THE RESEARCH ON TRANSPORT PROVISION MANAGEMENT AND PLANNING OF URBAN STRUCTURE

城市交通供给管理与规划设计研究（英文版）

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ABSTRACT

Traffic is the main structure of the application in urban design. This thesis explores how transport provision can be used towards the design of urban structure and hence the physical layout and design of urban areas.

The thesis considers different conceptions of urban structure, and how these relate significantly to transport. The relationship between history and modernity in transportation development. Although the new traditional urban design does not suggest the traffic layout and road grade as the dominant urban structure, there is no better way to replace the traffic structure at present, so we remain as the preferred structural form.

Therefore, based on the basic nature of urban structure, we put forward the obvious form types such as urban traffic network type and line type, and discuss the problem of traffic structure at different levels. Layout composition. The difference between structure configuration and road hierarchy.

The thesis develops a method of route structure analysis, appropriate to route networks at the urban scale, which can distinguish both network type and route type, in relation to key properties such as connectivity. A series of example networks are analyzed, and graphical constructs devised which can identify those structures and route types considered desirable by contemporary urban designers.

The route structure analysis also allows exploration and explanation of patterns characteristic of traditional street networks, suggesting a theoretical basis for the evolution of typical forms. Relationships between 'programs' of structural formation and resultant patterns are suggested.

This suggests a way forward for the design of urban structure based on a bottom-up, take the standardization traffic as the direction, which has the flexibility to create a diversity of forms, while incorporating the robust and transparent means of generation of conventional highway

engineering approaches. This offers an alternative to master planning of urban structure – whether in the style of monolithic modernism or neo-traditional urbanism.

An integrated design framework is devised which draws together the analytic and design components of the thesis.

Contents

Chapter 1 Introduction

The Athens Charter proposes four basic activities of the city – living, working, recreation and transportation. The figure shows the basic relationship between the four basic urban activities and the urban land use structure and the urban transportation system. Four basic activities of city like live, work and recreational activities are to be carried out in a fixed place and each has a fixed target, the arrangement of land use is the absolute land use, and the reciprocal relationship between them is the relative land use between each other, from the position and quantity relationship of urban land layout structure, reflects the static function relations of the city.

Buchanan's vision of a comprehensive urban design, led by transport, repurposed part of London into a vast mega-structure that vividly illustrates the "new urban form" that motor vehicles demand. Among other things, this envisages the city's urban highways and multi-storey car parks, towers and pedestrian platforms set up in the maze system of distributor roads and underground services. It was noted that this approach was "almost revolutionary", but in fact the design was later highlighted as "the revolutionary, even disastrous, impact of modern transport planning on the form of towns".

Today, both transport and urban design have a high profile, and their conjunction increasingly appears crucial to contemporary planning. This thesis sets out to explore how transport provision can be used towards urban structuring and hence the design of urban areas. In doing so, it cannot avoid the legacy of Traffic in Towns, nor the intervening reactions against its revolutionary impact.

It turns out that urban design methods dominated by highway design are "disastrous". In urban areas, the actual consequences of highway projects are not limited to the destruction of existing urban structures, such as invasion, separation, demolition and wither, which can be collectively referred to as urban destruction. They also include the negative effects of highway

engineering as a formative urban layout. In fact, this means that the methods of highway design tend to lead to monotonous or dysfunctional layouts, resulting in a lack of identity, vitality or urbanity in new development. Although the cost of urban destruction is tangible, it is also an opportunity to create more ideas in the design and create a good urban environment.

The loss engendered by this creation would be all the more tangibly felt here, due to being directly juxtaposed with an existing, functional city quarter. A bustling commercial street, would be transformed into a multilane motorway, terraced and flanked on either side by parallel collector-distributor roads, forming a traffic canyon some 100m wide, apparently accommodating a dozen lanes of traffic. Its four level intersection would occupy an area that could accommodate a hospital or university.

Such retrofits are hardly considered today. Even by the early 1960s, the wisdom of integrated redevelopment, traffic-led urban design and top-down planning was questioned, which Jane Jacobs linked to the failure of urban planning. Christopher Alexander then similarly questioned the strict simplicity of a hierarchical urban system.

In Buchanan's case study of design, the overlap between the street energy that Jacobs pursued and the urban life that Alexander pursued would disappear. Tottenham Court Road's role as a 'seam' between the cities of Fitzrovia in the west and Bloomsbury in the east will be lost as these areas will be separated and isolated. Shops will be stuck on the deck of the sidewalk, far from passing trade. Buses will be packed in the middle of the regional distributor level. The familiar urban "pattern" of a grocery store next to a bus stop and a bar on the corner will disappear.

Today, of course, the rhetoric of the 'motor age' has been replaced by the rhetoric of sustainability and New Urbanism. Sustainable transport modes and neo-traditional street patterns are in vogue. The 'monolithic modernism' of highway engineering and car-oriented urban 'solutions' are on the back foot.

However, Buchanan's basic blueprint is: the core principles of layout and the "hierarchy" of roads, and positive relational functions, urban morphology and structure, living in current theory and practice. His design idea is not only to coordinate the urban traffic, but also to put forward the basic blueprint of the urban structure based on the traffic system, showing the possibility of "traffic architecture". In a big sense, we still build towns like this.

The UK's housing development in 1999 exceeded expectations and its expanding needs

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urgently needed to reconcile the aspirations of contemporary urbanism with the functional structure of transport supply. This poses a challenge for all designers: it's not just about where to build new housing, it's about all the design forms associated with it.

Yet, despite present good intentions to prioritize sustainability, and the desire (at least among urbanists) for a return to more traditional urban forms, achieving these is not straightforward. While the destruction of central London might no longer be contemplated, it would be difficult to actually create a Fitzrovia or a Tottenham Court Road today. We could not create the exemplary urbanity of traditional cities such as London.

This, then, represents the stimulus and the challenge set for the research. Accordingly, this thesis will examine relationships between transport and urban structure, and hence explore how transport can contribute positively to the structuring of urban areas in a way appropriate to today's needs. This means reconciling the functional needs of traffic with those of sustainable transport modes and with wider urban design objectives. In doing so, the thesis must go beyond the rhetoric of contemporary urbanism, to the root of the urban structural problem, and develop an approach which can address today's ends.

1.1 Objectives

The particular concern of the thesis is the contribution of transport provision to urban structure, and hence the physical layout of urban areas. This focus on the *structure* of cities, and the transport structure at that, may be regarded as the definitive scope of the thesis. The research can ultimately contribute to the better design of cities, although the approach of this thesis represents just one possible way of doing so. Within the chosen scope, however, a substantial exploration is possible, and a clear sequence of objectives and sub-objectives may be identified.

These themes are the urban design centered on the urban structure proposed by the Shanghai cooperation organization, and the physical layout provided by transportation.

Therefore, our purpose is how to design the urban structure, especially the layout of residential area in the transportation network paper.

How does transport relate networks be structured to urban structure?

What are the desired? By what means should properties of network transport-constituted urban structure?

How to describe network? How to explain existing urban structure?

How has desirable urban network forms relate to structure traditionally been urban functions? In chapter 1, our goal is divided into two concerns: the relationship between traffic and urban structures, and the structure of transportation networks. The traffic network structure further solves the expected attributes of the urban structure and the methods to realize these attributes by design. These, in turn, raise several more specific questions about describing and interpreting network structures. Although these more detailed questions do not need to be explicitly raised at the beginning of the investigation, they will be effectively presented during the study, and they play an important role in linking the arguments and influencing the arguments.

In fact, our research can be viewed in two distinct but intertwined ways. The first part is the "design debate" which has to do with contemporary concerns such as how to integrate transport supplies and urban design, what urban structures are desirable, and how to design them. The second part is an in-depth investigation of "the nature of the urban structure", what it is, how it is described and analyzed, and how it explains the observed structure.

In a sense, urban structural design is included in the overall debate on urban design. The urban structure is a relatively abstract and theoretical part, while the design debate is more directly related to the contemporary design environment. The debate of design idea gives the purpose and relevance of urban structure survey, while urban structure provides some "solutions" for urban design and provides information basis for the debate of design idea.

The research topic is described and discussed from the whole urban design, which is integrated into the whole design concept structure. The chapters are interrelated, rather than an independent discrete theme.

1.2 Scope

In the introduction part of the paper, a series of extensive problems are proposed, and the background is set for the research topic, from which a more detailed set of goals is determined. This section provides an overview of the scope of a range of related theories and more precisely frames the subject areas covered in this article.

1.2.1 General

The urban design debate is an integral part of the norm, and the urban structure idea it proposes should first be considered as a desirable position. The position of this paper is

based on the expectations and goals of contemporary theory and practice. These aspirations are seen as embodying the broader social, cultural and economic contemporary wisdom of urban life and are seen as sustainable. Therefore, this paper does not recommend what is a good or bad urban structure, but aims to help better understand the urban structure, thus providing a design method that can be customized for various potential desirable urban structure results.

We focus on the design concept. From the research limitation of the design principle and method, the specific design idea or design specification without the solution is revised. Therefore, by adjusting the research basis, this paper makes corresponding suggestions for the subsequent theoretical research methods and existing design management, thus proving its practicability in principle.

1.2.2 Scope of Urban Structure

Urban structure refers to the physical and spatial structure of urban and regional architecture. In essence, the urban structure is regarded as the continuous structure of urban road and flat space as the medium of public accessibility. This is reflected in various aspects in the structure of public space, street pattern and the ultimate traffic network. In the discussion, we will further emphasize the differences between different transport network structures and mobile space. Urban structures are seen as distinct from urban forms and urban structures, which are thought to deal more with three-dimensional forms and their surfaces.

In this paper, we do not pay attention to the conceptual interpretation of urban structure, such as social structure, economic structure, administrative or institutional structure, will not be included in the scope of this study. Of course, this is not to say that these structures are important or to deny their possible relationship to physical structures. However, conceptualized urban structure may be conceptually excluded from the physical aspect of the structure, which is the subject of this study, which we have clearly defined.

1.2.3 Scope and Interplay of Policy Spheres

The goals of urban planning and design will include a desire for sustainable cities, urban quality and vitality. The broad goals of transport planning will include integrated transport, which aims to improve efficiency and sustainable mobility. To some extent, there is consensus and reinforcement. Sustainable mobility and sustainable urbanization can support

each other. But there are also conflicts in some areas, which are defensive responses to the main goal of one design field in another.

There is great concern among urban designers, traffic designers and environmental engineers about the negative impact of traffic and infrastructure on urban areas. Because it affects the quality and vitality of the city. The urban designer's expectation of physical design in urban planning makes certain road patterns and pedestrian priority get attention, hoping that it will not affect traffic efficiency and traffic safety.

Overall, our research focuses on the interaction between transport supply and urban design, rather than a single issue entirely within these two areas. Therefore, within this framework, there will be two specific areas of focus. First, it will focus on the role of transport forms that can help achieve urban goals, including urban quality and vitality as well as sustainability. Second, it is natural to focus on possible points of contention when considering the interaction between the "main approach" and the "respons". These arguments are effectively reflected in the response.

Firstly, there seems to be a consensus among disciplines that the destruction of cities must be avoided. Traffic planners and engineers today take the environmental impacts seriously and effectively and view them as parts of their concern that in the past, the urban consequences of road construction and other infrastructure interventions could be considered irrelevant or incidental.

Secondly, to some extent, extensive work has been done in this area, such as the entire field of environmental impact assessment. Similarly, the desire to maintain safety and efficiency is a frequent concern of transportation planners and engineers.

Urban planning designers in the design of the transportation infrastructure and urban route network structure and network design, have found that the creation of the design concept will help urban layout and optimization of settlements, but in terms of transportation function, giti on liquidity, in particular, the lack of promoting the quality of fine designer or urban planner.

It is not usually the responsibility of the traffic designer and the traffic engineer to effectively solve a series of problems in urban life, which is actually a whole problem in urban planning.

This has perhaps only managed to get underway since the mid 1990s, which explicitly links the design of built form with road layout considerations. Even so, to date, efforts seem to

have not got far beyond recognition of the oblem2. This is therefore very much a contemporary and pressing issue, and one requiring attention.

1.2.4 Research Scope

Based on the current policies and practices of the UK as the research background and as a whole of urban design, this study was conducted in different countries and locations of different cities, including analysis of some cases from all over the world. Most of the design analysis, design principles and practical results of the study can be applied to different design concepts, not limited to the UK. This study starts from the traditional idea, the mixed use of modern road and comprehensive traffic, as well as the design layout of the traffic and pedestrian priority in residential areas, as a general discussion, thus promoting the innovative development concept, and does not make the design scope specific in the UK.

1.2.5 Scales of Consideration

The research mainly focuses on the scale of "urban blocks or blocks", which is the typical scale of urban design considerations, between the scale of individual buildings that architects usually consider and the scale of complete settlements or traffic networks that strategic planners or traffic planners consider.

Form of the city, or part of the city, is considered to be more important than the overall shape and form a complete city or town, because in most cases, the urban construction gradually upward or outward, rather than the usual in creating a plan and execution behavior. Basically, the scale of the structure in design is the most effective analysis, as the structure and design process are intertwined. This usually means the size of the design block and quarter.

1.2.6 Focus on Roads and Streets

While the study is nominally about the supply of urban traffic, it will focus primarily on the street network, which combines the road network and the extended pedestrian network. These are major concerns because they directly constitute the public domain and are the main backdrop for most urban design.

Other networks, such as railways and waterways, are less important. While railways have a practical impact on urban structures (and can lead to urban destruction), they are generally

not in the public domain. Although waterways have an important influence on the formation of urban structures, the influence of traffic arteries is only a part, and the product of urban design is even less. In other words, these networks are less important to our current research. Railways and highways, too, are irrelevant to the topic, since their networks are often rough, meaning they tend to be only linear interventions at the local scale of urban design. Configuration, non-linear characteristics are reflected in local scale, such as route bifurcation, or the radial and orbital route between exchanges, which tend to be associated with larger demand patterns, such as the relationship between addressing the overall distribution of urban functions, or geographic settlements, rather than any generalisable configuration pattern. In contrast, there are enough generic roads and various types of streets, such as long, short, motorized and pedestrian streets, to justify their research, as they can be combined into different types of networks in multiple ways.

However, general "transport regulations", rather than "road regulations", are fully retained, since the inclusion of railways and certain other means can be implicitly considered within the scope of this paper.

1.2.7 Key Elements of Transport Modes

This study considers a variety of transportation modes and how these modes can adapt to the distinctive sustainable development concept of urban areas in terms of functional design.

In urban environments, every mode of transport takes up an "evolutionary factor". The public transport system, for example, thrives in densely congested corridors, where competition is fierce in areas where traffic is not heavy. The penetration of the bus in the suburbs is more flexible, although it may have only minimal use in areas with the lowest population density. However, the car is well suited for the dispersed suburbs, and from a Evolutionary factor perspective, the car has also helped drive suburban development. Pedestrians are restricted to a certain extent and disadvantaged by long-distance traffic in the suburbs, but we can find a development market that no other model can match. Finally, we see how some models are "extinct". This combine the disadvantages of low speed and fixed routes. It now exists only as a museum.

In some cases, new modes of transport have evolved to adapt to new urban conditions.

Bus Rapid Transit is a new public passenger transport system between Rapid Rail Transit and Normal Bus Transit. It is a unique urban passenger transport system that utilizes modern

bus technology to cooperate with intelligent traffic and operation management (integrated dispatch system), opens up bus special roads and builds new bus stations, realizes the operation service of rail transit mode and achieves the service level of light rail.

These latter cases represent solutions dealing with the 'mobility-led' problem of serving urban areas with transport. However, the problem can also be approached from the other side: the design of the built environment. Physical planning (embodying urban design and transport provision) can change the 'ecosystem' of the different modes, as it were, to favor one type over another, whether by helping to 'feed' public transport, or by differentially favoring routes for non-motorized modes, or, at least, by ensuring that there are plenty of convenient niches where walking and cycling can naturally flourish. It is this angle – the design of transport networks, in relation to urban structure, rather than direct treatment of systems of transport modes – that is the concern of this thesis.

Urban Traffic comes from urban land and comes back to urban land. The operation of social life and production activities between urban land use, as well as the connection between living, working and leisure activities have generated traffic activities, which requires a city transportation system to shoulder this task. The urban traffic system includes the urban road system, the urban transport system and the traffic management system, in which the transport system is the traffic operation network, the road and other facilities are the traffic access network, and the management system is the guarantee of the normal traffic operation. The urban traffic system depends on the dynamic relationship between urban land use, which reflects the dynamic functional relationship of the city. Transportation plays a core role in the four basic urban activities. Urban planning is not only a reasonable arrangement of urban living, work and open space, but also a guarantee of efficient and convenient transportation system. Urban traffic and road system planning (urban traffic system planning) is a core issue of urban planning.

The interpenetration of high-speed, long-distance and near-distance transportation systems makes the urban transportation system interact with each other, forming a multi-functional and comprehensive transportation system mode, which is also the prevailing mode at present. However, public transport and pedestrian transport do not necessarily provide the advantages of distance and crossing at the same time, so they are often complementary, forming a "replacement" system of cars together.

All levels of urban roads are the framework of the organization of the city, but also urban

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