How block typology influences the natural movement economic process.

Micro spatial conditions on the dispersal of shops and cafés in Berlin

Victor Joosten, Akkelies van Nes
Department of Urban Renewal and Management, Faculty of Architecture
Delft University of Technology,
email: v.b.a.joosten@student.tudelft.nl, a.vannes@bk.tudelft.nl

1. Abstract

This empirical research aims at explaining the dispersal pattern of shops and catering enterprises in urban environments. The results show that block typology has a strong influence on the dispersal of shops and catering enterprises whereby filled-in blocks facilitate most enterprises, hollow blocks facilitate enterprises less well and non block typologies serve enterprises very poorly. Population densities, block sizes and public transport hubs correlate less well with the presence of enterprises. Analyses of street configurations seem not to provide good correlations with the dispersal of shops and catering enterprises in Berlin. It is proposed that the building typology plays a crucial role in terms of a combination of a high floor space index and the facades following the street line.

2. Problem statement

It is generally known that traditional shopping streets contribute to urban diversity in terms of street life, location possibilities for smaller entrepreneurs, high diversity of shops, and social control and coherence in streets (Jacobs, 1961). A genuine understanding of the micro spatial conditions of the traditional linear shopping street is essential in order to protect or develop these areas successfully.

This research aims for an understanding on the micro spatial conditions under which traditional shops, cafés and restaurants flourish. A registration of these enterprises in Berlin has been carried out and been compared with configurative analyses of the street net, population density, block size and block typologies. The inquiry has the following hypotheses:

A) The distribution of shops and catering enterprises in a city is a pattern that is based on characteristics of the city, such as building typology and routes. If these characteristics change the pattern will adapt to the new circumstances. However, planning can interfere in the relationship between urban characteristics and shop distribution.

B) Micro-spatial conditions influence the location pattern of shops.

Earlier research on the spatial conditions of shopping areas shows that high spatial integration and high inter-connectivity of the street net tend to generate successful shopping areas (Hillier et. al. 1993, 1998, van Nes 2004). However, research on how micro spatial conditions
influence shopping areas are not taken sufficiently into account yet. Therefore this research also focuses on block typologies and sizes, population densities and its effect on the dispersal of shops and catering enterprises.

This research aims at answering the following question:
*What are the micro-spatial conditions determining the dispersal of shops, cafes and restaurants in urban environments?*

3. Method

3.1 Location choice

Berlin has been chosen as case study for this research. The first reason for this is because the city is sufficiently large and contains many areas with numerous shops, cafes and restaurants. Secondly the city has a special spatial set up because of bombing in the Second World War and the separation by the wall. This special differentiated spatial set-up can make the spatial conditions for shops, cafes and restaurants clear more easily.

3.2 Mapping shop and catering enterprise dispersal

Detailed maps or data on the location of shop and catering enterprises in Berlin are not available. This made it necessary to map the enterprises myself. The shops, cafes and restaurants in Berlin were mapped in an area of approximately 130 square kilometres. Enterprises were drawn in on a map while cycling through the city. Cycling through every street was not necessary. Short streets with little activity can be surveyed by looking into the street (section) from a crossing street.

The large majority of enterprises are clearly identifiable as a shop or catering enterprise. There are a number of enterprises where it is unclear if it can be categorised as a shop or not. Examples of these are (semi-private) bars and shops where profit is not the aim, workshops that sell only a few products directly to the customer and semi-fixed market stands. The criterion used to categorise these functions is a kind of ‘direct buyer seller contact’. Market stands were counted as a shop when they were present every day. Seasonal enterprises like an Italian ice-cream shop which is only open in summer or a beach bar were registered as a shop or catering enterprise. Vacant shopping space was registered as a shop when there were indications, like construction activities or advertisement, that the vacancy was only temporary. Evidently, there are a number of arbitrary cases in this categorisation. However, since the proportion of enterprises difficult to categorise is relatively small, this has a negligible influence.

To minimize the effort to map all enterprises several abstractions were made. Firstly no distinctions were made between different kinds of enterprises. Secondly, only the facades were drawn in, not the depth or the number of stories of the shop. Finally maps with a grain of about twenty-five metres were made.
3.3 Determining and mapping possible (micro) spatial characteristics explaining shop and catering enterprise dispersal.

The problem of explaining shop and catering enterprise dispersal was approached in two different ways. One approach was to use literature to collect as many possible (conventional) factors explaining shop dispersal and test them. The other approach was to develop an own spatial characteristic, mainly inspired by observation during the registration of shops. A categorisation of block typology explaining the dispersal of shop and catering enterprises became the result of this. This block typology hypothesis was then tested. First the conventional factors are treated, and then the block typology approach is described.

3.4 Conventional spatial characteristics used to explain shop dispersal

A number of micro spatial conditions possibly determining shop dispersal were selected. These conditions were chosen using literature. These possible micro spatial conditions and street configuration possibly explaining shop and catering enterprise dispersal were mapped. These maps were laid over the shop and catering enterprise dispersal maps.

3.4.1 Population density

Population density is named as an important factor for shop presence by several authors. (Jacobs 1961; Ghosh 1987; Guyt 2000) Data on the population per building block were obtained from the statistical office of Berlin. The areas the building blocks covered were calculated using AutoCAD software. The edge of the block was drawn in the middle of the street, thereby not leaving open spaces. These two datasets were combined to calculate and draw in the population density.

3.4.2 Block size

Block size has been debated often in relation to functional diversity. There are different views on this issue. There is the idea that small blocks provide a variety of possibilities to move through the urban tissue thereby making a greater functional diversity possible (Jacobs 1961). Large blocks are advocated by the designers of IJburg, a district of Amsterdam (Claus 2001). They argue that large blocks stimulate designers to find different solutions to fit program into the block, thereby increasing functional diversity. Since functional diversity is closely linked to the presence of shop and catering enterprises, it was worth to investigate this condition. AutoCAD software was used to calculate the size of blocks.

3.4.3 Public transit

In Berlin 49% of the households do not own a car (Senatsverwaltung für Stadtentwicklung). In such a city one would expect a strong co-occurrence between public transport nodes and shops. Accessibility is also considered to be important in literature. (Guyt 2000, Ghosh 1987) A map has been made showing circles with a fixed radius around metro (S and U-bahn) stations.

3.4.4 Street configuration

The great influence of street configuration on the dispersal of shop and catering enterprises is described by many authors (Hillier et. al. 1993, 1998, van Nes 2004). Attractors like shops influence the movement of people, and the presence of people influence the presence of shops. Street configuration influences both the location of attractors as the movement of people.
Computer programs using vector maps of the street pattern are used to calculate the importance of a street section. A range of formulas can be used. The most common formulas used to explain shop dispersal have been used to create vector maps. The following formulas have been used: global integration, radius-three integration, angular total depth and area integration, as well as the supergrid (Read 2005).

3.4.5 Other conditions
Because of time restraints a minimum amount of detailed maps were made. All possible conditions that could explain shop dispersal found in literature were investigated briefly to see if there was any chance that they would provide reasonable co-occurrences. Conditions that seemed to have little co-occurrence with shop dispersal were not mapped extensively. These conditions are treated here. The reason for the decision to not investigate them further is also given.

Building Age
A diversity of building age is seen as an important factor for functional diversity by Jacobs (1961). The age of a building is also important for the shop owner according to Ghosh (1987). Building age has not been mapped since there are examples of districts in Berlin built in a certain time both containing and lacking shops.

Demography
Demographic conditions apart from density, like income, nationality and age structure of the population may influence the amount and the types of enterprises (Ghosh 1987, Guyt 2000). A relationship between these factors and the location of shops seems not to exist. Rough maps from the statistical department of Berlin have been used to reach this conclusion.

Cross section of street
The cross-section of the street seems not to play a determining role at all. Successful shopping streets can be both wide and narrow, have higher and lower buildings and a great number of car lanes or none at all. Successful streets can be both curved as straight streets. These conclusions have been drawn while cycling through the city and studying 1:10.000 maps.

Parking facilities
Accurate data on parking spaces is difficult to obtain. Nevertheless the lack of parking facilities in successful shopping areas is apparent. Nearly all main shopping areas in Berlin lack parking places. This would suggest a negative relationship between parking space and shops, whereas parking space near shops is perceived as an advantage, both by customers as shop owners (Ghosh 1987). More parking spaces may be perceived as a positive characteristic, but this positive characteristic does not seem to lead to a positive relationship between shops and parking space.

3.5 Block typology
The second approach was to develop an own characteristic to explain shop and catering enterprise dispersal. This was done while registering the shops and catering enterprises, mainly based on intuition. Shops seemed to occur most in dense areas with built up street sides. A block typology was developed that divides the built up area into three categories. These categories were developed for Berlin and can therefore not be automatically used in every city, although most large European cities have similar block typologies.
These categories can be identified by:

<table>
<thead>
<tr>
<th></th>
<th>Inner area of block</th>
<th>Built up street sides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full block</td>
<td>Over 50% built up</td>
<td>Yes</td>
</tr>
<tr>
<td>Hollow block</td>
<td>Not built up</td>
<td>Yes</td>
</tr>
<tr>
<td>Non-block</td>
<td>Differing</td>
<td>No</td>
</tr>
</tbody>
</table>

These categories are characterised by:

<table>
<thead>
<tr>
<th></th>
<th>FSI</th>
<th>Built up street sides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full block</td>
<td>High</td>
<td>Yes</td>
</tr>
<tr>
<td>Hollow block</td>
<td>Middle</td>
<td>Yes</td>
</tr>
<tr>
<td>Non-block</td>
<td>Low, middle and high</td>
<td>No</td>
</tr>
</tbody>
</table>

Area in Prenzlauerberg
- Built in 1880
- Hardly bombed
- Communist rule 1945-1990, not allowing free enterprises

Area around Friedrichstraße
- Mainly built after 1995

Area around Kurfürstendamm
- Built 1890
- Some bomb damage, rebuilt after war

Fig 1: Examples of filled-in block typology. Source: Edition panorama Berlin

Area in Prenzlauerberg
- Built 1930

Rollberg Viertel in Neukölln
- Former blocks demolished and new ones built 1975

Area in Schöneberg
- Built 1890
- Block core demolished between 1943 and 1980

Fig 2: Examples of hollow block typology. Source: Edition panorama Berlin
A similar categorisation of urban blocks has been made by Ernst May in 1930 (Castex 1990).

A map has been made showing the dispersal of the different block typologies in Berlin. For this purpose aerial photographs, 1:10.000 maps and direct observation have been used.
4. Results

The results show that filled-in blocks facilitate most enterprises, hollow blocks facilitate enterprises less well and non block typologies serve enterprises very poorly. Population densities, block sizes and public transport hubs correlate less well with the presence of enterprises. Analyses of street configuration seem not to provide good co-occurrences with the dispersal of shops and catering enterprises in Berlin. The results are shown in the following maps.

4.1 The shop and catering enterprise pattern

This map shows the facades of all shop and catering enterprises drawn in on a map of the central area of Berlin in orange. The Grid is a 1x1 kilometre grid. The blue line indicates the border of the surveyed area.

Fig 5: Map showing shop and catering enterprises in Berlin. Source: own data and illustration
4.2 The shop and catering enterprise pattern isolated

This map shows the dispersal of all shop and catering enterprises coloured in orange. The blue line indicates the border of the surveyed area.

Fig 6: Map showing shop and catering enterprises in Berlin. Source: own data and illustration
4.3 Shops, catering enterprises and block typology

This map shows the dispersal of shop and catering enterprises on a map with the three different block typologies. The filled-in blocks are coloured in black, hollow blocks are shown in dark grey and non blocks are represented in light grey. As can be seen on the map, most shops are located along streets with filled-in blocks.

Fig 7: Map showing shop and catering enterprises on a block typology map in Berlin. Source: own data and illustration
4.4 Shops, catering enterprises and density

This map shows the dispersal of shops and catering enterprises on a map showing the population density. The shaded areas have not been drawn due to limited available time.

![Map showing shop and catering enterprises on a population density map in Berlin. Source: data from the statistical office of Berlin and own illustration](image)

Population density in people per hectare:
- 0-9
- 10-99
- 100-199
- 200-299
- 300-399
- 400<

Fig 8: Map showing shop and catering enterprises on a population density map in Berlin. Source: data from the statistical office of Berlin and own illustration
4.5 Shops, catering enterprises and block size

This map shows the dispersal of shops and catering enterprises on a map together with block size. Small blocks are shown in dark shades of grey and large blocks are shown in light shades of grey. The shaded areas have not been drawn due to time shortage.

Block size in 1000m²:

- 100<
- 60-99
- 40-59
- 25-39
- 15-24
- 0-14

Fig 9. Map showing shop and catering enterprises on a map showing block size in Berlin. Source: data from the statistical office of Berlin and own illustration
4.6 Shops, catering enterprises and metro stops

This map shows the location of metro stops (U- and S-bahn). Metro stops have been drawn in with a 350 meter radius around normal stops and a 550 meter radius around transit stations.

Fig 10. Map showing shop and catering enterprises on a map showing metro stops in Berlin. Source: own data and illustration
4.7 Shops, catering enterprises and global Integration

This map shows shops in black. The street net has been drawn as a vector map not taking the character of the streets into account. Using ‘Depthmap’ software the global (Rn) integration has been calculated. Red streets are best integrated, green streets are poorly integrated. As the spatial analyses of Berlin shows, the city possesses a topological shallow street structure. It has a network of well-connected boulevards.

Fig 11. Map showing shop and catering enterprises on a map showing the global integration in Berlin. Source: Data generated using depthmap, own illustration
4.8 Shops, catering enterprises and R3 integration

This map shows the local (R3) integration of Berlin. Depthmap software has been used. Red streets are well integrated, green streets are poorly integrated.

Fig 12. Map showing shop and catering enterprises on a map showing the local integration in Berlin. Source: Data generated using depthmap, own illustration
4.9 Shops, catering enterprises and radius-radius integration + supergrid

This map shows shop and catering enterprises in black. The supergrid is drawn in using observation, a Falk plan of the city and gradient integration. The supergrid is shown in bright red lines. The other lines represent area integration whereby red lines are best integrated and green lines are poorly integrated.

Fig 13. Map showing shop and catering enterprises on a map showing the area integration and the supergrid in Berlin. Source: Data generated using depthmap, own illustration
4.10 Shops, catering enterprises and angular total depth R3

This map shows the shop and catering enterprises in Berlin on a street configuration vector map used to calculate Angular total depth with radius 3. An angular calculation of the vector map represents curved streets better than ‘traditional’ space syntax analysis. The red lines are best integrated and the blue lines are poorly integrated.

Fig 14. Map showing shop and catering enterprises on a map showing the angular total depth in Berlin. Source: Data generated using depthmap, own illustration
5 Conclusions

5.1 Co-occurrences

The results show that block typology has the strongest co-occurrence with the dispersal of shops and catering enterprises. Most shops and catering enterprises tend to be concentrated in areas with a block typology characterised by a high FSI and built up street sides. More detailed conclusions regarding block typology will be drawn later on in this report. First conclusions based on co-occurrences between shop dispersal and the other investigated characteristics are dealt with.

5.1.1 Population density

A limited co-occurrence can be found between population density and shop dispersal. This would suggest a correlation between a high population density and a great number of shops. There are a number of areas where this correlation can not be found. These areas can be divided into two categories. The first category is made up of areas with low population densities but with a high number of shops. These areas contain predominantly offices. These areas are generally referred to as ‘central business district’ areas.

The other category is made up of areas with medium to high population densities where the blocks have no built up street sides. The modernist housing estate between the city districts ‘Friedrichshain’ and ‘Mitte’ is the clearest example of this. There are not many shops in these areas.
Population density has an equally strong co-occurrence with block typology as with shop dispersal. This would suggest that population density on its own is not enough for shops to flourish.

5.1.2 Block size
As regards to block size, no co-occurrence was found. Shops tend to flourish in both large and small blocks. Areas that lack shops can be found both in large and small blocks. The size of a block may have an influence on the movement patterns of people or the organisation of the block, but this factor seems not to have a determining influence on the settlement of shops in the area.

5.1.3 Public transit
A co-occurrence can be found between metro stations and shops. Nevertheless a metro station is no guarantee for shops; there are a significant number of metro stops with very few shops in its vicinity. A metro station seems not to be a necessary precondition for shops. A number of important shopping areas have no metro stations nearby.

A co-occurrence is expected, since metro stops are built under main streets. This is a matter of planning. The fact that there are both shopping areas with metro-stops and metro-stops without shops suggest that the co-occurrence between metro-stops and shops is a result of planning the metro in shopping areas.
5.1.4 Street configuration

Analyses of street configuration have been made through calculations by the use of space syntax software. Three theories on shop dispersal and street configuration have been tested.

*Combination of Global and local (R3) Integration*

According to Hillier and van Nes (Hillier et. al. 1993, 1998, van Nes 2004) shop owners locate their enterprises in streets with both a high global as a high local integration. The co-occurrence found between the combination of global and local integration and the presence of shops was weak. There are both shopping areas in areas with poor integration, as areas lacking shops in areas with high integration values. A street with high connections to its vicinity, or with high local and global integration is not always a condition for lively shopping streets.

![fig: 19: Detail of figure 11 showing Rn integration. Shops in black](image1)

![fig: 20: Detail of figure 12 showing R3 integration. Shops in black](image2)

*Combination of Radius radius integration and supergrid*

According to (Read 2005) shops tend to concentrate in areas with high area integration (radius radius) at the place where a supergrid street runs through the area. Also here a weak co-occurrence has been found. Successful shopping areas appear in places with low area integration, and there are even shopping streets that are not located on the supergrid. A strong co-occurrence is found where the supergrid runs through an area with a full-block typology.
This seems to imply that shops tend to concentrate on the supergrid, but only if the block typology is favourable.

**Angular total depth R3**

In a personal conversation at the 5th international space syntax conference in Delft, Allan Penn suggested that angular analysis would provide good co-occurrences with shops and catering enterprises in Berlin. An ‘angular total depth analysis’ promised to produce good results for predicting shop dispersal. The results seem to resemble the supergrid somewhat. Anyhow, also this calculation instrument was weak in order to provide a co-occurrence with shop and catering enterprises.
5.2 Shop dispersal in the city

Shop dispersal in Berlin shows a strong co-occurrence with block typology. Filled-in blocks facilitate most enterprises, hollow blocks facilitate enterprises less well and non-block typologies serve enterprises very poorly. Shops are therefore mainly concentrated in full-block typology areas.

![Fig 23: Detail of figure 7 showing the three block typologies](image)

Not only is there a strong co-occurrence, when the areas with a certain block typology are sufficiently large there are no exceptions to the relationship described above. Firstly, an area of minimally 20 hectares of full-block typology *always* contains many shops. Even if the area is relatively isolated from the rest of the city this seems to be the case. Smaller full-block typology areas often tend to also contain many shops. In an urban area with mixed typologies the shops tend to concentrate in the areas with full-block typology. Secondly, a large concentration of shops outside of a shopping centre is *never* found in non-block typology. Greater numbers of shops in these areas are always concentrated in shopping centres.
5.3 Shop dispersal within the different typologies

As stated before, shops tend to concentrate along the supergrid, although there are exceptions. The amount and type of shops that concentrate along the supergrid differs per block typology. Each of the three typologies has a typical dispersal pattern of shops. Figure 25 shows the typical dispersal of shops within the three different block typologies. The yellow lines represent main streets; the white lines represent local streets.

![Figure 25: Shown is the typical shop dispersal pattern within the different block typologies. The yellow lines represent main streets. The orange lines represent shop and catering enterprise facades. The white lines represent local streets. The black and grey shades represent the different block typologies. Source: own illustration.](image)

Fig 25. Shown is the typical shop dispersal pattern within the different block typologies. The yellow lines represent main streets. The orange lines represent shop and catering enterprise facades. The white lines represent local streets. The black and grey shades represent the different block typologies. Source: own illustration.
Full block typology not only has shops lining most of the supergrid streets, but also many shops inside the area. Shopping centres are located along the supergrid in full-block typology areas. Sometimes whole street sections of local streets inside a filled-in block typology area can be lined with shops. Shops tend to concentrate themselves on street corners rather than in the middle of a street section. If there are no clear main roads in an area with filled-in block typology, shops tend to be dispersed throughout the area. Examples of this are the ‘Spandauer Vorstadt’ and the area south of ‘Schloss Charlottenburg’.

In areas with a hollow block typology shops tend to be concentrated along some of the supergrid streets. The amount of shops inside the area is relatively limited.
In areas with non-block typology shops tend to concentrate in shopping centres. These can be shopping malls which are closed off from the outside but also small rows of shops.

5.4 The nature of filled-in block typology

Filled-in blocks characterise themselves by having a high Floor Space Index, combined with that the buildings' facades follow the street line. This would suggest that these two characteristics seem to be crucial for the presence of many small individual enterprises. Possible causal relationships are discussed here.

5.4.1 Built up street sides

The interface between sellers and buyers is topologically short in the way shops are directly connected to the public streets. In areas with built up street sides people move along the facades when they move through the area. This happens with every journey, not necessarily for a journey to a shop. In this way inhabitants are confronted with shop and catering enterprises while moving through the neighbourhood. The topological step to enter the shop is extremely short (one step); in other words, the shop can be entered with little effort.

Salingaros argues that successful paths (defined as routes people move along, not necessarily as a physical path) run along an existing boundary, like a façade. (Salingaros 2005 p32) This
would imply that built up street sides make the paths running through the street more successful. This could be a factor strengthening the importance of built up street sides.

5.4.2 High FSI
In an area with a high FSI a large number of people are present, either because they live or work there. These functions are primary functions (Jacobs 1961); functions where people go anyhow. The high amount of people present in places with a high FSI causes there to be a short topological distance between potential customer and enterprise. This would also explain the co-occurrence between population density and shops. The precondition for a high population density is a high FSI. In areas with built up street sides a high FSI makes the location of many shops possible.

5.4.3 The plinth
The ground floor of a building, the place where the building meets the street is referred to as the ‘plinth’. A high FSI and built up street sides influence the amount of shops on a block scale. On the smaller building scale there is a very practical prerequisite for a shop. There must be a space to contain the shop and the owner of this space must allow for a shop. This research has not dealt with the ownership structure of the city. This could be of influence on the presence of shops.

During the collection of data attention has been paid to the spaces shops and catering enterprises need. Shops need some kind of a direct adjacency and inter-visibility between inside space and outside space on ground floor level. Or put in a more concrete way: there must be a space for the shop in the building adjacent to the street with an opening.
This demand seems to be of less importance than the demands referring to FSI and built up street sides. This has two reasons.

Firstly most shops are flexible and can fit into unlikely spaces like semi-cellars or spaces above ground floor. There is virtually no space that would not be fit for some kind of shop or catering enterprise. Figure 27 shows photos of a shop and a catering enterprise in semi cellars. Figure 28 shows two similar buildings. One with no shop, and one with a fashion clothing shop. Figure 29 shows kiosks in spaces that were not designed to function as shopping spaces.

![Fig 27: The openness of the ‘plinth’ is only of secondary importance. Photos show examples of a café and a shop in a semi-cellar. Source: Own photograph, Gneisenau Straße, Kreuzberg, Berlin](image-url)
The second reason for the relatively limited importance of the character of the plinth is a time argument. Whereas the FSI and the built up character of the street sides are investments that take allot of planning, time and money, the changing of the plinth is a relatively minor investment. The demand for some kind of a direct adjacency and inter-visibility between inside space and outside space on ground floor level can be met in a matter of months if there is a building in place. The changing of the FSI of an area and the construction of buildings on the street sides takes at least several years.

This does not mean that the character of the plinth is not important at all. The importance of the character of the plinth has not been researched in detail but it might be likely to assume the following: The more direct the adjacency and inter-visibility between inside space and outside space on ground floor level, the smaller the investment to locate a shop in the building, the more likely the owner will allow for a shop and the more likely a shop owner is interested in using the space.

These findings on the plinth are clearly in a premature stadium, further research is necessary if any solid conclusions are to be drawn.
5.5 Hypotheses for future research

5.5.1 Types of shops within the different typologies
This research was not aimed at mapping the different kinds of enterprises. No maps have been made of the different types of enterprises. On first sight it did appear that the shops in the different typologies were of different character. Building typology might have an influence on the kind of enterprises.

Although there seemed to be a great number of chain stores and even shopping centres in areas with full-block typology, the majority of the shops seemed to be individually owned. It seems that areas with a full-block typology tend to contain every kind of enterprise. Moreover areas with full-block typology seemed to provide room to numerous catering enterprises. All the main nightlife and restaurant areas seemed to be located in areas with full-block typology.

In non-block typology the majority of the shops seemed to be chain stores. There seemed to be very little catering enterprises in these areas except for fast food chains. In malls the types of shops seemed not to be as divers and not as often privately owned compared to the shops in the areas with filled blocks. Furthermore, non-block typologies also seemed to contain less individually owned daily food shops like bakeries and grocers.

5.5.2 Hierarchy of shopping areas
Although Christaller’s model on the hierarchy of shopping areas is quite abstract, it could perhaps be applied to the different areas with predominantly filled-in block typology. All areas larger than about twenty hectares contain a large number of shops or catering enterprises. Urban areas containing shops probably compete with one another. There can only be a limited number of areas with shops that sell upper-class clothing for example. Probably not every area has managed to attract enterprises of a citywide importance. Since these areas do contain shops these areas might therefore be autarkic, in the way that the shopping area does not serve a larger part of or the whole city.

When areas with filled-in block typology lose this competition for city wide functions they will probably not lose all their shops. There will always be a high number of shops left.

5.5.3 Relationship between shops and inhabitants
The social composition of an area's inhabitants could influence the character of the enterprises as well as its merchandise. On first sight it seemed that when the neighbourhood is different, the shops were different too. The influence of the social composition of the area is probably greatest on shops selling goods that are bought by the local inhabitants. Whenever the types of customers change in an area, the types of shops change too. When a certain type of shops disappears from an area, they tend to get replaced by others suitable to the customers living or frequenting the area. However, an area with the right spatial set-up for shops will not lose its shops. The types of shops will simply change. It is likely to believe that areas with the same block typology can thus have a large variation in the types of enterprises.

5.5.4 Hypothesis on the role of block typology
Block typology is probably influenced by many things. The street pattern, planning, the underlying landscape, warfare and the economic, cultural and technical history of the city all determine the place and kind of typology the blocks have. The block typology in its turn seems to be the main factor affecting the location of shops.
There seems to not be a direct link between the street pattern of a city and the location of shops, although in a naturally grown city this may seem so. Berlin is an example to make this
idea clear. The block typology in Berlin is highly influenced by the allied bombing and Russian invasion of the city. The destruction of large parts of the city causes the block typology to be very different from how this used to be as the city developed naturally. Shops responded to the typology and not to the street pattern in Berlin after the war, thereby creating a shopping pattern different from what space syntax analyses suggest.

The following diagram represents this hypothesis:

![Diagram of hypothesis on the role of block typology](source: own illustration)

5.5.5 Universality

The study object of this research is Berlin. The typologies of blocks developed are clearly based on the context of Berlin. It would be very interesting to research if the relationship between FSI and built up street sides and shop dispersal is the same in other (non-European) cities. A different block typology would have to be developed per city, categorising the blocks by FSI and built up street sides. The same block typology as used in Berlin could probably be used for most European cities like Paris, Lyon, Brussels, Barcelona, Vienna, Warsaw or Budapest.
Literature


READ, S (2005) Flat city; a space syntax derived urban movement network model, in: van Nes, A (ed.) 5th international space syntax symposium proceedings (Volume 2, p341-357)


**Data**

