

Alternative Methodological Approaches in Understanding Tourist Spatial Behavior in Urban Heritage Destination

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ABSTRACT

The complexities of cities as spaces lead to the difficulties in understanding the spatial behavior of tourists within cities. Mapping and modelling of tourists' spatial activity is viewed by many researchers as an under researched field in which much progress is still needed. The advancement of tracking technologies development offers an opportunity to further and expand the nature of understanding the tourist particularly in urban destination. Understanding of this phenomenon may also allow planners and tourism managers to make decisions and to address tourism development in a well-versed manner. The rapid advancement and availability of small, cheap and reliable tracking devices drawing on GPS technology is assisting researchers to develop new methods of spatial research. From this point of view, tourism is mainly a geographic activity. Most of the information needed in tourism planning is spatial, indicating where and how extensive the tourism resources are, how intensively the resources are used and so on. Basically, different methods can be employed to utilize the collected spatial data. However, the most basic method is to present the collected information on a map. The tracks collected from tourists using advanced tracking technologies can be further used to calculate many different variables that describe the spatial activity of tourist particularly in urban destination. This paper aims to capture the new methodological approaches which can help to explain different modes of behavior in urban destination versus traditional approaches. In this context, advanced tracking technologies were seen as the best tool in order to give both actual and detailed insight into people's individual and collective travel behavior.

Keywords: Spatial Behavior of Tourist, Advanced Tracking Technologies and Urban Destination

1.0 INTRODUCTION

Tourist behavior in the context of urban area can be defined in a way to understand the reasons why people visit, the links between the various motivation and the deeper reasons why people are attracted to cities (Ryan, 2002). Tourism industry creates various activities that are developed through different types of characteristics and uniqueness of each place. Each place attracts different type of tourists because of the differences recognized between the motives and the characteristics of the journey (Mansfield, 1992). Significantly, tourist behavior tends to matter to tourists (Pearce, 2005) as it shows the overall perspective on how tourists behave during the holidays and types of activities they usually undertake. A number of studies have established relationships between various aspects of behavior relevant to tourism management as well as its theoretical understanding, related to motivation for tourist's activities. Apart from that, tourist behavior issues are also matter to people who are making decisions about tourist.

Knowledge of tourist behavior plays an important role in tourism planning and marketing activities for tourism planner. It helps to analyze the role of tourist consumer behavior and tourist typologies. This knowledge is also useful in developing, selling as well as packaging the tourism product in the tourism destination. As had been stated by Leiper (1997), understanding tourist consumer behavior is not merely of academic interest but doing so would provide knowledge for effective tourism planning and marketing. Besides that,

understanding of tourist behavior would also contribute in making the marketing activities more effective and efficient. In the context of urban area, cities provide the context for a diverse range of social, cultural and economic activities in which the population engages, and where tourism leisure and entertainment form major service activities (Page 2002). It can be clearly understood that the complex urban area can contribute to the variety of behavioral pattern that involves tourist that came in and out of the city. As mentioned by Ryan (2002), the way in which people perceive leisure and holidays is determined by the social fabric that surrounds them, and it is no new thing to observe that society has changed significantly over the decades and centuries (Ryan 2002).

1.1 Understanding Tourist Spatial Behavior in the context of Urban Area

The rise of the mass tourism for the past few decades has contributed significant waves towards economic, spatial and social implications on destinations (Arnegger & Job, 2010). The potential positive economic effects of tourism on cities were quickly recognized which certainly leads to the rise of the city as a tourism destination and to new urban tourism, apart from the existing tourism in cities (Ashworth & Page, 2011). The increasing volumes of tourism and urban tourism have attracted interest in tourist choice and behavior. Basically, tourism is mainly a geographic activity. Most of the information needed in tourism planning is spatial, indicating where and how extensive the tourism resources are, how intensively the resources are used and so on. Time geography presents a conceptual framework to describe and understand tourists' spatio-temporal behavior according to which the effective reach of an individual is defined by time-space constraints and the path taken by the tourist.

For the past few decades, the development of new digital information technologies made possible the development of novel and advanced tracking methods (Shoval & Isaacson, 2006). These new techniques proved very efficient in dealing with the shortcomings of traditional tracking methods (Shoval & Isaacson, 2007) producing high-resolution spatial and temporal data used to analyze on how tourist consume the cities (McKercher, Shoval, Ng, Birenboim, 2012; McKercher, Shoval, Ng, Birenboim, 2011) and tourism destinations (Birenboim et al., 2013; Russo et al., 2010) as well as to analyze individual temporal and spatial behaviors (Shoval & Isaacson, 2007; Zakrisson & Zillinger, 2012). Apart from that, the behavioral data of tourists in urban areas are essential for travel demand analysis and prediction required in the planning and management of urban transport systems. However, behavioral surveys are not always sufficient for measuring microscopic travel behavior in space-time dimensions. The aim of this paper is to explore the alternative methodological approaches based on the conceptual framework of time geography which further helps to distinguish different types of tourist behavior based on their time-space resources. Plus, some authors have also noted the possibility of applying time geography to tourism as a spatially implicit phenomenon (Hall, 2005; Shoval, 2012).

2.0 METHODOLOGY

The term spatial analysis is basically referring to a 'quantitative study of phenomena that are located in space' (Bailey & Gatrell, 1995). In this context, tourism tends to be superimposed on a spatial system and infrastructure network that was not designed specifically to cater for it and tourism activity can be unevenly distributed (Gladstone & Fainstein, 2001). Understanding where tourist go within a city and how they negotiate their way from one point of interest to the next is something discovered through subjective observation (Edwards, Dickson, Griffin, & Hayllar, 2010). The current methods used to

collect data on spatial activities are limited in accuracy and validity and there is a difficulty of collecting data on the spatial behavior of tourists (Meng et al, 2005). Manual research techniques on tourist mobility proved to be hardly cost effective and difficulties in developing tourist profiles. Plus, simple observation does not allow the gathering of qualitative data on tourist and problems of privacy breach. In addition, the development of spatial analysis as a field of study has been given much impetus by the growing demands for spatial data accuracy and quality given the increased amount of spatially referenced data held by the public and private sectors as well as the use of GIS as an interactive decision-making and planning tool (Hall, 2011)

2.1 Traditional Approaches vs. Current Approaches

Much of the lack of specific research can be traced to practical methodological challenges that have inhibited inquiry into these issues. Traditionally, trip diaries and maps were used as the primary data collection tool to gather information on tourist movements (Thornton, Williams, & Shaw, 1997). This technique proved useful at an inter-destination level (Oppermann, 1997), but as McKercher and Lau (2010) discuss, it has a number of operational limitations at a destination level. Scale issues and a tendency of respondents to identify places visited or stops, but not routes taken results in a loss of fine detail. Many trip diaries returned had incomplete information, resulting in many marginal data sets. Additionally, while the prospect of completing a diary was met with initial enthusiasm, the actual completion rate was low.

There are issues arises in obtaining the tourist spatial data activity. Recently, the current methods used to collect data on spatial activities are limited in accuracy and validity and there is a difficulty of collecting data on the spatial behavior of tourists (Meng et al, 2005). These manual research techniques on tourist mobility proved to be hardly cost effective and difficulties in developing tourist profiles. Plus, simple observation does not allow the gathering of qualitative data on tourist and problems of privacy breach. Designing the urban form to meet the needs of tourists requires collection and evaluation of data on tourists spatial behavior which until recently has been difficult because of the labor intensive nature of methods such as large surveys, traffic and people counts, travel or trip diaries, and observation (Edwards et al., 2009). While some commentators argue that semi structured interviews allow for a fuller understanding of tourist's motivations and perceptions (Maitland, 2006), others have concerns regarding the potential for recall bias to influence travel reporting and have shown that people's ability to reproduce a walking route on a map is inadequate (Edwards et al., 2009). Thus, using advanced tracking technologies such as GPS were seen as a new solution for this issue. GPS has the ability to accurately track the paths of tourists, to provide greater understanding of the socio-spatial behavior of tourists (Asakura and Iryo, 2007), to boost the interest of its potential in giving more comprehensive understanding of tourist behavior and to accurately mapping tourist expectation, satisfaction and motivation using development of a new generation of technologies.

Understanding processes in the city is a pre-requisite for good urban design (Schaick, 2008). Traditional urban planning and analysis methods only offer partial insight into these processes. The existing data collection methods implemented in tourism research is low in accuracy where labor intensive were used through extensive counting surveys on traffic and people, trip diaries and also observation. There are two types of methods that are currently employed by the researchers to gather information on the spatial behavior of tourists which are direct observation techniques and non-observational techniques.

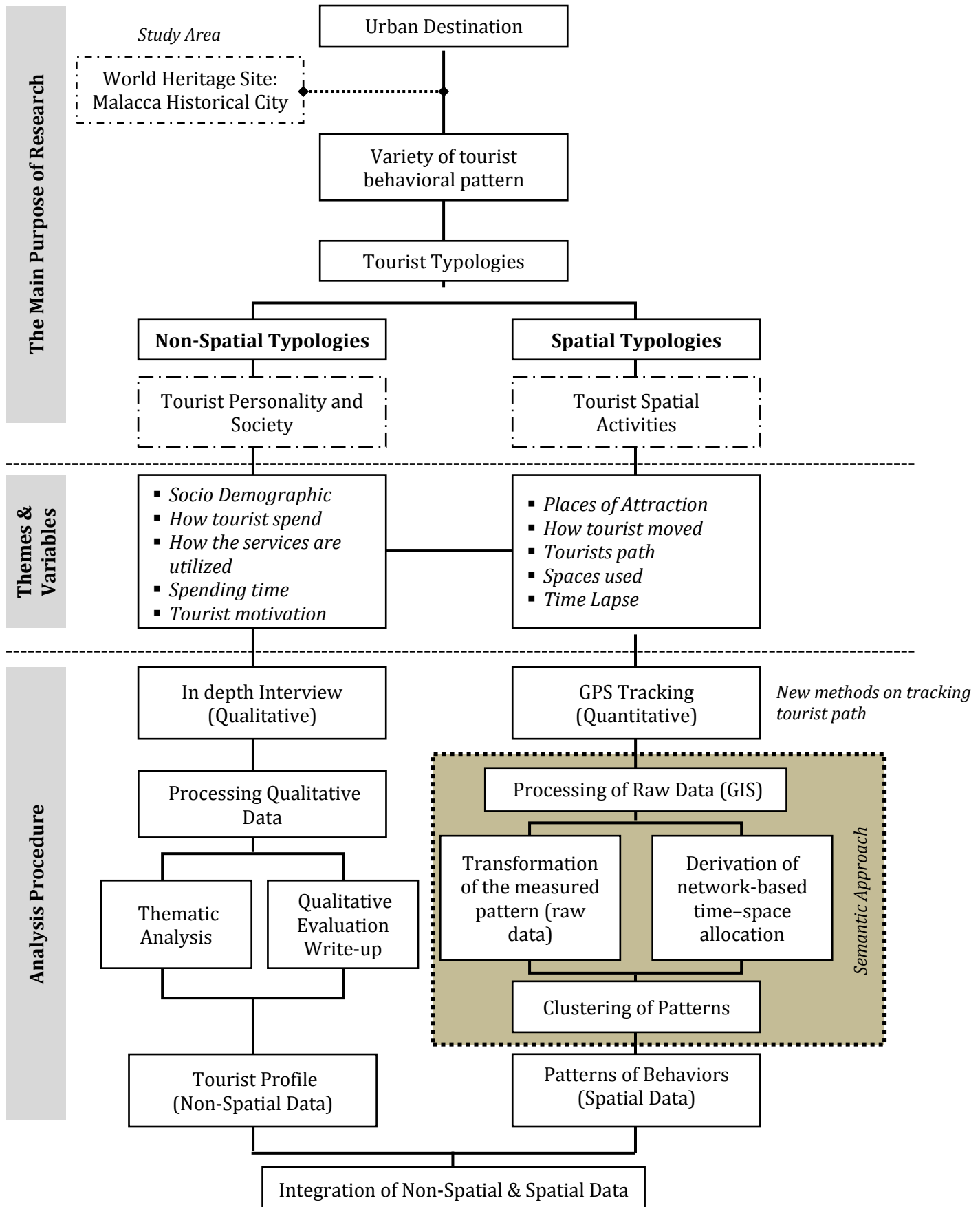
Table 2.1: Methodological Aspects of Measurement of Tourists' Spatial Behavior

	Techniques	Methods	Implementation
Traditional Approaches	Direct observation techniques	Participant Observer Method	The observer accompanying the individual under inspection in person
		Non-Participatory Observation	The observer follow the subject at a distance recording the pattern of their activities over time and space
		Remote Observation	Non participatory technique which is used to record and analyze aggregate tourist flows.
		Aggregative Video Tracking	The observer used the data obtained by video cameras or closed circuit television (CCTV) cameras arranged in public places to analyze behavioral patterns of users.
	Non observation techniques	Time-space budgets	A systematic record of a person's use of time over a given period. It describes the sequence, timing and duration of the person's activities typically for a short period ranging from single day to a week.
New Approaches	Tracking Technologies	GPS Tracking	A local tracking system consists of a series of satellites that orbit the earth broadcasting signals that are picked up by a system of receivers.
		Land-based Tracking	A local tracking system featuring a series of antenna stations which also known as radio frequency (RF) detectors distributed throughout a specific area.

Source: Adapted from Shoval & Isaacson (2010)

In this context of study, advanced tracking technologies were seen as the most suitable tool that have the abilities to resolve some of the problems that occur in the current methods used in tourism research to collect time space data about tourists. However, there are also limitations and challenges with these new technologies. The adoption of new technologies however does not mean that traditional tools such as interviews, questionnaires and time space diaries must be abandoned in tourism research. Conversely, the new technologies will complement, add to, and enrich the findings of these more traditional research tools. **Figure 2.1** shows how the researcher will further conduct the research by integrating both qualitative and quantitative approaches in order to acquire a more in-depth knowledge of tourist behavior and therefore able to develop a more comprehensive typologies of tourist particularly in urban destination. However, this paper will only highlight the quantitative approaches which focus mainly on how to analyze the spatial data gathered from GPS.

Figure 2.1: Methodological Framework of the Research



2.3 GPS as a Tool in Gathering Data on Spatial Behavior of Tourist

Referring to the new methodological approaches, both technologies comprises of Global Positioning System (GPS) and Land-based Tracking have the potential to be used as an effective tool in analyzing the spatial and temporal behavior of the tourists. However, it can only be useful if the tracking units does not restrict or alter the subject behavior in any way. These tracking units must be fairly lights, easy to carry and able to track the subject reflexively without forcing his or her into taking any kind of special action. Both technologies have their own advantages which makes them different from one and another and thus easy to determine which tracking unit is more suitable for collecting data on spatial tourist behavior. Land-based techniques have an advantage over the GPS which the end units do not need a direct line of sight to the sky and hence could obtain location in buildings. As for GPS tracking, it has the advantage over the Land-based tracking when it comes to obtaining accurate data. This makes them a suitable means to be used in micro-level investigations, such as studies which record the number and density of tourist visiting historic cities, tourist attractions, theme parks and similar locations where all of which require high-resolution data (Shoval & Isaacson , 2010). In particular, a new promising approach has been devised to provide applications with richer and more meaningful knowledge about movement. This is achieved by combining the raw mobility tracks (e.g. the GPS records) with related contextual data. These enriched track records are referred to as semantic trajectories.

2.4 Conceptualizing Tourist Behavior through Semantic Approach

Based on the literature review, the attempt to understand the tourist's allocation decisions regarding time-space resources involves recognizing participation in activities, their location and duration, and the movement choices between them, in relation to the potential activity space. This conceptualization of tourist behavior leads to a semantic approach towards the tourist's trajectory. Basically, a semantic trajectory deals with movements and stops, and can only be understood in relation to its environment (e.g. the transport network). This approach to trajectories represents the feature-based approach to sequential data, discussed above, and therefore allows the use of standard, simple clustering techniques. Thus, the analysis procedure presented here clusters individual trajectories into general behavior patterns according to time-space allocation measures extracted from them.

The analysis procedure should compose a GIS-based process of raw high-resolution (GPS) data into time-space allocation measures for each pattern. Using the output of the earlier stage, researcher should be able to clustering the patterns that had been shaped. The processing of raw data also consists of two stages, the first one being the transformation of the measured pattern (raw data) into a semantic trajectory (Renso et al., 2013) and the second being the derivation of network-based time-space allocation measures from each trajectory. Normally, when measuring trajectory which comprises of sample points that does not represent tourist behavior, a semantic trajectory will be used as it consist of point and line vector features which represent stops and movements. Stop (point) features are characterized by specific XY coordinates and the duration of stay. As scale is an important element when recognizing stops (consider the trajectory of an airplane, stopping in countries, versus the trajectory of an ant searching for food near its nest), a clarification is in order: the analysis here is of a tourist trajectory during a visit in a single destination, and the focus is on activities (visits in attractions) versus movement; thus, a stop is defined as any cluster of points in time and space within a limited spatial range to allow only one activity and for a

duration long enough to ensure it is not just a momentary pause in movement (such as one caused by the changing of transport mode). These spatial and temporal thresholds for a stop can change according to the specific nature of the destination and the inquiry, and therefore must be specified in advance, as is done later on in the case study. Movement (line) features are defined as a continuous set of sampled points between stops and are characterized by a start point, an end point and the length. Once all stops are identified, sample points between each pair of stops are transformed into a movement line feature.

There are many ways to use trajectory data. The simplest one is by querying the data to find facts about some moving object. For example, a trajectory database in an express delivery company allows customers to find out where their shipment is at any point in time. In the context of tourism industry, the trajectories database of tourists visiting tourism destination could help researcher to analyze and therefore develop tourist profiles and suggesting personalized tours and services, regulating the flows of tourists in the attractions, tuning the facilities. All of that relies on analyzing the similarities and dissimilarities among the trajectories, classifying the trajectories into groups of similar trajectories, identifying outliers, extracting the common characteristics that distinguish one group from another. A set of distinguishing characteristics forms a summary description of the group of trajectories. These summary descriptions are called patterns or behaviors (Laube 2009).

3.0 THE IMPACTS OF VARIOUS VARIABLES ON THE SPATIAL ACTIVITY OF TOURIST

The variables that are generally considered to be important in relation to the spatial activity of tourists can be divided into two main groups which are factors related to the character of the specific trip and the second group is associated with the specific characteristics of the tourists.

Table 3.1: Variables on the Spatial Activity of Tourists

Variables related to the character of the trip	Purpose of visit	Page and Hall, 2003	Tourists who travel for business or to visit friends and relatives will be less likely to visit tourists sites than tourists who travel for the specific purpose of touring and sightseeing
	Length of stay	Hagerstrand, 1970	The amount of time tourists spend in a city will have significant impact on their range of activities.
	Number of visit to the destination	Murphy and Oppermann, 1997	The more often a tourist visits a particular city, the fewer the visits to tourist sites on each visit
	Organization of the trip	-	The spatial activity of tourists and the geographic range of their activities in a city will be completely different from that organized groups as they are personally responsible in selecting the particular tourist sites to be visited
Variables related to tourist	Country of origin	Pizam and Jeong, 1996	Different ethnic background was seen to have an impact on the behavior and spatial activity of tourists at the tourist destination.
	Gender	Knox, 1994	There is a significant difference between the spatial activity of men and women in daily life.
	Age structure	Cooper,	It is possible to differentiate the spatial activity of

	of the travel group	1981	small groups of individual tourists according to age
	Religion	Sharchar and Shoval, 1999	In destinations with religious attractions, tourists from different religions will have differential activity patterns.
	Income	Cooper, 1981	The income level of tourists is likely to affect their spatial activity
	Education	Bourdieu and Darbel, 1991	In studies of patterns of consumption in general, it was found that people who are more educated and affluent will show a greater tendency to attend cultural events or visit museums and heritage sites.
	Personality type	Plog's 1973 and 1987	Classification of tourists by personality type was originally proposed to explain how personality structure is likely to influence the choice of travel destination.
External variables	Weather	--	Weather conditions during the site visit can have a significant impact on the time-space activity in a tourist destination.
	Transportation	-	Relates to the nature of the transport infrastructure or the layout of the tourists sites in the city.
	Crowding	-	The level of crowding in various sites may have an impact on the time-space activity of the tourists.

Source: Adapted from Shoval & Isaacson (2010)

4.0 POTENTIAL STUDY AREA

Cultural, including heritage, tourism has been growing rapidly in recent years (Alzua, O'leary, and Morrison 1998). It has been recognized in the literature that visitors to cultural tourism sites are often motivated to travel for different reasons than other types of tourists (DKS 1999; Formica and Uysal 1998; Hannabus 1999). Cultural attractions have become a crucial component in constituting the attractiveness of tourism destinations (Richards, 2002). Heritage, especially with World Heritage status, is increasingly becoming the main attraction of many tourist destinations. Heritage tourism is currently one of the most notable and widespread types of tourism in terms of visitors and attractions, appealing to hundreds of millions of people every year (Timothy, 2011). Apart from that, with the introduction of the World Heritage List in the late twentieth century, both the demand and supply sides of heritage tourism have received increasing attention and subsequent growth. Indeed, a heritage or world heritage status is becoming a significant selling point for tourist destinations (Timothy & Boyd, 2003).

4.1 Malacca City as an Urban Heritage Destination

Formerly, Malacca is listed as one of the world heritage site under UNESCO. Advantageously, heritage tourism is also the main tourism product and attraction of the city of Malacca. Malacca was seen as the most suitable site in testing the GPS due to its uniqueness of the heritage trail, the development of tourism in Malacca and also the increasing number of tourist arrival every year. Plus, Malacca was also listed as one of the World Heritage Site which is formerly renowned for its historical background. Basically, A

World Heritage Site is a place that is listed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as of special cultural or physical significance. Malacca history city have three trails which are Malacca Heritage Trail, Dutch Heritage Trail and American Heritage Trail where each of the trails has their own history and attractions. Advantageously, all of the trails are walking distance and are highly accessible that could assist the tourists to walk around easily and enjoying the attractions within appropriate time. Within the field of heritage tourism, scholars attempted to investigate heritage tourist profiles as well as categorizing them into different groups for a better understanding of heritage tourists and their experiences (Garrod & Fyall, 2001; McKercher, 2002; Prentice, 1993; Silberberg, 1995; Stebbins, 1996).

At this point of view, GPS technology would be the most suitable tool for this type of research due to the small size of this type of destination (Shoval & Isaacson, 2010). Desirably, Ashworth and Page (2010) had discussed the paradoxes in urban tourism research and observe that “it is curious that very little attention has been given to the questions about how tourists actually use cities”. However, the narrow paths that are typical to historic cities could create a challenge for obtaining GPS signals through the intense data collection by the devices (ranging from once per second to lower resolutions) means that the GPS signal will be found again by the device once a line of sight to the satellites is restored. Based on the research project that had been experimental by several authors, the results validated good reception of the GPS receivers’ in those dense environments. Plus, a relatively small size of the tourism destination area ranging approximately ten acres to several hundred acres makes GPS the most attractive option for tracking due to its high resolution. Nevertheless, the mapping and modeling of tourist spatial activity is viewed by many researchers as an under-researched field in which much progress is still needed (Prideaux 2000 and Modsching et al. 2008).

5.0 CONCLUSION

This paper aimed to explore the application of GPS data to the study of tourist behavior by adapting a new analysis approach which aggregates the spatial data and therefore analyzing them without less affecting the actual meaning of individual behaviors. This approach had also been applied to a case study of unfamiliar tourist behavior in Hong Kong proved to be successful in issuing thought-provoking and valuable conclusions even when using a small sample size (A.Y. Grinberger et. al, 2014). This new approach has also contributes to the new analysis method that allow researchers to bridge the gap between constraints to behavior and actual activity by revealing the internal origins of explicit behavior and thereby to create a new classification of tourist behavior and the spatial distribution of this behavior. Apart from that, this approach also allows the researcher to take the first steps in the shift from time-space description to explanation of tourist individual behaviors by investigating paths as products of time-space allocation. Above all, this type of research demonstrates that the analysis of GPS data can do more than just describing the explicit behavior of tourist.

In terms of urban tourism setting, understanding of tourist behaviors will able those who concern in tourism to forecast the potential activities and the chains of potential impacts. In terms of methodology, it will help to systematically adapt a better form of database using latest technology that can consistently update with changes in activities offered and changes in tourist trends of spending and appreciation. Changes in future may require a form of digital record on collection and evaluation of data on tourists’ behavior. There are growing attempts

to applied technology such as Global Positioning System (Shoval, 2008) in order to provide greater understanding of the socio-spatial behavior of tourists. In addition, the development of this advanced tracking methods such as GPS makes the collection of high resolution data regarding individuals' time space behavior become possible which offers time geographers new research opportunities (Kwan, 2012).

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