CHAPTER 7

Conclusions

The time–space convergence of time lines can be applied to describe a spectrum of trips through space, both real and virtual. This does not apply to all trips, but only to those with a distance decay metric from time-discounting spatial opportunities. This covers walking from a parked car to a shop, long distance plane travel, driving a car to a shopping centre or virtual trips through the Internet. A corollary of this distance decay is a hierarchical basis to spatial opportunities. There are hubs where traffic is concentrated in a network, whether at particular airports, routers or even within a supermarket's floorspace. Behaviour is not governed by random walks in space, but by distance minimisation strategies. The causes for this are different. For example, shoppers use distance minimisation as a behavioural strategy to minimise the total effort in shopping. Alternatively, for the Internet, the routers are programmed to seek least distance paths through the network, particularly at times of peak congestion. Nevertheless, the time-space distributions are the same in these situations since, firstly, there is the gravity model of spatial interaction and secondly, a periodic function defined by a time boundary. These interactions occur at different spatial and time scales. What is the common connection? The answer is that the model uses the same mathematical operators to deconstruct space and time interactions. Referring to the sentence analogy, there may be different subjects and objects, but we are using the same 'verb' in the spatial 'sentences'. What consumers and programmers have in common is the way they partition space and time. This is the essence of the time-space convergence for trips.

The RASTT model has been applied to the debate on the deregulation of trading hours of shops in Australia. It endeavours to answer the question: what happens to the spatial distribution of shopping trips when opening and closing times are increased relative to the 168 hour boundary of the week? Since the deregulation of trading hours in the UK, Canada and Australia, there appears to be a long term vacant shop problem in many town and suburb centres. The analogy of changes to blood and blood flow affecting vital organs is apt. Declining retail precincts are a symptom of a major re-structuring of the flow of consumers to other retail localities. The loss of passing trade has meant a loss of small business viability in many of these localities. Baker (2002) argued that until the advent of the RASTT model, such an event appeared to be coincidental, but further investigation in the Sydney Project, in regional New South Wales and in the UK, suggests that extended shopping hours is one mechanism for an equivalent expansion in the market penetration of planned shopping centres and supermarket anchors. This further contributes to an oversupply of aggregate floorspace, particularly after new retail developments. Consequently, this relationship has not been appreciated in the Draft Retail Policy for NSW (1996) and Revised PPG No.6 in the UK. 'Where', 'when' and 'how often' consumers shop have fundamentally changed with shopping hour

liberalisation and the model suggests that the impact of time boundaries is significant in the structuring of trip assignments to a retail hierarchy. Further, while local economic environments may also be important, the on-going nature of the failure of previously successful small business and high long-term vacancy rates (greater than 10%) in many in-town situations, suggests a more fundamental problem.

The RASTT model provides one explanation for the problem, where deregulated shopping hours continually allow more mobile and affluent households to access larger retail units at the expense of smaller establishments and local shopping. The relaxation of time lines at retail centres has resulted in a re-positioning of trips to access a wider choice set of shopping opportunities at different locations. Ferris (1990) argues that distance and opening hours substitute through their effect on shopping time, and this manipulation of time boundaries implicitly confers the ability to restructure the use of space. The consequence is very important for retail planning. As Ferris (1990, 183) has noted:

'An alternative to regulating time is to regulate space.'

There is a fundamental relationship between the regulation of time and the use of retail space and this is a significant conclusion. Unfortunately, planning legislation has not appreciated this interdependence.

The insights from this research come from a particular type of spatial interaction model and it offers a way of studying the flows of traffic, locally, regionally and globally and how it can change over time. It uses a differential equation, not used in the physical sciences, where time is a relative measure to a boundary, rather than taken to infinity. This allows for the study of how time impacts upon spatial distributions. The corollary to this time partitioning is the gravity model and if this assumption of limiting time is valid, then we should observe gravity-type interactions for walking from a carpark, driving to a shopping centre or 'surfing' the Internet. This type of distance decay has been examined empirically in each of these situations and there is a strong case for the validity of the distance minimisation assumption for each context. There are other types of spatial interaction not directly tested in this project, such as, space-discounting shopping opportunities through time minimisation strategies. Nevertheless, time-discounting behaviour is very important, particularly when it can explain processes found in a spectrum of origin-destination trips from walking from a carpark to 'surfing' the Internet.

An important question was asked in Chapter 1 as to whether technological advances in production and transportation have led to a situation whereby there has been an 'annihilation of space by time'. Is global access of the Internet the ultimate mechanism for the annihilation of the 'tyranny of distance'? The results suggest that there is still a distance decay effect in the Internet as routers seek to minimise