encyclopedia 2015). Figure 3 shows the study area based on data of the Ministry of Local Government in Palestine.

Figure 3. Study area



Source: By authors

Importance of study

The importance of this study is the clarification of the importance of the use of GIS technology and methodology in the spatial analysis of archaeological and tourist sites in the study area. It also derives its importance from the fact that it sheds light on the spatial distribution and spatial characteristics of the tourist sites in the study area. These sites include religious, ethnic, tourism and historical importance. Also, in this study, we employ GIS to determine the archaeological and tourist sites in the city of Nablus. We also find the best routes to reach all sites in the shortest time through the use of the shortest roads leading to the sites.

Objectives of study

1. Determination of the extent of the technical capacity of GIS in spatial analysis of sites and archaeological sites in the study area.
2. Identification of the pattern of the distribution of the archaeological and tourist sites in the city of Nablus to allow the development of appropriate solutions for tourism development.
3. Identification of the extent of the spatial relationships between monuments and tourist sites such as the importance of the centralized and more.
4. Recognition of the importance of the relationship between the transport network, monuments and tourism.
5. Identification the best tourist routes to reach possible number of attraction sites to the shortest possible time.

3. Results and Analysis

Spatial analysis of archaeological and tourist places

Whether statistical or spatial, geographic information systems technology has been widely used in many of the analytical operations. The spatial analytical operations require considerable time and effort through the traditional tools. Therefore, the technical assistance of the mathematical modeling of complex spatial in various types of geographical topics is highly required. Natural and human resources, environment and matching, evaluation of

unconditional sites, building the future layouts, measurements, the establishment of the ranges and models all require advanced analytical methods when being quantified (Moussa 2007). For example, the use of ArcGIS (10.1) (Alfarook 2008) in these studies allow planners and researchers in advancing various fields in the development of planning. Other applications and analysis that can reveal the patterns of distribution of monuments include:

First: the method to the neighborhood

Nearby is linked to one of the criteria in which the analysis of the distribution of the landmarks was based on. The analysis considered the value of (0) a focus of the sites. Whereas, specific point value (2.15) indicates that the sites are distributed regularly on the space (Hassan 2006). The spatial distributions follow one of the following patterns:

1. The distribution pattern of closely spaced pregnancies (combination): a factor linked to the nearby less than 1
 - * A factor linked to the nearby = 0: The pattern of combination
 - * A factor linked to the nearby = 0 - 0.5: Close Pattern
 - * The closer to the neighborhood of factor 0: Cluster converged pattern
 - * The closer links nearby Labs 0.5: Cluster pattern combination
 - * Linked to the neighborhood factor = 0.5 - 1: The pattern of convergent toward random pattern.
2. The random pattern of distribution: a factor linked to the nearby = 1
3. Bump pattern (thin): a factor linked to the nearby greater than 1
 - * A factor linked to the nearby = 1 - 2: The pattern of IRREGULAR THINLY (vector)
 - * A factor linked to the nearby = 2: systematic pattern (the form of the box)
 - * A factor linked to the nearby approaching 2.15: Hex form, systematic pattern on the surface of the study area.

This method depends on the study of the pattern of services distribution in order to identify the random pattern of distribution. To achieve a regular basis, which helps to proper planning in the future, the following equation can be applied in the study related to the Neighborhood:

$R = 2D * N \sqrt{A2}$: Equivalent to the Neighborhood (Hassan 2006).

R = Links nearby.

D = The distance between the points many readings (measurements.)

N = the number of points.

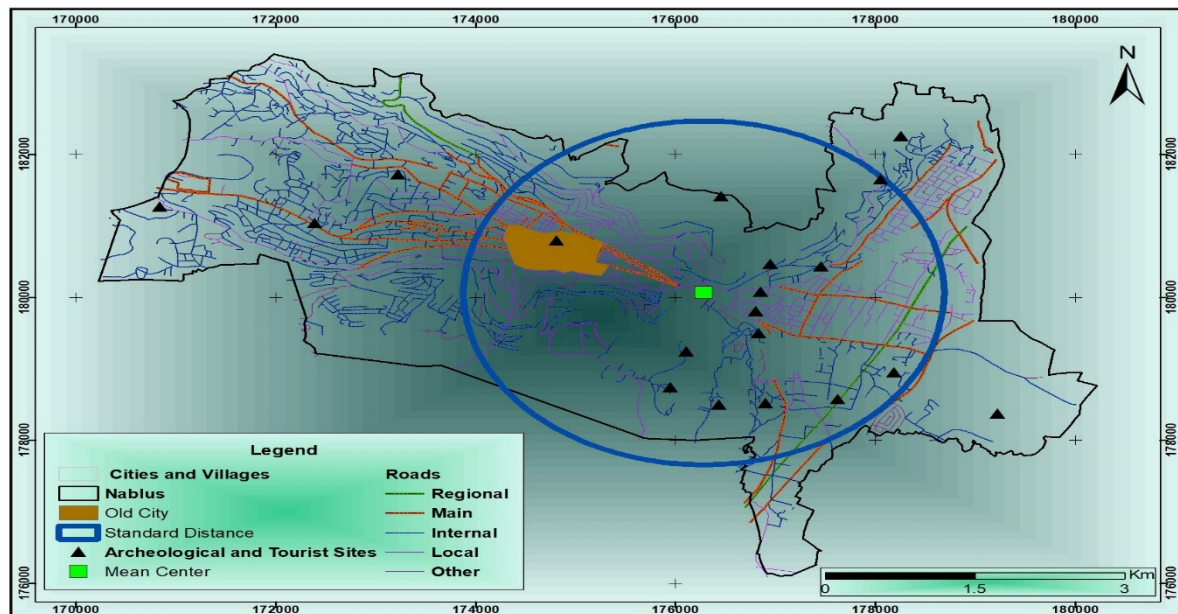
A2 = The area of the points of the area of the search.

It has been shown through the application of factor analysis to the nearby archaeological and tourist sites in the city of Nablus, and that the pattern of geographical distribution of sites is thin pattern (distances regularly) heads to random distribution and that the result of dividing the center calculated the sites at the center expected, was 1.13, which is close to one, which indicates a reasonable bloc, but it is not a random distribution.

Secondly: spatial analysis center (default) average standard distance

One of the functions of the central tendency to reveal a pattern of distribution, for creating distance. The Either test standard distance works on the measurement of the form of the proliferation of sites around its average. The standard distance is known as the shorthand description of the phenomena proliferation form on their status. The use of the supplement to the spatial analysis has been observed in spatial information systems program; extracting the average, standard and determine the distance, archaeological and tourist sites in the city of Nablus as shown in figure 4.

Figure 4. The standard deviation of the center for archaeological monuments



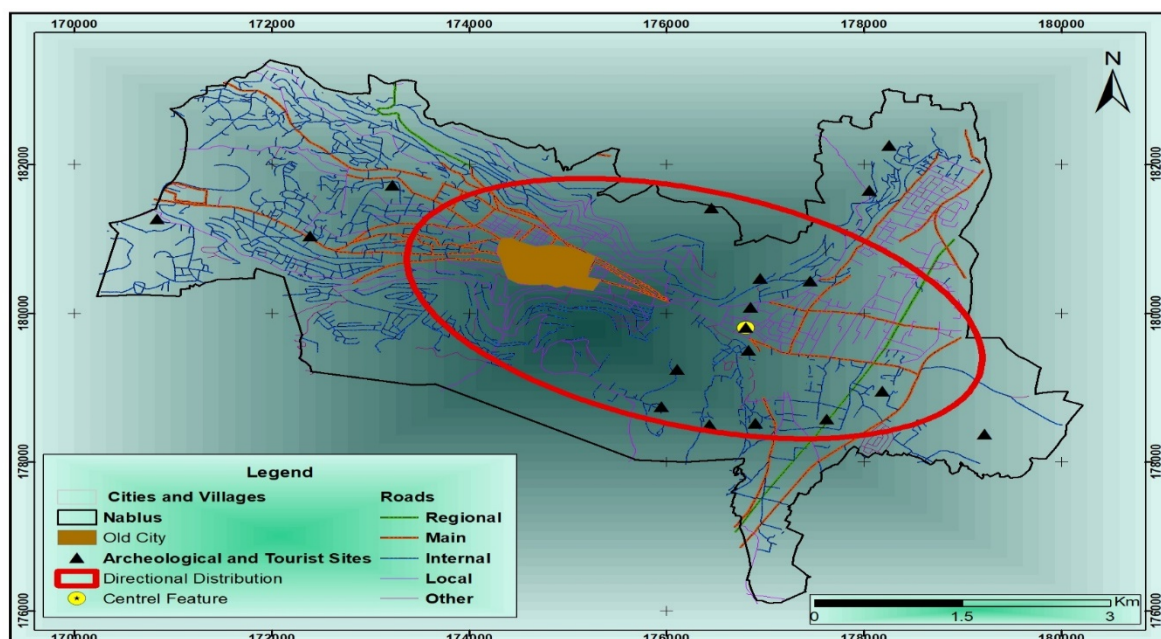
Source: By authors

Green dot on the map represented the Virtual Center (the center of gravity for distribution). All points that represent the archeological sites in Nablus are within walking distance of the horizontal (1630) meters from the old town. In the south-east; this point is located close to the city center. The blue circle (radius 2400 meters) represent the standard distance between site center for archaeological and tourist sites in the city. The circle represents 68.26% of the total number of monuments. However, the normative distance contained (15) sites, (%78.9 percent) of the total number of sites.

Thirdly: spatial analysis center (actual) average orientation distribution

The site is mediated between the tourist sites and archaeological sites. It was extracted by calculating the arithmetic average of the distance between both site-types using geographic information systems. Analysis found that the Balata Camp site (yellow dot in Figure 5) is located within the city center, (roughly, 2300 meters from the old town) and located in the south-eastern side of the town.

Figure 5. The direction of the actual distribution of monuments and archaeological sites



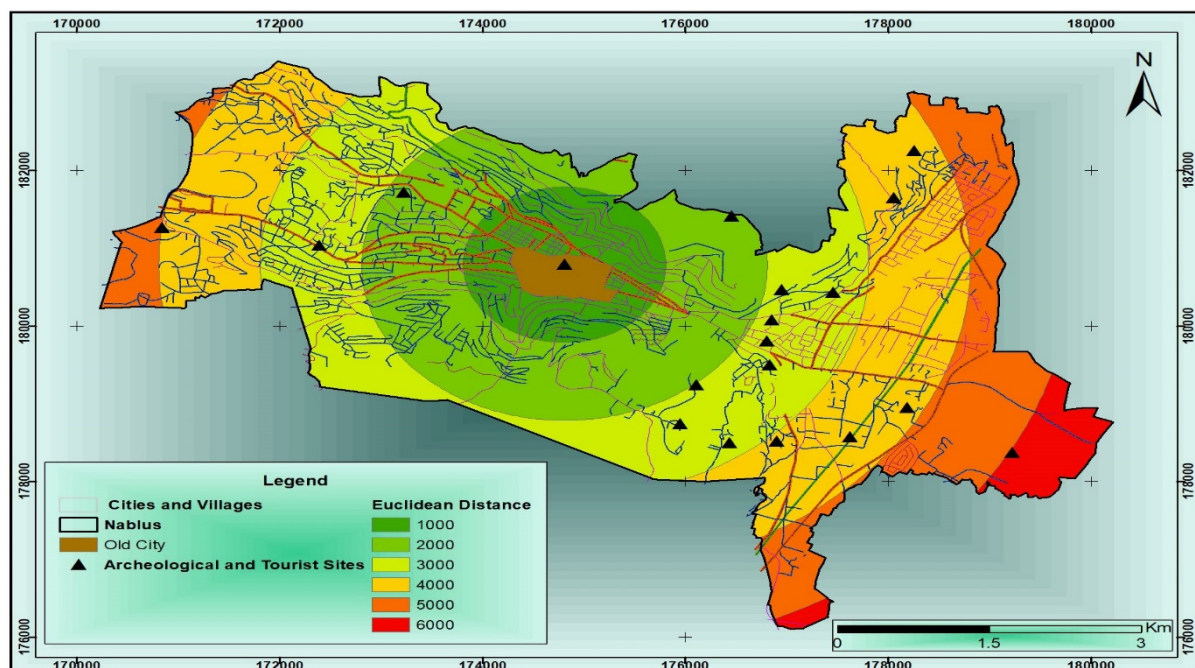
Source: By authors

The results show that the spread of the most touristic and archaeological sites throughout the city are located in the east of the city (Figure 6). This indicates that most sites are concentrated in the south-east and north-east of the old town.

Spatial analysis by distance criterion

The most important monuments and heritages are located in the old city of Nablus city. Therefore, many nearby tourist services, shops and restaurants, tourism and travel agencies and banks are located in the surrounding area of the old city. However, the massive urban development and the most important criterion of human and economic activities, including commercial centers are located in various parts of the city. Therefore, it is of great importance to shed light on the criterion of the distance from the old town. It is also of great significance to establish the best roads to all the monuments through the Layer of existing roads in the city of Nablus in several different speeds.

Figure 6. Spatial analysis by distance criterion



Source: By authors

A. Spatial analysis by standard distance from the old town

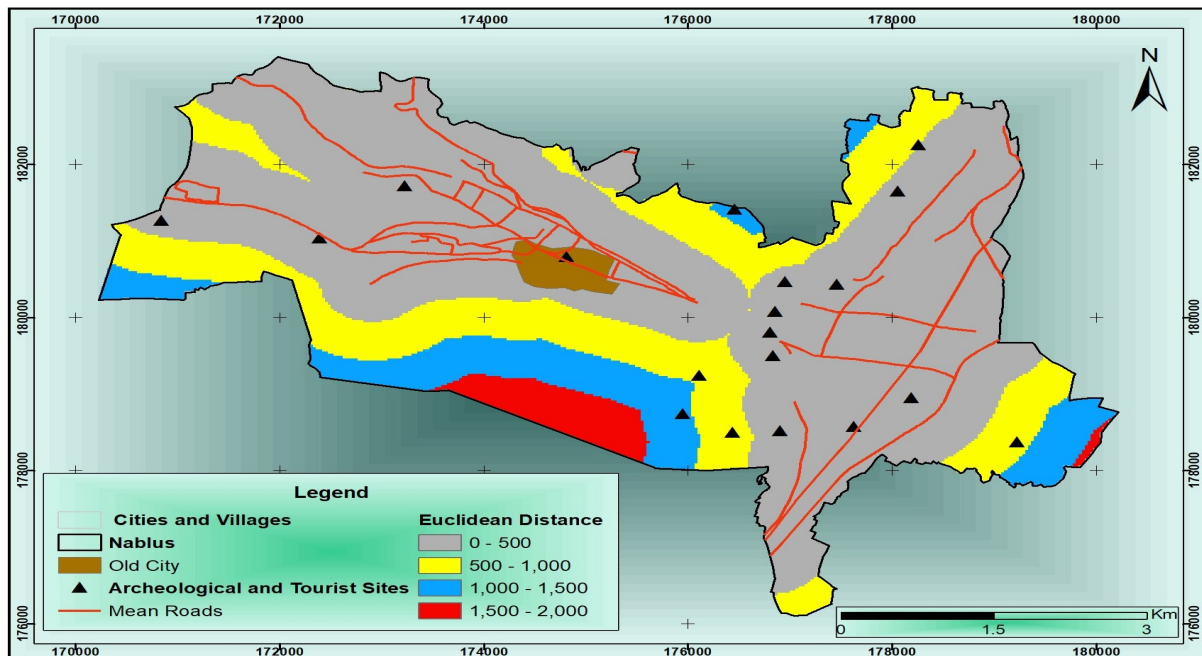
Is the measurement of distance, which is located by the city's archaeological sites of the old town, a measure is very important, the fact that the old town, the most important historical, religious and cultural landmark in the city. To reveal this link, use the test multiple ranges according to the dimension of the town, where the analysis of 6 the ranges around the town, a radius of 1 kilometer. And then drop all the sites on the map of the ranges, to indicate the number in each of these domains. See that all sites are located 6 km from the old town. Where was the first large-scale and scope has 0 locations, the second includes two sites any of 27.2%, the third scope includes 9 any sites by 50%, the fourth scope includes 6 sites by 33%, and scope v includes 0 location, scope and vi site find, this indicates that the sites are distributed on some ranges and others do not contains any sites, which does not reflect the direct impact of the old town and the geographical distribution of these sites, as the figure (6).

B. The spatial analysis by standard on the main roads and regional dimension

The written test was multiple ranges on major roads in Nablus for application; to measure the extent of the link these sites through the chairperson and regional or link roads, as these roads are the best in terms of quality and breadth and foot. One of the most important roads that have been chosen for the process of linkage is the main roads and regional. And (3) Written ranges from the center of the methods mentioned as in figure (7), then the signing of archaeological sites within these ranges. Where the highest number of archaeological and tourist

on the main roads, is within the distance between (500-0m); it reached number 13 and proportion of the site (68.5%), followed directly, the second (1000-500m), the 4 percent sites (21%). While the third scale contained within the distance between (1500-1000m) (10.5%).

Figure 7. Monuments on the roads



Source: By authors

C. The analysis of the road network and the establishment of the best routes to go to all the sites

Through the analysis in this application will work on the establishment of the model to find the best path up between 19 archeological landmarks in the city of Nablus, based on distance and efficiency of roads, this will work on the easy access to the tourist sites easily and faster as possible.

Action steps:

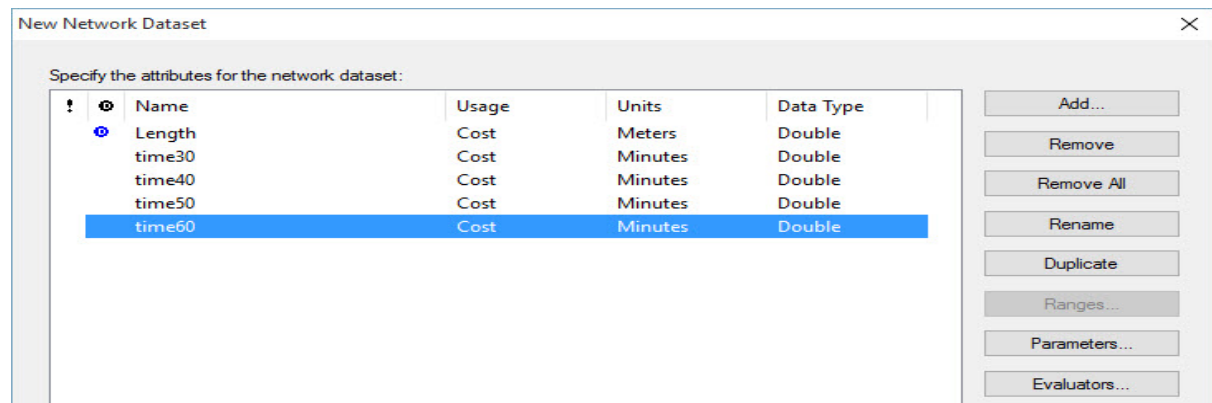
- 1- The establishment of new columns in the ways different vehicle speeds and appropriate EQUATIONS as in figure 8 as follows:
The vehicle-speed of 30km/hour b-vehicle speed of 40km/h c-speed of 50km/hour vehicle
D-vehicle speed of 60km/hour.

Figure 8. The analyzes of various vehicle speed

street	length	time30km	time40km	time50km	time60km
	2684.705916	5.369412	4.027059	3.221647	2.684706
	3537.97664	7.075953	5.306965	4.245572	3.537977
	149.273108	0.298546	0.22391	0.179128	0.149273
	887.877851	1.775756	1.331817	1.065453	0.887878
	20.333537	0.040667	0.0305	0.0244	0.020334
	347.585098	0.69517	0.521378	0.417102	0.347585
	569.241568	1.138483	0.853862	0.68309	0.569242
	26.249118	0.052498	0.039374	0.031499	0.026249
	633.775651	1.267551	0.950663	0.760531	0.633776
	228.627487	0.457255	0.342941	0.274353	0.228627
	120.325976	0.240652	0.180489	0.144391	0.120326
	1859.978493	3.719957	2.789968	2.231974	1.859978
	444.374589	0.888749	0.666562	0.53325	0.444375
	834.993491	1.669987	1.25249	1.001992	0.834993
	2437.853286	4.875707	3.65678	2.925424	2.437853
	268.372216	0.536744	0.402558	0.322047	0.268372
	191.779055	0.383558	0.287669	0.230135	0.191779
	271.096173	0.542192	0.406644	0.325315	0.271096

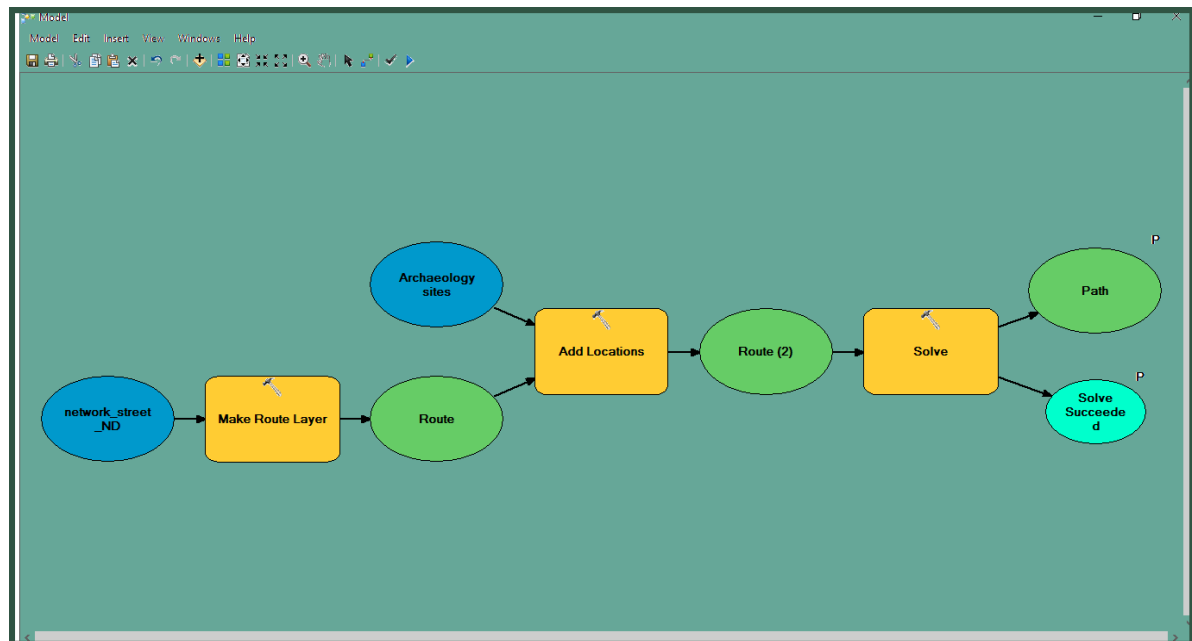
- 2- The analysis of the road network at different distances and speed of the vehicle and the characteristics of the road network of roads and paths and trends in (figure 9):

Figure 9. Analysis within the road network system environment



- 3- The establishment of model tourist route based on the archaeological sites within the city and based on different distances and speed of the vehicle through the window Arc Tool box, and in the (figure 10).

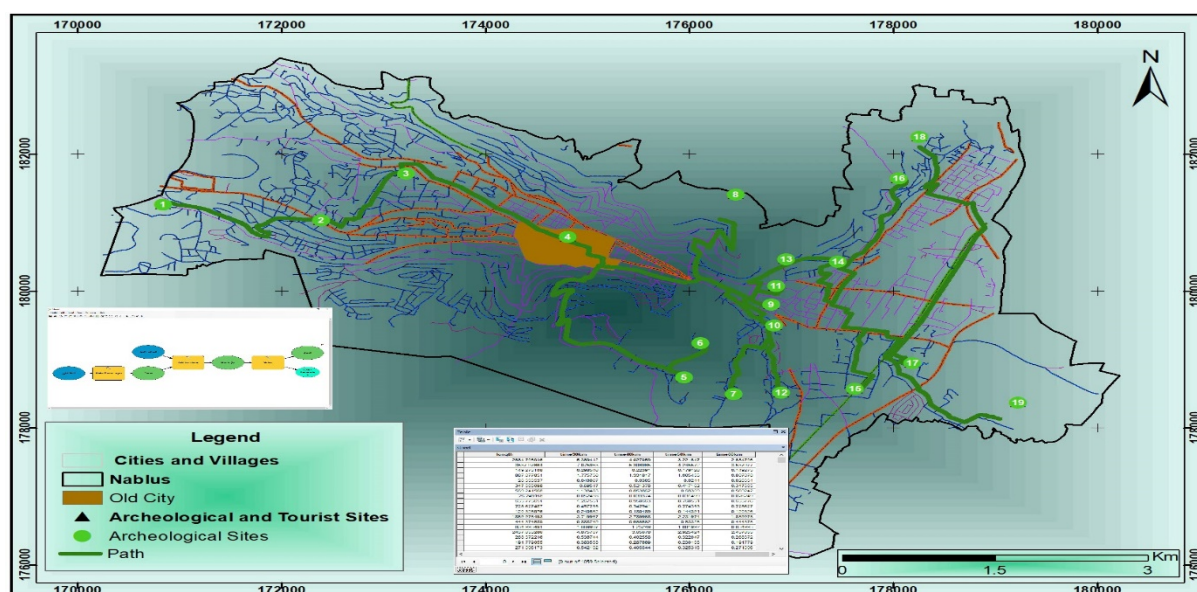
Figure 10. The best path analysis window model archaeological monuments in the city of Nablus



Source: By authors

And through the window model we start the analysis on the basis of the efficiency of the road network and then enter the archaeological sites within the city of Nablus for analysis to a network of roads, and then enter the appropriate analysis to find the best path up among all the monuments and entered the city of Nablus, and we have the introduction of the analysis that we have within the model on Spatial Analysis Network Analyst) within the program of Arc Map) and pressure on POODLE  to see the result of the tool during the map (Figure 11):

Figure 11. The best roads to reach archaeological and tourist sites



Source: By authors

Results of the analysis, the best route to reach all the monuments

Figure 12. The speed of the vehicle 30 km/hour

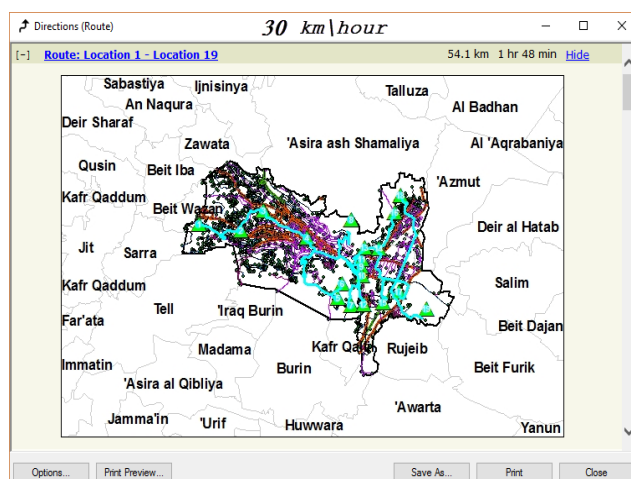


Figure 13. A vehicle speed of 40 km/hour

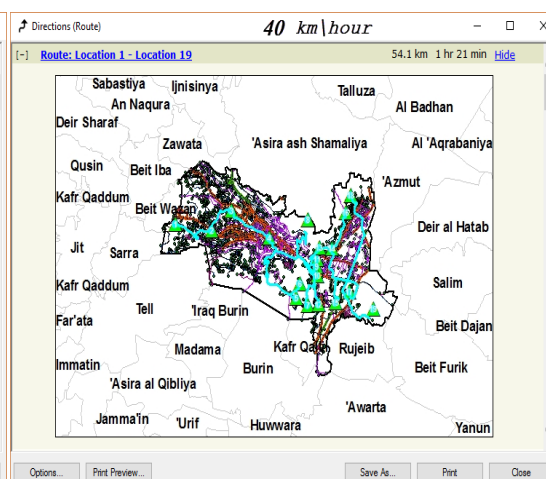


Figure 14. The speed of the vehicle 50 km/hour

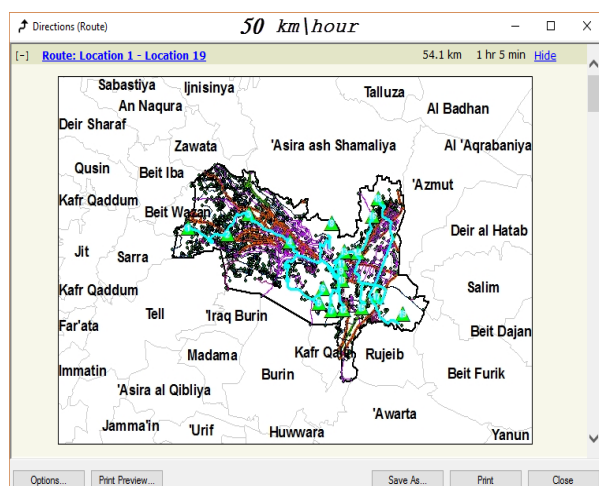
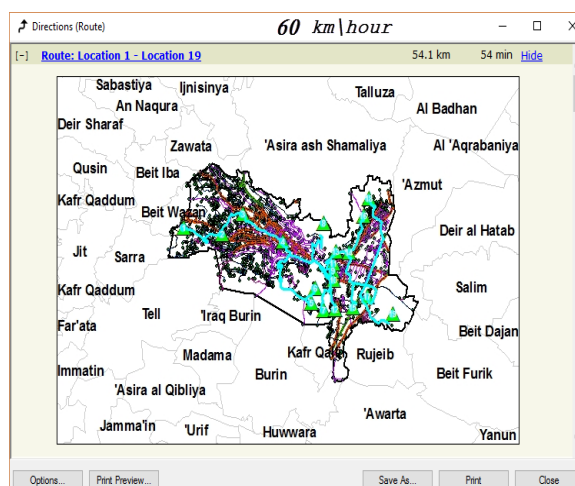


Figure 15. The speed of the vehicle 60 km/hour



Note the map (Figure 11) that because of the analysis given the best route to reach the archaeological sites through the best ways in terms of distance and time, because of the path that has been established through a network of roads and model learn walking path and time needed to move it based on the different speed of the vehicle as in figures number (12, 13, 14 and 15).

The best path to reach all the sights with a length of 52.6 km and the time it takes to follow this path on a vehicle speed of 30 km/hour is 1:45, and the vehicle speed is 40 km/hour is 1:19, and the speed of the vehicle 50 m/h is 1:03, and the vehicle speed is 60 km/hour is 53 minutes, that is, the more speed less time to access.

Conclusion and Recommendations

The number of archaeological and tourist attractions in the city of Nablus (19) sites and was dropped on the aerial image of the city of Nablus in the form of points, by identifying the coordinates through a field study. The study showed the ability of GIS software for spatial analysis of archaeological and tourist sites in the city; easy spatial analysis of the least time and without cost. The results of the spatial analysis showed that the form of distribution of monuments is the distribution of the thin pattern (the distances are not regular), heads to random distribution pattern. The Spatial Analysis also showed that the direction of the geographical spread of the places studied, most of the bloc and the archeological sites in the city, especially the actual average considers the actual locations of each archaeological centers, while the center takes the default average size south east, north east of the city.

The analysis also proved standard distance, which measures the extent of public and school; where the bloc, the study showed that (78.9%) of the public and thoughtful amenities located within one standard deviation from the average, the center of these sites. The sites distributed intermittently on the ranges of the main teacher dimension, which does not reflect the direct impact of the old town and the geographical distribution of these sites. Access to all the monuments through a route with a length of 52.6 km and the time it takes to follow this path on a vehicle speed of 30 km/hour is 1:45, and the vehicle speed is 40 km/hour is 1:19, and the speed of the vehicle 50 m/h is 1:03, and the vehicle speed is 60 km/hour is 53 minutes.

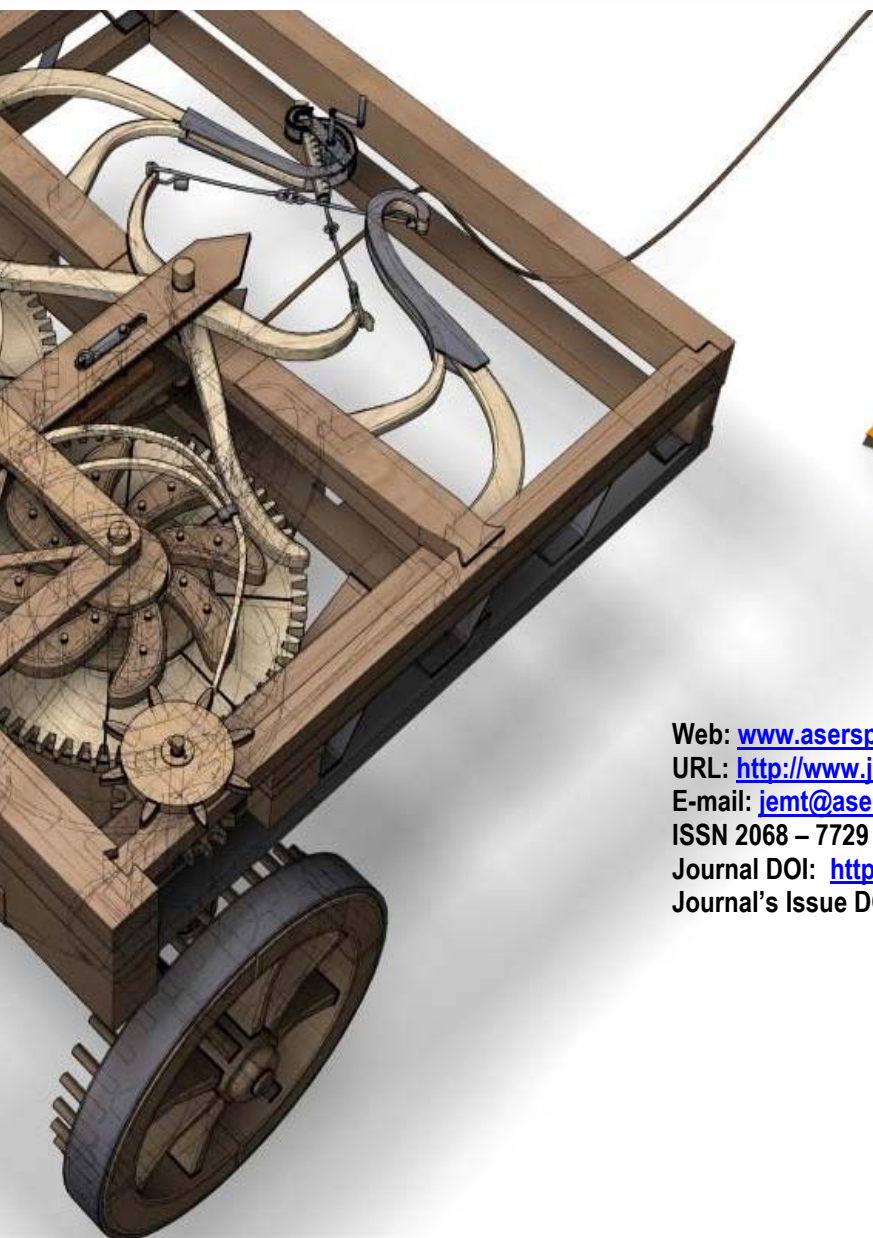
This study recommends working to increase the efficiency of the roads leading to the archaeological and tourist access them less time and effort. Also, need to educate the people of the importance of archaeological and tourist sites, through various media, the importance of attracting tourists from abroad. The electronic maps by public institutions and archaeological sites in more than one language, and dissemination through various media. The need for an electronic system to reduce the time to reach the archaeological sites and taking into consideration the program (GIS) to analyze the network of streets to the offering of accurate information in the case of the analysis.

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