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MODELING TOURIST MOVEMENTS
A Local Destination Analysis

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Abstract: Models depicting the spatial movement patterns of tourists within a destination are proposed in this paper. They are developed using an inductive approach based on urban transportation modeling and tourist behavior, to identify explanatory factors that could influence movements. Factors identified included a set of destination characteristics and a set of tourist characteristics that influence decisionmaking and behavior. These factors influence movement patterns in two ways, resulting in four types of territorial and three linear path models. Understanding the movement of tourists within a destination has practical applications for destination management, product development, and attraction marketing. **Keywords:** behavior, spatial movement, itinerary models, transportation planning. © 2006 Elsevier Ltd. All rights reserved.

Résumé: Modelage des mouvements touristiques: analyse des destinations locales. Des modèles qui représentent les caractéristiques des mouvements spatiaux des touristes à l'intérieur d'une destination sont proposés dans cet article. On développe les modèles en utilisant une approche inductive basée sur le modelage des transports urbains et le comportement des touristes pour identifier des facteurs explicatifs qui pourraient influencer les mouvements. Ces facteurs comprennent un ensemble de caractéristiques touristiques qui influencent le comportement et la prise de décisions. Ces facteurs influencent les schémas de mouvements de deux façons, ce qui résulte en quatre types de modèles territoriaux et trois types de chemins linéaires. La compréhension du mouvement des touristes à une destination a des applications pratiques pour la gestion des destinations, le développement des produits et le marketing des attractions. **Mots-clés:** comportement, mouvement spatial, modèles d'itinéraires, planification des transports. © 2006 Elsevier Ltd. All rights reserved.

INTRODUCTION

The relationship between tourism and transport is self-evident, but has not been significantly examined within a destination context (Hall 1999; Page 1999). Prideaux notes that ''the relationship between long-haul transport, such as aviation, and tourism is well understood, but the relationship at the destination level is less clear'' (2000:54). Others

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have also acknowledged that the mapping and modeling of tourist movements is an under-explored facet of tourism scholarship (Fennell 1996; Pearce 1987). Some studies discuss the spatial implications of variations in attraction site visits (Debbage 1991; Fennell 1996), but until recently, very few have attempted to model the actual movement patterns of tourists. This is, in part, because this movement is so fundamentally obvious that its form and practice are taken for granted and often overlooked (Urry 1990; Haldrup 2004).

The aim of this paper is to explore some of the conceptual challenges in understanding tourist intradestination movement patterns, to summarize the major influences on such movement, and to model the basic spatial forms that such movement can take. This insight can then be used as a basis for empirical studies of tourist movements, which can lead to practical applications for destination planners. Understanding how tourists move through time and space, and the factors that influence their movements, has important implications for infrastructure and transport development, product development, destination planning, and the planning of new attractions, as well as management of the social, environmental, and cultural impacts of tourism.

One of the challenges in model development is balancing the need for simplicity and ease of presentation with the countervailing need for sufficient detail to permit meaningful analysis. Overly simplistic constructs may be visually appealing but may lack utility and broad applicability. Likewise, overly complex models may be compelling but difficult to interpret. As such, it is important to identify an appropriate level of flexibility to reflect a useful range of scenarios. Research on inter-destination movements has traditionally been driven by an inductive, empirical-led methodology, principally using the mapping or listing of planned destinations and stopovers. However, as McKercher and Lew (2004) have illustrated, this approach has a number of limitations that have inhibited further investigation beyond initial explanatory studies. Mapping techniques, by necessity, rely on small scale maps, resulting in a loss of data detail. The listing of destinations and stopovers assumes the most direct route is taken between points, when no such assumption can be made with confidence. What on the surface appears to be a relatively simple task of documenting travel from Point A to Point B, in practice becomes an extremely complicated task of documenting and then attempting to make sense of hundreds or thousands of individual travel routes, some going from A to B using the most direct route, some going indirectly, and others making intervening stops at Points C, D, or E. Information overload becomes an inherent issue, even for studies using small sample sizes (Opperman 1995). Similar data complexities are likely to exist within a destination.

Delimiting a Destination

A second data issue is the definition of a ''destination''. The World Tourism Organization grappled with this concept during a special

forum that included academic institutions and destination management organizations. In the end, a ''local tourism destination'' was defined as

> a physical space that includes tourism products such as support services and attractions, and tourism resources. It has physical and administrative boundaries defining its management, and images and perceptions defining its market competitiveness. Local destinations incorporate various stakeholders, often including a host community, and can nest and network to form larger destinations. They are the focal point in the delivery of tourism products and the implementation of tourism policy (WTO 2002:np).

This somewhat inelegant description nonetheless provides insights into destination minima and maxima. The intent of this framework was to conceptualize destinations as local entities that can include cities, towns, or regional areas. This definition excludes, at one end, resort complexes regardless of their size, and at the other end states/provinces, countries, or multinational agglomerations. Thus, Orlando would be considered a local destination, while Disneyworld or Florida would not. Likewise, Montego Bay in Jamaica meets these criteria, while the Caribbean would be excluded.

The WTO definition reinforces the fuzzy nature of destination boundaries, for it also recognizes that destinations can nest and network to form larger destinations. For example, the Blue Mountains on the western fringes of Sydney, Australia, may be defined as a discrete destination at one level, but may also be nested within the larger Sydney region. The aim of this paper is to describe possible daytrip movement patterns within a local destination area. The outer boundary of the local destination area is important because this boundary distinguishes it from its larger destination region. For this paper, the local destination is defined as the area containing the products and activities that could normally be consumed in a daytrip from the heart of the destination and that are normally promoted by the destination as part of its overall suite of products. While still lacking in a high degree of specificity, it is a suitable definition for use in the spatial models described below. In recognition of these data challenges, a deductive, conceptual-led approach has been adopted to explore the issue of intradestination movement.

Urban Transportation Modeling

Contemporary urban transportation models have evolved from the early work of Lowry in the 60s, who used the gravity model to distribute trips among residential, work, and retail zones in the Pittsburgh area (Rodriguez 2003). They generally assume that the majority of people will take the shortest or otherwise most-efficient route possible from their point of origin to their destination (Meyer and Miller 1984). In a large population, the distribution of these trips will reflect perfect knowledge of the available route alternatives, and will include responses to congestion and the availability of public transport.

Research on landuse and transportation allocation models focuses on the development and testing of mathematical network formulas, linear and nonlinear landuse allocation programming, input-output analysis, and other microeconomic and mathematical approaches to best replicate the trip behavior in a city (Kim 1983). The key concepts of urban transportation modeling, which can also apply to the modeling of tourist trips, include: trip origin or generation—the demand factor, trip destinations—the supply or stops, the transportation network, and the mode or type of transportation used. An accurate transportation model can be used to postulate ''what if'' changes to the transportation network, including both improvement and disaster scenarios.

Trip Origin and Destination. The typical transportation model subdivides a city into relatively homogenous landuse zones, each of which has a fixed number wanting transportation (Kim 1983). This is the demand factor, and residential zones tend to have the highest trip generation at certain times of the day. For the tourism industry, trip-generating zones and points tend to be highly concentrated areas of hotels, motels, and resorts, as well as more dispersed second homes and those of friends and relatives. Like workday commuters, the overall flow of tourists will occur out from these points of origin in the morning, and return to them at the end of the day (similar to a hub-and-spoke pattern).

In urban transportation modeling, the same subdivisions of a city that generate trips also serve as destinations. The balance between the number of trips generated and received varies through the day. For example, in the mornings, residential areas will be major trip origin points, while in the late afternoon they will be major trip destination points. This balance differs based on each zone's landuse. For the tourism industry, trip-generating zones and points tend to be highly concentrated areas of hotels, motels, and resorts, as well as more dispersed second homes and those of friends and relatives. The principle destination landuses consist of a range of attractions and potential attractions, some of which are discrete and independent entities in the landscape, and some of which are more amorphous and more suitable to a zone approach. The latter may include areas with distinct views, scenery, smells, and architectural or design textures.

Transportation Network. The third element in urban transportation modeling is the transportation network, which includes the street layout, as well as elements that both encourage and discourage people from following one path over another. The more alternative routes that a network offers, the more difficult it is to accurately model transportation flows on it. Unlike commuting, though, some tourists may eschew a time-efficient route from their hotel to a major stop, in favor of a more indirect, scenic, or roundabout route that offers more opportunities for amorphous exploration and discovery, adding an extra layer

of complexity. Movement patterns are likely to be more easily predicted in small, compact destinations with few attractions and a limited transportation network than in complex urban or expansive rural destinations with multiple accommodation and attraction nodes (Page 1999). The range of movement options will also be more limited in destinations that have all of their main tourism products concentrated into one or a small number of nodes. Las Vegas is a good example, where the majority of attractions, hotel rooms, retail centers, and other facilities are clustered tightly together in the Strip. Few tourists venture outside of this node. By contrast, more complex patterns will be evident in destinations with multiple accommodation and attraction nodes, such as London or New York.

A destination's topography will also influence the siting of facilities and the form of the transport network, which in turn, will affect tourist flows. Movements in mountainous destinations intersected by challenging passes will be different than in flat destinations. Linear, point-to-point touring on clearly defined routes is more likely to occur in mountainous or island areas, while the potential exists for more dispersed and alternative routing patterns in destinations located in flatlands. Similarly, traffic congestion (often time-influenced), road and other construction, weather conditions, and traffic accidents can temporarily reshape the transportation geography of a place, and influence the itinerary.

Transport Mode. The fourth element of urban transportation modeling is the distribution of trips among different modes of transportation. Tourists are typically unfamiliar with and intimidated by the nuances of the public transit systems in the destination areas that they visit (Page 1999). However, this can vary with the place and with the type of tourists. Furthermore, many of the most popular destinations have special transportation systems specifically for tourism, which will have a direct impact on spatial behavior of both independent and package tours.

The selection of mode of transport consists of two elements: a practical one relating to forms of transport available and a perceptual one relating to the perceived costs and benefits of traveling on different forms of transportation. Four basic modes are available: automobiles (either owned or rented), commercial company transportation (especially for organized tours), public means (buses, trams, trains, ferries, and taxis), and walking. The distance to be traveled and the cost per trip are major variables that determine the preference of one mode over another.

Domestic tourism in most of the developed world is based on the private automobile and has sometimes been referred to as ''rubber-tire tourism''. Self-drive tourism is so prevalent that it appears to have been largely ignored in the academic research as a discrete topic in itself, although Jakle (1985) discussed its historical development in North America. In many destination areas, the automobile provides the greatest flexibility in route choice, attraction selection, and time use. Thus,

automobile use can be considered as a discrete variable in modeling intradestination movements. Tourists who do not have access to an automobile must rely on the local public transit system, specialist transport providers, or walking. All three will constrain movements to a certain extent. Public and private transportation is typically confined to specific routes, while pedestrian walking has distance limitations related to the strength and endurance of the walker. Rurco, Stumbo and Garnarcz (1998) cited difficult public transportation as a barrier to tourism participation, while Page has observed that only ''more adventurous tourists wish to travel on local public transport systems'' (1994:135). Some forms of public transport are more tourist-friendly than others, with public ferries, street cars, and subways being physically and psychologically easier to use. Bus networks, on the other hand, are often problematic for tourists who do not have the acquired local knowledge to negotiate them efficiently. Moreover, there is a real risk that people will leave tourism space and enter *terra incognita* (unknown territory) should they choose the wrong bus route or get off at the wrong stop.

Specialized tourism transport providers offer an alternative to public means. They include shuttle buses, hop-on-hop-off tour buses, limousines, tourist ferries, monorails, and the like. While they provide a more tourism-accessible environment, they also constrain the choices available since they follow set routes and stops delivering tourists to certain attractions. Taxis and pedicabs represent a further mode option that presents their own set of opportunities and constraints. They provide more flexibility than public or specialist tourism transport providers. However, cost considerations and concerns about the honesty of drivers, especially when visiting unfamiliar destinations where tourists do not speak the local language, can limit the use of these modes of transportation.

Intervening Factors

Urban transportation modeling provides the geographic foundation for understanding the movement of people from trip-generating places to destination places over a transportation network. No model will capture the actual path of every person. However, knowing the distribution of major, minor, and amorphous attractions, and how the available transportation network and modes connect these to different places of accommodation, and to each other, can allow for the more efficient planning of services to meet the needs of tourists and marketing of attractions and destinations.

The transportation geography of a place could be a sufficient planning tool if all tourists shared the same interests and sought to optimize their visits in the same way. However, their actual behavior in a destination can vary considerably, even if they might happen to share common motivations. Tourist behavior has been a major area of research interest (Walmsley 2004), so this body of knowledge can reveal the intervening factors that influence individual travel decisionmaking in local destina-

tion areas. The factors can be grouped into three: the size and expenditure of tourist time budgets; personal motivations, interests, and travel group composition; and tourist knowledge of the destination.

Tourist Time Budgets. Time spent in a destination area is arguably the single most influential criterion shaping tourist behavior because it can directly constrain or expand the number and range of potential activities available and the depth at which individual activities can be experienced (Pearce 1988). Truong and Henscher (1985) argued that time is one of the few absolutes, for it cannot be stored for use at a future date. The total destination time budget is usually fixed well in advance of arrival, and is difficult to modify once in situ. Because of this, how time is spent, rather than the amount of it available, becomes the key discretionary variable. Decisions on its expenditure often involve a trade-off between transit time and time spent at an attraction or place. Some tourists see time in an opportunity/cost framework, where greater transit time leaves less available at the desired objective (McKean, Johnson and Walsh 1995; Walsh, Sanders and McKean 1990). These tourists are ''outcome'' oriented, and seek to maximize time spent at a place by minimizing transit time. They prefer to follow the most direct routes and eschew trips requiring long transit times unless there is a substantial pay-off at the end. Others see transit time as a commodity that generates benefits in its own right (Chavas, Stoll and Sellar 1989). These tourists can be described as being ''process'' oriented, finding value in the journey as much the objective. They are more likely to engage in sightseeing, take indirect routes, and travel to outlying areas to explore a destination more widely.

Distance decay studies suggest that whether people value transit time as a commodity or a cost is a function of their total time budget, with those having more likely to treat it as a commodity (Greer and Wall 1979). Other factors may also influence its expenditure. Leiper (1989) and McKercher (2001), for example, showed how main and secondary destination tourists differed in their motives, consumption patterns, and activities. Main tourists have greater destination knowledge and make a stronger psychological investment in its overall role in providing a satisfying trip. As such, they consume the destination at a more intense level. Stopover tourists, on the other hand, tend to restrict themselves to visiting convenience-based attractions in well known nodes or along main transportation corridors. As well, differences were noted between first timers and repeaters, with the former keen to explore a destination, travel widely through it, and discover its culture and heritage. Repeaters prefer more social activities such as shopping, dining, and visiting friends and relatives (Fakeye and Crompton 1991; Gitelson and Crompton 1984; Lau and McKercher 2004).

Personal Factors Time. Budgets alone cannot fully explain variations in travel patterns. Haldrup (2004) used diaries to track daily the

time-space movements of second homers in Denmark, which he mapped in 3-D trajectory models. He found that these long-term tourists tended to prefer one of three styles or modes of movement: inhabiting (limited movement), navigation (destination oriented), and drifting (movement oriented). Each of these reflected a different narrative of how people experience place and interpret the meaning of leisure and tourism. Similar to this, Leiper (1990) asserts that tourists travel within their own discrete systems, even though these may overlap. In other words, each tourist has a distinct set of motivations, resources, accommodations, services, attractions, and movements, even though they may visit many of the same attractions during a trip.

Debbage (1991) suggests that personality types play a role in identifying the spatial behavior of tourists. His research in the Bahamas tested Plog's (1974) model of the psychological profile of tourists. He found that allocentric-types were more likely to leave the resort island in the early stages of their visit and were also more likely to take frequent trips off-island. Psychocentric tourists, on the other hand, tended to delay their departure from the resort area until later in the trip and also restricted their movement to nearby localities. These findings support Cohen's (1979) idea of strangeness versus familiarity and the need for certain types of tourists to envelop themselves in what he termed an environmental bubble of familiarity. Tourists who embrace the strangeness of a destination explore it widely, travel independently, and seek nontouristy activities. Others, though, are more constricted in their behavior and can find destinations to be confrontational. Their actions are more tentative or structured and they are more likely to restrict their movements to areas clearly marked as being tourist friendly. In extreme cases, they may not leave the safety of a resort or hotel, unless accompanied by a guide.

While personality influences behavior, so too does interest. Fennell (1996) found that special interest tourists consumed a destination quite differently from mainstream, generalist tourists. They were much more purposeful and directed in their actions and more willing to visit lower-order attractions with specialist appeal. They also spent more time at each place visited. Group dynamics can also influence movements, as a group of tourists must negotiate a mutually acceptable set of activities. An individual's preferences may be subsumed by pressure to conform to the group, especially in collectivist societies like those found in Asia. The sociocultural background of tourists also appears to have an influence.

Cultural distance may also affect behavior, with tourists from culturally proximate source markets seeking different attractions and traveling to different areas within a destination than those from culturally distant origins (Flogenfeldt 1999; Lew 1987). Alternatively, in one of the few destination movement studies that have been published, Keul and Küheberger (1997) followed randomly selected tourists anonymously in the old town area of Salzburg, noting the time spent walking and stopping. Follow-up interviews found no difference in patterns based on individual preferences, goals, and plans. This may indicate that the spatial behavior of tourists within clearly defined districts is

prescribed more by place geography and group conformity than individualism.

One major difference in how people travel is that between fully independent travelers and the various degrees of group-inclusive travelers. The full range of intradestination movement models is most applicable to independent tourists. Organized groups are more restricted in their choice of transportation mode, destinations visited, expressions of interest, and time budget allocations. While this varies from one organized tour to the next, it could be a significant variable depending on the destination.

Finally, the individual's own fitness level and the presence or absence of physical or age-related disabilities will moderate the intensity of their behavior. The relationship between age and activity level has been long recognized in tourism (Mill and Morrison 1985), with younger tourists seeking more energetic activities, while older ones prefer more sedentary activities. Recent research into the market of those with disabilities suggests that some disabled tourists prefer to engage in a smaller number of activities, require more time to travel to attractions, and need more time to get organized in the morning (McKercher, Packer, Yau and Lam 2003).

Place Knowledge. The information utilized when tourists conceptualize a place shapes their impression of what a place has to offer and, importantly, how experiences there are to be consumed (Dann 1996 as cited in Ryan 2000). However, the nature of the information search and the type of information needs that people have are variable and usually incomplete (Fodness and Murray 1997, Stewart and Vogt 1999). As a result, the tourist's ability to understand a destination and choose what activities to pursue is highly individualistic, though subject to considerable external influence. The advice of intermediaries can have a significant influence on tourist movements (Seaton and Bennett 1996).

The perceived renown of an attraction represents another set of movement considerations. An attraction's placement in the hierarchy of sites in a destination is often based on its ability to induce demand (Christaller 1963; Mill and Morrison 1985). Tourists feel obliged to visit primary attractions even if they are located in relatively out of the way places. However, the compulsion to visit diminishes and the purchase decision becomes increasingly discretionary as one moves down a destination's attraction hierarchy, until visits to tertiary, or the lowest order attractions, are typified by convenience-based, low involvement decisions, or happenstance encounters. Lower order attractions are also substitutable, meaning that if others providing a similar experience are more readily accessible, they will be chosen.

The dual concepts of distance decay and market influence this type of behavior. Distance decay theory suggests that demand varies inversely with the distance traveled (Bull 1991), while market access argues decline in demand is a function of intervening opportunities (Pearce 1989). Both theories assume that people are rational consumers and

will choose to use their time most efficiently. As such, they are unlikely to travel long distances for something of equal reward that is available closer to them unless the perceived payoff warrants the journey (McKercher and Lew 2003). Together, distance and the number of intervening opportunities will influence tourism decision making, especially for substitutable, lower order attractions.

It must also be noted that the destination is a nonordinary place and time for the tourists, while it is part of the ordinary, work-a-day world of the resident (Jafari 1987). Their destination knowledge is imperfect and, because of their short stays, most are unlikely to develop a comprehensive mental map of the destination (Walmsley and Jenkins 1999). Most destinations have clearly identifiable tourist and nontourist spaces, defined by a variety of markers (Leiper 1995) that signal to tourists whether they are welcome or unwelcome. Nontourist space is a form of *terra incognita*, an unknown territory that is not discussed in guidebooks and where tourists generally do not venture.

Table 1, summarizing this discussion, identifies the six broadly themed areas and their associated variables and impacts. The themes are divided into two types. The first are those that define the space (destination characteristics) and are based on elements of transportation modeling and tourism geography. Each destination has its own mix of physical geography, place morphology, and tourism infrastructure. The second set of variables have been shown to influence behavior (tourist characteristics) independent of the destination. These are the complex intervening variables that, when applied to the local destination geography, result in the range of tourist route itineraries that are likely to occur.

The destination characteristics closely follow the transportation modeling approach, with an emphasis on tourism landuses and transportation. The theme of transportation accessibility includes both the traffic network and transportation mode because these two elements of traditional transportation modeling are so closely intertwined from the perspective of the tourist. These characteristics include time budgets, motivations and composition of the tourist and tour group, and destination knowledge and emotional value. The difference between the motivation and the emotional attachment themes is that motivations and interests exist independent of the destination visited, even though they may be import in the destination selection. Emotional value, on the other hand, is dependent on the destination and thus is a form of destination knowledge.

ITINERARY PATTERNS WITHIN A DESTINATION

The destination and tourist characteristics outlined in Table 1 shape the path that tourists follow. The geometry of these movements can be modeled in two dimensions: territoriality and linearity. Territorial models (Figure 1) essentially reflect the impact and perception of distance and intervening opportunities, while linear models (Figure 2) reflect the geography of a place. With the exception of the no movement

Table 1. Destination and Variables Impacting Intradestination Movements

Themes	Impacts
Destination Characteristics	
1. Trip Origins/Accommodation Locations	
A. Clustered or Dispersed	Diversity and complexity of itineraries
B. Type: Hotel, Resort, Home, Other	Identification of geographic
C. Clientele / Market Segments	market segments
	Customization of services and products
2. Trip Destinations/Attraction Locations	
A. Number, Diversity/ Types, Hierarchy	Diversity and complexity of itineraries (including organized vs independent travel)
B. Clustering or Isolated	Identification of thematic districts
C. Intervening or Substitutable Attractions	Customization of services and products
	Importance of relative location to accommodations
3. Transportation Accessibility	
A. Traffic Network	Degree of freedom or
Dense / Concentrated or Linear	restriction of movement
Topography / Site Characteristics	Number of preferred and
B. Transportation Modes	alternative linear paths
Public, Tour Company,	Perceived ease of travel and
Self-drive vehicle, Walking	willingness to wander or explore
C. Quality, Ease, Congestion	Value of locations for development
Cost and Affordability	Variable access to attractions
Information and Signage	Transport mode options
D. Limitations/Barriers	or restrictions
Distance Decay	
Tourist Characteristics	
1. Time Budgets	
A. Trip Length, Visit Length	Number of activities or attractions
B. Time Value	that can be visited
C. Outcome or Process Oriented	Depth of participation in an activity
	Perception of acceptable itinerary distances
	Tolerance of transportation experience
2. Motivations, Interests and Composition	
A. Allocentric or Psychocentric	Selection set of acceptable attractions,
B. Special Interests or Generalists	including substitutable attractions
C. Recreation or Education Oriented	Perception of acceptable linear paths,
D. Age and Physical Disabilities	distances and content
E. Travel Group Dynamics	Freedom or restriction of movement
	Decision making process
3. Destination Knowledge and Emotional Value	
A. Information Sources, Gatekeepers	Emotional attachment to
B. First Time or Repeat Visit	destination or attraction
C. Primary or Secondary Destination	Relative appeal of attractions
	Perception of acceptable itinerary distances
	Selection set of acceptable attractions, including substitutable attractions

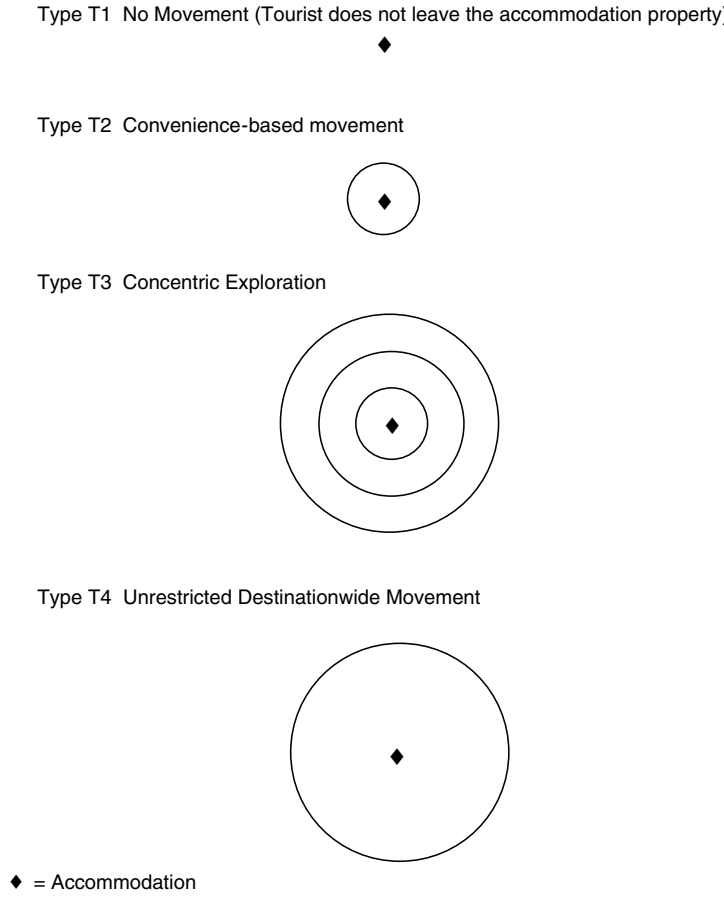

Figure 1. Territorial Models of Tourist Behavior in Local Destinations

(T1), every trip taken by a tourist has both territorial and linear path characteristics. The start point for both dimensions is the accommodation locus, (hotel, motel, hostel, resort, campground, friend's or relative's home or holiday home).

Territorial Models

The group of territorial models (Figure 1) shows variations in the distances that tourists venture from their place of accommodation. The relative distance of movement is represented by the rings surrounding the point of accommodation. These range from extremely restricted movement (T1) to completely unrestricted movement (T4). Destination characteristics, such as the relative location of accommodations and attractions and the availability and ease of modes of transportation, will affect the actual territorial form and true distances

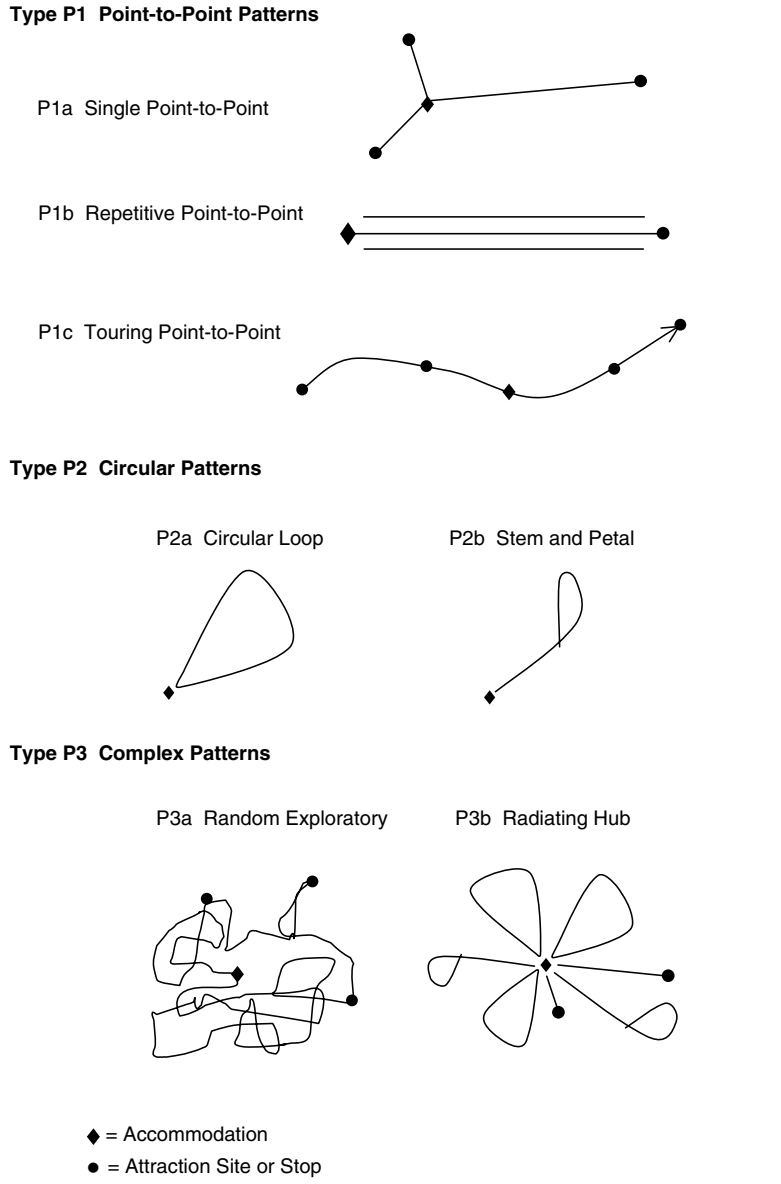

Figure 2. Linear Path Models of Tourist Behavior in Local Destinations

in a given destination. Most of the variation that occurs among the four types of territorial models is based on differences in tourist characteristics (Table 1). In general, as transportation becomes easier, time budgets, allocentric behavior, and destination knowledge increase, a tourist's territorial behavior is more likely to reflect types T3 and T4 in this dimension.

Type T1: No Movement. Some tourists never venture outside the confines of the accommodation property. This situation is most common at all-inclusive destination-resorts offering a comprehensive range of activities, services, and facilities designed to retain the tourist in-house for the duration of the stay. Typically, such movement patterns, or lack thereof, are observed in large resort complexes. No movement may also be observed in two other situations. It may occur in overnight transit stops, where the tourist travels directly to the accommodation property and, on departure, leaves the destination without touring it. Alternatively, some may feel too intimidated to leave an accommodation property, or may be advised against leaving for safety reasons. Debbage (1991) suggested that tourists displaying psychocentric characteristics may be more unwilling to venture beyond the safety of a hotel. In high crime neighborhoods and cities, hotel staff will often advise tourists not to leave a property without taking safety precautions.

Type T2: Convenience-based Movement. A convenience-based travel pattern is typified by visitation to attractions or participation in activities in the immediate area of the accommodation locus. This style reflects an extreme form of distance decay, where the tourist's willingness or ability to venture more deeply into the destination is considerably restricted. This type of behavior has been observed in the discretionary pleasure activities of some business and convention delegates, who use their small amounts of spare time to shop or visit attractions in the immediate proximity of their hotel. It may also be evident among those on transit, similarly constrained by time.

Type T3: Concentric Exploration. The concentric exploration behavior pattern reflects the movements of tourists who are initially uncertain and possibly intimidated by the destination. Displaying overt culture shock or psychocentric characteristics, their preliminary forays are tentative in nature and either confined to the proximity of the hotel or to the accompaniment of a tour guide. As they become more familiar with the destination, their ability to negotiate their new space, they venture further afield. Thus, this style can be likened to the shedding of one's environmental bubble and the increasing ability to consume the destination on its own terms. The concentric pattern can be much more complex than a simple circle. It can be multi-nodal, with ''safe'' areas being confined to the accommodation place and a small number of established attraction nodes. Movement within the safe bubble is usually restricted to walking, private vehicle, and specialized tourist transportation modes, while explorations beyond the safe zone add public transportation modes to the mix.

Type T4: Unrestricted Destination-wide Movement. For tourists who have a high level of information about a destination, much of which was gained from previous visits, the entire space may be perceived as

equally available for visitation. But even here distance-decay can impact tourist behavior, although this would be no different from the distance perceptions of local residents. An especially allocentric type could also exhibit this behavior through willingness to take risks and quickly master local forms of transportation. Mostly, however, it is the existential tourist (Cohen 1979) who is fully ''at-home'' in the destination who is most likely to feel uninhibited throughout the destination's territory. All forms of transportation mode are freely used by such unrestricted tourists.

Linear Path Models

Linear itinerary patterns have been identified by several authors examining interdestination patterns. Flogenfeldt (1999), Lue, Crompton and Fesenamier (1993), Mings and McHugh (1992), and Opperman (1995) have collectively identified 26 such itinerary styles, which can be grouped into four broad types: a single destination and return trip, with or without side trips; a circle tour with multiple stops, with or without side-trips from some destinations; a transit to a destination area followed by a multiple stop circle tour; and a complex combination of linear and circular trips from different hubs along a larger, multiple destination itinerary route. Of these, the first three patterns are logically evident in intradestination movements. Because one's accommodation place normally does not change during a single visit to an area, the fourth pattern would be rare.

Three types of linear path models are identified (P1, P2, and P3 in Figure 2). The point-to-point pattern (P1) follows the same path away from and back to the place of accommodation. The circular pattern (P2) generally follows different paths away from and back to the place of accommodation. The third category (P3) consists of complex and undifferentiated combinations of the point-to-point and circular patterns. These linear path models reflect the geometry of tourists' movement away from their accommodation point. They simplify the actual movement patterns that are shaped by the geography of a place. Furthermore, the linear path models are independent of territorial distance, can be undertaken with any mode of transportation, and can be scaled in combination with the different types of territorial models (Figure 2), with the exception of the no movement (T1) form. The different linear path model forms are not exclusive of one another, as tourists may display a combination of linear patterns over the course of their visit. In general, however, easier transportation options and increases in time budgets, allocentric behavior, and destination knowledge will result in linear paths that are more reflective of types P2 and P3.

Type P1a: Single Point-to-Point. This movement pattern is probably one of the two most common types. It involves one or more journeys directly to a desired stop and then returning to the accommodation

by the same route. No significant intermediate stops are made and no deviation from the most direct route is considered. This pattern maximizes the time spent at the stop by utilizing the most efficient transit path. The number of discrete accommodation-to-attraction journeys taken during a holiday depends on the length of stay, the spatial organization of the destination, the presence or absence of nodes of clustered attractions, tourist mobility, and available modes of transportation. Multiple single point-to-point trips could result in a hub and spoke pattern, centered on the accommodation. This type of pattern will be more prevalent in destinations with discrete but compact attraction nodes or with isolated primary attractions, such as theme parks, golf courses, or sporting venues. Tourists using public transport are more likely to engage in this type of behavior than are self-drive tourists because it is less complex than a circular route.

Type P1b: Repetitive Point-to-Point. This model represents an extreme form of the accommodation-to-attraction transit where tourists travel to the same stop a number of times during the course of their stay. This pattern can be seen, for example, among multiple visits to ski slopes, shopping/entertainment complexes, or large theme parks. It may also be common in smaller destinations that have one dominant attraction, such as a beach.

Type P1c: Touring Point-to-Point. This pattern is unique to tourists traveling through a destination. In this, one or more attractions are visited while arriving in the destination and approaching the accommodation place. The next day, the tourist departs the destination by another route and stops at one or more additional attractions on the way out. This pattern is most common for short, overnight stays at secondary or stopover destinations. ''Stops'' are convenience-based and limited to attractions located on or near major thoroughfares. This pattern has been observed in automobile tourists at regional Australian destinations (McKercher 2001) and has also been described by Gunn (1972) in Texas.

Type P2a: Circular Loop and Type P2b: Stem and Petal. These types of movement start at the accommodation point and include visits to two or more attraction stops in a circular pattern. Depending on the set of attractions visited and the established transportation network, this may be the most time- and distance-efficient movement pattern. It is used by most local organized tours, and even independent tourists often use this pattern. The primary difference between the circular loop pattern and the stem and petal pattern is the necessity of a transit leg to the area being visited. The use of a stem and petal pattern is a response to the geographic distribution of the destination's transportation system, accommodations, and attractions.

One form of circular loop might be described as that of the ''icon collector''—tourists whose primary objective is to see a destination's most important sites at the top of the attraction hierarchy. These are more interested in the tourist gaze (Urry 1990) than in engaging the destination at a deeper level. As a consequence, this movement style it is likely to be packed in a tour and prevalent among short stay or first-time tourists with limited time budgets.

Type P3a: Random Exploratory. This model could be considered the antithesis of the point-to-point, circular loop, and stem and petal pattern of movement. Whereas the tourist exhibiting these other patterns undertakes a purposeful and systematic exploration of the destination, individuals demonstrating the random exploratory movement show no or only a modest pattern in their actions. Personality style may influence this type, as allocentric tourists who eschew large environmental bubbles might have a higher tendency to wander. They are flexible, opportunistic, and process oriented. While on the surface the pattern may seem chaotic, there may very well be an underlying logic to their movements, which are defined by the microgeographies in the experience of place.

Type P3b: Radiating Hub. This pattern is probably the other most common movement pattern (along with the single point-to-point). Most tourists who have some reasonable amount of time in a destination will take several trips from their point of accommodation. Some of these may be point-to-point, but others will be circular loop and stem and petal patterns, and there may even be one or more random explorations. The accommodation serves as a ''hub'' for these diverse trips of varying length and motivation. The result is more complex that the single point-to-point pattern, which can also have a hub characteristic.

The number of discrete trips made will depend on are the length of the stay, the spatial organization of the destination, distance decay considerations, the valuation of time, and the tourist's special interests. Radiating blooms will be more common among process oriented individuals and first-timers, and main destination tourists who wish to explore the destination thoroughly.

CONCLUSION

The purpose of this paper was to contribute to the developing field by identifying factors that influence the intradestination movement patterns of tourists, and to model the range of resulting itinerary patterns. The models were developed deductively based on an examination of how intervening factors that have been previously identified in the urban transportation modeling and tourism literature might influence movement in a local destination. The implications of research in this area can be significant, especially for destinations that

are highly dependent on tourism and for which tourists comprise a large proportion of vehicle and pedestrian movement. Three areas in which knowledge of intradestination movements can have the biggest impact include transportation planning, product and image development, and tourism impact management:

Transportation Planning. Knowledge of tourists' preferred and actual daily itineraries, and the factors that influence those itineraries, can help transportation providers to meet their needs more efficiently, as well as to better coordinate travel with local transportation flows. Movement information can also be used to identify bottlenecks and unnecessary barriers in the flow from places of accommodation to attractions and other destinations. Van der Knapp (1999), for example, used GIS (geographical information systems) and trip diaries to visually and dynamically simulate tourist distribution densities through time in the Netherlands. More sophisticated modeling of behavior, similar to transportation modeling, can also be used to generate ''what if'' scenarios that simulate changes in the transportation and tourism infrastructure (Itami and Gimblett 2001).

Product and Image Development. Knowing which tourists prefer which paths and destinations can be used to better define existing attractions, plan new ones and market them more effectively. Knowledge of the actual routes of tourists can be used to define the boundaries of districts and nodes, as well as their most appropriate gateways. This information can be used to develop new attractions and products along common routes and in the districts and destination nodes. District/node knowledge can also be used in image development. It is common for different segments to be clustered spatially in districts and nodes within a destination (Lew 1991). A more comprehensive analysis of such clustering (along paths and in districts), and how each segment relates to others spatially, can help to create place identities, market niches, and more clarity in an overall destination image.

Impact Management. Tourism impacts tend to occur when more tourists frequent a place than it can sustain. Time and space knowledge of the routes that they most frequent, and the destinations that they most visit, can be used to identify time periods and locations that exceed their capacity and have the potential of causing negative social, environmental, or cultural impacts. Alternatively, underutilization patterns can also be identified, and management plans can be developed to mitigate negative impacts by shifting utilization from heavy periods, routes, and locations to alternative times, paths, and places.

It may well be that free market service providers are already instinctively responding to meet the transportation, accommodation, and attractions needs and interests of tourists in a way the minimizes costs,

wasted time, and frustration on the part of the tourists, while maximizing the economic benefits for the community and the overall experience of everyone involved. While certainly not the entire picture, understanding tourists' behavior, and in particular how they negotiate space, time, and place is a huge part of planning for a successful tourism industry in a local destination. A

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