

Chapter 4

Spatial Memory and Shifting Centrality

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I. Introduction

Cities are complex entities, which are constantly changing in terms of their built form, their social and demographic make-up, and their street network and public spaces as well as the way in which they are used and lived in by their population. The study of their evolution requires the capability to link all these different elements, historical and geographical, and relate them to each other in a meaningful way, so as to draw inferences as to the nature of changes in each element and how these interact spatially over time. History, whether in terms of the evolution of architectural forms or the socio-economic and political context of a place, can be used as a background to inform the analysis of the urban form at any point in time. Researchers have approached the analysis of the evolution of the urban form from various viewpoints, by bringing the social context to the foreground, by focusing on settlement forms or by linking the built form with ideologies and historical events.

Many of these approaches focus on the social and economic dimensions with little attention given to the effect of space on the issues in question. Without seeking to undermine such histories, this chapter is concerned with urban phenomena and city evolution, whilst taking into consideration the discourse concerning the implications that are embedded in or are generated from spatial patterns. Such an approach treats cities as socio-spatial entities, as 'highly relational systems' with complex organisation (Hillier and Vaughan 2007) that are driven by evolutionary processes that might generate, reproduce and transform urban phenomena over time.

This chapter seeks to provide such an understanding of the evolution of the city of Limassol in Cyprus, as particular kinds of spatial environments characterised by both change and persistence over time can be identified. Limassol, one of the most significant cities in the modern history of

urbanisation in Cyprus, experienced rapid growth throughout the twentieth century with significant spatial developments and transformations. Urban growth has affected the transformation of the historic centre resulting in a changing context where certain characteristics of the traditional high street changed, while others persisted through time, and the boundary of the former 'edge city' became the new high street.

As demonstrated by Hillier (1999a), centrality in a city is not a permanent, localised situation; rather it is a process which sees the shifting of centrality as the city grows or shrinks and as its spatial network changes. This process is formed according to the impact of spatial configuration on movement, which in turn influences the distribution of land uses. As cities grow, their choice values and their intelligibility tend to decrease, an effect which was shown to be particularly pronounced in Mediterranean port cities which have grown rapidly in recent years (Shpuza 2009). Centrality also tends to shift towards the edges of the city; this is because people's movement in cities has both a global and a local aspect, the one reflecting circulation in and out of the system, the other within the system. It is 'this tension between the internal and external movement economies of the settlement [that] is the fundamental reason why centrality tends to shift toward the edges of the settlement' (Hillier 2002: 176). As Hillier has noted (1999, 2009b), the dynamism of the 'edge city' is not restricted to the edge: he argues that it is the pervasive nature of centrality that allows cities to sustain themselves.

The question raised is how far can spatial configuration explain the historical pattern and sustained urban vitality and 'attraction' of the high streets under study? The idea that the spatial morphology of the urban grid itself creates movement attractors is an aspect of the space syntax theory of cities as 'movement economies' (Hillier 1996). Such an approach allows that 'attraction' might be implicit up to a point in the spatial configuration of the city itself (Griffiths et al. 2013). Griffiths et al. point out that we can then explore the potential of the high street to attract and facilitate co-presence as a result of its spatial configuration and its ability to sustain varied and mixed land uses, regardless of the presence of other, particular 'attractors'. The interaction between spatial configuration and land use distribution reflects social and economic activities that occur in the physical environment and possibly relate to urban vitality.

Within this framework the following analysis sets out to explore the development through time of the historic street network in the urban centre of Limassol, adding details of the complex historical processes which lead to changes and the persistence of some elements in its urban form. It focuses on the spatial properties of two main streets: Anexartisias, the traditional high street in the historical core of the city of Limassol, and a stretch

of Makariou, the first inner ring-road of the city built just after the Second World War; Figure 4.1 shows a tourist map of Limassol from 1947 indicating the location of the newly built inner ring-road (labelled *Bye-Pass*) on the outskirts and Anexartias, situated in the well-established historical core.

Historical analysis of the process of growth of Limassol, taking into account configurational changes and continuities together with land use and social data, will facilitate a better understanding of its contemporary urban form, spatial properties and the ways in which historical formations of urban configuration influence the present life of the city and its urban vitality. Such a perspective provides valuable evidence and facilitates an understanding of the ways a city or a street network grows and its capacity for resilience – its ability to adapt after experiencing multiple urban interventions, to accommodate change and to withstand the impact of economic cycles. With regard to the mechanisms of growth and the adaptability of cities, building on Hillier’s proposition (1996, 1999a), research by Al-Sayed et al. (2012) has shown that centrality drives the generative process and

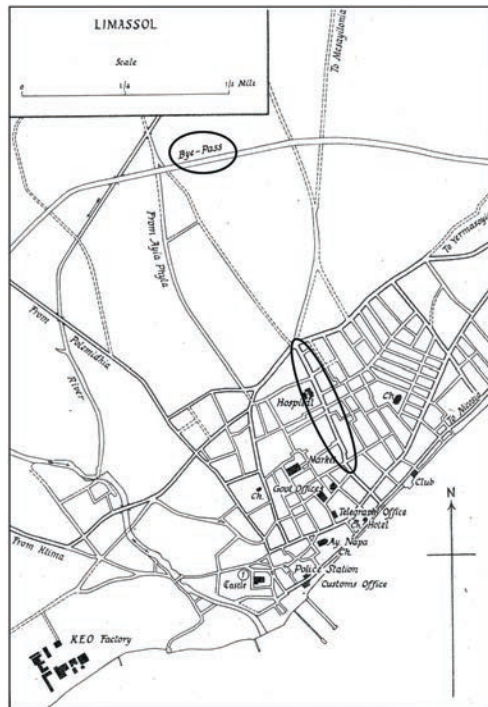


Figure 4.1

Tourist map of Limassol during the Colonial period from Mangoian and Mangoian (1947)

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precedes the emergence of densification – the intensification of the urban grid in areas which have seen high gains in centrality is identified as an adaptive process reflective of a form of intelligence.

Other recent research reveals morphological properties of the street network that in some cases seem to be distinct and persistent through time while in others they are continuously modified (Geddes 2014). While the processes of gaining centrality and densification suggest a form of intelligence, the persistence of certain spatial properties after a period of adjustment suggests a form of ‘spatial memory’, sustaining a mixture of land uses through time. Comparing the spatial features of the two streets at six points in time (1880s, 1930s, 1960s, 1980s, 2000s and 2010s) while assessing their contemporary situation through land use, pedestrian and vehicular movement analyses, the question is then raised whether there is such a thing as ‘spatial memory’.

The focus of this study is therefore the application of a suitable methodology to assess the historic street network’s patterns and process of growth and the ability of specific areas to adapt to multiple changes (Marcus 2012). The approach used here is the application of space syntax methodology coupled with land use and movement analysis. This approach is a spatial one: it directly links spaces with actual use and daily patterns of living, it has the ability to scale up and down from the particular to the general and vice versa and allows the investigation of a system as a whole or in its parts (Karimi 2012).

Historical maps are used to create spatial models of the city in the past, while contemporary land use and movement data and space syntax analysis form the basis for the methodological approach of this research. They are used in an attempt to explore whether contemporary spatial properties, distribution of land uses and movement patterns of the historic street network may have roots in the past, and may be better understood as being conditioned by the interaction between ‘inherited’ spatial configuration and contemporary life.

The historical evolution of the case studies is described in the following section, which is followed by a description of the research methods. Three sections of analysis are then presented focusing on how the spatial properties of the city and the two high streets changed over time, the contemporary land use distribution and the movement patterns in the two study areas.

II. Limassol’s urban development

Limassol, whose metropolitan area has a population of 183,656 (as of 2011), is the second largest city in Cyprus. It occupies the southernmost point of

the island, stretching from east to west while expanding across the low hills to the north as well. A highway running east–west and surrounding the city a few kilometres to the north of the coastline separates the city from the suburban villages to its north which have come to be part of the city conurbation. This highway and two ring-roads together form the main east–west circulation routes of the city. The old city centre and its southernmost limit, the coastline, are connected to the ring-roads and highway in the north by a number of radial streets running north–south. Town planning is still based on zoning, dedicating different areas of the city to specific uses, with the exception of the historical town centre, which grew organically as a mixed-use area comprising residential, commercial, retail and tourist activities. Development plans, including the recent regeneration of the old port and promenade and a new marina, have been designed with provisions for car use in mind. This has resulted partly in major vehicular routes linking ring-roads to the town centre, and partly in a large number of car parks serving as access points to the old town centre, the few pedestrianised areas of the University of Technology (TEPAK) and the old port and promenade. The situation is illustrated in Figure 4.2.

At the beginning of the nineteenth century Limassol was a very small settlement, described as ‘a miserable town consisting of 150 mud houses of which 100 are Greek and 50 Turks’ (Turner 1820: 568). It developed substantially during the second half of the century when Agkyras Street was



Figure 4.2

Diagram of Limassol's main routes, zones and car parks, 2011.

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the main commercial street (Severis 2006: 98). A map of 1849 (Figure 4.3) shows the small town with the street of Agiou Andreou (still a popular commercial street today) intersecting with Anexartisias at its southern end parallel to the seafront and Agkyras, the western continuation of the same street curving towards the north.

Towards the end of the Ottoman period, Limassol developed as a city of proto-industrialisation, as the economy benefited from the stationing of British troops in the district, with consequent development of catering establishments and retail facilities in the town stocking a greater array of imported goods, meeting increased and changing demands due to ongoing social and historical changes, such as the change in the administrative bodies and the settling of a British population in the area (Katziaounis 1996).

However, during this time ethnic and social divisions started to become spatially apparent. Pivlakis (1977) describes how these divisions were becoming more accentuated, with the Turkish living to the east of the river, a poorer area developing alongside the port and castle, and the wealthier Greek community settling around the church of Katholiki. Moreover, other social problems, partly related to social division and partly to the

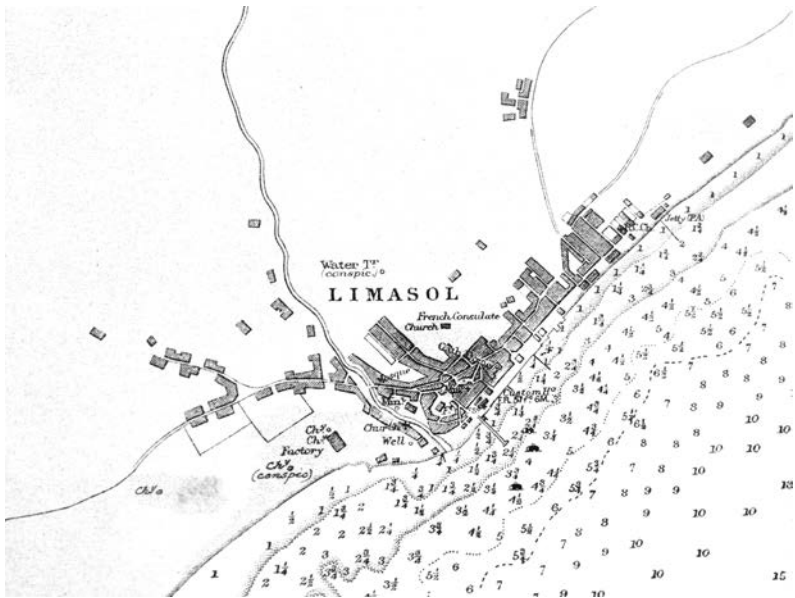


Figure 4.3

Admiralty chart of Limassol, 1849, drawn by Lieut. Lord John T. Browne (survey by Capt T. Graves. Admiralty Chart 2074. 3.5 sea miles to one inch)

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nearby stationing of military troops, were evident, although they provided a demand for land for uses such as wine shops, cafés and even brothels in much of the city at the time (Katziaounis 1996). A map of 1883 highlighting the relevant areas is shown in Figure 4.4.

In the 1920s and 1930s the ethnic diversity of the city is evidenced by travellers' records, with the seafront, Agkyras and Agiou Andreou retaining their importance as part of the city core and commercial areas. Gladys Peto's description of 1927 also confirms that different groups lived to a great extent in separate areas (Severis 2006).

Previous analyses of Limassol's growth have pointed out that uncontrolled urban development led to an uneven expansion of the city, creating a fragmented structure and leaving many gaps in the urban fabric (Kritiotti 1988). Limassol has now become a large and sprawling city, as the distribution of the population between the urban and the metropolitan areas has changed drastically. Whilst in 1982 70 per cent of the population was based in the urban area, this is true of only 52 per cent in the 2010s (Gerasimou and Georgoudis 2011). This process can be attributed, on the one hand, to suburban growth and, on the other hand, to development focused on providing vehicular access and parking while employment, services and



Figure 4.4
Map of Limassol in 1883 from Rodney (2001)
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commercial activities as well as tourist services had been developed in the historic town centre and the coastal area.

The two streets selected for this study are Anexartisias and Makariou, both considered popular commercial high streets within the city centre today – a detail of a contemporary map of the city is presented in Figure 4.5. Anexartisias is located within the historical town centre, an area classified by the town planning department as a ‘central commercial area’, while Makariou is located at the northern edge of the city centre and classified as a ‘secondary commercial area’ (Town Planning Department 2013).

There is evidence that Anexartisias was already developed by 1883 (Figure 4.4). It runs north–south from the seafront to the end of the historic town centre, where it meets another four roads forming a major junction known as Pentadromos (five roads). At about two-thirds of its length from the seafront, there is a significant bend in the road forming a junction with the street of Athinon, along which many of the TEPAK buildings are found. The southern stretch of the road is crossed by Agiou Andreou, another main commercial street with tourist shops in the historic centre,



Figure 4.5

Map of Limassol (detail) from 2011 Selas (2011). Arrows indicate Makariou street (above) and Anexartisias street (below)

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which leads all the way to the old castle where it joins the street of Agkyras, the commercial centre during the Ottoman period. The street does not appear on the map of 1849; however, this map may not be representative of the full extent of the city at the time – though accurate, it is an admiralty map concerned with representing visible landmarks from the water and the shape of the built form along the coast, rather than recording the built form of the city.

The section of the street under study is the northern section, from the junction with Athinon all the way to Pentadromos. The street is lined with shops, cafés and takeaway outlets. The street also has a public space opening from it (Gregori Afxentiou Square) – overlooked by the Municipality Offices building. Across the square two side roads lead to Iroon Square, a popular area, especially during the evenings with entertainment venues and restaurants, where many public events are held. The shops and cafés along the street comprise independent shops as well as popular brands such as Topshop, Bershka, Starbucks and Subway, although a number of outlets are currently empty following the economic crisis which came to a head in March 2013. The street was repaved in 2011 with a shared surface design. The design included separation of the pavement from vehicular traffic by posts rather than a step, and street furniture such as benches were also added along the street's length. Figure 4.6 summarises the visual characteristics of the high street.

Makariou was developed after the Second World War; it runs from the seafront towards the north and north-west at first, where it meets with another five major roads at a large roundabout; it then continues westwards around the whole city centre, forming the city's first inner ring-road. The section studied here runs from the roundabout to the west until the first major junction with the road of Agias Zonis, which leads south to Pentadromos and Anexartisias. This section was the first to be built along a pre-existing footpath along the ditch of the River Vathias, visible in the map of 1933 – although the eastern part of this section was realigned when the paved road was built; the footpath along the ditch is the street used in the spatial analysis of the 1933 map. Most of the street was in place by 1960 except for the eastern section running down to the seafront – we were unable to find information as to when this section was built, but it is present in a map of 1987, a time when the motorway was already in place, although the second ring-road between Makariou and the motorway had not yet been built.

This street is also a popular commercial area and it is where the yearly carnival parade runs, starting at the roundabout and heading westwards. Like Anexartisias it is lined with shops, cafés, restaurants and takeaways



Figure 4.6

Characteristics of Anexartisias street, left to right and top to bottom: the Rialto Theatre on Iron Square, built in the 1930s and a very popular venue until the late 1970s, when the area decayed and the theatre closed – it was reopened in 1999; popular shops along the street with a shared surface design and benches along the pavement; outdoor café seating on the corner of Gregori Afxentiou Square; parking area just off a side street; closed-down shops due to the economic crisis; public space in front of the Municipal Offices building

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(including closed-down shops affected by the economic crisis). A greater number of services are located here than on Anexartisias, particularly banks. Although the road is much wider than Anexartisias and has more of its original ring-road feel, here can be found not only popular brands, such as Calzedonia, Babylos, La Senza, KFC and Costa Coffee, but also more upmarket brand retailers (Fendi, Trussardi, Versace, La Perla), along with the local Marks & Spencer, and the offices of major international companies such as Deloitte. The road is served by bus routes with two stops along the case study area, and fairly large car parks are also found along the road, as well as in the side streets and back streets. Just to the south of the roundabout



Figure 4.7

Characteristics of Makriou street, images from left to right, top to bottom: parking area along the street; the local Marks & Spencer; outdoor café seating along the street; upmarket retailers and international banking services (Intercontinental Bank of Lebanon in this case); closed-down shops due to the economic crisis; the roundabout decorated for the upcoming carnival

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are the law courts, the archaeological museum, the historical archives and the public gardens (this was the most popular area with British residents during the 1930s). The characteristics of the street are presented in Figure 4.7.

III. Research methods

Three sets of analyses were run for this study. The urban structure of Limassol – focusing on the two high streets – was analysed at six points in time (1883, 1933, 1960, 1987, 2003 and 2014); prior to 1933 the development of the city was analysed qualitatively through maps of 1849 and 1883, as well

as the existing literature and travellers' records from the nineteenth and early twentieth centuries. Further to the spatial analysis, a land use survey and movement observations were run in the two study areas in February 2014.

Six spatial models of Limassol were constructed using space syntax methodology. Space syntax is a method for quantitatively describing patterns of spatial layout; once the model is built, it can be analysed to provide various measures reflecting different properties of the urban configuration and of specific elements of the street networks, such as a street segment (the section of a street from junction to junction or from a bend in the street to a junction or another bend and vice versa). The most important measures of space syntax are *integration*, representing 'to-movement' or the accessibility of a specific element within the system, and *choice*, representing 'through-movement' or betweenness (the number of times a segment falls on the shortest route between all pairs of segments within a specified network distance, termed 'radius'). Both global and local measures can be calculated, the global measures taking into account all elements in the system – a city-wide level – and the local measures taking into account all elements within a given radius, such as a notionally walkable radius of around 800m (here results for 400m, 800m and 1200m are presented). Global measures tend to be representative of the whole-city structure and often correlate with vehicular movement; local measures tend to be representative of local neighbourhood structures within a city and often correlate with pedestrian movement (see this volume's Glossary for more information on space syntax).

The specific analysis used in this study is angular segment analysis, which takes into account the least angular deviation of each segment from all other segments (hence it takes into account the relative straightness of a route). The measure used is *normalised angular choice* (referred to as 'NACH' in technical diagrams and 'choice' for short in the analyses presented in this chapter) – this measure was chosen because it allows for comparison between systems of different size and is thus the only reliable measure to compare a city diachronically where a city has grown significantly and the systems analysed are therefore of greatly different sizes. Furthermore, because of the mathematical way the measure of choice is normalised, it takes into account the depth of elements within the system (a proxy for integration) and so to an extent also combines a representation of to- and through-movement (see Hillier et al. 2012).

Choice values range between 0 and 2, where values above 1.3 are considered to be in the top range of choice, and values of 1.5 or above being extremely high. All the segments in the system with values of 1.3 or above are considered to be part of the 'integration core' of the city – the global core

when considering the whole system (the 'superstructure' of the city) or the local core when considering a specific local radius. The two cores can be matched to identify the *multi-scale* core of the city (Versluis 2013) – all the segments which have both the highest global and local integration values, constituting the centrality core of the city. The spatial models were drawn manually in MapInfo GIS using historical and contemporary maps as base-maps, which were geo-referenced manually using ten control points. The contemporary spatial model was constructed first by tracing onto the historical maps and then elements were removed and adjusted to construct the historical models. Some further adjustments of the historical models were also needed due to the errors caused by manual geo-referencing. The choice measures were calculated using the Depthmap Process tool in the Space Syntax extension for MapInfo, developed and licensed by Space Syntax Ltd. NACH (choice) was then calculated automatically in GIS using the formula provided in Hillier et al. (2012), thematic maps were constructed and the global, local and multi-scale cores calculated and displayed in GIS using simple querying and visualisation tools.

The land use survey was run on the same day as the movement observations. Only the ground-floor land uses were recorded along the high street and in the side streets up to the first junction in each street. Digital parcel maps (digitised by T. C. Geomatics Ltd. from the cadastral maps of the Department of Lands and Surveys) were used as basemaps to record land uses. The parcels reflect land property and do not always match the building outlines and even less so any subdivision of buildings. In these cases the buildings/outlets were redrawn manually to match the observed number of outlets. Although the number of outlets recorded is accurate, and so is the analysis based on the proportion of different land uses, the maps presented in this chapter do not always accurately represent the size and outline of the buildings and outlets. As no data were available for historical land uses, thematic maps were produced by reporting the points of interest on the historical and contemporary maps and classifying them with the same categories as the contemporary land uses. These maps are by no means comprehensive, as they give us no clue as to the extent of retail, housing and businesses; however, they do give an indication of the variety of uses in each area as well as how the uses adapt through changing times.

Movement observations were run on two consecutive Mondays in February 2014 – the weather in both cases was fair and warm (around 20 degrees Celsius) during the day and fair and cool (around 12 degrees Celsius) during the evenings. Movement was recorded in ten locations along each high street and a selection of major and minor side streets by a single observer. The observation locations were placed between junctions

and all vehicles, bicycles and pedestrians crossing an 'imaginary' line in front of the observer were recorded in five-minute slots twice during two-hour periods; the observations were then processed to derive hourly rates. The observation periods included early morning (08.00–10.00), lunchtime (12.00–14.00), mid-afternoon (16.00–18.00) and evening (20.00–22.00); the categories observed were male and female adults, male and female young people (up to 25 years of age, as assessed by the observer), bicycles (including pedestrians pushing a bicycle) and total vehicles (including buses, trucks, vans, cars, motorbikes and scooters); only unaccompanied children were counted.

Beyond the methodological issues regarding the basemaps used to construct the spatial models described above, one of the main limitations to the study is the different time gaps between the models (50, 27, 27, 16 and 11 years, respectively). However, the decreasing time gap between the maps is reflective of increasing rates of construction and swifter pace of change in more recent decades. Land uses are naturally bound to be changeable, and this is particularly true during recent economic upheaval. The land use picture is therefore prone to be a snapshot of a very specific point in time and likely to alter rapidly, in turn having an impact on the movement present on the high streets and the surrounding areas.

Regarding the historical land uses, these are necessarily dependent on what the maps report, which is changeable across time, especially when the maps come from different sources. Moreover, the 1960 map does not report the use of the points of interest; therefore, these were derived from a map of 1974 if the building still existed, or from the map of 1933 if the building was not present in the 1974 maps. This is of course a significant assumption, but proved the only way to produce a land use map for this period; in a few cases it was not possible to identify a use, so the building is reported on the map and classified as 'unknown'. As no map with points of interest was available for 2014, a map of 2011 (Figure 4.5) was used for comparative purposes.

Movement flows are dictated by socio-cultural patterns, day and season of observation. Though it was winter time during the observations, the weather was good for the time of year. However, it is likely that warmer weather might see higher movement flows – including more tourists, both pedestrian and vehicular – on both high streets, especially during the evening hours. This, though, is only true up to and after the very hot summers of Cyprus, when from lunchtime to the early afternoon hours most shops are closed and streets in cities are almost deserted (except for a few tourists). This is especially the case during the month of August, when movement peaks and pedestrian flows are likely to be high during the evening hours.

The same is true for weekends, when greater numbers of people are likely to go out for shopping and meeting friends in cafés and restaurants. The picture of movement flows presented in this chapter is thus limited to a winter weekday picture – further observations during weekends and warmer seasons are planned for future research.

IV. Continuity and change

This section presents the results of the space syntax analysis of the changing structure of the urban form as represented through space syntax normalised choice measures, used to find the multi-scale spatial core of the city. It also highlights the differences and similarities in the contemporary land use mix of the two high streets, as well as the different levels and patterns of movement which make up the social use of the two streets.

Over time the global (city-wide) integration core of the city shifts from the historical centre outwards. While in 1883 and 1933 the core comprises most of the historical centre, including the seafront – the streets of Agkyras, Agiou Andreou and Anexartisias – by 1960 the western side of the seafront is losing its importance at the city-scale and the global core includes fewer segments within the historical centre and more to its north, including much of Makariou. By 1987 the global core has shifted to the north of the historical centre, with global choice values decreasing even further between 2003 and 2014.

Looking at the local choice at 1200m radius, this changes far less over time and although choice values decrease slightly in the southern area of the city and increase in the area north of the historical centre, the difference is not significant, meaning that the development of the city to the north and the changes which have occurred over time have had only a very marginal impact on the functioning of the historical town centre at the local level.

When looking at the multi-scale analysis it is clear that the choice core of the city shifts northwards and eastwards as the global choice shifts; it becomes more scattered, shifts further towards the edge (the north side of the city) and includes more of the distant areas in the east and fewer of the areas than it used to in the west (Figure 4.8). Initially it comprises most major routes within the centre including most of the seafront – the streets of Angyras and Agiou Andreou – as well as most of Anexartisias. By 1933 the city seems to have strengthened the structure of its historical centre by having a high proportion of its global core matching the local core (33.6 per cent of the system has values of choice radius n (global) and choice 1200 over 1.3, compared with 25.2 per cent in 1883). The core forms an almost

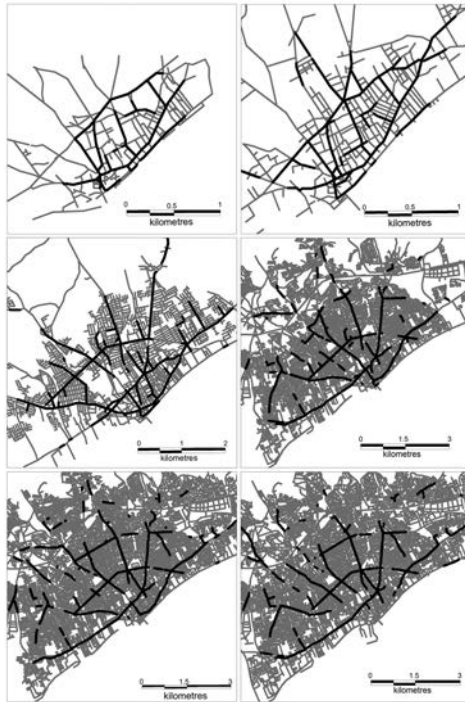


Figure 4.8

Multi-scale accessibility core of Limassol, left to right and top to bottom: 1883, 1933, 1960, 1987, 2003, 2014

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continuous loop around the historical centre, but also includes much of the seafront and has started radiating out of the historical centre. However, the extent of the multi-scale core has by now decreased (22.6 per cent of the system compared to 25.2 per cent in 1883), probably due to the expansion of routes out of the centre towards the surrounding villages. While in 1933 various stretches of the seafront and the whole of Agiou Andreou and Anexartisias were part of the multi-scale core, by 1960 the seafront has decreased in importance and, though both Agiou Andreou and Anexartisias remain part of the core, fewer streets in the historical centre are part of it. At the same time the edges of the stretch of Makariou under study and in particular the roundabout at its south-eastern edge have become part of the multi-scale core, though most of the study area is still not included in this.

In the later periods the choice core becomes steadily more fragmented and focused to the north of the historical centre; this is also reflected in the decreasing proportion of the system forming the multi-scale core (27.3 per

cent, 19.2 per cent, 15 per cent and 10.2 per cent for the town centre, and 14.7 per cent, 6.9 per cent, 6 per cent and 5 per cent for the whole city, in 1960, 1987, 2003 and 2014, respectively. As we get to the present day the seafront and Agiou Andreou are no longer part of the city's multi-scale core, nor is most of the historical centre. Only the northern part of Anexartisias (the section under study) and the eastern part of Agiou Andreou remain within the core, while longer stretches of Makariou are now included.

The choice values of the two high streets show how the importance of Makariou grows both locally and globally over time; it has to be noted, however, that its global choice was at its peak in 1960 and has since decreased again, probably due to further expansion of the city towards the north and the building of the further ring-road and motorway. Anexartisias though, had fairly high global choice values from the start and still does today (the mean being always above 1.3 and nearly 1.5 in 1933), although it has gradually decreased its importance at the city-wide level.

Although Makariou has increased its local choice values, these frequently continue to fail to reach the 1.3 threshold, with the wider scale of 1200m radius having higher values than the more local scale of 800m radius. In contrast, despite the dramatic growth of the city and the significant changes to the surrounding spatial structure, since 1933 Anexartisias has had practically unchanged values at the local scales of 800m and 1200m. The results are summarised in Table 4.1. An important finding from the spatial analysis is that, in both cases, the streets in the early years of their existence were more accessible at the global rather than the local level and so are characterised as carriers of through-movement. It seems that it is only when changes occurred in the surrounding and wider areas, coupled with densification of the street network over time, that they acquired their local importance. This process seems to confirm Hillier's propositions

Table 4.1 Comparison of choice values for the six study periods

	1883 Mean	1933 Mean	1960 Mean	1987 Mean	2003 Mean	2014 Mean
Anexartisias 400m	1.12	1.31	1.25	1.26	1.26	1.21
Makariou 400m	<i>n/a</i>	1.15	1.26	1.28	1.21	1.22
Anexartisias 800m	1.24	1.35	1.34	1.36	1.34	1.34
Makariou 800m	<i>n/a</i>	1.18	1.25	1.29	1.25	1.24
Anexartisias 1200m	1.33	1.42	1.41	1.41	1.39	1.39
Makariou 1200m	<i>n/a</i>	1.20	1.28	1.30	1.32	1.29
Anexartisias Global	1.49	1.49	1.43	1.29	1.27	1.32
Makariou Global	<i>n/a</i>	1.22	1.56	1.53	1.51	1.51

regarding spatial centrality being a temporal process, as described at the start of this chapter.

Historically, the 1883 map shows no particular landmarks on Anexartisias, its northern stretch still barely built up, with open fields and a garden featuring along the eastern side of the street. By 1933 the local hospital, the electric power station and two schools are recorded along the northern stretch, while four hotels are recorded along the southern stretch. The hospital is still recorded on the map of 1947 (Figure 4.1) but had become the Municipality Offices by 1960. The map of 1960 does not report landmarks, although significant buildings are highlighted in black and comprise the hospital plus one other building on Anexartisias.

As shown in Figure 4.9, it is clear that in the vicinity of Anexartisias a variety of land uses had developed by 1933 with services concentrated to the south of the street; this variety is clearly retained throughout time, and by 1960 the area to the west had become a popular entertainment area and services, especially hotels and banks, have developed around the area. With the decline of cinemas in recent years, the level of land use for entertainment and service in this area had reduced by 2011. However, the general variety in the area remains and adaptation of buildings over time is common. Examples of reuse and adaptation include a former cinema turned into a cultural centre, the hospital converted into the Municipality Offices and a school first turned into the law courts and then government offices, subsequently redeveloped as a university building, finally regaining its original educational use almost a century later.

Figure 4.10 shows that no buildings were present along the ditch and footpath of 1933. However, the map shows that two schools, three gypsum factories, a cemetery and a flour mill were in its vicinity. The Commissioner's house (already existing in 1883 and later to become the historical archives) and the public gardens found to the south of the roundabout were already present. Except for an educational complex, the area at this time is still dominated by industrial uses and public services requiring large spaces, such as the public gardens, athletic grounds and a cemetery, typically located at the edges of cities. No buildings of importance are highlighted along the street in the 1960 map. Nevertheless, a variety of land uses have developed in the area with further public and private services, educational and entertainment uses. By 1987 a concentration of educational uses has developed to the south of the street as well as a concentration of services at the western end of the area; both of these uses have continued to increase in number up to the present day. The map of 1987 by the Department of Lands and Surveys shows three banks, one hotel, one consulate, one post office box and one telephone box, along with the Municipality Offices along Anexartisias. The



Figure 4.9

Distribution of land uses in the area of Anexartisias, left to right and top to bottom: 1883, 1933, 1960, 1987, 2003, 2014

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same map shows a petrol station (still existing), a post office box and two guide posts along Makariou, as well as three banks around the roundabout and a cinema at the western junction with Agias Zonis. By 2003 three banks and a hotel were present on Anexartisias, uses which had by now given way to retail and catering; at this time the cinema was still present on Makariou, but was later converted to retail use.

The contemporary land use analysis shows that the two high streets now have a very similar make-up despite their different spatial characteristics: they are both dominated by retail outlets, which make up more than



Figure 4.10

Distribution of land uses in the area of Makariou, left to right and top to bottom:
1933, 1960, 1987, 2003, 2014

Nadia Charalambous and Illaria Geddes.

half of the land uses in the surveyed areas. The main difference between the two is that Makariou has a greater proportion of services, while Anexartias provides more catering outlets. Both high streets have suffered significantly from the economic crisis, with many shops, bars and restaurants having closed since March 2013 – they seem to have suffered almost equally if one uses the proportion of empty outlets as an indicator (11 per cent of commercial properties on Anexartias are empty, compared with 12 per cent on Makariou). Figure 4.11 shows the proportion of each type of land use in the surveyed areas.

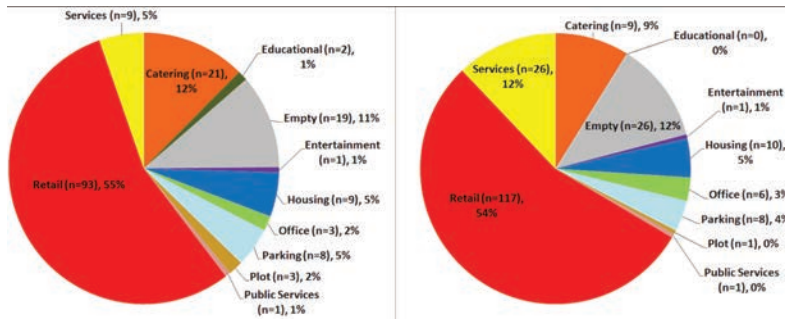


Figure 4.11

Proportion of land uses on Anexartisias (left) and Makariou (right)

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Regarding the distribution of land use, there is not much difference between the two high streets. In both cases uses are mixed throughout the surveyed areas, with no particular concentration of one use or another in one specific area. However, it can also be noted that in both cases services tend to concentrate towards the edges of the high streets and in the side streets, particularly in the case of Anexartisias. Empty outlets are also more common towards the edges, although they can be found towards the middle of the streets. Dwellings are found almost exclusively on the side streets – only one case was found on the high street on Makariou (a large detached home from the late 1940s, dating from when the street was built). One main difference between the two streets is that parking areas can be found on Makariou, while in the case of Anexartisias parking is located on the side streets. The distribution of land uses is shown in Figure 4.12.

The analysis of pedestrian and vehicular movement reveals that pedestrian flows are generally very low and vehicular flows very high (Figure 4.9). Pedestrian movement levels were higher on Anexartisias, reaching almost double the number of pedestrians per hour in comparison to Makariou; in both cases peak pedestrian movements were found at lunchtime (12.00–14.00). Regarding vehicular movement, levels were higher on Makariou, with the peak found at lunchtime, although the difference compared to the afternoon rush hour was not great (less than 100 vehicles per hour). On Anexartisias the vehicular movement peak was during the afternoon rush hour (16.00–18.00), with a substantial increase when compared to the rest of the day. Figure 4.13 shows the average pedestrian and vehicular flows for the surveyed areas.

Bicycle use was very low, reaching 48 bicycles per hour in one location during the afternoon rush hour, but in most cases comprising between 0 and 24 bicycles per hour. The proportion of young people was much higher

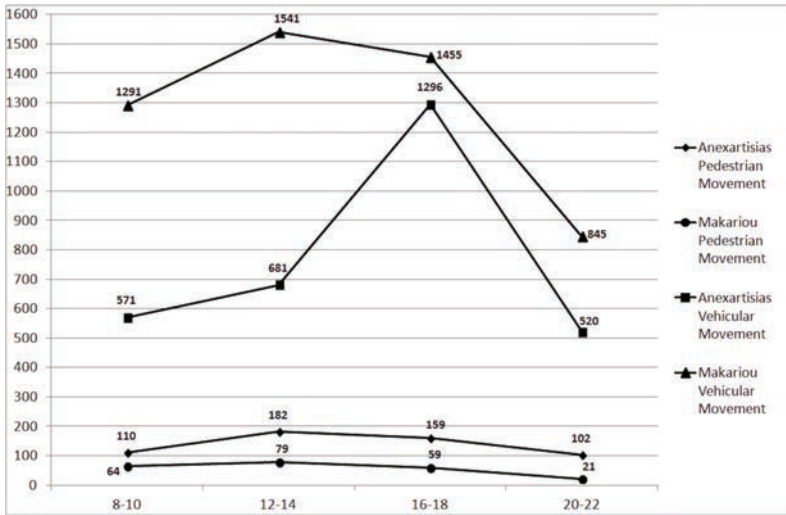


Figure 4.12
Average pedestrian and vehicular movement per hour in the surveyed areas Nadia Charalambous and Illaria Geddes.

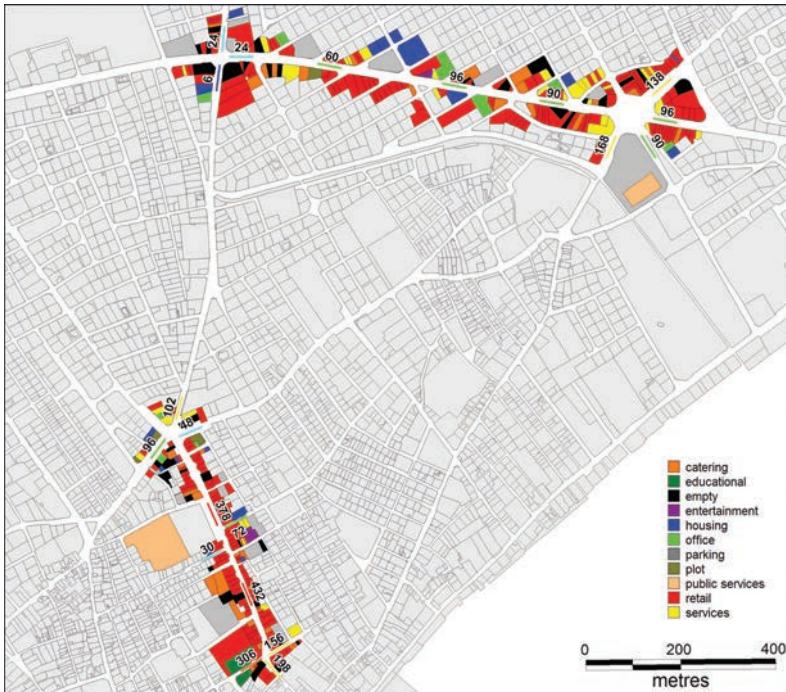


Figure 4.13
Distribution of land uses and pedestrian movement peak (12:00–14:00) on the two high streets, Makariou at the top, Anexartias at the bottom Nadia Charalambous and Illaria Geddes.

on Anexartisias, possibly due to the presence of the university campus nearby, while Makariou is located within the main business district and thus has a high number of offices and corporate companies in its vicinity. As shown in Figure 4.13, in the case of Anexartisias (bottom of the map) pedestrian movement tends to concentrate on the high street itself and to a certain extent on the southern edge nearer to the university and to the waterfront. On Makariou (top of the map) pedestrian movement focuses around the roundabout at its south-eastern edge, nearest to the courts of law, the public gardens and the archaeological museum. While on Anexartisias movement is fairly evenly spread out, on Makariou pedestrian rates tend to progressively decrease as one moves farther away from the roundabout, with the exception of the evening hours during which pedestrian numbers are slightly higher along the high street itself.

Vehicular flows tend to concentrate on the northern side of Anexartisias where the high street joins four other major roads. However, during the afternoon rush hour and during the evening vehicular flows are more evenly spread out and rates become significantly increased on the high street itself during the afternoon rush hour. On Makariou vehicular flows are more evenly spread out but tend to be slightly greater on the high street, in particular during the evening hours when rates around the roundabout on its south-eastern edge and at the junction on its north-western edge drop to a greater extent than on the high street itself.

V. Shifting centrality

This analysis has shown how in the changing context of Limassol's urban growth its integration core shifted towards the edge of the old city and then farther out into the contemporary city. The shift in centrality is mostly due to changes in the global choice values. The global integration core of the city shifted from the historical centre outwards: initially it comprised all major routes within the centre including the whole of the seafront, the street of Agiou Andreou and the whole of Anexartisias. By 1960 the western side of the seafront was losing its importance at the city-scale, and the global core included fewer segments within the historical centre and more to its north, including much of Makariou. Centrality has since shifted towards the north and the east, in particular the 'superstructure' has moved towards the former edge of the city centre, now a central area itself. At present the global core barely includes the northern stretch of Anexartisias, which has moved farther to the north and the west and comprises the whole of Makariou.

The global–spatial properties that once belonged to Anexartisias were appropriated by Makariou, which became a new high street with some characteristics different from its older counterpart, for example the higher proportion of services it offers, and its higher vehicular and lower pedestrian flows. Over time Makariou has become a local high street over time with as great a variety of land uses as Anexartisias: it is not just a ring-road any longer, possibly due to its location near to historically popular areas with various uses in the vicinity, the fact that it was developed along an historic element of the city (the ditch/footpath alignment) and its significantly high choice value (reaching and at times higher than 1.3) at the medium-local scale of 1200m. This is probably also due to further expansion of the city to the north and the east, grid intensification in the surrounding areas and its position in the wider urban network that enabled its development as a successful high street at the edge of the historical core. As Vaughan et al. (2010b) point out, ‘live’ suburban centres are characterised by a relation to the wider active centre in terms of choice and the inter-relationship between a variety of activities fostered by mixed land use.

The local choice values have changed far less over time, with the historical centre, in particular Anexartisias, retaining its local historical values at the 800m and 1200m radii, while Makariou has increased its values at these radii, though not quite reaching the same values as Anexartisias. It is perhaps to be expected that local choice values of the historical town centre would change little after a certain time, as development and redevelopment would occur mostly in areas relatively far from it. This, however, is unlikely to be the cause given that many changes occurred within and near the town centre between 1933 and 1960. Moreover, a major development recently occurred within the historical town centre with the construction of the new marina at its western edge, which does not seem to have had a measurable impact on Anexartisias’ local choice values. This raises the issue as to whether there is such a thing as ‘spatial memory’, whether once an element of the system has established a certain status, or perhaps an ideal level in the local spatial hierarchy, it then develops a resilience – an ability to retain some of its spatial properties in the face of significant growth and change. Such a concept could be key to further an understanding of urban development and of how high streets can have the ability to sustain a mixture of land uses and movement patterns through time.

Despite the differences between pedestrian and vehicular movement flows, both the studied cases are popular high streets with a very similar land use make-up. This may be related to the fact that Limassol has a car-based society and Makariou can function as a high street despite low levels of pedestrian movement. Again, despite lower levels of pedestrian movement,

Makariou has not, to the present day, suffered much more than Anexartisias from the economic crisis.

As centrality shifted with city growth and planning developed to suit the post-war car-based society, Anexartisias retained high street characteristics typical of its former spatial properties, more suited to pedestrian use, while Makariou developed first to meet its requirements as a vehicular route improving long-distance connectivity within and through the city and later seems to have adapted to suit more diverse modes of use as densification made it part of a local network, and its requirements for through-movement decreased with the construction of the outer ring-road and motorway.

Historical spatial properties played an important part in the development of the function and role of the two high streets and despite the spatial changes, Anexartisias has retained the characteristics and functions of a high street, competing with and complementing its younger counterpart. The multiplicity of activities observed around the area may be a contributory factor in its ability to remain a lively area and to adapt to socio-economic changes over time.

VI. Conclusion

This chapter has presented the findings of an exploration of the evolution of the spatial structure of Limassol's historic street network. More specifically, it focused on the spatial properties of Anexartisias, the traditional high street in the historic core of the city of Limassol, and a stretch of Makariou, the first inner ring-road of the city built just after the Second World War; once the edge of the city and now a central area, Makariou marks the boundary between the old historic core and the contemporary post-war city.

The historical analysis of the whole city has provided a detailed understanding of various processes that seem to contribute to the formation and development of the high streets, not just from a spatial point of view, but also in the context of demographic and social changes, highlighting how the commercial core of the city shifted: from the west where the ruling and trading Ottoman community lived; and to the east and north where the wealthier Greek community resided after the end of Ottoman rule. In subsequent years the first stretch of Makariou developed along a pre-existing physical alignment, supporting a then-suburban area where the newly arrived British community settled, and the formal government offices of the Commissioner's House were established. At the same time, the major services and infrastructure of the city (the hospital, the electric power station,

the market and various schools) were located in the geographical centre of the city, along Anexartisias and its surrounding area.

The evolution of the city of Limassol and the tension between the newly developed areas and the historical core clearly affected the transformation of the historic centre and the traditional high street within it. In the context of urban growth, a shifting of centres was observed, indicating the tendency of local centrality to shift from traditional centres towards new areas where peripheral commercial streets emerge in relatively highly accessible locations.

Despite differences in the spatial morphology and choice values of the two high streets at various scales, the findings have revealed a similar process in their development with an initial role as through-movement carriers developing into important local destinations. This adaptability took place both through spatial changes and as a result of the provision, retention and adaptation of historical land uses. While spatial changes have occurred, after a time of adaptation both streets seem to have stabilised through time, fixing their choice values at certain medium-local scales, imbuing them with a kind of 'spatial memory' of their former local and global roles, as well as perhaps providing them with a certain level of resilience to changes both in their vicinity and at a wider whole-city scale. The maintenance of a variety of land use patterns over time seems to affect street vitality, indicating that the interaction between spatial structures and land use patterns facilitates social and economic development, which is important in understanding urban evolution.

Despite the perception that lively urban centres depend on commercial activities, the analysis has shown that the spatial configuration of the two high streets in the context of the wider area (high choice values at various scales, supporting a mixture of movement through and to the area) is a key factor in their ability to support a mixture of land uses through time, thus maintaining their vitality. This finding confirms research by Vaughan et al. (2010b) and Dhanani (in this volume) on the urban evolution of London over a similar historical period, and suggests that there are generic temporal processes occurring in both cases – and potentially elsewhere.

The value of Limassol as a case study is related to wider contemporary urban development issues around fast growth characterised by extensive and superficially inchoate sprawl and concurrent multiple developments, in particular in port cities of the Eastern Mediterranean area. Many such port cities have recently undergone rapid growth and redevelopment of their waterfront areas, turning former traditional ports into targets for urban renewal programmes; for example, the redevelopment of port areas and warehouses at the Ladadika quarter in Thessaloniki, the Solidere Project in Beirut and modern development projects in the former port areas of the

Golden Horn and the Bosphorus in Istanbul, to name just a few. This 'renaissance' of port cities and recent re-emergence of cultural pluralism in many parts of the Mediterranean calls for a careful analysis of how such changes to the urban space impact on the city and its society.

The outcomes of the methodology proposed in this chapter not only highlight the importance of considering historical–spatial properties and land uses when analysing contemporary space use in these cities, but also points to the relevance of diachronic analysis for understanding and assessing how streets at the edges of cities may have the potential to transform into vibrant central high streets through the process of adaptive centrality. It demonstrates that it is not just centrality that allows for transformations to take place but the adaptability of the network and the built form itself. Furthermore, it allows the exploration of the dimension of time and the role it plays in the way the street network and the built form itself react to change and development; in other words, the city's capacity for resilience, in particular the resilience of its high streets, and their ability to recover and accommodate change over time.