THE SOCIAL LOGIC OF SHOPPING:
case study New Delhi -
a syntactic approach to the analysis of spatial and positional trends of community centre markets in New Delhi

086

Amit Kumar Sarma
The Bartlett School of Graduate Studies, UCL

Keywords:

Space syntax
Interface of exchange
Retail analysis
Spatial configuration

Amit Kumar Sarma
The Bartlett School of Graduate Studies, University College London, 22-24 Torrington Place London
sarma.amit@gmail.com

Abstract

This paper examines planned community markets in New Delhi, India and proposes that the spatial and configurational properties of the markets as embedded in the urban grid can, in part, explain their observed social and economic differences. Shopping is considered as a social activity, and the choices made by shopper and shop to visit or to locate in a particular area together constitute an 'interface of exchange'.

The spatial characteristics of each market explored using Space Syntax [i] theories and methodologies are linked to observed pedestrian movement, discriminated into high, medium and low income groups and the mixture of shops categorised as multipurpose and comparison (Eaton & Lipsey 1982). These three strands of information describe the existing spatial organisation of the city, existing movement and usage patterns within each market and the volume and type of goods and services offered. The analysis of these descriptions, individually and collectively, links spatial features and the economic act of shopping to the social realm of markets and consumption.

This paper argues that spatial properties of Choice and Integration inform the interface between shop and shopper, and implicates to-movement, through-movement and the distance at which the urban grid affects such movement as prime influences of this interface.

This paper will, therefore, seek to draw links between space, society and the act of shopping. These links demonstrate that an underlying logic exists to the observed differences between the markets, and that spatial factors play a fundamental role in this differentiation. This logic is mediated by the movement and mix of social groups in space and the social importance attached to shopping: therein arriving at a Social logic of Shopping.

Introduction

This paper describes a case study of Community Centre markets in New Delhi, in light of the spatial constituents of their socio-economic differentiation. The question asked is whether the differences in the character and mix of shops and in the volume and mix of movement in the markets can be partly or wholly explained by the spatial properties associated with the markets. The paper examines this question in light

of theories of consumption, and links the network properties of urban space to the sociality of shopping, and through this to the economic realities of the market place.

The hypothesis is that spatial structure not only affects gross movement, but also plays a role in determining the constitution of that movement. This differentiation in movement creates differentiated social potentials for markets, termed the 'interface of exchange', which develop different forms of shopping in order to tap this potential. This hypothesis is tested against the specific case of Community Centre markets [ii] in New Delhi, India.

086-02

The perfect market (Marshall1920) is 'a district, large or small, in which there are many buyers and many sellers all so keenly on the alert… that the price of a commodity is always practically the same for the whole of the district'. The individual is considered to be rational and utility-seeking in order to maximise pleasure (Smith 1776). This definition implicates space, time, the ability and desire to exchange goods, the awareness of commodities and their prices, but emphasises utility as the prime determinant of consumption.

Subsequent writings, however, implicate a social perspective, with Veblen (1925), arguing against human rationality. With conspicuous consumption and conspicuous leisure as the prime motivating force behind consumption, he argued for a shift of emphasis from the means of production to the means of consumption. For Bourdieu (1984), consumption is a way of perpetuating and naturalizing social (class) distinctions. He stresses the importance of class position or social location as a determinant of taste. Douglas (1979) also argues for a social approach where the social value assigned to a commodity provides the rationale behind individual choice. Goods are treated as markers of rational categories and behaving in a rational manner implies making physical, visible statements about the values to which the consumer subscribes. Commodities constitute an intelligible universe where individual choice informs lifestyle choices and identity of the consumer.

This idea of individual choice perhaps originates from Simmel's (1907) ideas of value as a social entity. He describes value not as an inherent property of objects, but as a subjective judgement about them. Objects, he suggests, 'are not difficult to acquire because they are valuable, but we call those objects valuable that resist our desire to possess them'. He further goes to suggest that the value of an object does not originate from the enjoyment of the object but of the distance between the object and the enjoyment of it: to be attained by the 'conquest of distance, obstacles and difficulties'. This distance could be physical distance, scarcity, cost, time, renunciation or sacrifice, and is overcome in and through economic exchange.

Daniel Miller (1987) proposes an approach where object groups relate to divisions that may or may not relate to exiting social groupings. The distinction between goods may relate to differences within social categories as well as similarities between the categories themselves. Douglas (1997) extends this argument and suggests four categories of shoppers independent of class, gender, creed or ethnicity identified through their consumption and points out that consumer preference, either for a particular product or against all other products, is a powerful force in the understanding of consumerism. Retailers alter themselves to take into account consumer preferences, rather than the other way round. Miller (1998) also suggests that the act of consumption expresses more than just identity or position: his ethnography of a shopping street in north London suggests 'how shoppers develop and imagine those social relationships which they most care about through the medium of selecting goods' (1998). He

argues that shopping exists between the concepts of the 'treat' and 'thrift', and that commodities are used to constitute the complexity of contemporary social relations.

However, as Giddens (1981, 1984), in his theory of Structuration, suggests, all social relations are produced and reproduced only by being realised in space-time, through a system of presence and absence in space. Hillier and Hanson (1984; Hillier 2001) also highlight this realisation in space, but go on to suggest that space itself has structural properties. Space, they suggest, is both the generator and the medium of movement and co-presence. Space then creates and controls the interfaces between different categories of people and the objects they interact with.

Central Place Theory (Christaller, 1933) was one of the earlier attempts to explain the size, nature and spacing of cities as central places supplying goods to the surrounding population. He classifies goods in either lower or higher orders, where lower order goods represent those which consumers frequently need and are willing to travel only short distances for, while higher order goods represent those which are needed less frequently, and require further travel. A result of these consumer preferences is that a system of centres of various sizes will emerge over space, each with goods according to its position in the hierarchy of centres. Works by Losch [iii] and Heilbrun [iv] extend the argument with Hielbrun developing the widely used gravitational model, where individual units are kept in place by quasi-gravitational forces between them.

Eaton and Lipsey (1982) suggested a model based upon cost minimising consumers, in addition to the simple demand economies considered by Christaller. They set out to show that the clustering of firms selling heterogeneous goods can be derived from a model with profit maximising firms and cost minimising consumers. Both Cristaller and Eaton-Lipsey (E-L) suggest that a hierarchy of central places can exist in equilibrium, and that the highest level centre will offer all goods sold at a lower level. While the Christaller model suggests equidistant centres, E-L's model does not depend on regularity of spacing. The main difference between the two models is the assumption by E-L that the demand for a market is dependant on multipurpose shopping behaviours and that the consumer minimises transportation costs on each trip.

West et al (1985) demonstrate the efficacy of the E-L model in a test case in the city of Edmonton, USA, where they differentiate between markets on the basis of customer base and the extent of locating near other firms that sell the same or different goods. Their thesis suggests that the position of a shopping centre (or market) in the hierarchy from central business district to local neighbourhood centre can be correlated to the proportion of shops in each category [v]. They categorise shopping either as Multipurpose, Comparison, a combination of Multipurpose and Comparison, and Single Isolated Purchases.

A major drawback of these theories is the absence of any element of urban morphology. Neither model utilises theoretical or mathematical descriptions of the city, nor any of the associated issues like differentiated population densities, accessibility or movement patterns. Hillier and Hanson's (1984) perspective on the nature of urban and architectural space permit their objective and rigorous mathematical description. The method involves representing the open space network of a city as a line graph having the fewest number of longest straight lines that pass through all spaces, and complete all rings, with streets represented as nodes and intersections as links. This map is

termed an axial map and can be used to describe characteristics of individual spaces relative to all other spaces in the system.

Hillier et al (1993, 1987, Hillier, Iida 2005) describe two types of movement: to movement and through movement, and suggest that both are affected by the configuration of the urban grid. They further suggest that in a situation where configuration, movement and land use are in agreement, configuration must be given causal primacy (Hillier et al 1993). The authors suggest that the 'primary property of the urban grid is to privilege certain spaces over others for through movement' (Hillier et al, 1993). Retail and other movement-seeking uses locate along these privileged areas, to make maximum use of the opportunities for passing traffic and subsequently act as multipliers on the basic pattern of movement. This theory of 'natural movement' provides an alternative to the 'gravitational model' and, in several studies, demonstrates that movement patterns are closely related to the spatial property of global Integration.

086-04

A second theory, the theory of the city as a 'movement economy' (Hillier 1996a, 1996b) extends the idea that the urban grid is the prime determinant of movement in the grid. The relationship between the grid configuration and movement underlies many aspects of the urban form like land use, crime, the evolution of different densities and even the part-whole structure of cities' (Hillier 1996b). Cities have been conceptualised as 'movement economies' with movement, as determined by the urban grid, leading to the dense and sparse patterns of mixed use encounter that characterises urban social life.

Hillier and Iida (2005) suggest a principle of distance decay: that one visits more destinations closer by and less destinations further away [vi], and that this has the formal consequence that locations which are closer to all others in the network (locations of high integration or high accessibility) will be more attractive as destinations than remote areas. They also highlight the effect of the grid on through-movement, as whatever route is selected, all available sequences are determined by the grid, and suggest that as trip lengths increase, the movement patterns will more reflect the choice or between-ness structure of the graph than the integration or closeness structure. The paper concludes that the measurement of distance in terms of least angle change provides the best correlation between movement and the urban grid. These ideas present cogent arguments that the urban grid affects movement, and that the effects of differential movement rates are differentiated land uses, with movement seeking uses aggregating along high natural movement locations. These aggregations then attract even more movement and create a multiplier effect.

In summary, the price, nature and quantity of commodity production follows the fundamental laws of economics in addition to social and culturally determined forces like value and distance, taste, conspicuous consumption, status and social differentiation, identity and social relations. All interactions take place in space, and spatial configuration is a prime determinant of movement and the potential for interaction. Thus, the shopper and the retailer locate in space in such a way as to maximise the potential for those with surplus and those with needs of a particular social category of product to interface with each other. This interface of exchange exists at several levels: the type, mix and location of shops within a market, the location of the market within the urban context, the accessibility/visibility associated with the shop window, and the display of goods within the shop. The market (and the individual retailer) determines the interface in light of the potential customer, and the consumer visits a particular market (or shop) in light of the social (and economic) values attached to the commodities available.

Categorisation in terms of multipurpose or comparison shopping (Eaton and Lipsey 1982) is universal for all markets, but fails to account for the implications of specialised markets. However, in the context of this study, the markets studied offer a wide range of goods, and the broad categorisation of the E-L model offer better means for cross-comparisons. Thus the variations in shopping categories provides a base of data to represent the social 'status' of the market, while the categories of people visiting indicate those who seek this 'status'. The spatial characteristics of the markets provide the primary element of the interface that brings the shopper, the shopping and the shop together.

New Delhi

Delhi is a metropolis in Northern India with a population of 13.81 million [vii]. It comprises the original core (1638) and Lutyens 'New Delhi' (1914-1931) encircled by a ring road. Post-partition immigration in 1947 doubled the city's population and created a dense ring around the relatively sparse centre. This 'haphazard growth of Delhi … with its sprawling colonies' (MPD 1961) warranted the first Masterplan for Delhi. Its primary tool was the land use plan which proposed to decentralise places of employment. This objective along with the residential policy of neighbourhood units was configured in the form of a hierarchical system of shopping and business centres. A five tiered commercial plan was proposed with residential (convenience) shopping comprising 4 to 6 shops for every 3500-5000 population; Residential Planning Area Centres of 15 to 20 shops for every 12000-15000 people; Community Centres of 80 to 100 shops catering to groups of 40000 to 50000 persons; District Centres of 200 to 350 shops for every 150,000 to 250,000 residents; and Central Business Districts serving the whole city. The plan proposed new central business districts to cater to the new eastern conurbations; fifteen new District Centres and thirteen new Sub-District Centres. The result is an 'inverse compact city', with a sparse core and highly dense periphery, constituting 2 ring roads interspaced with neighbourhood units.

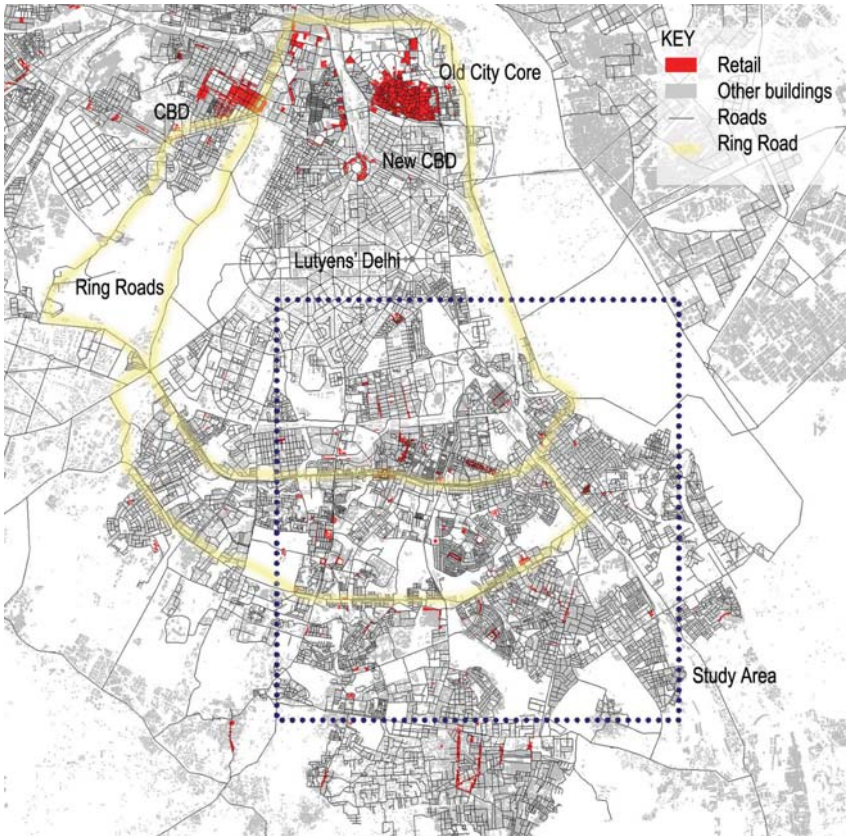


Figure 1:

The segment map of south Delhi with shops. The area of study has been highlighted. Note the sparse centre of Lutyens' Delhi with the denser business and residential areas around. The study area comprises planned Neighbourhood Units, older villages/ communities and slums arranged along the Ring Roads.
[image by the author]

Within this context, six markets are examined; the spatial properties [xiii] of Integration and Choice at varying radii in the immediate proximity to the markets, and the total segment length [ix] within axial radii of 2, 3, 4 and 5 are used to describe each market. The retail analysis distinguishes between the different shops retailing in each market. Two websites, the Yellow Pages, Delhi [x], and the Government of NCT Delhi [xi] were used to list each shop and main commodity sold for each market. These shops were then categorised in terms of multipurpose or comparison categories. Finally, a pedestrian survey was undertaken in five locations [xii] per market. The number of pedestrians passing through each location was measured to give a sample of typical movement through the market. Each movement count lasted five minutes, and was repeated three times a day for two days. Thus in total, each market was counted for a total of thirty minutes over two days. The pedestrian study distinguished between male, female and youth (school going children), and also between categories of High, Middle and Low income groups. These three categories were distinguished by appearance: persons wearing dirty, torn or old clothing were classified as Low Income Group (LIG); persons wearing neat and clean clothing and having leather shoes or trainers, but not sporting designer labels, sunglasses or other high end accessories were distinguished as Middle Income Group (MIG); persons wearing designer labels, sports attire or having accessories like sunglasses etc or having a 4-wheeled vehicle were classified High Income Group (HIG).

086-06

Of the case studies, Khan Market is classified as a sub-district centre, and comprises 169 shops in approximately 55,000 sq metres. Four of the markets (Defence Colony, Greater Kailash 1 and 2, and New Friends Colony markets) are Community Centres and range from 65 to 193 shops over areas of approximately 16,000 to 56,000 sq metres. All the markets selected are reasonably successful examples of Community Centre markets, and are located on or around the two main ring-roads in South Delhi. The last case study is Lodhi Colony market, which is included as an example of Residential Planning Unit, having only 19 shops, and catering to a smaller clientele.

Analysis

Figure 2 represents the Segment Map for the case study area coloured according to Choice [xiii] radius 5000 metric. In the case of Community Centre markets, Choice at radius 5000 metric appears to provide the best insight into the functioning of the markets. Not only does it relate best with overall movement measured in the markets, but also highlights the intermediate structure of the city. This is perhaps significant in that Community Centre markets are planned as intermediate level markets catering to a population of between 40 and 50 thousand persons. The two important horizontal lines visible represent the inner and outer ring roads respectively, with several important north south routes connecting them. Considering that all the markets are planned markets, it is expected that important routes at a 5km range will not pass through the markets. However, each market does have a route of colour yellow or higher in the near vicinity. New Friends Colony market is adjacent to a main highway leading to Agra in the south, while Defence Colony, Lodhi Colony and Khan Market lie on important routes within the city. Both Greater Kailash 1 and 2 lie adjacent to less important routes, and are relatively segregated from the main through routes in the city.

New Friend's Colony has the highest global Choice in its vicinity, followed by Defence Colony, Khan Market and Lodhi Colony. This suggests large volumes of vehicular movement close by. At the local end of the scale at radius 500 metres, all the markets, with the

exception of Lodhi Colony, have similar local pedestrian movement in the near vicinity. At the intermediate (pedestrian scale) of 2000 metres, Defence Colony followed by Khan Market have the highest Choice, while GK1, GK2 and NFC have relatively less through movement nearby.

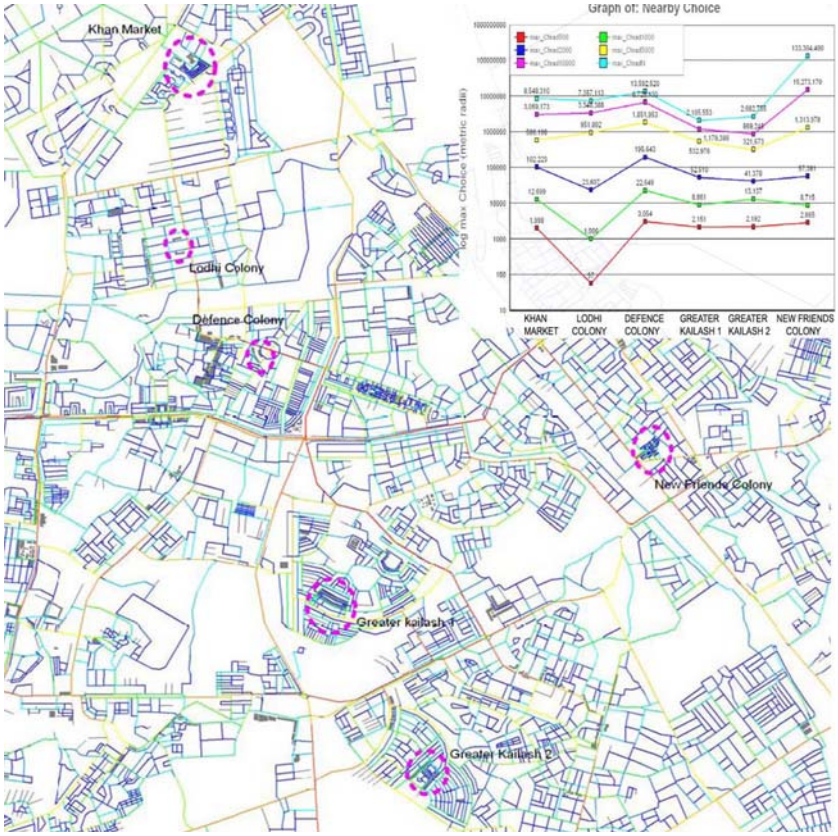


Figure 2:

Segment map of Delhi showing the area of study. Gray tones represent choice radius 5000 metric. This particular radius has been chosen as it best represents observed movement and the intermediate structure of the city. The six markets have been highlighted. Note that all the markets have at least one line of yellow or higher in their near vicinity. The inset shows the relative choice values for the market at metric radii 500, 1000, 2000, 5000, 10000 and n. [image by the author]

086-07

In terms of Integration [xiv] at varying axial radii, Khan Market appears to be the natural destination for global and intermediate scale to-movement, while NFC naturally draws a high degree of localized to-movement. Alternatively, GK1 does not naturally draw as much local to-movement, nor does GK2 draw much global to-movement. Considering both the relative Integration exhibited by each market and the range of that Integration. Khan Market indeed has the highest potential for attracting longer range (radius 5) consumers, followed by NFC and Defence Colony markets. At the local end of the scale, NFC potentially draws the maximum custom, followed by GK1 and GK2. Surprisingly, GK2 potentially draws on a larger customer base at axial radius 4 that it does at axial radius 5.

Average movement for all lines counted in each market is highest for GK1, followed by NFC and Khan Markets. The lowest movement rates were observed in Lodhi Colony. This average movement rates correspond best with spatial value of Choice at radius 5000 metric with a correlation coefficient (r^2) of 0.93. It is noteworthy, perhaps, to suggest that movement displays a lower relation (r^2=0.55) with Global (radius n) Choice, due to the nature of the markets as intermediate level markets. However, another variable combining Choice (radius 5000 metric) and Integration (NC/MD radius 5 axial*total segment length radius 5 axial) gives an even better correlation of 0.962. Both these relate intermediate spatial factors to average movement rates within the markets.

While overall movement relates to a combination of through movement and to-movement, the distribution of people in terms of HIG, MIG and LIG also highlights several differences in the markets.

HIG is concentrated in GK1, Khan and, to a lesser extent, Defence Colony and New Friends Colony; MIG in New Friends Colony and Lodhi Colony; and LIG in GK2. Each of these categories relates to different spatial properties, together combine to give a more detailed picture of each market.

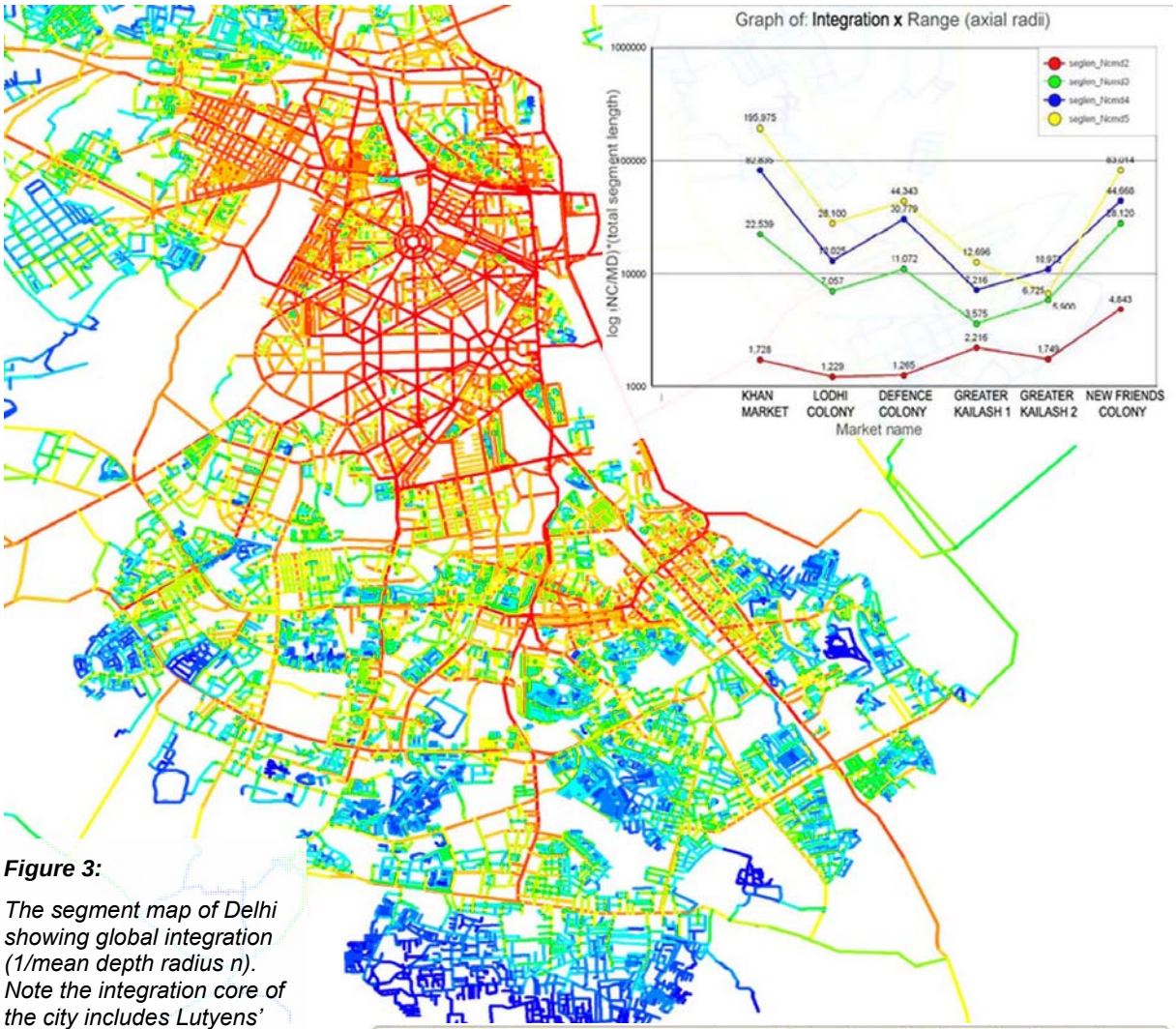


Figure 3:

The segment map of Delhi showing global integration (1/mean depth radius n). Note the integration core of the city includes Lutyens' Delhi, the old city and the wholesale district. South Delhi, mainly composed of neighbourhood units, comprises of differentiated 'grid' like structures against a background of more segregated neighbourhood residential colonies. The inset shows relative integration values multiplied by the total segment length at axial radii 2, 3, 4 and 5. [image by the author]

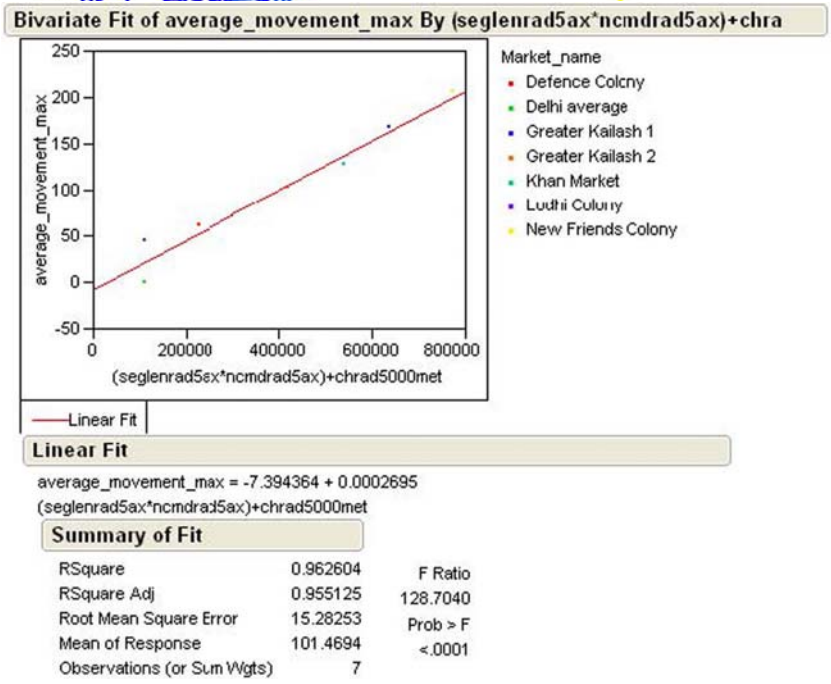


Figure 4:

*Bivariate fit of average movement against combined choice and integration measure (NC/MD radius 5 axial * total segment length radius 5 axial). [image by the author]*

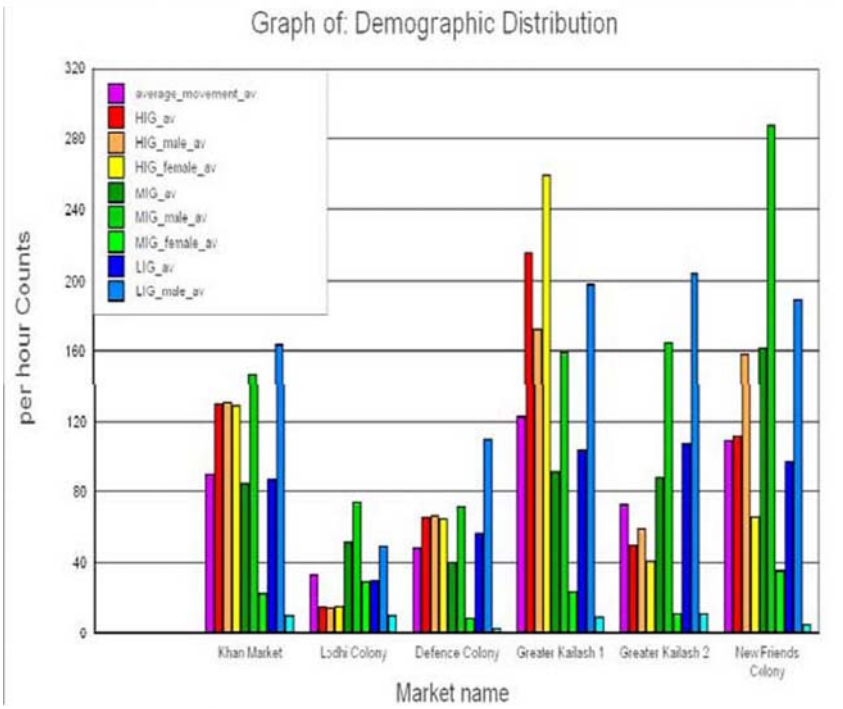
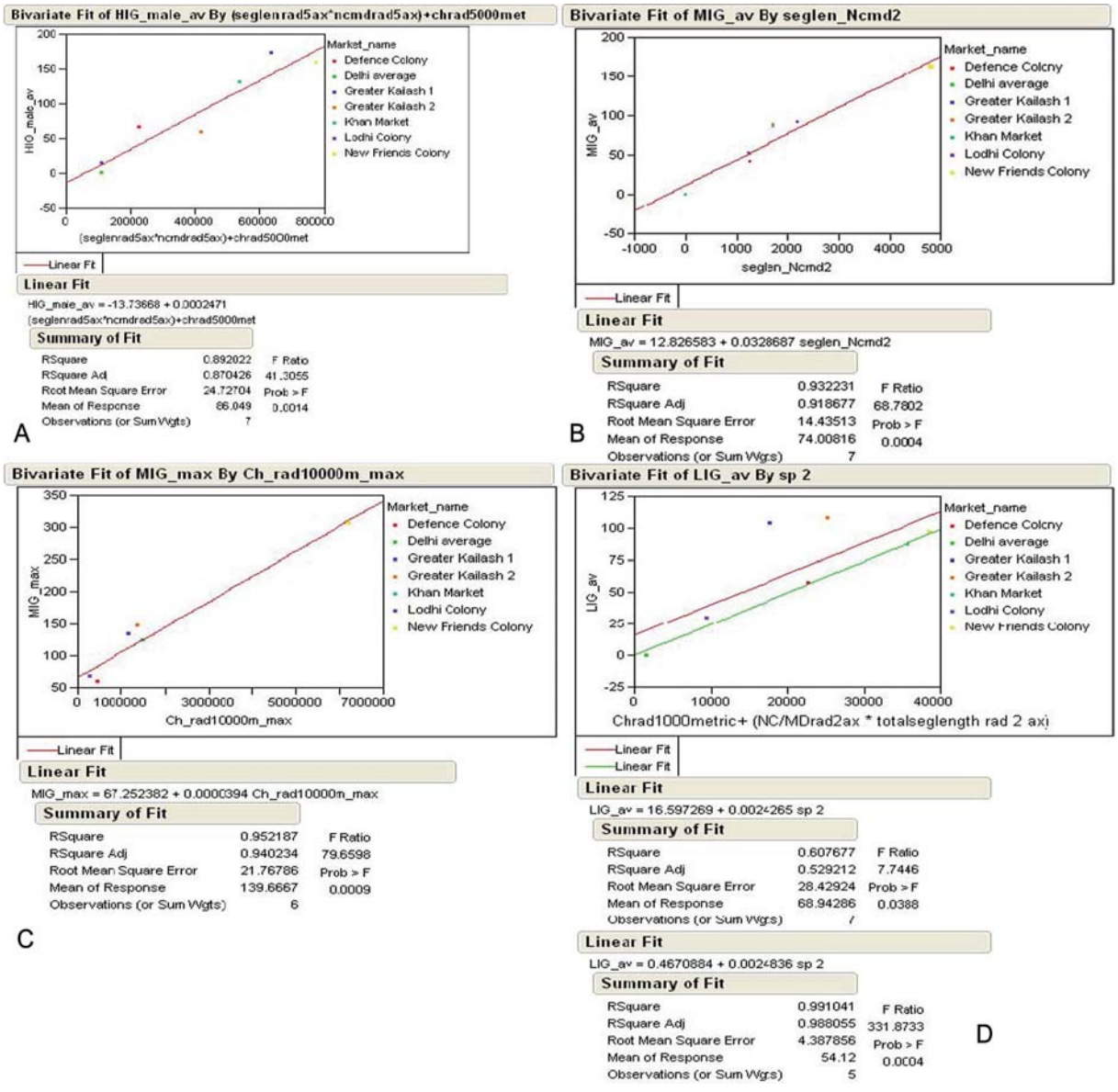


Figure 5:

Distribution of movement in each market (left) [image by the author]

Figure 6:

*Scattergrams showing bivariate fit of (a) HIG movement against combined choice and integration measure (NC/MD radius 5 axial * total segment length radius 5 axial), (b) MIG movement against integration measure (NC/MD radius 2 axial), (c) MIG movement against choice radius 1000 metric and (d) LIG movement against combined local choice integration measure (Choice radius 1000 metric+(NC/MDI * total segment length radius 2 axial)) (bottom). [image by the author]*



The High Income Group preferentially visits GK1, which has the relatively low local choice, is relatively isolated in terms of through movement in the vicinity and has low measures of Integration at all radii. At the same time the HIG also frequents Khan Market, which has relatively higher through movement nearby, high Choice at the local and global ends of the scale, highest Integration measure at the medium to global radii and the highest combination of Integration and segment length. It is apparent that the HIG visit markets for two contrasting reasons. Firstly, due to high global accessibility, and secondly due to the attraction and status attached to individual shops located in less accessible areas. This phenomenon is illustrated by the fact that male HIG persons correlate significantly (r^2=0.89) to a combination of Choice radius 5000metric and Integration radius 5 axial but no significant relationship exist with either the average HIG movement or female HIG movement. Both total movement and HIG male movement correlate significantly with the combined measure of Choice 5000 metric and NC/MD radius 5 axial. This suggests that in the case of community centres in New Delhi, these two spatial variables are the critical variables to the success or failure of the market.

086-10

In the case of MIG movement, there appear to be two separate spatial parameters at work. HIG movement relates significantly to Choice at a 10km radius but also to Integration at a radius of 2 axial steps. This suggests that the average person visits the market either as part of another journey within a radius of 10km, or makes a conscious decision to visit the market within a radius of only 2 axial steps.

The Low Income Group is visible significantly in all the markets, and relates closely to a combination of Choice radius 1000 metric, Integration (NC/MD) radius 2 axial and the total segment length radius 2 axial. This is a local measure and suggests that LIG movement is generally restricted to the immediate surroundings. While the scattergram shows a correlation coefficient (r^2) of only 0.60 for all the markets, if GK1 and GK2 are removed all other markets show a fit of r2=0.99 with a significant probability less than 0.0004.

New Friends Colony market and Defence Colony market seem to be very similar in composition: a large proportion of M1 shops, followed by M2 and MC, and a lesser proportion of C and S type stores. At the same time, Khan Market and GK1 also have certain similarities, in that with the exception of exaggerated MC stores in GK1, the proportions of other type of stores are similar. Greater Kailash 2 is predominantly M1 and C, while Lodhi Colony exhibits a higher proportion of C type stores.

While there are some trends to be examined while relating retail to movement, there are no outright significant correlations. Some key observations are as follows: M1 type shops correlate positively with the Medium Income group, while M2 type shops relate to both MIG and LIG. MC type shops relate to HIG, which is expected, while C and S are negatively correlated, suggesting they occur in greater numbers where movement is less, that is, emphasising their exclusivity.

Similarly, comparing retail distribution to the spatial values of Choice, M1 shops have a positive correlation with Choice radius 500 and global Choice, suggesting that at some level convenience stores are a global phenomenon. M2 stores are best correlated to Choice radius 500 metric with a significant correlation coefficient of 0.91. MC is not significantly related to Choice, with the correlation peaking at 0.42 with Choice radius 2000 metric, suggesting that shopping for clothes, footwear, jewellery or designer wear is not an action related to through movement. Both C and S type stores are again negatively correlated, suggesting their dislike of spaces with high natural through movement.

The correlation matrix for Integration against retail distribution highlights the local properties of M1 shopping, with a best relation with radius 2 Integration. M2 also correlates positively with Integration, with the correlation peaking at 0.65 at radius 4. MC enjoys a decreasing negative trend, suggesting that the global Integration measures are less actively discriminating against MC, while C and S type stores are consistently negatively correlated.

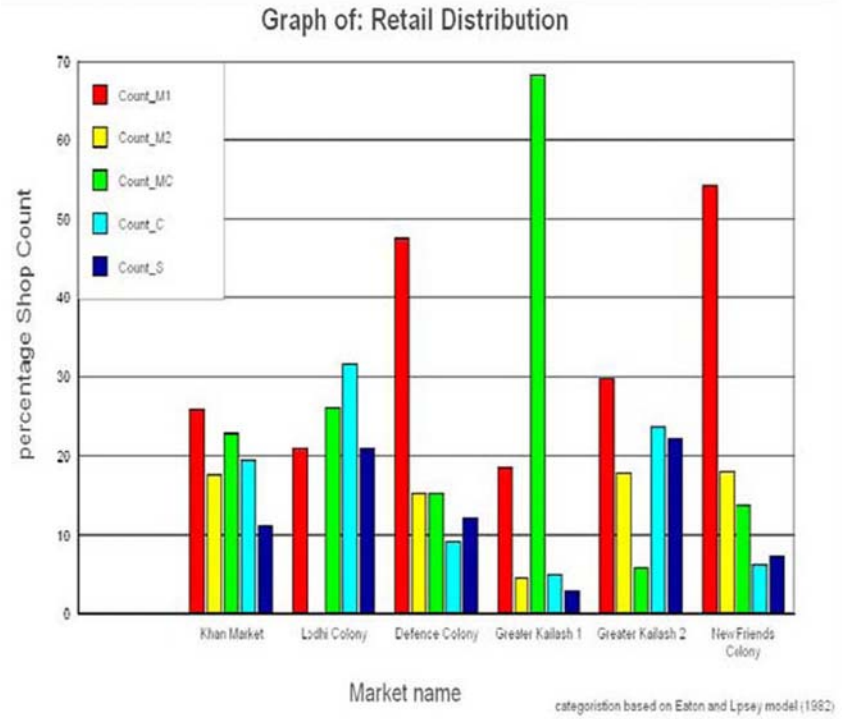


Figure 7:

Column graph of retail distribution for all markets. [image by the author]

Row	Ch_rad250m_max	Ch_rad500m_max	Ch_rad1000m_max	Ch_rad2000m_max	Ch_rad5000m_max	Ch_rad10000m_max	Ch_rad20000m_max	Ch_radN_max
Count_M1	0.27640502	0.36118372	0.03239598	-0.2622558	0.22416576	0.64914212	0.68270794	0.68654612
Count_M2	0.71105082	0.90827656	0.62780964	0.4104343	0.31501774	0.47044918	0.4168428	0.40533096
Count_MC	-0.2557154	-0.3990168	-0.057314	0.25624785	0.30108942	-0.2323844	-0.2460656	-0.2483886
Count_C	-0.2222325	-0.3123735	-0.3193411	-0.3135988	-0.6871204	-0.4665469	-0.4539991	-0.4518064
Count_S	-0.3240201	-0.083517	-0.1149766	-0.2710628	-0.6850984	-0.399588	-0.377602	-0.3847527

_	NC_MD_rad2ax_av	NC_MD_rad3ax_av	NC_MD_rad4ax_av	NC_MD_rad5ax_av	NC_MD_rad8ax_av	NC_MD_rad10ax_av	NC_MD_rad16ax_av
Count_M1	0.92556918	0.85348506	0.6525207	0.46282334	0.19360286	0.19387344	0.21053664
Count_M2	0.57422109	0.65785592	0.6282345	0.54520971	0.28287234	0.16073655	0.00066983
Count_MC	-0.6125119	-0.6332833	-0.5572524	-0.458782	-0.2811504	-0.2175876	-0.0745719
Count_C	-0.3253259	-0.2633947	-0.1547234	-0.0557783	0.11629048	0.10751984	0.00205894
Count_S	-0.1183153	-0.1429146	-0.1360503	-0.1316149	-0.1106098	-0.1457455	-0.2628339

	average_movement_av	HIG_av	MIG_av	LIG_av
Count_M1	0.02441813	-0.182208	0.40813489	0.06156668
Count_M2	0.24198428	0.00220249	0.40353415	0.53721188
Count_MC	0.49039451	0.76031991	-0.0530027	0.13461359
Count_C	-0.6904625	-0.7209312	-0.4392547	-0.4864716
Count_S	-0.7838262	-0.8912308	-0.4350701	-0.4029211

Figure 8:

Correlation matrices of retail distribution by (a) choice, (b) integration and (c) movement. [image by the author]

Discussion

This paper has discussed shopping as an economic and social phenomenon, bound in a spatial interface. As has been indicated, each market has differing spatial, demographic and retail characteristics. Clear, direct correlations between spatial factors and movement have been examined; however, no such direct correlations exist between movement and retail mix, though certain trends have been indicated. For example, HIG movement is best related to MC

type shopping, while MIG and LIG are somewhat related to M1 and M2 shopping. It is conceived, that the retail mix is not dependant on a single factor, but on combinations of factors.

The movement study highlights the spatial characteristics of movement. HIG movement appears related to a combination of both global choice and global Integration while also visiting areas having high exclusivity values. MIG flows relate to global choice and local Integration; and LIG groups generally follow a combination of local choice and Integration, though they also appear in areas where industry, office workers or large numbers of HIG people are found.

086-12

Thus, Khan Market attracts all categories of movement (with an emphasis on HIG) due to its natural high Choice and Integration measures at all scales. Defence Colony has an almost identical distribution of movement as Khan Market, but to a lesser degree due its relatively lower spatial choice and Integration measures. New Friends Colony, on the other hand, has high global and local Choice combined with high local and mid range Integration, and therefore attracts a larger proportion of MIG, but also substantial volumes of HIG and LIG. Greater Kailash 2 has similar proportions of movement to NFC. However, due its relatively lower spatial characteristics, especially global Integration, it attracts a lesser proportion of HIG and a larger proportion of LIG traffic. Lodhi Colony market has little Choice at any scale, and falls below the Delhi average above radius 5000 metric, nor does it have particularly high Integration, resulting in the lowest movement rates of all the markets studied. It exhibits a high proportion of MIG movement due to its location next to a large park which is extensively used for recreation in the evenings.

Greater Kailash 1 is unique in this study as it is relatively segregated at most levels compared to the other markets, but enjoys high degrees of (especially HIG) movement. This phenomenon can perhaps be explained by the disproportionately high degree of MC type goods available; the market has developed into a speciality market, and MC goods, by definition, are generally high end durables which require a degree of comparison. They engender longer trip lengths and general awareness in the customer of prices, quality and range. In this context, the very inaccessibility, which would perhaps have discouraged other markets has given GK1 a high degree of exclusivity, which in turn supports high HIG movement patterns.

The variation of shops can also be explained by combinations of global and local movement. Khan market displays all the characteristics due a district centre (or any other central business district shopping facility): an even mix of all demographic groups, and an even mix of global and local attractors. This is apparent in the retail mix, with every category of goods available in substantial proportions.

New Friends Colony, on the other hand, exhibits the propensity for a high degree of passing trade, realised in the high proportion of M1 and M2 type shopping. Since the passing trade is as much global as it is local, NFC has developed both high end conveniences, like a number of speciality restaurants, and low end conveniences. It also supports a small proportion of other goods due to its role as the central market for the locality demonstrated by its high local Integration.

Defence Colony market has a similar, though lesser, demographic distribution to Khan Market, and should display a similar retail character. However, considering its smaller catchment area, it appears unable to support large volumes of MC, C and S type stores. In addition, due to a high degree of intermediate to global Choice in nearby areas, it has gone the NFC way, providing additional high end convenience (M1) shopping to tap this potential.

Greater Kailash 1 and 2 are both relatively segregated, though movement patterns are contradictory. GK1 supports a high degree of HIG movement combined with a highly disproportionate degree of MC shops, while GK2 supports MIG and LIG movement with a greater proportion of M1, C and S type stores. These can be considered to be two diverging forms of development in similar, relatively inaccessible locations. Both markets cater to the multipurpose and other needs of the immediate surroundings, however, it is in the interface generated at the larger scale that the two markets differ. GK1 has developed into a speciality market, catering to the demand for exclusivity, and emphasising its segregation; whereas GK2, in addition to a few restaurants and general stores, is almost exclusively a market of C and S type stores; goods that do not depend of natural movement, but exist due to a small, dedicated, specialised customer base. Lodhi Colony provides a similar case to GK2, with the absence of anything but the most basic local through traffic; it caters mainly to services and goods that depend on local idiosyncrasies.

In conclusion, this paper has demonstrated some basic ingredients of a social logic of shopping. Firstly, movement patterns are related to spatial patterns. Higher, more mobile social groups follow the global properties of space, while the middle groups follow both global and local properties. The lower end groups follow the local properties of space.

Retail types also follow basic spatial patterns mediated by movement patterns. Through movement, predicted by choice, generally results in multipurpose shopping. Where the through movement is global, high end multipurpose shopping results, and where movement is local, lower end multipurpose shops develop. Integration and its associated movements generally result in other types of shopping, especially MC but also C type shops. The relative segregation of markets can result in either exclusivity, or in general degeneration. Both types of movement relate to shopping by means of a distance law: that distance is directly proportionate to social or economic class in terms of movement and in terms of shops.

References

Bourdieu, P., 1984, “Introduction to Distinction: A Social Critique of the Judgement of Taste”, M.J. Lee (Ed.), 2000, *The Consumer Society Reader*, Blackwell Publishers Ltd., Oxford.

Christaller, W., 1933, “Central Places in Southern Germany”, (trans-in part) C.W. Baskin, 1966, Prentice Hall.

Delhi Development Authority, 1961, Master Plan for Delhi, Government of India, New Delhi.

Douglas, M., 1997, “In Defence of Shopping”, P. Falk, C. Campbell (Eds.), *The Shopping Experience*, Sage, London.

Douglas, M., 1979, (8th edition 2003), *Collected Works: The World of Goods*, Routledge, London.

Eaton, B.C., Lipsey, R.G., 1982, “An Economic Theory of Central Places”, *Economic Journal*, Vol. 92, pp 56-72.

Giddens, A., 1984, *The Constitution of Society*, Cambridge: Polity Press.

Giddens, A., 1981, *A Contemporary Critique of Social Materialism*, Macmillan, London.

Hillier, B., Iida, S., 2005, “Network and Psychological Effects: A Theory of Urban Movement”, A.G. Cohn, D.M. Mark (Eds.), *Proceedings*, Spatial Information Theory: International Conference COSIT, Elliotsville, NY, USA.

Hillier, B., Penn, A., Hanson, J., Grejewski, T., Xu, J., 1993, “Natural Movement: Or, Configuration and Attraction in Urban Pedestrian Movement”, *Environment and Planning B: Planning and Design*, 20.

Hillier, B., 1996a, *Space is the Machine*, Cambridge University Press.

Hillier, B., 1996b, "Cities as Movement Economies", *Urban Design International 1*, (1), pp 41-60.

Hillier, B., Burdett, R., Peponis, J., Penn, A., 1987, "Creating Life: Or, Does Architecture Determine Anything?", *Arch and Comport/Arch. Behav.*, Vol 3, no 3. p 233-250.

Hillier, B., Hanson, J., 1984, *The Social logic of Space*, Cambridge University Press.

Hossain, N., 1999, "A Syntactic Approach to the Analysis of Spatial Patterns in Spontaneous Retail Development in Dhaka", *Proceedings*, 2nd International Space Syntax Symposium, Brasilia.

086-14

Marshall, A., 1920 (first published 1890), *Principles of Economics*, 8th edition, Macmillan and Co., Ltd, London (pdf version downloaded from http://www.econlib.org/library/Marshall/marPtoc.html [accessed Aug 21, 2006]).

Miller, D., 1998, *A Theory of Shopping*, Polity Press, Cambridge.

Miller, D., 1987, "Object Domains, Ideology and Interests", M.J. Lee (Ed.), 2000, *The Consumer Society Reader*, Blackwell Publishers Ltd., Oxford.

Penn, A., 2005, "The Complexity of the Elementary Interface: Shopping Space", A. van Nes (Ed.), *Proceedings*, 5th International Space Syntax Symposium, Delft.

Sabikhi, R., 1996, "The Collapse of Planning: A Case Study of Delhi", A. Hoffman (Ed.), *Form, Modernism and History, Essays in Honour of Eduard Sekler*, Harvard University Press.

Simmel, G., 1907 (English translation 1978), *The Philosophy of Money*, Routledge, London, New York.

Smith, A., 1776, "An Enquiry into the Nature and Causes of the Wealth of Nations", (pdf version downloaded from http://www.econlib.org/library/Smith/smWN.html [accessed Aug 21, 2006]).

Veblen, T., 1925 (first edition 1899, New York), "Conspicuous Consumption from The Theory of the Working Class", M.J. Lee (Ed.), 2000, *The Consumer Society Reader*, Blackwell Publishers Ltd., Oxford.

West, D.S., Hohenbalken, B.V., Kroner, K., 1985, "Tests of Central Place Theory", *Economic Journal*, Vol. 95 No. 377 pp 101-117.

i. Refer Hillier and Hanson, 1984, The Social Logic of Space, and Hillier, 1996a, Space is the Machine

ii. The six case studies include four community centre markets, one sub-district centre market and one residential planning unit market (MPD 1961).

iii. Losch, A., 1954, The Economics of Location: A pioneer Book in the Relations Between Economic Goods and Geography, trans Woglom, W. H., (from 2nd edition 1944), Yale University Press

iv. Heilbrun, J., 1987, Urban Economics and Public Policy, 3rd edition, St Martin's Press, New York

v. Store type definitions (West et al 1985)M1 stores (Multipurpose 1) are establishments that cluster together to attract mainly multipurpose shopping; the patrons of these stores will not usually engage in search because expenditures on the goods involved, and quality and price variations between stores, tend to be insignificant compared to the associated search costs. Examples include drug stores, groceries, gasoline stations etc.
M2 stores (Multipurpose 2) are similarly defined in that they cater to multipurpose shoppers, but they need a larger customer base, as for instance book stores, music stores, gift shops etc
C stores (Comparison) cater mainly to single purpose comparison shoppers; consumers will perceive some net gains to search while acquiring the goods such stores sell. Examples are automobile dealerships and appliance stores.
MC stores (Multipurpose-Comparison) rely on externalities created by a combination of multipurpose and comparison shopping. Shoe stores, clothing stores and camera stores belong to this category.
S stores (Single isolated purchase), finally, are establishments that cater to single isolated purchases, i.e. neither multipurpose nor comparison shopping is important for their business. These firms locate in retail districts for extraneous reasons; movie theatres, for instance, take advantage of ample parking facilities at night, arcades engage the children of shopping parents.

vi. This also links to the Christaller model, where low order and high order goods exist at different distances from the consumer. Low order goods are used frequently and exist in close proximity to the consumer, while high order goods exist at larger distances and require greater premeditation and formality.

vii. From the Government of National Capital Territory of Delhi [http://delhigovt.nic.in/dept/economic/stat/statistics.asp]. The greater Delhi metropolitan area (National Capital Region) has a population of 19.7 million.

viii. Analysis done using UCL Depthmap, © Space Syntax Limited

ix. The total segment length indicates the total length of line within a specified radius, in this case topological steps of 2, 3, 4 and 5. This measure represents the density of the street network accessible to each market at different radii.

x. Sulekha Yellow Pages for Delhi http://www.yellowpages.sulekha.com [accessed June 2006]

xi. Website of the Shops and Establishments Inspectorate, Office of the Labour Commissioner, Government of National Capital Territory, Delhi http://labour.delhigovt.nic.in/shop_establishment/public [accessed June 2006]

xii. These locations represent the areas of highest integration and choice at both the global and local scales, as well as the area of highest observed movement. Where these overlapped the next highest location was selected.

xiii. Choice represents the number of times a segment is used to travel from all possible origins to all possible destinations by the shortest possible route, here the smallest angular route. Choice 5000metric represents the angular choice within a metric radius of 5000m or 5km, i.e. the importance of a particular segment while travelling from all possible origins to all other destinations within a distance of 5km from the segment.

xiv. Integration here is mathematically calculated as the inverse of the angular mean depth of a segment divided by its node count.

086-16