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Spatial patterns: The late-medieval and early-modern economy of the Bailiwick of 's-Hertogenbosch from an interregional, regional and local spatial perspective

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SPATIAL PATTERNS;

The Late-Medieval and Early-Modern Economy of the Bailiwick of 's-Hertogenbosch from an Interregional, Regional and Local Spatial Perspective.

Ruimtelijke patronen;
De laatmiddeleeuwse
en vroegmoderne economie
van de Meierij
van 's-Hertogenbosch
bekeken vanuit een interregionaal,
regionaal en
lokaal ruimtelijk perspectief.

Proefschrift ter verkrijging van de graad van doctor
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op gezag van de rector magnificus,
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PREFACE AND ACKNOWLEDGEMENTS

"What is past is prologue" (Shakespeare: The Tempest)

At the beginning of 2005 I was invited back to Leiden University to attend a master class given by Professor Bill Hillier of University College London. Apparently Professor Hiller was very well-known as the author of *The Social Logic of Space* and for pioneering a spatial analysis method entitled 'Space Syntax', but being an archaeologist with no experience in spatial analysis, I had never heard of him. Having looked at the book, it seemed to me that the master class could be very interesting so I accepted the invitation. Little did I know that this class would determine the direction of my future research. Since that day in 2005 I have attended many stimulating lectures by Professor Hillier, taken part in a number of impromptu workshops and presented two well-received papers at the International Space Syntax Symposium in Stockholm in 2009. This turned out to be the most inspiring, interesting and worthwhile symposium I have ever attended because of the many animated discussions and conversations I was able to enjoy with many of the other conference-goers.

Therefore the first people I would like to thank are Professor Hillier and all of the other Space Syntaxticians amongst whom, most notably Akkelies van Nes, Hanna Stöger, Laura Vaughan, Sam Griffiths and the late Alasdair Turner, for their lectures, one-on-one workshops and conversations, software demonstrations and inspiring scientific work. Hanna Stöger deserves a special mention for inviting me back to Leiden in 2005 to attend that master class, for organizing the stimulating Spaceheads sessions at the Faculty of Archaeology in Leiden and for organizing the Space Syntax sessions at the CAA Congress in Berlin in 2007 and the EAA Congress in The Hague in 2010. Moreover, Hanna was always there with interesting ideas on Space Syntax and how to use it, besides providing me with questions that left me puzzling for an answer.
Despite the drive that Space Syntax instilled in me, this thesis would not have been possible if my supervisors Arnoud-Jan Bijsterveld and Frans Theuws had not applied for a grant from the Netherlands Organisation for Scientific Research (NWO), accepted my job application and put up with all this Space Syntax mumbo-jumbo in the first place. Arnoud-Jan thank you for your patience, guidance and advice. This thesis had its ups and downs but I am glad we were able to bring my PhD to this successful conclusion.
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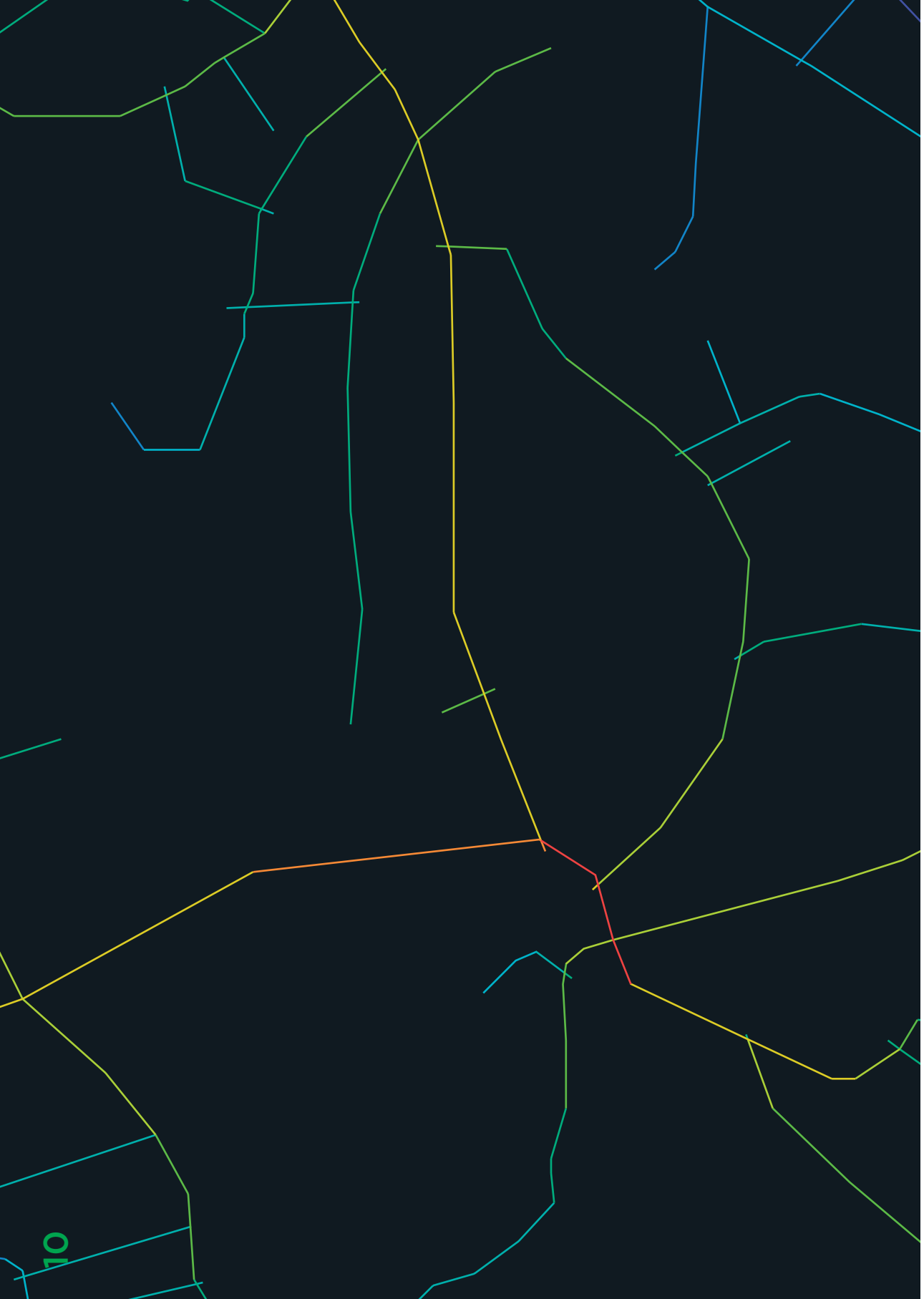
However, writing a PhD thesis was a very personal journey as well as an academic one, with many ups and downs, especially towards the end. Accordingly, I would like to thank my (ex-) PhD colleagues Evelien, Marjolein and Suzanne for their cups of tea, treats, tissues and e-mail checking and for simply being there when I needed a listening ear from someone who would immediately understand what I was talking about. Besides them I would like to thank all my other colleagues at the Department of Sociology, who have always shown a keen interest in my research despite it being so different from their own. Moreover, I would like to thank the former manager of ORI Shirley Baert for her support during the latter stages of my PhD. I am also indebted to my colleagues at Ingenieursbureau Oranjewoud and the gemeente Breda who gave me the motivation to carry on to the end and who created a stimulating work environment in which I could forget about my thesis when I needed to. I am also very grateful for the opportunity to take some time off to finish my thesis.

For a long time this thesis only really existed as a simple Word document on a PC screen. In the grant the Netherlands Organisation for Scientific Research had given my supervisors and me there was a provision for publication and printing costs. This enabled me to engage a professional to design the final version. Jan Treffers, a fellow fencer, with his own design company Nulzevenzes, kindly accepted the commission. Working on the design in the final stages of my PhD really helped me to visualize it and realize that there would be an end, and inspired me to keep going to the finish.

As I write these acknowledgements my Viva still has to happen. Knowing what I will probably be like on the day I have to thank my two *paranymphs* Hanneke and Suzanne for making the day go as stress-free as possible and for helping to make it a very memorable one. Thank you both for all of the last-minute advice, help and support in both the completion of my thesis and the organization of the big day.

Without my family, none of this would have been possible either. Having left my parental home at seventeen to study in Scotland, coming back home for two years to do my Master's degree in Leiden, and moving back across the North Sea to York for two years to start my PhD, only to come back home when I got the job in Tilburg, I want to thank my parents for putting up with the ambitions of their only daughter even though they might not necessarily have matched their own and for providing me with the opportunity and means to be able to follow my chosen career path.
The last few lines of my acknowledgements can only be for one person, the most important person of all, the love of my life Ferdi. We met nearly five years ago on the fencing piste and my life has not been the same since. We had so many happy times on holiday, where you fell in love with the UK almost as much as I have, but also in Bavel, as I soon moved in to your bachelor pad and started to make it our home. However, when I moved, my PhD thesis moved in with me, and despite finding it difficult to deal with, you did put up with my tantrums, depressions and moans about it or because of it. That is finally all over now! Ferdi, without you I would not be standing here today, thank you for being there for me. I love you.



INTRODUCTION AND THEORETICAL BACKGROUND

1

The market economy and the urban environment are central to our current way of life. This was not always the case, however. Through the ages, our society, which was once built on self-sufficiency, agriculture and small communities, has evolved via a market-based system with specialized jobs, to our current global market economy, with metropolises and towns, inhabited by more than fifty per cent of the world's population.[1]

This transformation did not occur overnight and every era has seen some economic changes that contributed to it. This thesis will focus on one such period. During the later Middle Ages and the early-modern period, as towns had already been founded, people became more market-oriented and started to specialize in individual crafts.

Towns had to work closely with the surrounding countryside to provide for that part of the urban community who had neither the space nor the time to raise crops and produce the daily essentials for their families. Money and exchange had become much more important in the procurement of subsistence goods. However, these goods still had to be produced and transported before they could be bought or exchanged. Where did they come from? Were they all imported or was a town or countryside able to provide for itself? What spatial conditions were required for the interchange to take place between producers and consumers? Answering lower level questions such as these will aid the achievement of the central aims and objectives of this thesis.

[1] http://news.bbc.co.uk/1/hi/sci/tech/4561183.stm

1.1. **AIMS AND OBJECTIVES** This thesis aims to answer the question of how far the spatial form and spatial pattern of urbanization correlated with economic development. It aims to find out how town and countryside functioned as one entity and as the participants in an economic symbiosis on a local, regional and interregional level. It will present the findings of multidisciplinary research into the late-medieval and early-modern economy of the Bailiwick of 's-Hertogenbosch from an interregional, regional and local spatial perspective.

This large objective can be broken down into various smaller objectives. Paragraph 1.4. provides the theoretical framework for each of these and illustrates the importance of each one for the analysis of the social and economic transformations throughout this period.

The first two concern the symbiosis of town and countryside. For argument's sake we assume that town and country were closely linked and cannot be analysed separately. Moreover, we propose that town and country were much more alike in their material culture than has previously been thought. Hence, towns should not necessarily be labelled as dynamic and countryside as conservative. This town-countryside symbiosis resulted mainly from economic determinants. In addition, location theory, as discussed in the first chapter, will be used to show that in any one particular region there never is just one central place. Instead, there is a network of cooperating settlements, and as a consequence, a spatial logic between town and country may be discerned. The location of production and consumption within a region therefore has various geo-graphical and economic determinants and is not the result of coincidence.

Moreover, we examine the relationship between economic development and urbanization. For argument's sake, we assume that 's-Her-togenbosch and its Bailiwick in the later Middle Ages relied much less on import and export than previous authors have contended, since both were relatively self-sufficient. Rural settlements were instrumental in the economic development of the Bailiwick. Therefore, I assume that every medieval urban network and urban form is underpinned by a structure which determines its rate of success.

The perceived spatial logic within settlements, within the urban network, and between town and country will be based on spatial analysis, besides the findings from more mainstream studies of urban form. This will also help to explain how material culture spread as a result of economic and social factors.

All of these statements are hypotheses which I will test in this thesis. Previous studies and theoretical debates have enabled me to formulate them. However, none have been convincingly proven. In this thesis I have tested them by analysing the town-country symbiosis in a particular region. In doing so, I have adopted an interdisciplinary approach to the study of the dynamics between town and countryside, by combining historical, archaeological, and cartographic evidence with spatial methodologies.

1.2. THE SPATIAL AND TEMPORAL DEFINITION OF THE RESEARCH AREA

1.2.1. **SPATIAL DEFINITION** The central case-study in this thesis concerns the late-medieval Bailiwick or 'Meierij' of 's-Hertogen-bosch. The Bailiwick is situated in the eastern part of the present Dutch province of North Brabant. During the Middle Ages, the Bailiwick was one of the four quarters of the Duchy of Brabant. The other three were Leuven, Antwerp, and Brussels. Roughly, the geographical borders of the Bailiwick coincide with the river Meuse in the north and the Peel region in the east. The Bailiwick had no natural borders to the south and west, but bordered on the Lordship of Breda in the west and the Prince-bishopric of Liège in the south. The Bailiwick consisted of five administrative regions: four quarters and a freedom. These were the quarters of Peelland, Oisterwijk, Kempenland and Maasland and the freedom of 's-Hertogenbosch. The Bailiwick took its name from the bailiff or *meier* of 's-Hertogenbosch, who administered the area in the name of the Duke of Brabant.

The soil in the Bailiwick of 's-Hertogenbosch was mainly poor and sandy, especially in the Peelland and Kempenland quarters, which consisted of wide heaths and marshlands interspersed by woods and fens. The recla-mation of these uncultivated areas started in the Middle Ages. After that, some were laid fallow again, which resulted in the abandonment of some villages, whereas others have been farmed until modern times. The Bailiwick is criss-crossed by rivers and rivulets. Some of these rivers, in particular the Aa and the Dommel, were at least partly navigable in the Middle Ages. This subject will be discussed in greater detail in Chapter 3.

The reason for selecting the Bailiwick as a case-study is threefold. First, a wide and unique range of primary sources dating from the thirteenth to the sixteenth century is available for the Bailiwick. These sources are archival as well as archaeological and have hardly been used in an integrated approach. They will be addressed in the second chapter. Secondly, the Bailiwick provides an excellent case-study since it is a relatively typical geographical region and therefore easily comparable with other regions in Western Europe. Though the Bailiwick of 's-Hertogenbosch is the central case, comparisons will be drawn by consulting secondary literature on other regions, such as Holland, Flanders, the Rhineland, Hainaut and a few regions in England. These comparisons will show the Bailiwick of 's-Hertogenbosch to be a prime example of economic and urban development in this period rather than an exception. Thirdly, North Brabant and especially the Bailiwick have been neglected in the larger synthesizing studies of the medieval period in the Low Countries. Dutch research has focused almost exclusively on Holland, as the cradle of the Golden Age (Van Bavel and Van Zanden 2004).

1.2.2. **TEMPORAL DEFINITION** The temporal scope of my research is determined largely by the availability of sources. The main focus is the period around 1550, when economic and urban activity was at its height. However, the general scope of this thesis is the period between circa 1180 and 1568. Archaeologists are currently of the opinion that 's-Hertogenbosch was founded around 1180, and since 's-Hertogenbosch is the largest settlement in the research area, this date provides a good starting point for my research. The year 1568 has been selected as the end of the period, because it was also the year that marked the start of the Dutch Revolt and a period of profound social and economic change, which is worthy of a study in itself.
To summarize, this thesis will focus on the period around 1550 but will place the findings in a temporal context and show any developments leading up to that crucial date of 1550 as and when they are sufficiently available.

1.3. **STRUCTURE** As stated earlier, the rest of this chapter discusses the theoretical framework of my thesis. Sources and methodology will be discussed in the second chapter. The core part of this thesis starts with Chapter 3, in which the characteristics of the Bailiwick as well as any links, other than the economic ties, between town and countryside will be analysed. The fourth chapter examines the interregional links between the Bailiwick and 's-Hertogenbosch in particular and the fifth chapter investigates the internal economic network of the Bailiwick. Chapter 6 analyses the economic spaces of the town of 's-Hertogenbosch itself. Chapter 7 presents the conclusion, integrates the findings about the location of economic activities into the wider body of literature, and poses challenges for future research.

1.4. **THEORETICAL BACKGROUND** When one researches such large and complex issues as urbanization, production and consumption, and spatial patterns, further clarification of these terms, and their theoretical origins and development is required. These issues have been the subject of many debates and theories, five of which are discussed in this chapter.
The first two debates concern urbanization and production and consumption. The first is the town versus countryside debate. Here I will highlight previous research on town and countryside relationships, and the theories behind the concepts. Secondly, location theory will be discussed as this is the main theory that is applied in the examination of the economic symbiosis of town and countryside. When discussing the third debate I will shed light solely on the issue of production and consumption, and address commercialization theory. This will illustrate the transformation from a self-sufficient to a market oriented economy. The fourth debate focuses solely on the issue of urban form by providing the essential definitions of what we mean, for instance, by 'town' and 'countryside', and by discussing urban morphology and urban networks. I treat the growth of urbanization and the changing economy as two different subjects, so it is important to discuss these terms separately, given that it is still open to debate whether urban growth caused economic change or vice versa. The final debate focuses on the issue of spatial patterns. In discussing Space Syntax theory I will shed light on how space can be analysed and understood. Space Syntax aids the analysis of the spatial aspects of town-countryside relationships

and the economic organization of towns, and how they changed as a result of economic and societal developments.
In my discussion of these five debates and theories I will define the theoretical background to this thesis, the gaps in previous research that this thesis aims to fill, and the way I intend to fill them.

1.4.1. TOWN AND COUNTRYSIDE

'Town' and 'countryside' are elastic concepts. What size defines a settlement, and what institutions and amenities does a settlement need in order to be classified as a 'town'? Does the countryside consist only of fields and farms, or can all the settlements – which do not qualify as towns – be included? Even these basic questions already show the degree to which these concepts are elastic and closely linked. I take the view that town and countryside cannot be classed as two separate entities but should be analysed as parts of a symbiosis.
The way in which towns and countryside functioned exactly during the Middle Ages is a much-debated topic. While some scholars regard towns as a crucial element in the changing economic nature of medieval society and as an entity separate from the surrounding countryside, others have argued that town and country should always be analysed together, and that it was their symbiotic relationship that allowed the medieval economy to flourish.
Pirenne (1965, orig. pub. 1936) pioneered this debate by proposing a dual theory. First, he argued that towns started to flourish only after the revival of long-distance trade within the European continent in the thirteenth century and that their development came to a halt with the discovery of the New World and the opening up of the world economy. He regarded European trade routes as extremely important factors in the early stimulation of urban growth and their continuing progress of towns and cities. Pirenne argued that the ever-increasing trade with the East and the New World territories adversely affected continental trade in Europe and caused urban decline. Secondly, he claimed that the agrarian economy differed radically from the urban exchange economy, because it was based on feudalism – a system of geared to subsistence – whereas the urban exchange economy was capitalist and geared to the market (Sweezy and Hilton 1978).
In recent decades, Pirenne's first theory on the importance of long-distance trade in urban development has been strongly criticized by adherents to the view that the de-urbanization at the end of the Roman Empire started long before the Arab conquests in the seventh century. Despite the revival of trade in the tenth and eleventh century it was not the merchants who became the ruling class in the growing towns but rather the local landowners and feudal officials (Hilton 1992, 8).
Pirenne's second theory on the separation of town and countryside has been the norm for slightly longer. Pirenne (1965, 171) had stated that the main mission of the town was to secure the supply of enough food for its population. Towns, therefore, were focused on the market. In rural society many traces were found of the more traditional, feudal hierarchy with lords, vassals and serfs, which operated according to the feudal laws of self-sufficiency. Postan (1976, 239) has elaborated on this view by arguing that towns were "non-feudal islands in the feudal seas". In his work on the economic history of Britain in the Middle Ages, he attributes the growth of, mainly English, towns to the fact that people wanted to escape the immobility of feudalism and the growing professionalization of the countryside, which worked to their disadvantage as I will illustrate later. Moreover, living in towns freed merchants from tolls in other towns. However, like Pirenne's theory that the rise of urbanization was caused by the revival of long-distance trade, the view that towns were non-feudal islands in feudal seas has almost completely disappeared among historians.
The town versus countryside debate is sometimes also referred to as the feudalism versus capitalism debate. This is because most standard texts currently express the opinion that "urban histories are inseparable from the histories of the economic, social and political systems of which they were part" (Hilton 1992, 9). This Marxist view centres on the idea that capitalism did not exist before the end of the fifteenth century, and that towns were very much a part of the surrounding feudal countryside. Britnell, Courtney and Nicholas even go as far as to say that a close relationship exists between feudal lordship and commercial economy (Britnell 1996; Nicholas 1997, xvi; Courtney 2007, 66). Courtney argues that town and country are linked by pointing to the feudalist and capitalist overlap: towns grew out of the feudal countryside, and feudal lords depended on the market to convert their agrarian resources into money to support their lavish lifestyle. Swanson (1999, 22), on the other hand, explains the close relationship between town and country by showing that commercial outlets could be found in rural locations besides urban markets. While both Courtney and Swanson stress the close links between town and countryside, Courtney maintains that this is due to feudal factors whereas Swanson focuses on the capitalist marketing links. Van Bavel (2010, 101-102) takes a more central stance by stating that the separation between town and countryside was indeed very much a legace of the Middle Ages until at least the French Revolution. The importance of the town and its separation from the countryside may, however, have been overemphasized in earlier literature. This thesis adheres most to Van Bavel's stance that there is a difference between town and countryside as they are, in a sense, separate entities. However, there was still a lot that linked the town with its countryside, so much so that one could not exist without the other. Therefore I too subscribe to the view that the difference or the separation of town and countryside has been overemphasized in much of the literature on the medieval period.
In order to flourish, a town had to be able to support the majority of the inhabitants in non-agrarian occupations (Swanson 1999, 24). Boucheron *et al.* (2003) agree with Swanson that the urban economy was closely intertwined with the rural economy and that the main link in this town-country relationship was the market. Towns provided the outlet for local produce on a fixed day or fixed days of the week, and had year-round amenities for wholesaling. Only the regional urban economic network enabled the trade from each region to flow from the smaller market towns to the large provincial towns and vice versa (Dyer 2005, 193). Boucheron, on the other hand, stresses the importance of the urban market rather than the collaboration between urban and rural markets by contending that it is the interaction between production, provisioning and consumption in an urban setting which gives the town its function as a central place. Boone (2002) also recognizes the economic link between town and countryside, but differs from Swanson and Boucheron by claiming that it was agrarian rather than commercial.
Even though the view that towns can be studied independently in terms of society and the surrounding countryside has been refuted, the nature of the town and its economic importance are still subject to debate. Within this debate, Blockmans (1993, 166) has expressed the view that "the urban space in the most urbanized regions of the Low Countries was a direct reflection of the needs of merchants and of the artisans". Boone (2002, 622), on the other hand, rejects this economy-centred focus on urban space and debates instead how a combination of economic and political factors contributed to urban development. This thesis will add to this debate by examining the nature of the economic links between town and countryside within the region of the Bailiwick of 's-Hertogenbosch.
Since the topic of this thesis straddles both the archaeological and historical disciplines, attention should be drawn to the difference between the respective analytical approaches regarding the extent to which Pirenne's views have been discounted. Whereas, as mentioned earlier, most historians have abandoned the concept of 'non-feudal islands in the feudal seas', many archaeologists still adhere to it. This thesis follows the historian's tradition and integrates town and country in one analysis but it will also apply an interdisciplinary approach by drawing upon both archaeological and historical evidence. In doing so, it complies with Galloway's (2007, 77-78) view that an interdisciplinary approach affords productive openings for examining the complex interaction between 'feudalism' and the commercial economy.

1.4.2. LOCATION THEORY

It is evident that different regions have different settlement patterns. Why this is the case needs to be explained. Various scholars have analysed settlement patterns for their own case-studies but only a few have developed a model that can be applied to other case-studies and which will permit comparisons between geographical regions. This is referred to as location theory. The two central proponents of this theory are Von Thünen and Christaller. This section focuses on their ideas, that is, on Von Thünen's isolated state model and Christaller's central place theory (von Thünen 1863; Christaller 1935).
Even though Von Thünen's model (1863) analyses land-use patterns in an abstract rather than a concrete environment, his theories and ideas have proven useful in the analysis of concrete town and countryside relationships. Von Thünen uses an abstract environment to analyse the different internal determinants of land-use patterns, such as production and transportation costs, without the results being affected by external influences such as

landscape, soil conditions, taxes, and import and export. In a concrete case-study, where these outside influences do actually exist, his model can be used to analyse their effect and they can be incorporated in a successful model for that particular area.
One of the main arguments against Von Thünen's model centres on the improbability of a region having only one town, since in most regions there is hardly ever one single town but more likely a combination of several towns and villages. Christaller's response to this argument constitutes his main addition to Von Thünen's model (Christaller 1935). According to Christaller, but also Slater (2007, 26), towns and villages can be ranked according to their functions and amenities. In most countries the settlement pattern of these ranked towns is remarkably similar, and ranking can therefore be part of the model. Moreover, Slater (2007, 25) argues that it is not even necessary for a region to have just one dominant town. There are various case-studies which demonstrate that there could be several towns, all sharing important central-place functions. Christaller has illustrated this in his schematic representations of the central-place system. According to him, the order of these central places was decided by the kind of goods and services they offered (Christaller 1935, 58-70).
One of the main discoveries of location theory is that a balance is always sought between the size of a town and the size of its hinterland. Galloway (2007, 119) illustrates this balance by stating that the size of a town's immediate hinterland will always stay the same regardless of whether the central place expands or contracts. This implies that a town in a particular geographical location will always have a maximum attainable size, which depends on the fertility of the soil, the availability of navigable waterways, and the cost of road transport. Moreover, location theory has shown that the location of producers and manufacturers is predominantly economically driven and is not necessarily restricted to the central place. Von Thünen (1863) found that the closer a city was to a farming region, the greater the degree of commercialization and intensification of production in that region, and that self-sufficiency and extensive production increased with distance. Despite previous reservations voiced by other authors, Masschaele (1997, 6) argues that location theory is also applicable within a medieval context: "By cross-referencing the different sources, we can develop an overview of the spatial horizons and internal structures of the prevailing regional commercial networks of the period, identifying some of the variety in regional networks, and distinguishing common traits over larger areas." (Masschaele 1997, 8)

Thus, location theory is useful in addressing one of the aims of this thesis, *viz*. to explain why different regions have different settlement patterns. Usually this is due to factors such as proximity to the coast, the availability of navigable waterways, geographical constraints, the diversity of settlement patterns, and economic activity. However, the extent to which these factors actually influenced the settlement pattern needs closer investigation. The use of location theory may enlighten us as to how the settlement pattern in the Bailiwick was structured. 's-Hertogenbosch was a central place of the first order, but the way the other settlements were organized and connected is still subject to debate. This highlights the main problem with location theory, as neither Von Thünen's nor Christaller's model offers a refined concept of urban space. Moreover, the methods in both models are practically inapplicable, which means that findings about a region remain theoretical and cannot be proven. There are, however, theories and methods which have moved on from location theory and can collectively be referred to as spatial analysis. These methods are far more concrete and applicable. One of the spatial analyses – Space Syntax – will be discussed in the final section of this chapter.

1.4.3. **COMMERCIALIZATION** The two most important changes in the central medieval economy in Western Europe were the penetration of commercial activity into the countryside – particularly into the ranks of the peasantry – and the coalescence of towns and rural markets into a series of integrated regional trade networks (Masschaele 1997, 230-231). These changes may appear to have been the consequence of two antagonistic economic systems, but this is not the case because, in fact, proto-industrialization strengthened the symbiosis between town and countryside (Stabel 1997, 161; Blockmans 2010). In this section I discuss the economic change at household level and the development of the regional networks, as both were at the heart of economic change in the Central Middle Ages.
However, these two changes did not occur spontaneously, but were sparked largely by significant demographic growth during the Central Middle Ages. In the last quarter of the twelfth century commercial growth accelerated in most European countries, mainly as a result of population growth but also because of the expansion of overseas trade and the reclamation of new agricultural land. Therefore, the significant increase in population can be seen as a precondition for the development of a commercial exchange economy as, without demand, there is little incentive to innovate or intensify production levels. That said, an increase in population does not in itself cause commercialization. For that to happen, peasants have to resist the fragmentation of landed property, which occurs as a result of the population increase and whereby more people strive for the same number of acres. Those who managed to secure a larger than average plot could increase their product per capita. In combination with political stability, favourable institutional circumstances, and a decline in population in the later Middle Ages, this rise in product per capita triggered a process of commercialization which, in turn, facilitated a rise in absolute levels of collective wealth and human capital (Britnell 1993, 360; Masschaele 1997, 227-229). This account shows that the relationship between demography and commercialization is far too complex to be labelled as an example of direct cause and effect. However, I agree with Hilton (1985, 131) that demography is always an important factor in any study of social and economic development and should therefore be taken into account.
The growing population pushed up demand, which in turn encouraged the development of specialized occupations (Britnell 1996, 79).
The population increase also created a class difference between those who owned land and those who did not. The landless people were all looking for work, which was usually specialized and seasonal. The seasons dictated the demand for labour, which peaked during harvest time. Because of this most people were multi-skilled and could make the most of every job opportunity. Specialization meant that people had to take part in an exchange economy, which enabled them to obtain every product they required but which they were unable to produce themselves. Moreover, in order to make specialization profitable many producers had to go farther afield to find more customers. However, it has been argued that only peasants with larger estates took an active part in the exchange economy, and that peasants with smaller holdings only took part on an irregular basis, for instance, when the yield was higher than expected (Masschaele 1997, 52).
This economic change at household level has received considerable attention in the past decade (De Vries 1994; Britnell 1996; Masschaele 1997). De Vries stresses the importance of this economic change by labelling it the 'Industrious Revolution', which he sees as the essential prelude to the Industrial Revolution. Though De Vries accurately diagnosed the economic development of the era, he does not do justice to it by naming it the 'Industrious Revolution' and partitioning the continuing process of economic development. Even De Vries (1994, 262) himself stated that "the Industrious Revolution was no sudden thing", and admitted that 'revolution' is the wrong word. I agree with Britnell (1993, 359) who argued that the economic shift towards capitalism started much earlier than had previously been thought and only studies with a large time span can analyse economic development.
As a result of high population levels and high urban ratios, a refined and integrated market system became a necessity to supply town-dwellers as well as country folk with food, fuel and other commodities (Stabel 1997, 158). Even though there was still some form of agricultural activity in most towns, the density of urban living in tenements meant that it was not enough to feed an entire family. Moreover, as a result of specialization, people could not produce every product that was required. Consequently, for most towns, especially those with larger populations, the development of a reciprocal relationship with the surrounding countryside was crucially important. Securing supply lines was a matter of life or death "and as such, a moral imperative for mayors and aldermen as well as an economic imperative for artisans and labourers" (Masschaele 1997, 129). Towns could not just sit back and wait for the rural goods to be brought to them, and urban merchants had to actively source the countryside for supply (Masschaele 1997, 131). Towns therefore became main centres of trade, and the growth of urbanization can be seen as an important indicator of expanding trade (Van Bavel 2010, 218, 223).
Apart from the necessity of feeding the urban population, landowners had a financial motive for founding new markets. Though it cost a town money to hold a market, a popular market could easily support itself and even generate a

profit from the obligatory tolls and taxes. Markets had to be strictly defined and regulated and were often chartered. These rules and regulations were necessary to entice merchants to use the chartered instead of the informal markets. The latter were more alluring because they did not charge tolls and taxes. Therefore, unlike the chartered markets, the informal markets were not a source of revenue for the local lord. Hence, it was in the lord's best (financial) interests to persuade as many merchants as possible to use his chartered markets. Thanks to the survival of most of these stringent rules and regulations, researchers can gain a clear insight into chartered markets. Unfortunately, these sources give a normative view of the past. As a result, not enough attention has been paid to the existence of those markets – mostly rural ones – which never gained a chartered status. As a result of this non-transparency, previous research has focused mainly on urban commerce and left rural commerce entirely out of the picture, even though the cooperation between the two must have been central to the growth of commercialization (Masschaele 1997, 3).
The informal economic relationships between town and country could take various forms. There were rural markets, which collected the produce from the surrounding countryside and which was subsequently transported in bulk to the larger markets. Secondly, there were rural markets which peasants visited to meet their day-to-day needs as the larger markets were sometimes too far away. Moreover, lords and peasants who resided near the town brought goods to the market, whereas town dwellers went into the country to obtain rural products (Unwin 1981; Masschaele 1997, 57). In essence, there were three levels at which commercial activity was undertaken. First, the exchange level to subsist and pay rent; secondly, the specialized production level, which entered interregional trade; and finally, the export level comprising commodities (Hatcher and Bailey 2001, 49). The advances in both land and water transport played an important role in increasing the volumes traded and the extent of commercialization (Van Bavel 2010, 223; Blockmans 2010, 86). The transport network therefore is one of the central themes in this thesis.
Needless to say, the integration of the regional urban-rural network and the promotion of exchange did not occur overnight or during an 'industrious revolution'. Long before peasants were engaged by merchants in regional markets, they had participated in simple exchange between households in their own villages. "Peasants, merchants and markets are mutually necessary elements of commercialization; subtract one element from the mix and the other two will fail to solidify" (Masschaele 1997, 232).
The market had thus become a central institution of social and economic life and had transformed both towns and villages in the process (Masschaele 1997, 233). Markets became essential for the survival of urban society, so safeguarding trade routes and regulating trade was of prime importance for the town magistrates (Stabel 1997, 161).
So far, it may seem that the effects of commercialization were purely economic. Commercialization, however, also affected the way people lived. It did not necessarily improve most people's way of life. It raised the standard of living but it also widened the class division between those who owned landed property and those who did not (Dyer 2005, 178). Moreover, this higher standard of living did not prompt the workers to spend money on luxury goods. Most of them preferred to earn just enough to meet their subsistence levels and have more spare time instead (Hatcher and Bailey 2001, 10). Whereas the sale of luxury goods did not rise as sharply as had been thought, the sale of subsistence goods received a boost from the rise in disposable income.
Despite all of this, it is difficult to measure the actual level of commercialization as there are so many factors influencing this process. One could for instance look at the extent of labour division in the countryside, the development of urbanization and marketing institutions, the use of money and credit, the extent of regional specialization in agricultural production, the difference in agricultural intensity, and, last but not least, the progress in transport (Hatcher and Bailey 2001, 134; Van Bavel 2010, 223). It is mostly as a result of this immeasurability that many scholars (see Sweezy and Hilton 1978) have claimed that medieval Europe was anything but commercialized. This is an assertion that I do not agree with. This section has moreover shown the importance of integrating town and countryside in one research topic, and exposed the redundancy of the question whether a symbiosis existed between town and countryside. As Masschaele (1997) has argued, commercialization cannot occur if there is no strong cooperation between town and countryside and amongst the towns themselves. The question answered by this thesis is how the integration of town and countryside functioned, originated and developed.

1.4.4. **URBAN FORM** The previous paragraphs focused on the close links between town and country but nothing has so far been said about the formation and development of the urban environment. Moreover, though the discussion of location theory has shown that different town-country relationships exist, depending on whether a region has only one urban settlement or several, no detailed analysis has been made of these different relationships. In order to do so, it is important to shed light on some of the studies of urban form. These studies use systematic analysis to explore urbanization. However, before they can be discussed it is important to briefly discuss this issue of urbanization and its vocabulary.
Since historians have not reached a consensus on the definition of 'urbanization', 'town', and 'countryside', the debate on urbanization has become a complex one. Moreover, it involves many smaller issues such as urban networks, town foundation, urban form, town-plan analysis, and urban morphology. Before I discuss each of these issues I will provide the definitions, which I believe to be most salient in relation to this thesis.
I found the most pertinent definition of urbanization in De Vries (1984, 10). He equates urbanization with urban growth and demographic urbanization, stating that "urbanization is a process of population concentration. It proceeds in two ways; the multiplication of points of concentration and the increase in size of individual concentrations." While the term 'urbanization' could include the social and economic aspects of urban growth, I am of the opinion that, for the analysis of the influence of economic change on urbanization and vice versa, a strictly physical definition of the word is much more informative, as it enables one to analyse both economic change and urbanization as separate entities.
Before defining town and countryside, it is important to be clear about what is meant by the terms 'urban' and 'rural'. Urban relates to densely populated areas, whereas rural relates to sparsely populated areas. For a settlement to be classed as urban it has to appear in the hearth-counts with at least thirty hearths.
We shall now proceed to discuss 'town' and 'countryside'. 'Town' has always been a disputed term in historical terminology since it means something different in every period, and different criteria are applied to qualify a settlement as a town (Lesger 1993, 30; Rutte 2005a, 74). Lesger has even proposed the use of the term 'gateway' instead of town since, in his view, the town functioned first of all as an intermediary between the countryside and the wider world. Since different languages have different words to describe settlements of different sizes[2], and since medieval terms are not easily interpretable, many modern authors have attempted to compile a list of urban characteristics to determine whether a settlement could be classed as a town or not. Biddle (1976, 100) provides the most cited list of characteristics; a settlement needs to have at least one to be classed as a town. However, he adds that the possession of one or more characteristics does not necessarily confer urban status, but merely provides an indication of urbanity which has to be considered more closely in each case. He suggests that a settlement probably needs to fulfil at least four of these criteria to merit serious consideration as a town. In his list, Biddle includes easily definable characteristics such as fortifications, a planned street system, markets, mints, legal autonomy, and a role as a central place and a judicial centre. He also names much more subjective aspects, such as a relatively large and dense population, a diversified economic base, plots and houses of an urban type, social differentiation, and a complex religious organization.
This discussion shows how complicated it is to define what a town actually is. In this thesis I have therefore chosen to use the term 'town' only when discussing 's-Hertogenbosch, because it is by far the largest settlement in the Bailiwick. All other settlements in the region, anything from a cluster of houses to a village of several hundred dwellings, as long as they have a name by which they are known, are described as 'settlements'. No distinction will be drawn between villages, hamlets, etc. In that way, this thesis avoids the discussion posed by Leenders (2011) on whether it is possible to distinguish between villages and hamlets in North Brabant. I also have my own definition for countryside. I use the term hinterland to describe the rural area surrounding a settlement which provided it with subsistence goods. The term countryside denotes the general rural environment irrespective of its subsistence function, and

[2] Whereas French and English have three (village, ville, and cité and village, town, and city respectively), Dutch and German have only two (dorp and stad and Dorf and Stadt) and Norwegian and Danish only one (by) Schledermann (1970), 115.

therefore includes, besides the hinterland, uncultivated land such as forests, heath and marshlands.
As these definitions show, the distinction between town and country is somewhat difficult to convey. This is largely due to the lack of a clear definition of urban space. However, even in geographical terms the distinction was sometimes vague (Lesger 1993, 31). A town-wall was nothing more than a visual barrier, as there was often a smooth geographical transition between town and country. Not only did the urban building expand into the hinterland, the hinterland was very much a part of the urban environment as it was only from the sixteenth century onwards that green spaces in the town started to disappear due to lack of space.
But whereas the visual distinction between town and country was vague, the legal distinction was crystal clear. As a result, the erection of buildings around the town was severely restricted to prevent them from being used as shelters by invading forces. The establishment of rural industry just outside the town boundaries was also seriously restricted: these industries would enjoy all the advantages of being located near an urban centre but would not pay tax for the privilege since they were not located within the town (Van den Heuvel 1993, 40).
Having addressed the difference between town and countryside semantically and spatially it is time to return to the central aim of this section and discuss the studies on urban form. Boerefijn (2005) stresses the current accepted view on urban development that even towns with the most irregular shapes were planned and never developed organically. This view was first voiced by Conzen (1960, 1968, 1988, 2004) and further developed by Lilley (1998, 2000, 2007). Their map regression methodology is based on the premise that every part of a town is planned and that it is therefore possible to analyse different stages in a town's development. They also agree on the premise that plot boundaries remained the same despite changes to the buildings on them. Though, as Taverne (2005, 181) acknowledges, cartographic evidence should be used with care, it is too important a source to ignore as it provides a unique record of the urban development. Assuming that towns are planned, it should be possible to analyse the location of the urban economic spaces, as they must have been planned as well. This thesis proposes that urban economic spaces were structured logically and that there are logical explanations for the location of particular trades and markets. By studying the street grid and the location of the various economic spaces in greater detail this thesis will examine the effects that the delivery of goods from the surrounding countryside had on the topographic differentiation of markets in the medieval town. However, this approach does not mean that I see hidden meanings in town plans, as for instance, Lilley and Van Ginkel have suggested (Van Ginkel 1998, 15-17; Lilley 2004). I agree with Boerefijn (2005, 133) on this, and I use this theory only for the analysis of the spatial patterns of production and consumption.
Such a systematic approach to town-plan analysis is relatively new in the study of urban form. In contrast to various authors (Burke 1956; Beresford 1967; Barley 1976; Hindle 1990; Morris 1994; Boucheron et al. 2003; Schofield and Vince 2003; Rutte 2005b), I agree with Taverne (2005, 181) that it is not useful to differentiate towns according to the time and type of their foundation, their street grid, or their architecture. It is virtually impossible to classify each town successfully and, even more importantly, these classifications did not exist for the medieval urban resident. A more relevant classification can be achieved by examining the amenities, such as markets, cloth-makers' halls, and weighing houses, which were present in a town as inventoried by Van Uytven (1992, 78) and Van Asseldonk (Van Asseldonk 2002, 108), for example. These facilities influenced the hierarchical role of a town in a particular region, and determined the number of merchants and the frequency of their visits.
An interdisciplinary approach is invaluable in the analysis of such complex matters. The Netherlands, however, has lagged behind most of Europe, and especially Germany and the UK, in interdisciplinary urban research. There are long-standing traditions of historico-geographical and urban morphological research in both countries, but they have barely found their way into Dutch historical and archaeological studies. Rutte (2005b, 143-144) acknowledges the lack of synthesizing and comparative research on the urban environment in the Netherlands, pointing out moreover that most of the archaeological and historical research has focused on the larger towns at the expense of the smaller towns and villages. In addition, most researchers have focused on Holland and have paid little or no attention to most of the other Dutch provinces. Rutte's comments illustrate the gap which this thesis aims to fill by researching the urban network as a whole, consisting of both large and small towns, in a synthesizing and comparative manner, in an area which has not yet been studied from an interdisciplinary perspective.
It might have seemed, so far, that urbanization is only about single towns, but that is definitely not the case. Urbanization is also about how towns are connected and about urban networks. Stabel (1997) has stressed the importance of urban networks by integrating various approaches in his study on the urbanization of Flanders. In his discussion of urbanization he sees the various towns and villages as players in a network in which the actions of one influence another. He argues that "Flemish cities did not merely exist as independent entities [as] their social, political, economic and cultural actions were shaped by equilibriums within a network" (Stabel 1997, 271). De Vries (1984, 9) cites Rozman, Skinner, Robson and Pred in stressing the importance of networks: "Economic, social and administrative functions of cities are carried out in hierarchic, or at least interconnected frameworks. More important, the characters of those structures condition the sort of role that cities, taken collectively, can play."
Stabel (1997, 63) argues that the economic and political development of a region is reflected in the structure of the urban network. However, there is never one urban network that covers all aspects of urban life, which is why his monograph has more breadth than depth (Stabel 1997, 272). That is why I have chosen to discuss the structure of the economic urban network in my aim to analyse first of all the economic town-country relationship of the Bailiwick of 's-Hertogenbosch. In essence, my thesis develops his methods by incorporating the physical evidence into my analysis rather than merely discussing it, which is what Stabel found sufficient. This is because Stabel feels that socio-geographical methods for analysing the distribution of settlements were exhausted all too soon (Stabel 1997, 237). Methodologically, a great deal has changed in ten years. Moreover, I believe that socio-geographical analysis, as well as the pure geographical and archaeological component, can greatly enhance our knowledge of urban networks.
Stabel (1997, 240) recognizes the problem of the relationship between the hierarchy and the way networks function, but we can approach this problem by applying Space Syntax, a technique that analyses the network solely from a mathematical perspective and is not influenced by any hierarchical or organizational information. Moreover, in comparison with urban spatial analysis tools, Space Syntax has developed clean operational concepts about urban space. The spatial properties of a built environment can be analysed independently on the basis of socio-economic data, making it possible to correlate spatial data with socio-economic data at a later stage.

1.4.5. **SPACE SYNTAX** "Urban space influences societal processes and societal processes influence urban space." (Van Nes 2011, vii)

Hillier and Hanson's 1984 study entitled *The Social Logic of Space* pioneered a new form of spatial analysis which became known as 'Space Syntax'. This technique was subsequently developed by Hillier (Hillier et al. 1993b; Hillier 1996b, 1998, 1999a, 2005b; Hillier and Iida 2005), Hanson (1998), Turner (Turner 2000, 2001b,a, 2004; Turner et al. 2005) and Penn (Penn et al. 1998; 2003). Though it has been primarily used for the design of new architectural spaces it has also been applied to historic sites (Hanson 1989a; Vaughan and Penn 2006; Vaughan 2007). At first, Space Syntax was used mainly to analyse small towns, but the development of computer software and hardware enabled the analysis of larger metropolitan cities and even entire regions.
Currently, there are three aspects to Space Syntax. First, it is a set of techniques for analysing cities as networks of space formed by the placing, grouping and orientation of buildings. Secondly, it is used for observing how these networks of space relate to functional patterns such as movement, land use, areal differentiation, migration patterns, and even social well-being and malaise. Finally, it is also a set of theories about how urban space networks in general relate to the social, economic and cognitive factors by which they are shaped and influenced. It has been applied to a large number of cities in different parts of the world, so a substantial database now exists of cities which have been studied at some level using Space Syntax (Hillier 2007).
Before continuing the discussion about what Space Syntax is, it is important to take a few steps back and discuss which 'spaces' we can distinguish and how Space Syntax uses this distinction and, in the process, distances itself from other theories about the built environment. This brief intermezzo will aid the understanding of the theory and its practices and is important in order to gain a clear understanding of the thrust of this thesis.

A settlement consists of a set of private and public spaces. According to Hillier and Hanson (1984, 92), "public spaces are the results of the arrangements of buildings, and possibly other bounded areas such as gardens, parks and the like". The main point of applying Space Syntax in urban studies is to analyse the spatial configuration of public spaces and how they relate to private spaces. The way in which public and private spaces are connected conditions the possibilities for socio-economic activities. Space Syntax focuses mostly on the extrinsic properties of space, as in how all spatial units relate to one another rather than the size or feel of one particular space. This is why we speak about topological patterns, as they describe only the mathematical properties of a particular place, city, town, manor, parish, or tract of land without its geography and architecture. Intrinsic properties of space are about the geography, the architecture, the size and the feel of a particular place. Many methods, such as those of urban form discussed in the previous section, focus on the analysis and description of these intrinsic properties of space. This is where the terms market-town, castle-town, suburb, organic towns and the like originate: these describe what one sees.

Basically, these terms are general statements and only apply to that particular built environment. Moreover, most of these studies of the historic urban form rely on vaguely formulated theories, which allow space for circuitous arguments and manipulation of the results. A good hypothesis, theory or method must be stated clearly and must be able to be applied to more than one type of built environment for it to be falsifiable and testable. Because Space Syntax operates independently from the context it can be applied to all types of built environment in the past, present and future, and across the globe.

This general applicability has led to the concept that the urban fabric is made up of three layers, a topological, a cultural and a geographical layer, all of which contribute to the specific urban form of a particular town (Hillier 1996b). The topological layer is generic and is the same for every town in every region. It is the underlying spatial pattern that makes towns comprehensible and consists of all public spaces within a town such as streets and squares. The cultural layer creates the difference between, for instance, Asian and European towns, and incorporates all of the features which make a town typical for a particular region. For instance, in prehistoric Anatolian settlements there are no streets as we know them in the western world. All the houses are built side-by-side and people go from one building to the next via the roofs (Cutting 2003). The geographical layer is specific for every town. This layer creates the difference that exists between towns within a cultural region as a result of their location in the landscape. Some are located on a river, others in the mountains, and look different as a result.

Space Syntax has developed these strategies for describing configured, inhabited spaces with the aim of gaining a deeper understanding of how society functions. Space Syntax is based on the idea that human societies use and configure space, and that social structure is expressed spatially. The premise is that sociologically relevant aspects of configured space can be captured by studying the topological description. This premise is supported by observation rather than by theoretical arguments and is generally accepted in Space Syntax literature. The central ideas behind this premise are that topological features are more robust than documentary evidence, that they lend themselves to quantitative analysis, and that they allow the small circumstantial differences between spaces to be disregarded, thereby enabling a more objective analysis and comparison of settlements (Bafna 2003, 17-19).

Using these theories as a basis, Space Syntax has, for instance, illustrated that towns have a macroeconomic focus, meaning that the spaces in which economic activity takes place (such as markets and shops) are located in the most topologically integrated street segments. The most integrated street segments are the ones with the most to-movement or through-movement potential across the entire town. These measures will be explained in more detail in the methodology section in Chapter 2 (section 2.2.1.2). However, for the moment, it needs to be noted that Space Syntax uses only the topological features (i.e. how all spaces relate to one another) in its analysis, and does not use any information on the current location of economic spaces, residences, and other buildings (Hillier 2005a). The fact that Space Syntax does not take any historical or current information into account and looks only at space itself is one of the reasons why I have chosen to use it: its mathematical methodology provides a new perspective on medieval urban form, medieval urban networks and the positioning of medieval economic space.

Space Syntax is constantly developing. For instance, in *The Social Logic of Space,* a Space Syntax graph was based on an algorithmic reduction of all the complete lines of sight which could be drawn in all of the public spaces in a town (Turner 2004; Turner et al. 2005).[3] More recently, however, research has shown that dividing the lines of sight into segments (junction to junction) results in a higher correlation with urban movement patterns (Hillier and Iida 2005). Most of these developments have been made possible by the ongoing research in this field and the rapid advances in computer software and hardware. Despite these developments, and the change in calculation, the main Space Syntax measures remain the same and are also the ones used in this thesis. In short, Space Syntax measures how every public space or street segment relates to all other public spaces. On the one hand, it measures the to-movement or accessibility potential of each street segment with respect to all others. On the other, it measures the through-movement potential of each street segment with respect to all others. Space Syntax is a more useful technique for historians and archaeologists than the more traditional urban models because of its more detailed level of analysis. The more traditional urban models have identified the zone as the defining urban element, as for instance in the previously discussed location theory, and inter-zonal flows, as in the primary relation. In contrast, Space Syntax identifies the street segment between junctions as the defining urban element and the spatial relations between each (street) segment and all others as the primary relations, *viz.* to-movement and through-movement. Space Syntax uses the segment rather than the zone as the central urban element because of the importance it assigns to the sightlines in the analysis of movement patterns. According to Bafna (2003, 23-24), "the line of sight is a significant organizing and unifying device in experience, and the number of distinctive turns on a route are more crucial to spatial experience than actual distance covered".

Despite these promising results, Space Syntax has been strongly criticized by the historical disciplines. Only recently has it been able to exert a profound influence on the analysis of space and the built environment in an archaeological context. This was partly due to its lack of historical specificity, since it was not clear which periods or environment Space Syntax can be successfully applied to. Recent research has shown, however, that Space Syntax can be applied successfully to, for instance, Anatolian fortified towns (Kubat 1997), Roman towns (Van Nes 2009b; Stoeger 2009), and medieval cities (Kubat 1997; Craane 2007). Many scholars were also somewhat sceptical of the techniques when Space Syntax was first published. The main problem perceived with Space Syntax was that one would never be able to explain a society's behaviour and how settlements work merely by using mathematics. It is not surprising that people are sceptical about predicting human behaviour, since it is normally unpredictable anyway. This scepticism is most often voiced when analysing on a micro-society level, such a household. However, the success of Space Syntax will be determined by the scale in which it is used. Hillier (Hillier *et al.* 1993b; Hillier 1999a), and Penn (2003) have adequately proven that Space Syntax works well on the level of a townscape, and Van Nes (2009a) and Turner (2009) have demonstrated its value for systems of towns.

The only downside to Space Syntax is that its basic concepts and ideas are hard to explain to those who are not familiar with it. Since words such as choice and integration have a meaning outside the world of Space Syntax, people are easily confused, and wrongly dismiss Space Syntax as a whole, simply because they do not understand it. I will try to explain my findings as clearly as possible in this thesis by remaining loyal to the concepts and terminology of Space Syntax and avoid the risk of dumbing down. Moreover, this thesis does not pretend to be a handbook of Space Syntax. For this I refer the reader to the *Introduction to Space Syntax* written by Akkelies van Nes (2011).

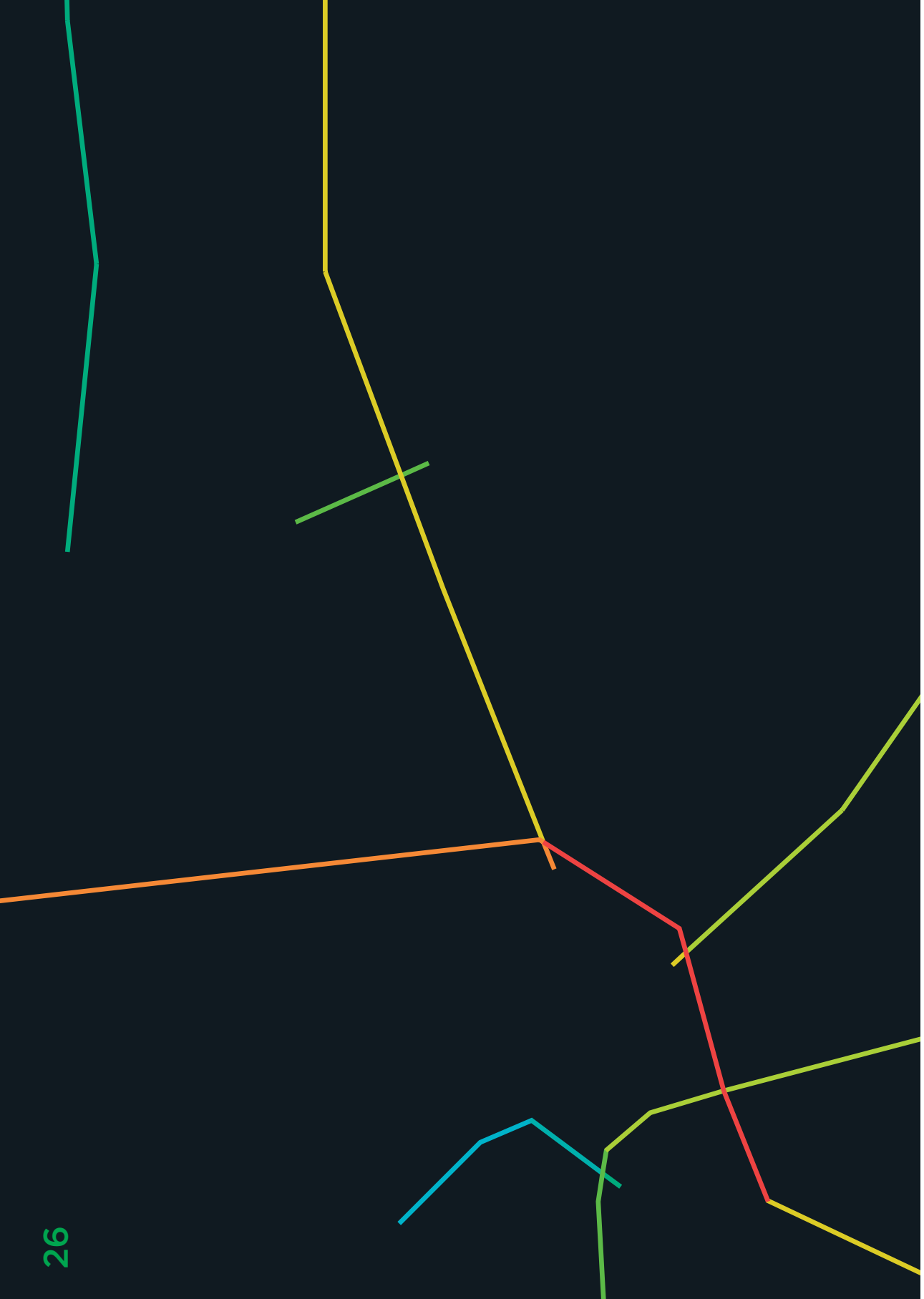
CONCLUSION This chapter has demonstrated the need for a study of the symbiosis of town and countryside. The town versus countryside debate as well as the commercialization theory have underlined the economic importance of this symbiosis and highlighted the lack of detailed analysis of this feature of the medieval economy. Even though other economic changes occurred during this period, such as the professionalization of the countryside, the strong marketing links between town and countryside are perceived as the main motor behind urban growth.

It remains, however, important to examine the two issues – economic change and urbanization – separately to be able to answer the question of which caused which. Moreover, the discussion

[3] For a more detailed description of this algorithm, see Turner, Penn and Hillier (2005)

of urbanization theories has shown that there are still many unanswered questions with regard to urbanization issues.
In investigating the causal relationship between economic change and urbanization, I will also shed light on the particulars of urban networks, urban form, and urban development. Most of the issues I have discussed in this chapter have some form of spatial element. This is why I have chosen to use Space Syntax in this thesis to shed light on the spatial aspects of economic change, urbanization and their causal relationship.
The discussion of location theory has shown that the spatial study of the town and hinterland relationship is more complex than models have previously allowed for. Space Syntax will refresh this town and hinterland model.
Spatial analysis fits in neatly with the strong interdisciplinary focus of this thesis. As we have seen, many authors have stressed the importance of interdisciplinary research on this particular topic.

Space Syntax focuses mostly on the extrinsic properties of space, as in how all spatial units relate to one another rather than the size or feel of one particular space. This is why we speak about topological patterns, as they describe only the mathematical properties of a particular place, city, town, manor, parish, or tract of land without its geography and architecture. Intrinsic properties of space are about the geography, the architecture, the size and the feel of a particular place. Many methods focus on the analysis and description of these intrinsic properties of space. This is where the terms market-town, castle-town, suburb, organic towns and the like originate: these describe what one sees.



SOURCES OF EVIDENCE AND METHODOLOGY

This thesis uses several sources of evidence as well as several methodologies, which together aim to provide the most complete picture possible of the economic relationships between town and countryside in the Bailiwick of ‘s-Hertogenbosch. These sources and the various stages of the research will be discussed consecutively in this chapter. The aim of the discussion of the sources is to provide insight into which ones are available or unavailable for the research topic of this thesis. It will also show why particular sources have been included or excluded.

2

The two main methodologies used in this thesis are also discussed in this chapter. Since these methodologies are relatively new to the historical and archaeological field of research in general, it was felt that basic information about them had to be included in order to make this thesis accessible for a wider audience.
The discussion of the basic concepts and ideas in this separate chapter will hopefully remove the need for repetition every time they are referred to.

2.1. SOURCES

2.1.1. ARCHAEOLOGICAL EVIDENCE

The use of archaeological data raises many problems in a thesis such as this. Despite the introduction of a central electronic archaeological repository (Archis) several years ago, many archaeological services, amongst which the urban archaeological service of 's-Hertogenbosch (BAM), do not enter their excavation results in full in this database. Even though the use of Archis is compulsory now, there is a large backlog of old excavation results which are still not available. It is therefore difficult to gain insight into the percentage of the Bailiwick which has actually been excavated and, in particular, into the finds that have been made. To complicate things further, the databases created by some archaeological services are often far from complete. In order to make successful use of the archaeological evidence the paper archives need to be consulted, which is a time-consuming exercise. The only way to bring about a significant reduction in the time needed to investigate the archaeological evidence is to follow particular types of artefacts throughout the period and the region. It is for these reasons that I have decided to use only archaeological evidence from published excavations. This will enable me to investigate many more excavations in greater detail. These archaeological publications will, of course, be used to gain insight into the landscape of the Bailiwick and its buildings and infrastructure. The archaeological data will be combined with the historical and cartographic evidence in a technique called map regression to create a visual representation of the Bailiwick and its towns in the medieval period.
Besides immovable archaeological evidence, such as buildings and roads, there are a few types of movable archaeological evidence that this thesis will focus on in particular.
The most important is the botanical material. Van Haaster (2009) has investigated a lot of material in his thesis, and the more recent excavations also list discovered botanical material, which will enable me to create a reasonably complete picture of the produce grown and consumed in and around 's-Hertogenbosch. There are also some publications available on faunal remains from 's-Hertogenbosch and its bailiwick which will give me some insight into which animals were kept in which places. Both types of sources will also shed light on the degree to which 's-Hertogenbosch was able to provide food for itself and the produce that it had to obtain from the surrounding countryside. The building material will provide another important archaeological clue on town-countryside relations.
Some publications have focused on this material and its provenance (Janssen 1983b; Vink 2000; Van Drunen 2006). The most widely available archaeological evidence is, of course, pottery. Because most of the pottery in the Bailiwick was imported it will not provide many clues about the town-country relationship. However, I will investigate a few key excavations from both town and country and calculate the percentage of local to imported pottery to see whether there is any significant difference between the pottery available in urban and rural settings. Moreover, I will investigate some luxury products such as metal objects and cloth to ascertain any penetration from towns into the country.

2.1.2. **WRITTEN SOURCES** The actual written evidence for the Bailiwick and especially the town of 's-Hertogenbosch is rich and varied. One of the main sources is the *Bossche Protocollen* in which every single official legal transaction is recorded. The people from all over the Bailiwick had to come to 's-Hertogenbosch to have their deeds drawn up before the town's aldermen, so the *Bossche Protocollen* provide valuable insight into the administrative transactions of the Bailiwick. The only downside of the *Bossche Protocollen* is the handwriting, which requires a significant amount of training to decipher. Fortunately, some parts have been opened by previous publications and indices. I will be using Geertrui Van Synghel's thesis (2007), which has investigated all entries up to 1450, and the online index (*Het Schepenprotocol van 's-Hertogenbosch* 2008), which deals with the period from 1410. Sasse van Ysselt (1975) has published a book on the important houses in 's-Hertogenbosch and their owners, which was compiled with data from the *Bossche Protocollen*. Van Zuijlen (1863) has used the *Bossche Protocollen* to create an overview of the most important events in the town's history between 1399 and 1800. The *Bossche Protocollen* are an extremely valuable source when studying the history of 's-Hertogenbosch and its Bailiwick since they provide information on such varied topics as ownership, products and occupations.
Another important source is the tribute ledgers, which record the annual tributes (*cijnzen*) due to the Duke of Brabant. Inhabitants of the Bailiwick had to pay these tributes on land or buildings that they rented from the Duke. Each settlement had a set payment date. The tribute ledgers will give particular insight into the level of tributes, ownership of land and buildings, the network of towns and villages, and the state of the economy. All of this will aid my analysis of the economic relationship between town and country. The duke's tribute ledger of 1340 has been opened in its entirety by Van Asseldonk (1998).
Kappelhof has opened the archives of the Table of the Holy Ghost (1989a) and the Great Beguinage (1989b) in 's-Hertogenbosch. These archives not only shed light on ownership of land and buildings but also on the various trades practised in the town of 's-Hertogenbosch and in the countryside. Kappelhof has also compiled a CD-Rom on the territory of North Brabant 1478-1647 which provides details of administrative borders etc. (Kappelhof 1996, 1997).
The lists of hearth-counts for 1374, 1438, 1464, 1472, 1480, 1496, 1515 and 1526 (BHIC 307- 41, 42, 45, 46, BHIC 8 – 381, 383, 384) tell us more about the size of the urban population, the ranking of towns and villages, the number of poor people, and the number of convents, monasteries and manors belonging to the town (Hermans 1845; Van de Hammen and Sassen 1894; Cuvelier 1912; Schuttelaars 1998).
There are also various indices available for the different charters. These concern town charters, the right to hold markets, toll freedoms, and guild-charters, and have been opened by Van Den Heuvel (1946a,b) (craft guilds / *ambachtsgilden*), Camps (1979) (Cartulary of North Brabant / *Oorkondenboek Noord-Brabant*) Sassen (1865) (Charters in the city archives of 's-Hertogenbosch / *charters and privilegebrieven in het archief van 's-Hertogenbosch*), Hoekx and Paquay (Hoekx *et al.* 2004) (Inventory of the city archives of 's-Hertogenbosch / *inventaris van het stadsarchief van 's-Hertogenbosch*). Apart from these larger archival collections there are some smaller documents available which will provide valuable infor-mation for my thesis. There is information on the value of corn and the quantities it was sold in, about the use and the upkeep of the Dieze, and there are archives of various villages and freedoms about their own privileges and legal boundaries.
Apart from actual archival material, other primary sources are available on the history of 's-Hertogenbosch and its Bailiwick. I refer in particular to the publications of Bor Christaenzoon (Bor Christiaenzoon 1630), Van Oudenhoven (1649, 1670b,a) and Heurn (C18), whose contemporary descriptions of 's-Hertogenbosch and its Bailiwick include historical references to the origins of markets, the location of particular crafts, markets, religious buildings, the different urban regions into which 's-Hertogenbosch was divided, and the general history of the area.

2.1.3. CARTOGRAPHIC EVIDENCE

One of the main sources used in this thesis is the cartographic evidence. This will provide insight into what the Bailiwick looked like geographically, which towns existed, whether they were linked to other towns by a road or a navigable waterway, and which vegetation could be found in the Bailiwick. Unlike historical and archaeological evidence, cartographic evidence can offer an overview of the entire situation. However, as with any form of evidence, there are, of course, concerns regarding validity and usability. First, before using any map, one needs to ascertain the purpose for which it was drawn, as most maps have some form of subjective bias. On the other hand, once this has been taken into account, and provided one compares different maps from the same time period, this is unlikely to be a major problem. The second reservation is slightly more significant but it too can be solved, albeit with less ease. wThe first reasonably accurate map of the Bailiwick is Van Deventer's 1536 map of Brabant (Koeman 1994). This leads to the simple conclusion that there are no contemporary maps available for most of the research period. The situation is even worse for town plans, as the first plan of 's-Hertogenbosch dates from 1545 and is again by Van Deventer (Van Deventer *et al.* cop. 1998).
Van Deventer has drawn only Eindhoven (1557-1568) and Helmond (before 1548) out of all the towns in the Bailiwick and, as a result, the earliest maps for most other towns date from much later. However, various historical geographers have recognized this problem and have developed a methodology to address it called map regression or town-plan analysis (Conzen 1968, 1988; Lilley 2000; Whitehand 2001, 2007), which will be explained in the next section. Map regression has mainly been used as a technique to analyse the morphological development of towns, but, it can easily be adapted to incorporate an entire region. Map regression will therefore show the morphological development not only of the towns but also

of the region as a whole, and it will enable an analysis at a later stage of how the foundation of new towns, the laying of new roads and the building of new bridges affected the town-country relationship, the settlement network and the urban spatial composition. Many later regional and town plans are available and have already been investigated at the Brabant Historic Information Centre *(BHIC)*, the National Archives, the Brabant Collection at Tilburg University and the Regional Historic Information Centre Eindhoven *(RHCE)*. This will aid the implementation of the map regression methodology.

2.2. METHODOLOGY

2.2.1. TOWN

2.2.1.1. CONZENIAN MORPHOLOGY

The previous section highlighted the lack of accurate medieval maps and town plans. If these documents had existed they would have provided an important framework for the reconstruction of urban spaces and for urban economic spaces in particular. Conzen (1960) realized the potential of these medieval town plans and pioneered a new methodology entitled 'town-plan analysis' in his study of the medieval burgh of Alnwick. This and his subsequent publications stand at the basis of what is currently referred to as Conzenian Morphology (Whitehand 2001). Conzen's techniques have since been developed and improved by various scholars, including Lilley, who has achieved the greatest advancement by providing a step-by-step methodology for town-plan analysis (Lilley 2000), which will be detailed in the following paragraphs.
First, Conzen has shown that British Ordnance Survey maps published between 1843 and 1893 on a scale of 1:2500 or 1:5000 can be used as a basis for the derivation of medieval town plans (Conzen 1960, 1968, 1981, 1988; Lilley 2000, 11; Conzen 2004). Similar evidence is available for the towns of the Netherlands, as the first uniform and plot-patterned cartography was organized in the first half of the nineteenth century and drawn on a scale of 1:1250 (Margry *et al.* 1987). The *Historische Atlas Noord-Brabant* 1836-1843 (Caspers and Stam 2008) can provide cartographic evidence for the Bailiwick of 's-Hertogenbosch. Moreover, plenty of additional cartographic material is available in the form of the maps drawn by Van Deventer, Blaeu, and Drossaers among others.

The underlying reason for using nineteenth-century plans rather than the most recent ones as the basis for the derivation of medieval town plans is that many towns have changed substantially since the end of the nineteenth century, thus making town-plan analysis much more difficult if not impossible. In 's-Hertogenbosch this can be seen in the creation of the Arena shopping centre (1997) (Janssen and Thelen 2007, 9), the erection and later demolition of the military barracks (1744 until 1960s) (Vos 2007, 29) and the disappearance of the monasteries (+/-1911) (Vos 2007, 28).
Secondly, these early cadastral plans need to be transformed into vector drawings (for which I have used Adobe Illustrator). A vector drawing is simply a drawing made up of geometrical primitives, such as points, lines, curves and polygons, which are all based upon mathematical equations. This is in contrast to raster graphics, which is the representation of images as a collection of pixels (dots). These vector drawings should only show the insulae, streets, waterways and town-walls, thus erasing any other features that might be shown in the original map, and which could obscure important spatial developments. These will form the base maps from which to start the town-plan analysis.
Thirdly, various forms of evidence, such as archaeological, archival and cartographic evidence, from secondary sources, historiographies and standing buildings, will be plotted on these base maps in order to gain insight into how the street grid of the town has changed over the centuries.[4] Because of its inaccuracy in terms of scale, antiquarian cartographic evidence should be used with caution and only in comparison with the base town plan on an insula-to-insula basis.
Finally, having incorporated this evidence on the base town plan, more maps will be created which show 's-Hertogenbosch at earlier stages in its history. It is envisaged that it will be possible to create maps, at least for the town of 's-Hertogenbosch, at 50-year intervals, and thus at 1650, 1600, 1550, 1500, 1450, 1400, 1350, 1300, 1250 and 1200. However, the further back in time the maps go, the less detailed they will be.

To summarize, Conzenian Morphology has enabled the reconstruction of the medieval townscape and its surrounding infrastructure. These reconstructions can be used as evidence in the analysis of town-country relationships, urban development, and urban networks.

[4] For more details on this technique see: Lilley (2000).

They can also be used as the basis for Space Syntax, a form of spatial analysis. This technique will be explored in the following section.

2.2.1.2. SPACE SYNTAX

"A great opportunity clearly exists for exploring the potential complementarities of the different traditions of Space Syntax and Conzenian morphology" (Larkham 2006, 130). As was explained in the first chapter, spatial analysis – and Space Syntax in particular – is based on the idea that human societies use and configure space and that space can therefore be analysed to tell us something about society. Though this technique has mainly been used in modern cities, it could prove advantageous in the analysis of historic cities by enabling us to gain a clearer picture of how society worked in the past. In a previous article (Craane 2007) I showed that Space Syntax can indeed be successfully applied to a medieval urban environment. However, like map regression, Space Syntax has been applied principally to cities in the past. Recent research, published in the proceedings of the seventh International Space Syntax Symposium by Van Nes (2009a), Turner (2009), Hanson (2009) and myself[5] (Craane 2009a) has shown that it is also possible to analyse networks of cities with this method. The methodology detailed below will focus on urban analysis. In section 2.2.2 attention will be paid to adaptation of this technique for the analysis of urban networks.

The vector-drawn reconstructions of the town of 's-Hertogenbosch created in the previous stage provide the ideal format for progressing with the spatial analysis, as Bafna (2003, 18-19) states: "It is essential in any analytical study of the configured space to re-describe it in an abstracted format focusing on its topology". The abstracted format that was created to use the Space Syntax methodology is entitled 'axial map'. "Axial maps are the representation of an urban area in terms of the longest and fewest lines it takes to pass through all the (public) space" (Griffiths 2005, 657). Public space as defined in the previous chapter is all the space between the buildings and other areas that are closed off from public use. The reason why the axial map is the main method of analysis for urban form stems from one of the main concepts of Space Syntax, *viz.* that people experience space visually by means of line-of-sight, or axiality. When walking through an urban environment people prefer to take the straightest possible route from A to B. When they need to change direction, they tend to choose an angle close to 90 or 180 degrees, which minimizes the complexity of the route. This concept is known as the 'British Library Hypothesis' (Van Nes 2011, 61-64).
It is possible to draw an axial map by hand by "laying down the longest straight line that passes through at least one permeable threshold between two adjacent convex spaces and repeating this until all the permeable thresholds between all adjacent convex spaces have been crossed" (Bafna 2003, 23). However, this is a time-consuming and rather subjective exercise.
To speed up and objectivize the process of creating axial maps it is preferable to use a dedicated computer program. It should be noted that Space Syntax only uses these topological features (streets and roads) in its analysis, and does not use any information on the current location of economic spaces, residences or other buildings (Hillier 2005a).

Depthmap, a software package developed by Alasdair Turner at the Space Syntax Laboratory (UCL), is specifically designed to do the spatial analysis calculations and draw axial maps.
To use the program one needs to import the vector-drawn reconstructions. Depthmap first draws an all-line axial map through the reconstruction's convex spaces, before reducing this map to the fewest-line axial map, which is the one generally used in Space Syntax (see Figure 1). An all-line map comprises "every line that connects two corners in open space extended until they hit a solid object" (Turner 2005, 58). This all-line map is then reduced to the fewest-line map using a technique called subset elimination. "A line whose connections are the subset of another line may be deleted, until only the core lines remain, bearing in mind two guidlines. Firstly, ensure that all open space may be observed by the combination of lines, and secondly that all topological loops are completed, i.e. that all islands of built form are cut off from all other islands of built form" (Turner 2005, 58). This fewest-line map is equivalent to a handdrawn axial map produced with the method specified in the *Social Logic of Space* (Hillier and Hanson 1984, 91-92; Turner *et al.* 2005).

The creation of axial maps seems a subjective exercise for historical maps since in most cases lack of evidence makes it impossible to determine street width with absolute certainty. However, research has pointed out that, provided there is no significantly large

[5] This paper was a concise version of Chapter 5 of this thesis.

discrepancy (e.g. from a single track to a dual carriageway) between the plans and the actual historical street width, the results of the axial line analysis are scarcely affected. This is due to the fact that the axial map used in the analysis is the fewest-line axial map, which only shows the fewest number of lines that cover all the open space and links with other axial lines. The all-line axial map, which simply shows all axial lines that can be drawn in the open space, is not used in any analysis.

The fewest-line axial map is analysed by Depthmap by first calculating the to-movement potential of a line (also referred to as integration) by counting "the number of steps it takes to get from one line to all other lines in the system. If this number is low, then the line is considered integrated, if this number is high the line is segregated. The most integrated lines correlate with high levels of movement" (Turner 2005, 59). In short, the less depth a space is from the complex as a whole, the more integrated it will be, and vice versa (Hillier 1996b, 25). Secondly, Depthmap calculates the through-movement potential of a line (also referred to as choice) by counting the number of times that it appears on the shortest path routes between all possible pairs of origins and destinations in a system (Turner 2007).[6]
Every line is assigned the value from the integration or choice calculations. These values can of course be presented in a table, but a visual method whereby all lines are coloured according to their value is much more meaningful. An example is displayed in Figure 2. Depthmap shades the lines from the highest to the lowest to- and through-movement potential from red to indigo via orange, yellow, green and blue.

The integration and choice values both reflect a part of the decision process that humans undergo before moving anywhere in a system. First, a human decides on an origin and a destination. This destination is the to-movement. More accessible destinations are more likely to feature as a destination and, as a result, are the most integrated, whereas the most inaccessible destinations are less likely to feature as such and are therefore the least integrated. Secondly, before a human can start moving he or she needs to select the streets (lines) that must be passed through to go from origin to destination, or the through-movement.

The line which appears on the largest number of shortest routes between origin and destination has the highest choice value, whereas the line which appears on the least of the shortest routes between origin and destination has the lowest choice value. Like the choice of destination, the choice of route to that destination is highly dependable upon the network. The ratio of through-movement lines to origin/destination lines will become higher as the length of trip increases and therefore, in those cases, the choice value will be more accurately reflected (Hillier and Iida 2005, 6).
Apart from differentiating between integration values (to-movement) and choice values (through-movement), it is important to distinguish the global and local scale of both. Global values (high radii) correlate strongly with primary routes through an urban system, whereas local values (low radii) correlate strongly with secondary streets or a neighbourhood level. Therefore, the latter is particularly useful in calculating how local people use the space (to go to the local shops, school, or friends), whereas the former calculates how non-locals use the urban space (to travel through a town, or take the most logical straight route to their destination).
In order to differentiate between local and global values, the radius for the global value must be set to 'n' or infinite to allow the program to calculate the integration and choice values from one line to all others in the system. In the local value the radius must be set to a definite number whereupon Depthmap calculates only the integration and choice values from one line to all others in the system, which are less than the given radius away from the original line (Penn 2003, 39).

In 1984 settlement analysis started with this axial-line analysis. However, since Space Syntax is constantly evolving, a new method has been discovered which correlates more strongly with natural movement levels. Segment angular analysis, as this new method is called, makes use of the fewest-line axial maps and also analyses the to- and through-movement potential of lines. A segment is a street between junctions. When a street between junctions has a significant curve it will be broken up into several segments.
To create a segment map from a fewest-line axial map, the axial lines are divided into segments from crossroads to crossroads.
In contrast to axial-line analysis it is not the

[6] A detailed explanation of the calculations behind Space Syntax and the validation of the theory can be found in the following publications: Hillier and Hanson (1984), Hillier, Hanson and Peponis (1987), Hillier, Penn, Hanson, Grajewski and Xu (1993b), Penn, Hillier, Banister and Xu (1998), Hillier (1999a), Penn (2003), Hillier (2005b), Turner, Penn and Hillier (2005).

Vector-drawn reconstruction

Road-centre lines as imported into Depthmap

All-line map

Axial Map

Fewest-line map

Segment Map

Figure 1: Examples of a vector-drawn reconstruction, the all-line map drawn by Depthmap and the fewest-line map after the greedy algorithm has been applied.

Figure 2: Illustration of the colours in Depthmap

number of actual direction changes which is important but rather the total angle of direction change (e.g. acute, straight, obtuse or no angle). A segment with high to-movement potential is one that is 'closest' to all others in terms of the size of the angle one must turn to get to each other line. Segments with a high through-movement potential are the ones on the most least-angle routes between all pairs of other segments (Hillier and Iida 2005). Segment angular analysis is the form of analysis that is most used in this thesis. Segment analysis has an added benefit in that its connections can be weighed. This is important given that one long straight street with high visibility will probably be composed of various small segments. The weighing of these connections will preserve this high visibility in contrast to the incidences in which segments are connected at right angles and have extremely poor visibility. Connections between segments can be weighed for metric distance, complexity distance and angle of change. The radius for the local measurements can therefore be set to the maximum number of metres, the maximum number of turns and the maximum angle of change. The latter is an especially useful value, since, as in the example just given, it still takes account of long streets, which are straight or nearly straight, and will still receive the high integration value which most of the longest axial lines receive. Therefore, the least-angle value correlates best with real movement.[7] This is because people move across town when they want to go from A to B in the most direct and logical route possible, but this might not necessarily be the shortest. It may be a route with a large number of turns (see the 'British Library Hypothesis' discussed earlier in this chapter). People read an urban network in geometrical and topological rather than metric terms. In other words, even though people always try to take the shortest routes to their destination, their concept of distance is shaped more by the geometric and topological properties of the network than by the ability to calculate metric distances (Hillier and Iida 2005, 15). This discovery has profound implications since it proves, as Space Syntax has always argued, that:

"the geometric and topological architecture of the large scale urban grid is the most powerful shaper in urban movement. Secondly, that axial graphs are in most circumstances a good approximation of the impact of spatial configuration on movement and thirdly that the architecture of the street network in geometrical and topological sense through its effect on movement flows influences the evolution of land use patterns and consequently the whole pattern of life in the city" (Hillier and Iida 2005, 15).

As stated earlier in this section, in both the modern and historic urban environment, high integration and choice values correlate strongly with the presence of economic spaces along that segment or line. This is because integration measures movement potential – and movement, or footfall, is the main contributor to a successful business (Hillier *et al.* 1993a; Hillier 1996a, 1998, 1999b). One of the main reasons why Space Syntax has been chosen as a method of analysis in this study is because it does this and hence sheds a quantitative and thus falsifiable light upon urban form and urban networks.

By way of summary, the main values as they have been discussed and the socio-economic aspect that they correlate with are set out in Table 1.

2.2.2. **REGION** The previous sections focused on the application of Conzenian Morphology and Space Syntax in an urban context. As explained in the introduction, this thesis does not focus solely upon the urban economy but also upon the regional economy. Since both methodologies have been primarily applied in urban contexts some explanation is required of their use in a regional context.
Conzenian Morphology has been used mainly for villages and small towns. More recently, papers have been published on its application to larger towns (Conzen 2004, 108-115; Craane 2007), but not to entire regions, the reason being that this – albeit successful – technique is rather time-consuming. As a result, I have decided that, for the analysis of the Bailiwick as a whole and in contrast to my suggested methodology for medieval urban analysis (Craane 2007), I will not create medieval town plans using Conzenian Morphology and subsequently analyse them using Space Syntax. Instead, I have applied my methodology in reverse order by first creating a nineteenth-century axial map and using Conzenian Morphology to create the medieval axial maps, which can then subsequently be analysed with the Depthmap computer program.
First, as illustrated in Figure 3, I created a 'fewest-line axial map' in Adobe Illustrator from the base town plan, the Historical Atlas 1836-1843 (Caspers and Stam 2008), using Turner's road-centre line method (Turner 2007, 2009). This method traces the middle of all roads in a system to create a fewest-line axial map. Turner's research has shown that, for segment angular analyses in particular, there is hardly any difference in the results from the fewest-line method or the more traditional method. A fewest-line axial map is a map of all of the streets and roads in a system, in this case the Bailiwick of 's-Hertogenbosch.

Secondly, using this 'fewest-line axial map' as a base I employed the Conzenian Morphology methodology and used antiquarian maps, archaeological evidence, historical sources and secondary literature to create maps of the medieval and early-modern period. When the street system is discussed in a later section I shall describe the sources in more detail. The maps that I have created of the medieval and early-modern period have the same layout as the original 1843 fewest-line axial map and show only the streets and roads in the

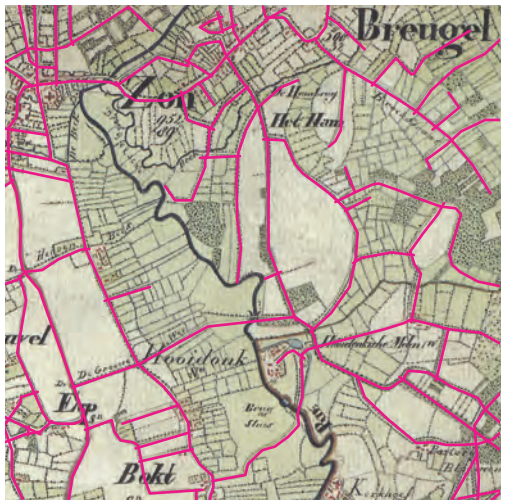
Segment angular measure / axial line measure	What does it measure?		High values correlate with	Low values correlate with
Global Integration	**To-movement potential: Shows where the potential lies for economic activities such as shops and markets in a whole region or city**	The degree of accessibility of a street to all other streets within an urban environment in terms of the total number of direction changes	The spatial potential for the main shopping street within an urban environment	Silent streets. Tend mostly to be dwelling areas or industrial areas located on the edges of a city.
Local Integration	**To-movement potential: Shows where the potential lies for the various local centres in a city or a region**	The degree of accessibility of a street to other streets within a set number of direction changes (usually three)	Discovering neighbourhood shopping streets	Quiet residential streets
Global Choice	**Through-movement potential: the likelihood that people will pass through a particular street (segment) when they travel from any A to any B in a system**	Highlights the main route network through the towns and cities	The main thoroughfares running through and between urban areas	Routes no-one takes to get across town
Local Choice	**Through-movement potential: the likelihood that people will pass through a particular street (segment) when they travel from any A to any B in a system**	Highlights the various vital pedestrian areas in towns and cities	The most vital local pedestrian streets	Routes no-one takes to get across a neighbourhood

Table 1: The main Space Syntax values summarized

[7] Segment analysis is therefore also referred to as ASA (angular segment analysis).

Figure 3: Illustration of the creation process for the 'Fewest-Line Axial Map'

Historical Atlas 1836-1843



Historical Atlas with road-centre lines

Road-centre lines as imported into Depthmap

Bailiwick. Apart from being used as Space Syntax maps, these fewest-line axial maps can be used as maps in their own right since they depict all the roads and streets at a particular period in time and will therefore aid the analysis of the economic relationship between town and countryside.

Unlike Conzenian Morphology, Space Syntax has been used to analyse whole regions. Moreover, the methodology for analysing the axial and segment maps for a whole region does not differ much from analysing the axial and segment maps for an urban system.
The medieval fewest-line axial map created with Conzenian Morphology is uploaded to the Depthmap computer program, which firstly performs the axial-line analysis to check that the axial map is correct and that all axial links have been made (i.e. that there are no lines which do not connect with any other).
Next, Depthmap creates a segment map to create a segment map from a fewest-line axial map by dividing the axial lines into segments from crossroads to crossroads. Depthmap then performs the main analysis, the segment angular analysis. Since the map was drawn using the road-centre line method, segment angular analysis has a higher correlation with actual movement patterns than axial-line analysis. Axial-line analysis would have segregated shorter lines, even if they had joined another line at a near 360 degree angle. Segment angular analysis takes this obtuse angle into account and makes the joining segments more integrated.

CONCLUSION In this chapter the various sources of evidence and methodologies that are used in this thesis have been discussed along with the accompanying advantages and problems. As only brief remarks about the methodology will be made throughout the thesis, it will be necessary to refer back to this chapter for a more detailed discussion.

"the number of
steps it takes
to get from one line
to all other lines
in the system.
If this number is low,
then the line is considered integrated,
if this number is high
the line is segregated.
The most integrated lines correlate
with high levels of movement"

(Turner 2005, 59)

TOWN AND COUNTRYSIDE OR ONE BAILIWICK?

3

Many authors have discussed the links between town and countryside, focusing mostly on administrative or specific economic links.[8] It appeared that in some regions, such as Antwerp, Bruges and Ghent, the countryside was largely dependent on, or in other words, was a subsidiary of the central town (Stabel 1992, 1997; Limberger 2008). Consequently, any links between town and countryside have been discussed primarily from the viewpoint of the town. Even though many researchers have come to the conclusion that the Bailiwick was not entirely a subsidiary of the central town, 's-Hertogenbosch, it is still argued that it was very much inferior to it, in keeping with the pattern observed in other regions.

As stated in the introduction, the main hypothesis in this thesis is not the dependence of the countryside on the town but the interdependence of the two, specifically in economic terms. Thus, this chapter argues that in the case of the Bailiwick, economically speaking, the countryside and its villages functioned relatively independently of 's-Hertogenbosch, but they still had to rely on each other for certain economic, and other, needs as will be explained in this chapter.

[8] See for instance Christaller (1935), Mitterauer (1971), Masschaele (1997), Stabel (1997), Hoppenbrouwers (2001), Van Asseldonk (2002), Blondé and Limberger (2004), Limberger (2008).

The mutual dependency between town and countryside may be expressed in many different ways, such as direct economic links, administrative and judicial ties, the transport of raw materials, land ownership and geography. The latter four, though not strictly economic, do have an economic connection and examining them will contribute to our understanding of the economic interdependence between the town and countryside. In addition, this chapter will argue that even though town and countryside were linked in several ways, each can be studied separately without one being considered a subsidiary of the other. At this stage, it is important to discuss the interdependence of town and countryside in this way to set the context for the following chapters, where the different scales of the economic relationship will be discussed in more detail.
The discussion in this chapter will use the term 'town' for 's-Hertogenbosch and the term 'countryside' for the entire Bailiwick, including all the other villages and towns. In order to test the hypothesis that town and countryside were interdependent and that there was no clear-cut hierarchy in which the Bailiwick was subordinate to 's-Hertogenbosch, this chapter will address the following questions: How can town and countryside be defined in the Bailiwick? What links existed between town and countryside and how did they develop? To what degree were the countryside and 's-Hertogenbosch interdependent? Answering these questions will provide the basis for the subsequent chapters. An understanding of the general characteristics of the Bailiwick and the specific links between town and countryside, as well as an awareness that the countryside was not entirely subordinate to the town, are essential prerequisites for the arguments in the following chapters.

3.1. CHARACTERISTICS OF THE BAILIWICK

This first section will focus on characteristics of the Bailiwick such as landscape, area and population. These characteristics determine the urban and rural character as well as the economic capabilities of each location. The size and density of the population determines the degree to which an area was urbanized, while the geography and size of the area determine the likelihood that a region or a town could produce enough basic foodstuffs to feed its population and be technically self-sufficient without relying on imports from another town or region. First, we shall discuss the administrative divisions that defined the Bailiwick and, secondly, we shall analyse the geography and soil conditions. The last two sections will focus on the size of the Bailiwick and the number of inhabitants respectively.

3.1.1. ADMINISTRATIVE DIVISIONS

As stated in the first chapter of this thesis, the Bailiwick was one of the four quarters of the Duchy of Brabant. Roughly, the geographical borders of the Bailiwick coincide with the river Meuse in the north and the Peel region in the east. The Bailiwick did not have natural borders to the south and west but adjoined the Lordship of Breda in the west and the county of Loon, after 1366 the Prince-Bishopric of Liège, in the south. The Bailiwick took its name from the bailiff or *meier* of 's-Hertogenbosch, who administered the area on behalf of the Duke of Brabant.
The Bailiwick was so named in 1288 at the latest, but had probably already been known as such at the beginning of the thirteenth century (Van Asseldonk 2002, 76). It consisted of five administrative regions: four quarters and a freedom (*vrijheid*). These were the quarters of Peelland, Oisterwijk, Kempenland and Maasland and the freedom of 's-Hertogenbosch. The word 'freedom' here denotes a settlement which had charters but which was not allowed to have town-walls, gates or other such defences.
As was the case with the entire Bailiwick, the quarters were formalized during the thirteenth century. Oisterwijk is the Bailiwick's most western quarter and includes in the north, part of the area known as the Langstraat (Waalwijk, Drunen and Loon op Zand). Maasland, as the name suggests, is situated along the border of the river Meuse (*Maas*) and is the Bailiwick's most northern quarter. However, not all of this area was part of the actual Maasland quarter as many independent seigniories such as Ravenstein, Cuijk and Grave were also situated there (Van der Ree-Scholtens 1993).[9] Peelland is situated in the eastern part of the Bailiwick and borders on the Peel heaths and the present-day Province of Limburg. The main estates included in the quarter of Peelland were the Lands of Helmond and the county of Sint-Oedenrode. Kempenland is located in the central southern part of the Bailiwick and includes a small part of the current country of Belgium. The Kempenland quarter was formed out of the feudal estates of Kempenland and the *eninge* of the Kempen.
The term 'freedom' of 's-Hertogenbosch rather than 'town' of 's-Hertogenbosch is used to show that the jurisdiction of the aldermen and the court of 's-Hertogenbosch did not stop at the town-walls. The freedom included, in addition to the town, the immediate surrounding countryside which was free from ducal jurisdiction. Four villages were located in this freedom: Hintham, Orthen, Den Dungen, and Vranckenhofstad en het Reut (Coopmans 1975, 75). These villages as well as the countryside immediately surrounding 's-Hertogenbosch were considered an official part of the town.[10] All citizens of the freedom had the same rights as the citizens of the town of 's-Hertogenbosch, with those who were born or baptized in the freedom automatically becoming a citizen of the town. It was possible for those who had not been born in the freedom or in the town to buy citizenship. The freedom was an important

Town	Charter	Archaeological Date
's-Hertogenbosch	1194/1195?	1180
Oisterwijk	1212 or 1230[11]	
Eindhoven	Between 9 April 1232 and 2 April 1233	1212
Sint-Oedenrode	Between 9 April 1232 and 2 April 1233	
Helmond	Between 1225 and 28 May 1241, presumably between 9 April 1232 and 2 April 1233	1225
Waalwijk	17 December 1303	
Oerle	Before 1334, possibly between 1294 and1312	
Hilvarenbeek	Before 1340, possibly between 1267 and 1294	
Eersel	Definitely by 1340, presumably between 1312 and 1340	
Mierde	Before 1340	
Oirschot	Before 18 Feb 1372, but presumably after 1355	
Lommel	Before 1381, presumably before 1340[12]	<1291
Oss	Before 1387	<1309
Bergeijk	January 1468	

Table 2: Towns, their charters and archaeology (after Van Asseldonk 2002, 94-101; Janssen 2007, 98) **in chronological order of the first known date of a charter.**

9 These seigniories will be discussed at the end of this section.
10 In order to prevent confusion in the terminology, this thesis uses the word 'town' to describe the entire freedom of 's-Hertogenbosch unless specified otherwise.
11 Even though the term *opidum liber* is used in 1212 for Oisterwijk, there is evidence which suggests that Oisterwijk was awarded a freedom and the population was allowed to choose its own rights only in 1230. They chose those of 's-Hertogenbosch, and received its privileges (apart from the toll freedom on the Rhine).
12 The oldest mention of Lommel as having a bench of aldermen dates from 1291.

source of income for the town, since the town council was allowed to levy taxes – usually on foodstuff – in the countryside as well as the town.. In order to improve the state of the town's finances, the freedom was functionally extended in 1499 to include Vught, Cromvoirt, Berlicum and Rosmalen, an arrangement which remained in place during the whole of the sixteenth century (Coopmans 1975, 81). In order to increase the town's revenues further, no inns, breweries or bakeries could be established within 500 metres of these villages. Thus, the inhabitants of the freedom contributed to the wealth of the town but did not profit from the protection of its walls.

The town of 's-Hertogenbosch was the largest in the Bailiwick. However, it was not the only settlement with a charter and privileges, albeit the first. Many settlements in the Bailiwick were awarded charters and privileges or became freedoms during the thirteenth and fourteenth century. Table 2 shows the years in which the towns and freedoms of the Bailiwick either received their status as a freedom (when an actual date is mentioned) or when it was first mentioned in the records ('before' is used).

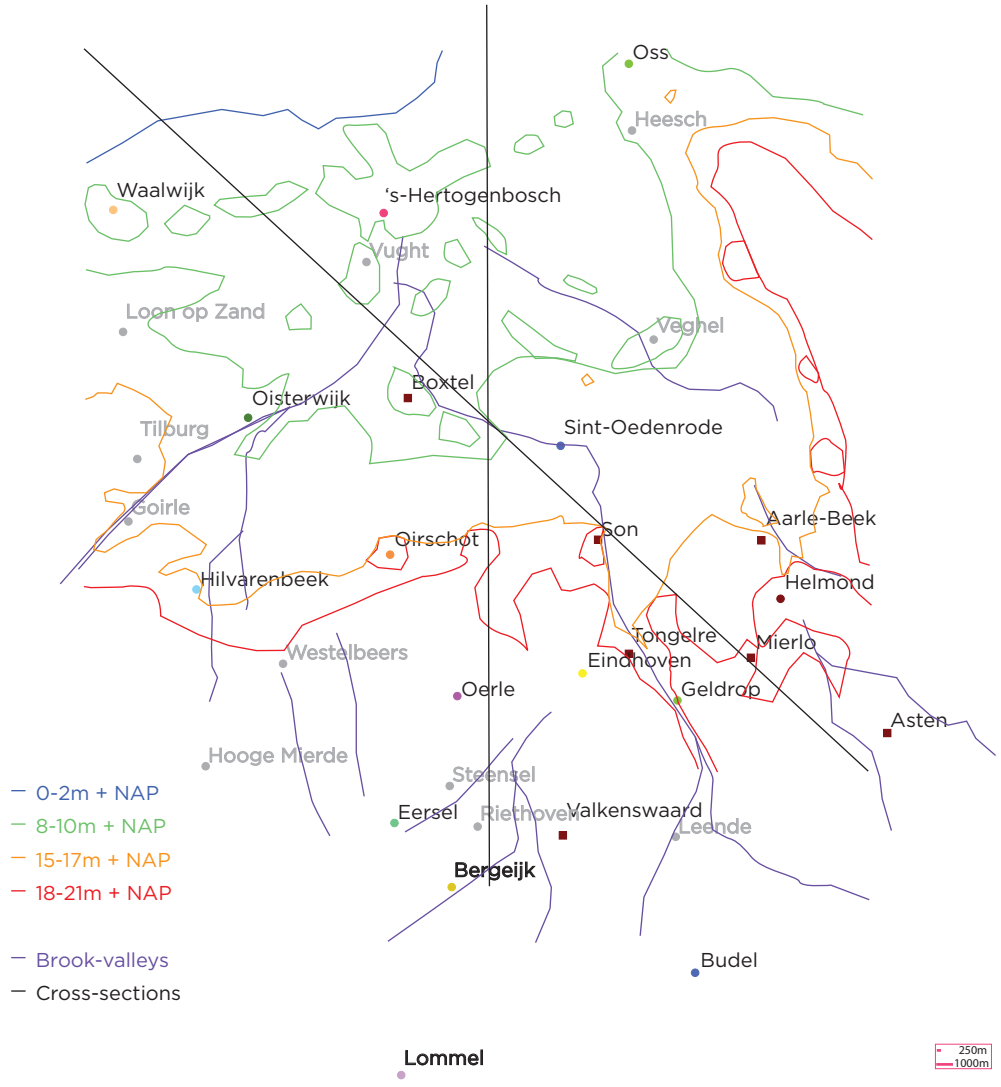


Figure 4: Schematic map of the Bailiwick with altitudes, brook valleys, the location of the cross-sections (Figure 5) and the settlements with markets and/or fairs in the medieval period. This map is based upon the Actual Height model of the Netherlands (www.ahn.nl), the map of water table classes and the geomorphological map (http://www.bodemdata.nl/ and http://archis2.archis.nl).

This table shows, the actual dates for granting privileges are seldom recorded and we must therefore rely on other records for a *terminus ante quem* date. Since these other records frequently mention privileges, this table illustrates the significant rise in the number of freedoms in the Bailiwick during the thirteenth and fourteenth century. The reason why we know so few of the exact dates is probably not because these charters were lost but because they were oral agreements which were never put in writing. In addition, these towns did not receive the status of freedom and the accompanying privileges when first founded, but usually at least twenty or thirty years later. As a result, archaeological research usually assigns an earlier date to a town's foundation than does historical research. For instance, it is still not known with any certainty when the town of 's-Hertogenbosch was founded, though archaeologists currently suggest 1180, which is some fifteen years earlier than had been determined by historical research, i.e., 1194 -1195, when it received its privileges. The archaeological dates for the foundation of Eindhoven, Helmond, Lommel and Oss also predate the years of the granting of their privileges (Janssen 2007, 96-99).

Most towns and villages in the Bailiwick formed an integral part of the region. However, as has been indicated, some independent seigniories existed as enclaves within the geographical boundaries of the Bailiwick, especially in the Maasland quarter. These were villages and lands with another lord than the Duke of Brabant. These lords gained so much power that they ruled over more or less sovereign domains, most of which were located in the north-eastern border area on the Meuse (Van der Ree-Scholtens 1993). It is therefore not surprising that 's-Hertogenbosch attempted to integrate these domains within the Duchy of Brabant or more specifically within the Bailiwick, especially since they were situated on the frontline of its wars with Guelders during the fourteenth and fifteenth century. Even if the town could not successfully incorporate these areas, 's-Hertogenbosch at least attempted to assert its judicial, administrative and economic rights in them (Coopmans 1975, 83).

Having defined the Bailiwick as an administrative region, the next section will focus on its geography.

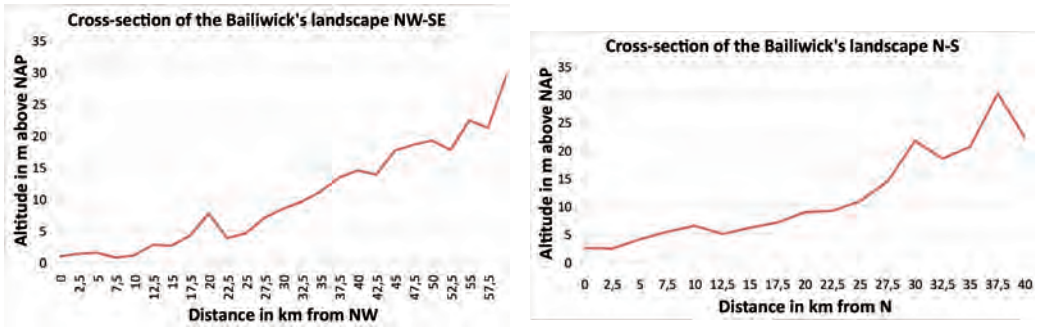
3.1.2. **GEOGRAPHY** The landscape or, more precisely, the composition of the soil, the presence of water, and the temperature determine whether particular plants can grow in an area. Whether the Bailiwick could provide enough food for its population was more or less dictated by the fertility of its soil.

The natural environment and the conditions for settlement are largely determined by the geomorphology of an area. Geomorphological maps can therefore shed some light on the evolution of the landscape of the Bailiwick and its ability to sustain a population. They show the natural features of the earth's surface such as valleys, ridges and plains. By combining these geomorphological maps with altitude maps of the area (*AHN*, the Actual Height model of the Netherlands), maps of water table classes and maps of the soil composition, one can analyse the history of the landscape of the Bailiwick and its influence on settlement and the economy. The results of the analysis of these maps have been combined in Figure 4.

Two factors influenced the landscape of the Bailiwick. The dominant feature in this landscape was a blow-sand ridge (*dekzandrug*), which ran west to east from Drunen, Vlijmen, 's-Hertogenbosch, Rosmalen, Nuland and Geffen to Oss. This ridge, which was formed during the last ice age (circa 12,000 years ago), influenced the drainage of eastern Brabant, as the natural drainage of the Bailiwick is perpendicular (north-north-west) to this ridge (west-south-west to east-north-east). Another feature of the Bailiwick's landscape is that the direct area around 's-Hertogenbosch is much more prone to subsidence (*bodemdaling*) than the other areas. Finally, the south-eastern part is situated about thirty metres above sea level, whereas the north-western part is situated on or only slightly above sea level (see Figure 5) (Leenders 2002, 48-49; Van Haaster 2009, 47). These features can explain the two distinct settlement patterns that occurred in the Bailiwick, one typical for the north-western part and the other for the southern part.

In the north-western part of the Bailiwick only high-lying parts (*donken*) remained after some of the low-lying parts of the blow-sand ridge and other areas in the northwest of the Bailiwick had eroded. These high-lying parts were more suitable for habitation as the flooding risk was much lower. These 'donken' are visible in Figure 4 as the small green circles, which represent areas with a higher altitude

Figure 5: Cross-section of the Bailiwick landscape from NW-SE and from N-S.



than the immediate surroundings. They can also be seen on the two cross-sections (Figure 5) of the Bailiwick's landscape. They show up as slight peaks on the graph.

Figure 4 illustrates that all of the main settlements were situated either on these 'donken' or more commonly in the high-lying (southern) parts of the Bailiwick. For instance, older settlements such as Orthen and Empel were situated on such a ridge (*donk*), and the centre of 's-Hertogenbosch was later founded on one (Van Haaster 2009, 42).
In the southern part of the Bailiwick, the availability of areas suitable for settlement was somewhat limited. As a result, many villages were relocated in the thirteenth century when permanent settlement became possible and more profitable in other areas, usually along the edges of the brook valleys. This explains why there are many solitary churches in the Bailiwick: the settlement had moved but the church stayed in the same place. The original village locations on higher ground were merged and used as arable land, and the lowest parts of the brook valleys and the heaths were used for pasture or peat-cutting. Many creeks converged in this area, southeast of 's-Hertogenbosch, trying to find a way through the blow-sand ridge in the northwest of the Bailiwick. Peat was formed as a result of deficient drainage in this area and was relatively abundant in this south-eastern part of the Bailiwick.
This movement of villages occurred mainly in the twelfth and thirteenth century; in other words, before the main period of research covered by this thesis (Theuws 1989, 180-188; Vangheluwe and Spek 2008, 2).

As can be seen in Figure 4, many settlements were eventually located in or near a brook valley. This movement of villages in brook valleys is only one of a large number of changes relating to urbanization, farming and 'designing public space' that occurred during the thirteenth and fourteenth century. Farms started to be located together in hamlets, farmhouses moved to the edge of the fields (which resulted in a solitary church in the middle), the building methods changed, and common lands were established (Leenders 2011, 74). Moreover, the archaeological record shows that during this era farmers did a lot to make their lands as fertile as possible. Plaggen soil is evidence that sods of peat combined with manure were used to fertilize fields, but possibly also of the use of a continuous rather than a three-field system. Nutrients found in the heath soil would enrich the farmer's fields and deliver a higher yield for longer periods as no fallow periods were needed. The difference between a continuous field system and a three-field system is discussed in more detail in section 3.2.2.1. on produce. Since the farms added these sods to their fields they were inevitably situated at a higher level and therefore less prone to flooding. This type of fertilization became popular from the second half of the thirteenth century, but was probably only extensively used from the eighteenth and nineteenth century onwards (Theuws *et al.* 2011, 73; Vera 2011, 104).
The presence of plaggen soil has traditionally been connected with the use of deep litter houses in which the manure was collected and mixed with sods of peat in pits in the stables. Vera (2011, 110) has shown that this connection did not necessarily exist before the eighteenth century. Fourteenth- and fifteenth-century sources mention heaps of manure which would not have existed if a pit had been available to store them in. It is therefore better to use the plaggen soil solely as evidence of what it is: a means of fertilizing fields, and to refrain from linking it to the use of deep litter houses as they did not become popular until three or four centuries later.
The previous paragraphs have shown that the Bailiwick is made up of two areas with a distinctly different and diverse geomorphological composition. As a result, there are many transitional areas in the Bailiwick. 's-Hertogenbosch, for instance, is situated in the transitional area between the high-lying remains of the blow-sand ridge and the low-lying and wetter areas where the blow-sand ridge had eroded. Specifically, 's-Hertogenbosch is located on the junction of the brook valleys of the Dommel, the Aa and the Run and the fertile Meuse basin (Van Haaster 2009, 59).

A lot can also be learned from the lithology of the land. The soil conditions dictate the crops that can grow in a particular area. The most favourable soil is sand with a loamy texture. The lithology of the Bailiwick indicates that most of the region has this favourable combination made up of varying ratios of sand to loam (see Figure 6). There are some sandy areas, e.g. to the north of Eindhoven and to the south of 's-Hertogenbosch, which have a clay topsoil.
In all other areas the lithology is entirely sand or sand on top of loam (mostly in the western part of the Bailiwick). In the far east of the Bailiwick there are some areas with peaty soil.

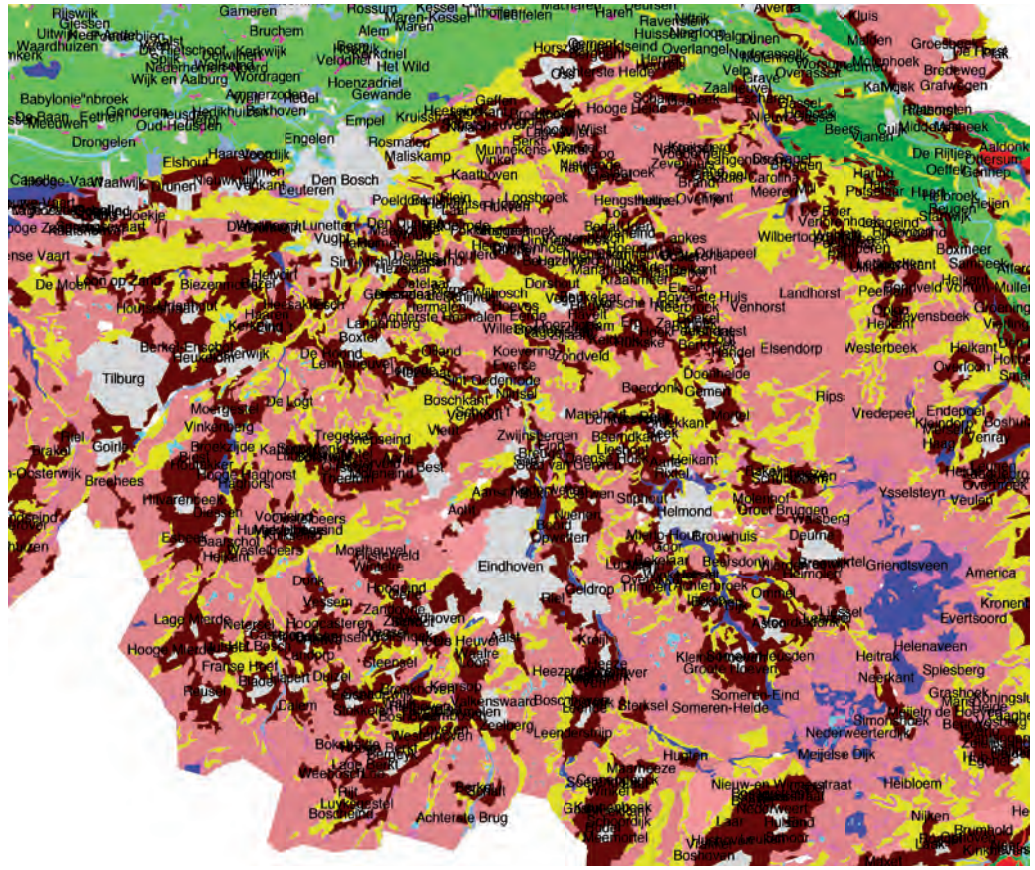


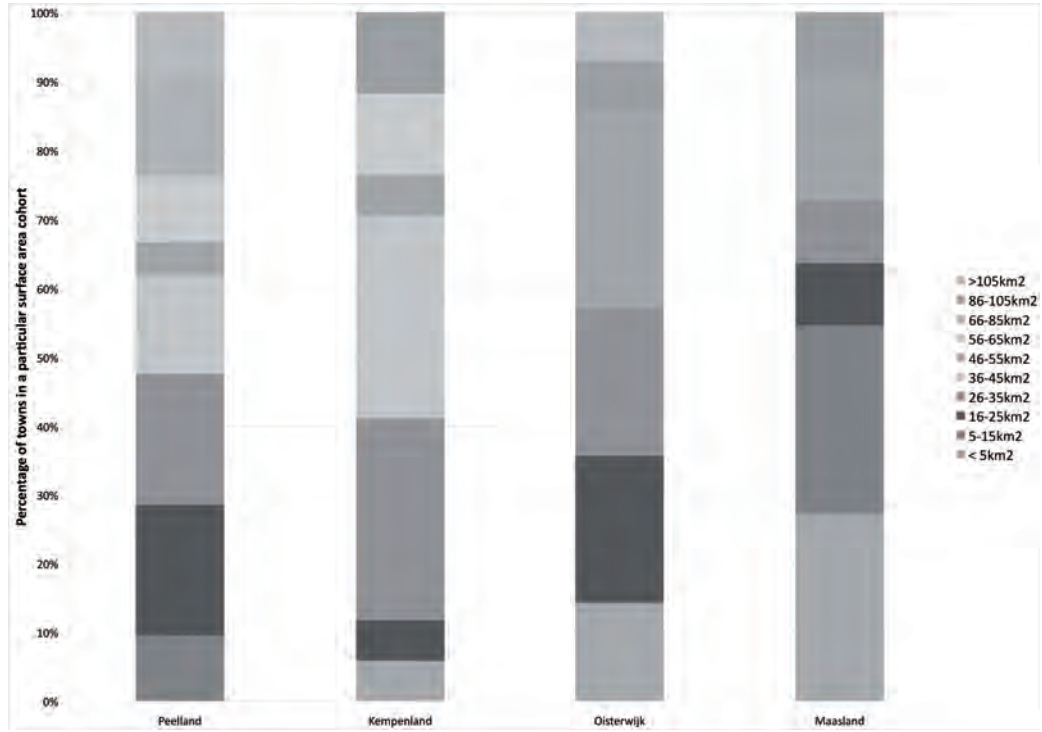
Figure 6: Lithology of the Bailiwick: loam (pink), sand (yellow), peat (blue). (Archis2. Archis.nl)

It may therefore be concluded that only specific locations were suitable for settlement because they were situated high enough to have a lower water table. Moreover, the location of a settlement is dictated by the soil and its drainage. Crops need good drainage in order to grow, and this is not naturally provided by the land directly south of the blow-sand ridge. The sandy areas, however, do allow for good natural drainage. Loamy soil is the best soil for crops. Sand with a loamy texture would therefore be an ideal combination, and this soil type can be found in most of the Bailiwick. The earliest settlements can therefore be found more or less all over the Bailiwick in the high-lying areas. When water management techniques became more common from the thirteenth and fourteenth century onwards, people could also settle in the more low-lying areas, along the edges of the brook valleys, with even more fertile soil. We have also seen that during this time farmers used fertilization methods and grouped their farm with others, thus creating hamlets and larger, more workable fields.

3.1.3. **SIZE OF AREA** The first section of this chapter focused on the administrative boundaries of the Bailiwick. These boundaries determine the surface area of this region. The size of the surface area of the Bailiwick was discussed because it shows how much land there was to distribute and therefore forms the basis for any discussion on land ownership. Moreover, together with the previous section on landscape, and the next chapter on population, the surface area will determine whether the Bailiwick could have been self-sufficient or whether it had to rely to some extent on imports. Soil can be extremely rich and have good drainage, but if it measures, for example, only five square kilometres it cannot feed a population of 50,000.
Government agencies can provide figures to calculate the surface area of the modern municipalities within the Bailiwick. The municipal key figures (*gemeentelijke kerncijfers*) of Statistics Netherlands (*CBS*) list the surface area for all Dutch municipalities. The total surface area of a country and most regions stays roughly the same over time, unless changed by land reclamations or disputes between countries – events that did not occur in this region (Bosatlas Ondergronds Nederland 2009, 15). On the other hand, the surface area of the various municipalities has changed considerably since medieval times, largely due to the many municipal reorganizations (*gemeentelijke herindelingen*).
It is therefore relatively straightforward to use these municipal key figures to calculate the surface area of the entire Bailiwick, but not so straightforward to calculate it for the various settlements. On the other hand, since many of the municipal reorganizations (especially the more recent ones) have been recorded, it is possible to work out an approximation of the surface area of the medieval municipalities. The result will be more usable than the original municipal key figures. Otherwise there would be no data on municipalities which have since merged. The recalculation will therefore provide data for most municipalities.
Despite these issues, these data are the best available, as reliable medieval or early-modern data do not exist for this area. Thanks to modern GPS and GIS techniques the modern data are more reliable than any available earlier data. Moreover, these data are only used to compare the different settlements in order to find out which had the largest and the smallest surface area, and thus a potentially lower or higher population per square kilometre. Like other historical sources, the calculations using the municipal key figures are not 100% reliable but they are still a valuable source. Moreover, the municipal key figures were compared with the Hundredth Penny data of 1569 researched by Vangheluwe (1999, 367) to ensure that the correct ratios between the surface areas of the various settlements were being applied.

In addition, for the sake of clarity and because there is a margin of error in the values of surface areas, they have been grouped in cohorts rounded to the nearest ten. The complete and unabridged table can be found in Appendix 1. Calculating the surface areas is useful because it can provide some indication of the amount of land that was distributed between the various towns and villages in the Bailiwick. The hypothesis is that a settlement will first make use of its own lands to feed its population. Therefore the more land a town or village has the larger the population it will be able to feed. However, as the previous section has shown, there were many uncultivated areas in the Bailiwick. It is therefore necessary to combine the surface area and the soil conditions in order to analyse the agricultural affluence of a particular settlement.

Graph 1: The percentage of settlements in each surface area cohort per quarter.



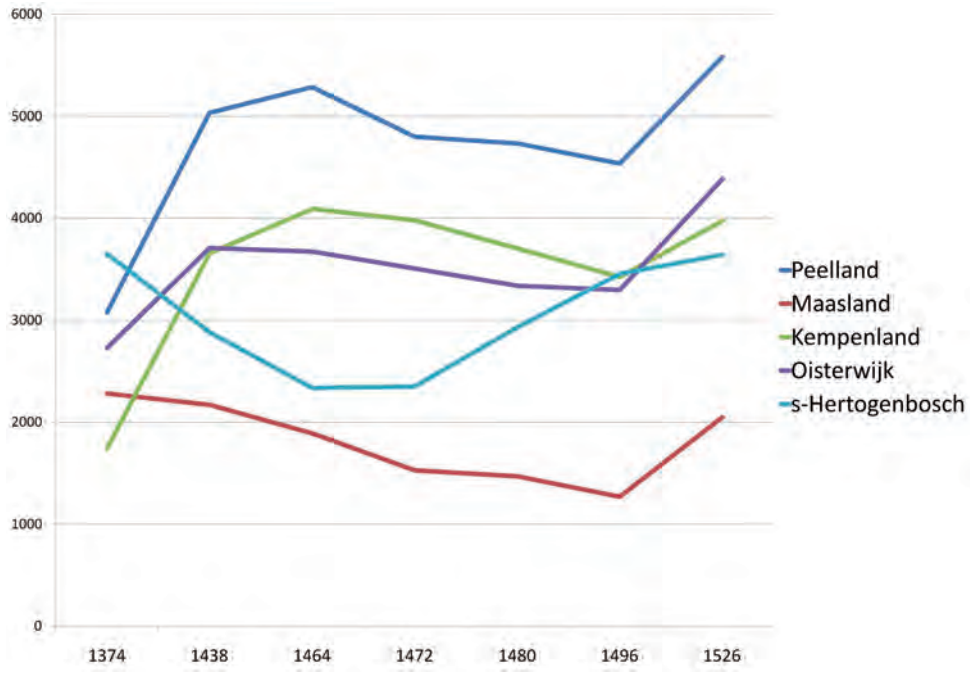
Graph 1 shows the results of the surface area calculations. The bar chart shows the percentage of settlements in each surface area cohort per quarter of the Bailiwick (Maasland, Oisterwijk, Kempenland and Peelland). A surface area cohort is a group of settlements within a particular surface area, for instance 26 to 35 km^2. 's-Hertogenbosch is not included in the graph, since it had only one settlement and thus would have only one value (group 46-55 km^2) and show only one pink bar. As explained in the previous paragraph, the surface area figures do have a margin of error and this is why the surface area sizes have been rounded up or down to the nearest ten into a cohort. Each colour shows the percentage of settlements in a particular quarter that have a surface area within the corresponding cohort. For instance, the chart illustrates the large proportion of settlements with a surface area of less than 5 km^2 in the Maasland quarter. It also shows that, out of all the quarters, Oisterwijk had the largest percentage of settlements with a surface area larger than 45 km^2. As a result of reclamation of the heath in this part of the Bailiwick, the surface area per settlement was above average. There was a lot of land but very few people. A large surface area is important for self-sufficiency, but is not much use if the land is unsuitable for cultivation. Section 2.3 will explore this subject in greater detail but for the time being it is important to state that there were large swathes of uncultivated lands (*gemeintes*)[13] in the Bailiwick. These lands would be included in the aforementioned figures and the surface area of a settlement could therefore be significantly larger than the cultivated land actually available. The uncultivated lands, however, were used for economic activities such as grazing, tree-felling and peat-cutting. They were of course less valuable than land that could be used for agriculture but they still had a significant economic importance, albeit for a different industry. It would of course be preferable to split the surface area figures according to cultivated and uncultivated lands but this is not possible for the entire Bailiwick. Combining both figures is therefore a good option especially since uncultivated land did play some part in the economic processes in this region.

[13] These gemeintes will be discussed in more detail in section 3.2.3.

Neither surface area nor fertility are indicators of the number of people who needed to use this land. To find out the population levels in an area, it is essential to study the population figures which are available for the period 1350-1550. In combination with surface area data they can provide population density figures for an area and can therefore shed some light on the possible demands made upon the cultivated land. Accor-dingly, the next section examines the population size of the Bailiwick and combines it with the surface area data.

3.1.4. **POPULATION SIZE** In order to make a distinction between town, village and countryside we need to find out how many people lived in the various parts of the Bailiwick. Moreover, finding out these details will provide insight into the population density and answer the question whether the surface area of the Bailiwick was large enough to sustain its population. Unfortunately, there were no public record offices in the Middle Ages but population – or more commonly – household levels were recorded in a manner that was fairly accurate for that time.

For instance, in several years between 1374 and 1526, the number of hearths were counted for tax purposes. These hearth-counts are lists of the number of hearths or chimneys in a town or village and determined the amount of taxes that had to be paid (the hearth tax). In this way the tax burden was divided proportionally. Hearths were counted as opposed to other attributes, because a hearth was said to be equal to one average household. Poorer households might have shared a hearth, or had none at all. Richer households might have had more than one. Counting hearths rather than actual households can therefore account for a difference in richer or poorer settlements and divide the taxes according to the ability to pay. These hearth-counts date from 1374, 1438, 1464, 1472, 1480, 1496 and 1526. Several authors (Hermans 1845; Van de Hammen and Sassen 1894; Cuvelier 1912; Schuttelaars 1998) have compiled lists of these hearth-counts, and some transcriptions are available in the archives (BHIC 307- 41, 42, 45, 46, BHIC 8 – 381, 383, 384). Unfortunately, not all of these compilations are entirely accurate and a lot of verification is needed across all the sources to produce a reliable list.



Graph 2: Number of hearths in each of the four quarters and the freedom of 's-Hertogenbosch in each year of a hearth-count.

'Reliable' is of course a relative term since there is no way of knowing just how accurate the hearth-counts were as there is no other source available for cross-referencing. However, they are considered very useful and reliable when they are used to compare the population sizes in the various settlements as opposed to using the absolute values to compare the settlements in the Bailiwick with settlements in other regions. This is because any mistakes in deciding how many hearths to tax would have occurred across the board and not in isolation. Jansen (1955, 28) also states that it does not matter whether one hearth actually equalled one house as the relative values still stand.
In order to prevent any further increase in the margin of error, a decision was taken to list and discuss the number of hearths rather than a number of inhabitants (achieved by multiplying the number of hearths by the average household size). There is no consensus in the literature on the average size of a household in the Middle Ages. Multiplication by an unfounded figure would therefore unnecessarily raise the error factor. Moreover, a hearth was sometimes shared by two households, in which case multiplication by an average household size would underestimate the size of the population. In addition, the hearth taxes are used to show the ratio between the population size of the various settlements in the Bailiwick rather than giving exact numbers so that they can be compared with settlements from other regions.
One feature of the hearth-counts that needs to be mentioned is that they do not all contain exactly the same information. The counts of 1374, 1464, 1472, 1480 and 1496 list only the number of hearths in a settlement. The count of 1438 also lists the number of poor hearths in a settlement. The count of 1526 is the most extensive and lists the number of buildings with single, double and triple hearths, and the number of monasteries, beguinages, poor houses and farms.
Another feature of the hearth-counts is that not all settlements are counted separately all the time. As a result of administrative changes some settlements were counted together in the earlier counts and separately in the later ones. Since it is impossible to tell how many hearths each settlement had individually, when they were enumerated together with neighbouring settlements, it was decided to count these settlements together in later counts as well, so that they could be compared across the period. Appendix 1 lists all the data from the hearth-counts.

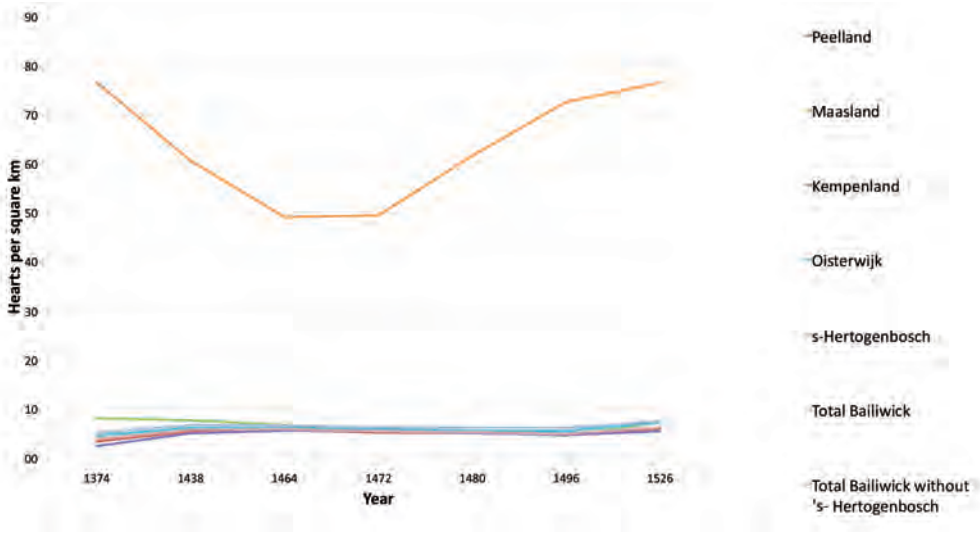
Graph 2 presents a summary of these data by listing the total number of hearths in each quarter and in the freedom of 's-Hertogenbosch.[14] Kempenland and Peelland have a similar population trend, showing a sharp increase followed by a shallow decline starting in the second half of the fifteenth century, and followed by a sharp increase from the beginning of the sixteenth century, a trend also closely followed by Oisterwijk. The patterns in 's-Hertogenbosch and Maasland are, however, entirely different.
In 's-Hertogenbosch the pattern starts with a decline and is followed by a continuous increase from the 1470s. Maasland, on the other hand, shows a continuous but shallow decline with an increase only at the beginning of the sixteenth century. These differences in levels and trends are probably a result of economic and political influences. For instance, the wars with Guelders had a disastrous effect on the Maasland quarter as it was situated on the front line. The Duke of Brabant, Charles the Bold, had conquered Guelders in 1473. After his death in 1477 the leaders of Guelders prepared for war to regain independence. This conflict was not settled until 1543, when under the terms of the Treaty of Venlo, Duke William of Kleef, Jülich and Guelders was ordered to relinquish Guelders to Charles V as a punishment for insubordination (Adriaenssen 2007, 35-37).

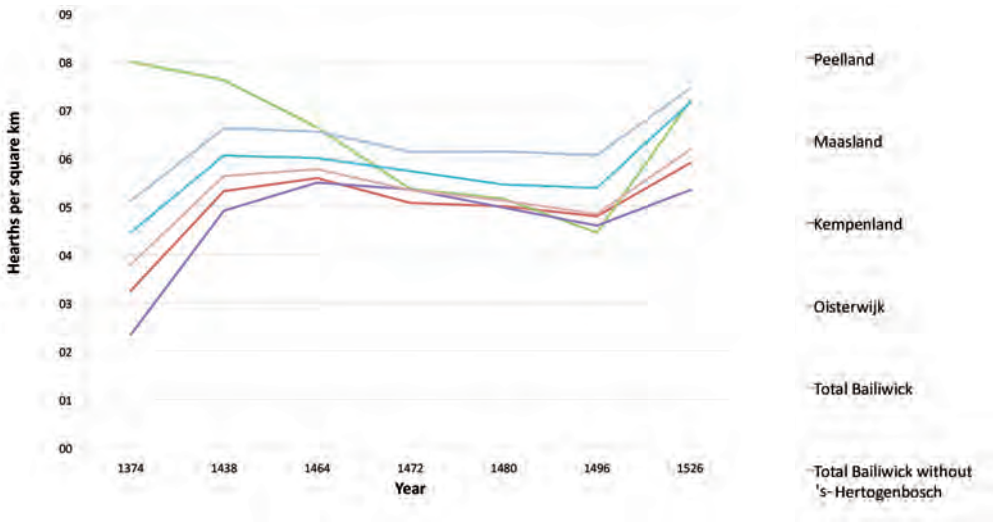
This chart also shows that Peelland had the largest population and Maasland the smallest. However, population figures by themselves do not give any indication of population density. To find out the settlement with the highest population density these data need to be combined with the surface area data.[15]

Graph 3 shows the trends in the population density of the quarters and the Bailiwick as a whole. The top chart shows the high population density of 's-Hertogenbosch. As a result, the trends in the other quarters are far less pronounced. This is why the bottom chart, which shows the same figures apart from those of 's-Hertogenbosch, has been provided.
The trends in these charts are comparable with the general population trend, because the surface area value does not of course change during the medieval period. The chart, however, does show that Maasland had the highest population density at the first two hearth-counts (1374 and 1438) but an average density in the rest of the period. It is assumed that the wars with Guelders

14 For the full list of the hearth taxes see Appendix 1
15 When one combines the surface area data with the population data described in the previous sections any errors become immediately apparent. For instance the village of Blaarthem below Oerle had an average hearth density per km2 of 69.1, which is of course far too high.

Graph 3a: Population per square km with 's-Hertogenbosch.





Graph 3b: Population per square km without 's-Hertogenbosch.

prompted many people to emigrate from the Maasland quarter. On average Kempenland had the lowest population density of the four quarters and Oisterwijk the highest.

It is unfortunate that the earliest hearth-counts date from 1374 as the dynamic period in the history of the Bailiwick, which saw, for instance, an increase in the urban, but also the rural population, had commenced a century earlier (Theuws 1989; Vangheluwe 1999; Vangheluwe and Spek 2008). In these graphs only the last phase of this population rise until 1438 can be seen. Moreover, it appears that the population density in 's-Hertogenbosch decreased considerably at the end of the fourteenth and the beginning of the sixteenth century, possibly – judging from the rise in the other quarters – as a result of migration to the rest of the Bailiwick. The increase in population density in 's-Hertogenbosch appears to go hand in hand with a decrease in the rest of the Bailiwick. It is only towards the end of the fifteenth and the beginning of the sixteenth century that all areas saw an increase in population density. It appears therefore that population levels in 's-Hertogenbosch and its Bailiwick had a negative effect on each other; in other words, an increase in the town seemed to be caused by a decrease in the countryside and vice versa. Depending on the circumstances at particular periods in time, 's-Hertogenbosch seems to have exerted more pull factors or push factors. Especially at a time of unrest, such as during the wars with Guelders, the town could have been seen as a safe haven. The sharp rise in the population of 's-Hertogenbosch since the count of 1472 can be interpreted as evidence that people fled the countryside in search of protection at the stronghold of 's-Hertogenbosch at the height of the wars with Guelders. Explaining the cause of rises and falls in population levels is of course a speculative exercise. However, the safety argument appears to have the highest probability. Anticipating the results of the rest of the chapter, a move to the town was for many people not a goal in itself but prompted by the need to protect themselves, their family and their livelihood. Survival is the most important motive; a spontaneous move to the town would bring about too many insecurities and could therefore not have been a pull factor in itself.

3.2. ECONOMIC LINKS ARE NOT JUST INFLUENCED BY THE ECONOMY

Town and countryside can be linked in many ways – administratively, economically, geographically and legally to name but a few. The economic connections between town, countryside and areas further afield are the main focus of this thesis. In this section it will become clear that these connections are not solely of an economic nature but are also influenced by administrative, agrarian, property and defensive factors. In order to discuss the economic connections it is important to discuss these other factors as well. Moreover, this will provide the context for the body of this thesis when it focuses solely on the economic links. All parts of this section will therefore discuss the respective effects of these factors on the economy with a view to painting as clear a picture as possible of the interaction. Social factors will be left out of this discussion because they are part of a parallel research project and because it was felt that the economic links have been underexposed in recent research.[16]

3.2.1. ADMINISTRATIVE AND JUDICIAL

Some of the central connections between town and countryside are of an administrative and judicial nature. The complexity of late-medieval regions, as explained in the first section of this chapter, inevitably led to equally complex administrative processes. Fortunately, the administrative processes for the Bailiwick and the town of 's-Hertogenbosch have been extensively studied by Jacobs (1986), Van Asseldonk (2002), and Van Synghel (2007) in their respective theses, to which the reader is referred for more detailed information, as this section will focus primarily upon the factors that influenced the economic and financial relationship between town and countryside.
The territorial unity of Brabant was guaranteed in various articles of the Joyous Entry (*Blijde Inkomste*) of 1356 (Van Bragt 1956), a charter which documented the relationship between the Duke of Brabant and his subjects. 's-Hertogenbosch was the administrative and judicial centre of the Bailiwick. In order to maintain its position as capital, 's-Hertogenbosch actively endeavoured to preserve this territorial unity since the middle of the fourteenth

16 Social links form another part of the NWO-funded research project Town and Countryside a dynamic symbiosis and are being researched by Antoinette Huijbers.

century, especially in respect of the Bailiwick. This policy is reflected mostly in the efforts to regain land previously leased out by the Duke or to prevent leases in the first place (Coopmans 1975, 82-83). Land and seigniories as well as other possessions were often leased out by the owner, usually the Duke of Brabant, as a means of generating an extra source of income. This practice, however, undermined the territorial unity of the area (Jansen 1955). Land that was owned by someone else, especially someone who was to become an enemy of the Duke of Brabant, could become a forward post and would be strategically important. This is what happened to Grave, which was used as an outpost by Guelders during its wars with Brabant (Kuijer 2000, 255).

's-Hertogenbosch's administrative and judicial system was adapted to serve as the administrative and judicial system of Oisterwijk, Eindhoven, Sint-Oedenrode and Waalwijk; the system of Oss was almost entirely based on it (Van Asseldonk 2002, 94-98). This can be seen as a process of unification of either the town of 's-Hertogenbosch itself or the Duke of Brabant (Kuijer 2000, 194). However, 's-Hertogenbosch did feel that its status as capital of its Bailiwick was threatened when more urban settlements with privileges were established in the countryside. By granting these privileges the Duke had caused, intentionally or otherwise, much resentment in the other areas of the Bailiwick (Kuijer 2000, 193-197).

To understand the judicial entanglement of town and Bailiwick, we will now unravel the ways in which criminal, voluntary and civil jurisdiction was applied. All severe criminal cases which carried corporal punishment or the death sentence had to come before the High Sheriff (*Hoogschout*) and the aldermen's bench of 's-Hertogenbosch (Coopmans 1975, 92-93). Moreover, the Bosch' court was the court of appeal for all civil, criminal and administrative cases that had been heard in the entire Bailiwick. Before coming to appeal, cases would have been heard at the local bench in the Bailiwick or the bench in 's-Hertogenbosch, if townspeople were involved. It is presumed that if there was no local bench, e.g. before one was actually established, the bench at 's-Hertogenbosch had judicial power in that particular area.

Besides these forms of jurisdiction that we still know today, there was another type: voluntary jurisdiction. A valuable resource for the voluntary jurisdiction in the Bailiwick of 's-Hertogenbosch is the *Bossch' protocol*, which registers all the voluntary cases which came before the court between 1365 and 1811, ranging from the sale of real estate to marriage settlements and tutelage and from inheritances to leases and rents. People were not legally obliged to bring these cases before the court until the sixteenth century, which explains the existence of voluntary jurisdiction in the first place. People chose to bring these cases before the court because of 's-Hertogenbosch's so-called *recht van ingebod* which gave the parties in a voluntary legal case extra security, as the *recht van ingebod* was a privilege whereby creditors could call to justice all debtors from the surrounding countryside who fell behind with their payments (Van Synghel 1993, 9). The *Bossch' protocol,* therefore, also includes records of arrangements which are not actually (voluntary) legal transactions, such as wagers. The parties to such arrangements chose to record them as proof and relied on the *recht van ingebod* to call the defaulting party to justice. The *Bossch' protocol* contains all cases that were taken to court in the Bailiwick, even those that were taken to a local aldermen's bench as well. About 80% relate to goods situated outside the town and its freedom, and only 16% to the town of 's-Hertogenbosch itself. The aldermen of 's-Hertogenbosch had to document these cases even if the land or residence of the plaintiff was not located in 's-Hertogenbosch. Some deeds were even recorded twice, when the buyer and seller of real estate hailed from two different areas. This transaction was then recorded in two different ledgers. Moreover, transactions were recorded using standard formula and, for a long time, in Latin. The *Bossch' protocol* contains all kinds of deeds.

Apart from the sometimes monetary nature of a transaction, such as the purchase and sale of real estate, there does not seem to be an economic aspect to the voluntary jurisdiction. However, when one takes a closer look at the day on which most of these transactions took place, there does seem to be an important economic connection. Most contracts were exchanged on a Thursday, the day of the weekly market in 's-Hertogenbosch (Jansen 1955, 35).[17] People from all over the Bailiwick would travel to 's-Hertogenbosch for the market and would see to any legal tasks, such as setting up contracts and settling disputes, on the same day (Jacobs 1986, 117).

The underlying reason for recording all these transactions in 's-Hertogenbosch rather than in a local court was not known for a long time (Coopmans 1975, 95-96). The most obvious explanation would be that this was a practice that aimed to provide equality in the judicial system. According to the Brabant law (*Brabants landrecht*), these transactions would be held in front of the local court, where the estates being sold were situated (Coopmans 1975, 96-97). People, however, became dissatisfied with the practice because when goods (e.g. money, estates) had to be transferred in front of a notary, Bossch religious institutions or other mortmains often received payment in kind. This is why Charles V decided in 1531 to end this practice of bringing all voluntary cases before the court in 's-Hertogenbosch by allowing any real-estate transactions to be recorded either by the aldermen's bench in 's-Hertogenbosch as before, or by a local bench, as long as no minors were involved and as long as all appropriate fees were paid (Sassen 1865, 113, no. 755).

These last few paragraphs have shown the way in which the town and countryside were linked judicially, either via a system based on the one in 's-Hertogenbosch or because the inhabitants of the Bailiwick preferred to settle their business in the courts of 's-Hertogenbosch.

Besides the judicial links between town and countryside there was a more administrative link in the form of meetings. Regular meetings between 's-Hertogenbosch and its Bailiwick were held from the end of the fifteenth century (Coopmans 1975, 90-91; Schuttelaars 1998; Adriaenssen 2007, 21-33), presumably to promote contact and equality between town and countryside. The so-called 'Bailiwick Council' was a regional council advocating cooperation between town and countryside. It is presumed that these sessions originated much earlier than the end of the fifteenth century – the first recorded council dates from 1496 – but there is no firm confirmation on when they officially started or when they began to be held on a regular basis. They were not only held to deal with internal affairs. Representatives of the Bailiwick Council were also found as attendees of regional and interregional meetings. Even though many agendas for these sessions have survived, they do not usually provide much insight into what was discussed because many items are simply listed as 'issues to do with the town and its Bailiwick'. However, when more details are given, the main discussion topics seem to have been war and defence, water management, division of taxes, and common procedures (Coopmans 1975, 90-91). In other words, the Bailiwick Council probably discussed larger – usually financial – issues which concerned the entire Bailiwick.

These regular sessions were essential since opinions differed between town and country, especially on financial matters, which really started to take flight towards the end of the fifteenth century (Coopmans 1975, 108-109; Schuttelaars 1998; Adriaenssen 2007, 21-33). The town of 's-Hertogenbosch had tried to force the Bailiwick to pay part of the fines it had been charged by the Duke or pay expenses it had incurred. Moreover, 's-Hertogenbosch started to divide the cost of its war with Guelders between the town and the Bailiwick. This action was greeted with protests from Eindhoven and Helmond in 1480 (Sassen 1865, no. 582. 1480. 4 Junij, 84). These and other issues between the town and the countryside about financial matters were the main reasons for a measure in the *Raminghe* of 1495 (Sassen 1865, 95, no. 649), according to which 's-Hertogenbosch was not allowed to pass any expenses on to the Bailiwick if they had not been sanctioned beforehand, apart from cases in which delay would have been disastrous. In 1512 the town and countryside agreed that the former would pay a quarter of the costs of the war with Guelders and the latter three quarters. The *Raminghe* of 25 August 1495 also sorted out the division of taxes between town and countryside, the judicial powers and the details of the voluntary jurisdiction and was approved by the duke after a few amendments in 1506 (Coopmans 1975, 91-92). More regulations to promote equality were however required and Charles V abolished the aforementioned practice of holding all voluntary jurisdiction cases before the aldermen's bench of 's-Hertogenbosch.

In 1544 's-Hertogenbosch refused to let the Bailiwick share in the reduction of the financial burden it had received. By 1547 a peace treaty had been signed which stopped the regular meetings between town and country in the Bailiwick Council and the division of costs between the two. The peace treaty did not change anything in the *Raminghe* or the declaration by Charles V (Adriaenssen 2007, 31). This meant that even though there were no regular meetings between town and countryside and costs would not be divided, voluntary cases from the entire Bailiwick could

[17] For more information about the markets and fairs that were held in the Bailiwick see Chapter 5, and for more information about the markets and fairs of 's-Hertogenbosch in particular see Chapter 6.

still be brought before the aldermen's bench in 's-Hertogenbosch, the *recht van ingebod* still functioned, and 's-Hertogenbosch still housed the court of appeal for all civil and criminal cases which had come before the courts in the Bailiwick.
As new towns with privileges were encroaching on its influence, 's-Hertogenbosch had to make constant economic choices between its relationship with the Bailiwick and its defence of the northern border against Guelders.
The exploits of 's-Hertogenbosch should not therefore be seen as expansionism but rather as self-defence. However, these issues did widen the gap between town and countryside and eventually resulted in the end of consultation opportunities and financial ties between 's-Hertogenbosch and its Bailiwick in 1547.
This section has shown that town and countryside were closely linked administratively and judicially. This relationship was, however, not always a happy one, since the countryside often felt that it was worse off when taxes and income were divided. On the other hand, the countryside did profit from its relationship with the town by, for instance, having access to an enforceable judiciary system.

3.2.2. **RAW MATERIALS** At the beginning of section 3.2 it was stated that it is important to discuss other links besides purely economic ones. The next link to be discussed is the 'raw materials' link. An earlier section on geography and geomorphology provided details of the landscape of the Bailiwick and how they influenced settlement. This section will elaborate on this further by discussing the raw materials that were available in the Bailiwick. It will focus mainly on the edible raw materials, i.e. the agricultural produce cultivated in the Bailiwick, and how agricultural production relates to the changing economy. Secondly it will discuss how research into building and building materials can shed light on the relationship between town and country.

3.2.2.1. **PRODUCE** This section builds on the work of Henk van Haaster, who researched archaeo-botanical samples that were taken during archaeological excavations on twelve sites in the town of 's-Hertogenbosch for his PhD thesis (Van Haaster 2009). These archaeological sources are essential in determining what people actually consumed rather than just what they bought or sold. Previous historical studies have tried to make a case for a sober medieval diet. Archaeological research has shown, however, that the medieval diet was actually generally quite varied (Lilley 2002, 220).
Section 3.1.2. illustrated the agricultural potential of the Bailiwick; its physical conditions in terms of geomorphology, hydrography and lithology. It offered a variety of opportunities for exploitation by humans. However, the lack of many high-lying areas was a limiting factor for permanent habitation and agriculture (Van Haaster 2009, 59). Geographically, the Bailiwick was in a prime position as the transition between the Meuse valley and the Brabant sands. The valley systems of the Dommel, the Aa and the Run opened up almost the entire area of Eastern Brabant. However, they also enabled the authorities to exercise tight control over the area. Those rivers also connected via the Dieze with the Meuse and other regions. It can therefore be said that any settlement in this area would have served as a gateway and would consequently have played some part in the habitation history (Van Haaster 2009, 59).
This habitation history is partly illustrated by botanical evidence from 's-Hertogenbosch, which points to anthropogenic activities in the area directly surrounding 's-Hertogenbosch starting from the Carolingian period. In this area there are four high-lying areas, which in principle could be suitable for settlement. Huijbers (2010) argues that Halder and Vught, to the south of 's-Hertogenbosch, were the predecessors of that town. However, she also states that archaeological evidence for the earliest settlement in the area immediately surrounding 's-Hertogenbosch is still rather sketchy. Historical, or actual toponymic evidence, can, however, give some indication of previous early-medieval settlement in this area. 's-Hertogenbosch was called *nova civitas apud silva* ('new town in or near the forest') in 1196, suggesting there was no earlier settlement. Moreover, 's-Hertogenbosch literally translated from Dutch into English means 'the Duke's forest'. Reference was also made to *Homines civitatis ducis, videlicet Othen, que nunc silva dicitur* ('Inhabitants of the town of the Duke, Orthen, which is now called forest') in 1204, which suggests that Orthen was the earlier settlement, later replaced by 's-Hertogenbosch. The name Orthen, according to an etymological study, is of Celtic origin (Toorians 2004).
The earlier names for 's-Hertogenbosch and the name 's-Hertogenbosch itself are evidence of an important feature of the early-medieval landscape: forests. A large part of the sandy ground in the Bailiwick was originally forested. However, the number and size of the forests had diminished since prehistoric times. During the Roman era the area was already being cultivated and deforested. The forest could, on the other hand, recover during subsequent centuries until the Bailiwick was cultivated in earnest during the central Middle Ages. The cultural landscape consisted of open fields and timber or fenced camps. The heaths were also open areas, and alder-carr forests remained only in humid loamy areas. The Bailiwick had become rather tree-less in the later Middle Ages. In some cases inhabitants of the areas closest to the *gemeintes,* the uncultivated common lands, were given the right to plant trees on the first six or twelve metres of the *gemeint*. This was more or less a financial investment by the Duke as a tax (the *houtschat*) had to be paid on all felled trees (Leenders 2002, 65). The types of tree depended strongly on the soil conditions and the drainage. Botanical research has shown that, during the early Middle Ages, oak, birch and beech trees grew on the high-lying areas. In the low-lying areas alders and willows could be found in between reed swamps. Where the alder trees grew, the groundwater would have been below ground level during summer. The groundwater in areas with willow trees could have been above ground level throughout the year (Van Haaster 2009, 59). Poplars, for which the Bailiwick was well-known from the eighteenth century, were actually only planted in that century (Leenders 2002, 65-69).

Archaeo-botanical evidence not only shows when people first started to settle in an area but also that they started to cultivate it or grow particular crops. After a decline from the end of the ninth until the eleventh century, a period of economic and demographic recovery started in the mid-eleventh century. Many abbeys regained their old domains, abandoned estates were brought back to life, and barren land was cultivated. This led to a large wave of cultivation during the twelfth century. New farms and settlements were built. This agrarian expansion is clearly visible in the archaeo-botanical records. The economy at that time was centred on self-sufficiency rather than surplus production (Roymans and Theuws 1999, 20-23). Any surplus was handed over to the lord as rent. This started to change in the thirteenth century when the economy began evolving around money and markets (Vangheluwe and Spek 2008, 1-2; Van Haaster 2009, 61-62) and led to agricultural development. From the second half of the thirteenth century, the fallow period, which was part of a three-field system, was no longer necessary thanks to stable-manuring. As a result, rye could be cultivated continuously (Blondé and Limberger 2004, 319; Bakels 2007, 335). The presence of lamb's succory (*korensla*) in the rye pollen is an indication of continuous rye cultivation (Van Haaster 2009, 62).
Cattle were bred in the Bailiwick primarily to supply enough manure to make the continuous rye cultivation possible rather than for beef (Hoppenbrouwers 2004, 116)
Peat-cutting and the resulting sand drifts in this period are indicated by the high pine values in botanical samples at times of sand drifts. Archaeo-botanical research has shown a sharp increase in agricultural activity as a result of this large-scale cultivation (Van Haaster 2009, 62-63). More land was needed to feed the growing population. Moreover, peat was a readily available and relatively cheap source of fuel. Cultivating the peat bogs was therefore doubly advantageous.
Other areas, however, could not be cultivated. The *gemeintes*, the common lands, could not be cultivated, but they provided a source of manure and were therefore essential for arable farming. Moreover, the *gemeint* served as pasture and was a source of sand, peat and bog myrtle, which was used in brewing (Adriaenssen 2007, 284).

When 's-Hertogenbosch was founded at the end of the twelfth century its economic, i.e. agrarian, hinterland extended only as far as Boxtel and Oirschot, which were situated in the geographical centre of the Bailiwick. When the town expanded, the hinterland expanded as well. In principal, all produce which could be grown in the hinterland was obtained there. Produce which was not available locally was imported from further afield and thus enhanced the importance of regional and interregional markets. Farmers in the Bailiwick started to combine subsistence and commercial farming from around the thirteenth century. This combination started the proto-industrialization when commercial farming replaced subsistence farming (Van Haaster 2009, 61-62). Even though the north of Brabant was probably less commercialized than the south, it no longer

had a subsistence economy by the middle of the thirteenth century (Hoppenbrouwers 2004, 116). Eggs, dairy produce (mainly butter), wool, flax and oil-bearing seeds were produced first and foremost for the market. Large quantities of hops were grown by the farmers in Heeswijk, Dinther, Veghel, Den Dungen, Sint-Michielsgestel, Schijndel and Berlicum; the transitional area between clay and sandy soil. The hops were shipped to the Rhineland, Antwerp and Holland (Van Haaster 2009, 71). Oxen fattening was a popular occupation in the area around Waalwijk. Local oxen buyers bought large herds of lean animals intended for slaughter, in Denmark and fattened them in the area around 's-Hertogenbosch and in the Langstraat, before herding them to the staple market at Lier, and later to the staple market at 's-Hertogenbosch when it was granted the same rights as Lier in 1585 (Adriaenssen 2007, 285). Blondé and Limberger (2004, 320) have argued that the Bailiwick was the ideal place to fatten cattle. Since 's-Hertogenbosch could not exert any profound economic influence upon its rural surroundings, the villages became an ideal location for butchers to set up shop and thus avoid the rules and regulations of the 's-Hertogenbosch guilds.

As archaeo-botanical research is a recent development within the archaeological discipline as a whole, this information could not be used in many previous archaeological studies. Moreover, archaeo-botanical findings are still not taken into account in current historical studies. Even though it has been correctly stated that the soil in the Bailiwick was relatively infertile and, even with a large labour investment, would still produce much less than the other parts of the Duchy of Brabant (Adriaenssen 2007, 281-282), the Bailiwick was still able to produce foodstuffs in such quantities that imports of particular products were not necessary (Hoppenbrouwers 2004, 118). Nevertheless, when the Duke of Alva assigned values to the land in the entire province of Brabant at the beginning of the Dutch Revolt, most of the areas in the Bailiwick were assigned a low value. These values depended on the quality of the soil, as well as on the value of the buildings, the population density and the demand for land and houses, and the accessibility of the land from a town. The low values for most areas in the Bailiwick, apart from some in the Maasland and 's-Hertogenbosch, stand in sharp contrast to the much higher values for the rest of the Duchy of Brabant. These low values, as well as other historical evidence, have been used in the past as an argument for the overrepresentation of infertile soil in the Bailiwick and a sole reliance on import for subsistence products (Blondé and Limberger 2004, 317-319; Adriaenssen 2007, 281-282). Adriaenssen (2007, 283) concluded that the Bailiwick soil was infertile on the basis of the fact that the farmers in Kempenland still used the three-field system whereby two years of winter cereals (mostly rye) were followed by one year of summer cereals (oats or barley). In this system there was no fallow period apart from the time between the harvest of the second winter cereals and the sowing of the summer cereals. However, this did not really count as a fallow period as corn spurry was sown to fertilize the land and to serve as pasture.

Van Haaster (2009, 65-70), however, has argued that the Bailiwick was able to produce enough foodstuffs to avoid being entirely dependent on imports. He calculated that all the rye needed for the population of 's-Hertogenbosch and the Bailiwick could be grown in the Bailiwick. In addition, he found no evidence for the import of rye at any time. As stated earlier, rye was farmed intensively from the second half of the thirteenth century (Bakels 2007, 335). This is evident from the weeds found amongst the remains of the rye, which point to soil fertilization with manure from cattle farmed indoors. These weeds are typically found in the particular soil composition of the Bailiwick, which has so far not been found elsewhere. This is why Van Haaster concluded that no rye was imported into the Bailiwick (Van Haaster 2009, 65-66).

Apart from the importance of rye – which was found in almost all archaeo-botanical excavations – as a source of flour, archaeo-botanical research in 's-Hertogenbosch has revealed the importance of buckwheat, which was found just as often. It is not known where the buckwheat was grown, because hardly any weeds grew amongst the buckwheat in the fields, and the place of origin cannot therefore be determined as closely as for rye. There are, however, ample historical sources which attest to the cultivation of buckwheat in the Bailiwick from the fifteenth century onwards (Van Haaster 2009, 68). Moreover, a previous assumption about the use of buckwheat needs to be revised. Van Uytven and Blondé (1988) had stated that buckwheat was not used in the town before 1578 because that is the date its use is first mentioned in historical sources. The archaeo-botanical evidence, however, has shown that buckwheat was widely consumed in the fifteenth and sixteenth century. Moreover, buckwheat can be grown on poor sandy soils, and the fourteenth-century cultivation of buckwheat in the Bailiwick is already visible in pollen diagrams (Leenders 1987, 222-223).

Hardly any oats or wheat were grown in the Bailiwick because they were unsuitable for sandy soil. Oats were grown mostly in the colder and wetter soils in the Land of Heusden bordering the north-western Bailiwick (Braams 1995, 105). Oats were even the most important produce of the Land of Heusden as opposed to other cereals in other parts. Wheat was grown mostly in the Maasland quarter. Oats and wheat were not grown for consumption as flour, but for brewing beer or animal fodder. Some historical sources do attest to the use of wheat for consumption as flour, but it was short-lived, as the much cheaper cereal, buckwheat, was preferred during the economic crisis of the sixteenth century (Van Haaster 2009, 68).

Essentially, the Bailiwick fits Von Thünen's model (1863) in which cereals, perishable produce, and produce intended for trade were grown in the hinterland of 's-Hertogenbosch, whereas all oats and hay were grown further afield and all sheep-farming and cattle-breeding was carried out at a greater distance from the town (Hoppenbrouwers 2004, 117).

In the first two centuries after the foundation of 's-Hertogenbosch (the thirteenth and fourteenth century) there was still ample space within the town itself for people to have small-scale plots and to grow perishable fruit and vegetables themselves.

The town's population, however, grew so rapidly that after the fourteenth century there would no longer have been sufficient space for such activities. Den Dungen, one of the settlements in the freedom of 's-Hertogenbosch but outside the town of 's-Hertogenbosch itself (around six kilo-metres to the south-east), was soon regarded as the kitchen garden of 's-Hertogenbosch (Van Gestel 1995, 77). A large variety of vegetables, mainly cabbages and beans, and fruit, mainly apples, pears and berries, were grown there and sold at the market in 's-Hertogenbosch or door-to-door. On the return trip from 's-Hertogenbosch the bargemen brought manure to keep the soil of Den Dungen well fertilized. Unlike a lot of other settlements in the proximity of 's-Hertogenbosch, such as Rosmalen (to the northeast), Den Dungen's soil was already relatively fertile. However, like the rest of the area in which Den Dungen was situated, it had to deal with the frequent floods as described in section 3.1.2. on the geography of 's-Hertogenbosch.

3.2.2.2 **CRAFTS** As the previous sections have shown, the sixteenth century witnessed rapidly increasing productivity and diversity in the agricultural sector (Blondé and Limberger 2004, 316). This growth was caused mainly by the expansion of the urban as well as the rural population in the region. However, other, non-agrarian industries profited from the urban expansion as well. These non-agrarian industries, also referred to as crafts, will be discussed in this section.

The town was, and stayed, exceedingly protective of its economic status and privileges. In 1335 Duke John had prohibited the production of cloth in the Bailiwick and in all the independent seigniories in order to protect the cloth industry in the freedom of 's-Hertogenbosch (Sassen 1865, 12, no. 70; Van den Heuvel 1946a, 24).

On the other hand, the range of influence of the 's-Hertogenbosch's guilds, whose rules and regulations all cloth producers in the Bailiwick had to adhere to, was usually restricted to the town and its freedom, since the 's-Hertogenbosch's guilds had no jurisdiction in areas which were governed independently by other lords either alone or in collaboration with the Duke of Brabant (Van den Heuvel 1946b, 51-53). For instance, the Bailiwick definitely had rural centres of cloth production such as Oisterwijk, Tilburg and Geldrop from the first half of the sixteenth century and probably even earlier (Blondé and Limberger 2004, 317; Van Gurp 2004, 32-33).

The cloth and linen industries, as well as the metal industry, will be dealt with in more detail in Chapter 4 as they were important products for the interregional trade.

Not only the cloth industry had to deal with measures to protect production in the town. A price and quality regulation for beer brewed in the Bailiwick came into effect in 1464, not only to protect the urban beer industry and the urban finances but also the ducal *gruitrecht*. (Sassen 1865, 188, 210; Van den Heuvel 1946a, 220-222, 1946b, 416). The *gruitrecht* was a tax on the *gruit* which had to be paid to the owner of the *gruitrecht*. *Gruit* is a mixture of herbs, mostly rosemary

and bog myrtle, which were used in the brewing of beer before the discovery of hops. When hops increasingly replaced *gruit* in the brewing of beer the *gruitrecht* was replaced by a beer tax. By a single price and quality regulation the Duke guaranteed his income from the *gruitrecht*.
In order to be of any real value, crafts and produce have to be sold, or at least traded. Otherwise they merely help people to be self-sufficient. Since face-to-face contact was important it was most advantageous to sell one's wares at a designated spot and time together with other producers. Markets and fairs were central to the commerce in medieval times because they provided opportunities to sell surplus produce and to buy what one could not grow or make oneself. However, markets and fairs not only enabled people to buy and sell goods locally and regionally but also to import and export products to and from other regions. Markets, and more importantly, fairs can be found all over the Bailiwick, in the town and in the large and small settlements. Produce and crafts brought town and countryside together and became part of an economic link. The interregional trading opportunities will be addressed in more detail in Chapter 4, while Chapter 5 will focus more closely on the regional system of markets and fairs.

3.2.2.3. **BUILDING MATERIALS** Certain raw materials for building, such as clay for the firing of bricks, and timber and tufa had to be imported.[18] Brick buildings are of course more durable and more fire-proof than timber buildings but timber was still used in brick buildings for floors and dividing walls as well as windows and doors. Tufa was used mainly for building churches, some of which were also built from brick as it was usually more readily available than tufa. Because of this, tufa from an old church was sometimes re-used in the building of a new church. This occurred in Boxtel, for instance (Strijbos 1996, 12).
The first brick buildings started to appear in 's-Hertogenbosch around 1300 (Janssen 2007, 128-129). Enough clay could be found in the surrounding areas to fire the bricks. However, most houses had wooden fronts as wood lent itself to more elaborate constructions. Only side and back elevations were made of bricks to reduce the risk of fire. The firing of bricks in 's-Hertogenbosch was more of an industrial activity than a craft, especially in light of the new town-wall that was constructed around that time. Even though loam was available in the countryside, it was not as readily available as around 's-Hertogenbosch so the large-scale industrial production of bricks never took off in the medieval countryside (Strijbos 1995, 13).
As a result of the lack of raw material and the problems of transporting it from elsewhere, as we shall see later in this section, brick buildings were extremely rare in the countryside. The first brick building in a village was usually the church. Brick churches were built from around the fourteenth century, and would certainly have stood out in a village in between all the timber-framed houses. Brick was chosen as a suitable building material because it was much more durable than timber frames and more readily available than tufa, a type of stone used for building churches in the past but which had to be imported (Van Kempen 1997).
Most of the churches in the Bailiwick were built during the fifteenth or early sixteenth century. This building boom was triggered by a rise in prosperity (Strijbos 1995, 12).
A development in the use of brick is discernible. During the later middle ages brick sizes became smaller. The bricks were then easier to handle by the bricklayer, but most importantly, smaller-sized bricks were easier to fire. This does not imply, however, that buildings can be accurately dated by noting the size of the brick, as sizes do vary, even though the general trend is that they became smaller (Strijbos 1996, 14-16).
Some landowners, such as Postel's Priory, tried to regulate the brick size, since it was felt that smaller bricks would not provide the required support, especially for the structural elements in a building, such as the supports for vaulted roofs (Strijbos 1996, 17).
This notable difference between the building materials used in 's-Hertogenbosch, *viz.*, much more brick and tufa, and those used in the countryside is due largely to the fact that building materials were heavy and large loads were more easily transported by boat. 's-Hertogenbosch was located in a prime position close to the river Meuse and downstream from the rivers in the Bailiwick. Even if the rivers in the south-eastern part of the Bailiwick could have been navigated – the Dommel for instance was only navigable as far as Boxtel – they could not have accommodated ships of a size necessary for the large-scale import and export of brick to and from this area. River transport was possible but only with smaller ships, and this was how in all probability the imported tufa was transported. Transport by cart was possible when destinations could not be reached by water. However, only loads of 125 to 200 bricks could be carried (Van Kempen 1997, 79-80). This would not have been an insurmountable problem across shorter distances, and is probably why the church at Oirschot could be built with tufa (Strijbos 1996, 12). However, when large buildings, such as churches, were being built with bricks, local field ovens were erected to do the firing locally via arrangements with a brick-maker, sometimes of 'foreign' origin' – as in the case of Lage Mierde (Strijbos 1996, 13). Similar problems arose for the transport of timber. When 's-Hertogenbosch first existed there was plenty of timber in close proximity (Vink 2000). Section 3.2.2.1. mentioned that 's-Hertogenbosch derived its name from 'the Duke's forest', but by the end of the Middle Ages the forest had disappeared and timber had to be transported from elsewhere. There is evidence that 's-Hertogenbosch got timber from as far afield as Helmond, Oerle and Hilvarenbeek to supplement the local diminishing stocks (Strijbos 1996, 12).
This section has illustrated the way in which problems in the availability and transport of building materials were solved during the later Middle Ages. They were essential items, for the construction of more durable churches and houses. Moreover, it has shown the advantage of one location over another. Section 3.2.4. will discuss the importance of location in more detail. The next section will first focus on the issues involved in land ownership.

3.2.3. **LAND OWNERSHIP** The previous sections focused largely on the land and the produce grown on it. However, if that land, and therefore the produce belongs to someone else, it is not certain that the owners will allow others to make use of it even to buy it. This section discusses the ownership of the land in the Bailiwick and the influence of this ownership upon the economy of the Bailiwick and the (inter)dependency of town and countryside.
There were many large landowners in the Bailiwick, most of them religious institutions. These usually had some presence in the town of 's-Hertogenbosch as well as owning some part of the countryside, thereby already creating a link between town and countryside. Of course, not all landowners owned large swathes of land, some owned smaller individual farms which, for instance, only measured around 1.5 to 3 hectares in the area around Bergeijk between the fourteenth and sixteenth century (Vangheluwe 1999, 385). These figures are comparable with the figures derived from the records of the hamlet of Berkel, near Oisterwijk, which show that in 1569 half of the seventy households in the village had fewer than 2.7 hectares of cultivated land, and only ten farms had more than 8 hectares (Blondé and Limberger 2004, 320). Most people grew buckwheat and rye and a little flax.
Seventeen households had sheep and three owned a horse. Hardly any of the land in Berkel was owned by residents of 's-Hertogenbosch, half was owned by the people of Berkel themselves, the other half was owned by religious institutions, a few noblemen, and other unknown individuals.
As no comprehensive accounts of these small individually-owned farms have survived, it is only possible to comment on the products the larger landowners sold, and the buyers. Moreover, as land ownership is a complex issue and subject to many changes, it would require a separate study to chart all the developments in ownership during the later Middle Ages. However, that is not to say that some generalizations cannot be made about land ownership in the Bailiwick of 's-Hertogenbosch and its influence on the economy. In addition, land was not simply sold to another party. Instead, much of it was leased to provide the landlord with a continuous source of income. As mentioned earlier, there were many larger landowners besides the small farmers.
After a slow start, many monasteries became established in the Bailiwick of 's-Hertogenbosch from the thirteenth century onwards; first in the town of 's-Hertogenbosch itself and later also in the countryside. Sixteen were located in the town of 's-Hertogenbosch and thirteen in the countryside. Moreover, there were five beguinages and five secular chapters (Janssen 1983a, 18). Almost all of the religious institutions in the area were situated in the Dommel basin or near the river Meuse (Bijsterveld 2002). Most of them lived of the proceeds of their land and tributes. However, the monasteries, which owned the largest proportion of land of all religious institutions, were located outside the Bailiwick. In the thirteenth century a great deal of land was owned by monasteries in the southern part of Brabant. After the expansion efforts by the Duke of Brabant to include the Bailiwick, many of these lands were donated or sold

[18] The import of tufa is discussed in section 4.3.4.

to monasteries closer to the Bailiwick such as Postel, Tongerlo and Averbode (Bijsterveld 1989). During the fourteenth, fifteenth and sixteenth century the latter two had become the largest religious landowners in the Bailiwick together with the abbey of Berne near Heusden in Holland (Adriaenssen 2007, 286). These large religious landowners played a key role in the cultivation of the Bailiwick (Jansen 1955, 25; Dekkers 1998).

Unfortunately, most of the records of the indigenous (i.e. situated within the Bailiwick) religious institutions disappeared during the Spanish Revolt. The records for Averbode and Tongerlo have, however, survived as well as those for lay institutions and the Tables of the Holy Ghost (the *Bossche Geefhuis*).

Dekkers (1998) has researched the ownership of the monastery land at Sterksel by the abbey of Averbode from the fourteenth to the sixteenth century. The farms at Sterksel are comparable with those of the abbey of Tongerlo at Alphen, and of Postel at Lierop in terms of size, produce and yields. According to the written evidence, the five livestock farms focused mainly on breeding sheep and milch cows. Because of the shortage of English wool at the end of the fourteenth and throughout the fifteenth century, the Kempen wool was a much sought-after export product and was a popular regional trading product. It has even been suggested that the area in which the Bailiwick was situated was annexed to the Duchy of Brabant so that the Duchy could be self-sufficient in the production of wool rather than reliant on interregional imports from Flanders or England (Theuws 1989, 194-195; De Wachter 2000, 87). The debate about the Duke of Brabant's reasons for expanding his domain to include the Kempen area during the thirteenth century are addressed by De Wachter (2000), who poses the aforementioned view of Theuws (1989) against Leenders (1996), who argues that the Duke expanded his territory towards the north merely because he wanted to own more land and generate more income from taxes. The Duke's motives for rapidly expanding his territory in the thirteenth century are not the main issue here. What concerns us is whether or not there were enough sheep in the Bailiwick to supply the textile industry with wool.

Part of the answer can be found in an article by Bijsterveld (1989, 28-29), who argues that, at least since the thirteenth century, religious institutions had realized that keeping sheep for wool was a profitable business. Farmers who kept sheep on monastery land were charged high rents. This assured the abbeys of Tongerlo and Averbode of a regular annual income. Moreover, economic fluctuations had less effect on five small farms than on one large farm, all the more reason for the abbey of Averbode to rent out the farms individually. The tenant farmers were relatively rich and could live well from the land they had rented. Archaeological excavations at two of the five farms, however, do not show the same picture of sheep breeding and milch cows (van Dijk 2011). The size and construction of the buildings and the diversity of the botanical records do however show that they were wealthy. It emerged, for instance, that buckwheat and rye grown on the farms served in lieu of monetary rent and were subsequently bought back by the farmers.

The difference in focus between the archival and the archaeological research again highlights the importance of an interdisciplinary approach since conclusions based on one type of research alone can create an incomplete, or even inaccurate, picture of the past. As the last paragraphs of this section show, sheep breeding was important on these farms. The sheep were put out to pasture on the *gemeintes*, the common lands, rather than on the farms.

The largest and richest Table of the Holy Ghost in the Bailiwick was St John's parish in 's-Hertogenbosch, also called the '*Geefhuis*'. Its wealth was based on interest, rents and real estate. The main part of this real estate was formed by forty-six farms, located throughout the Bailiwick, and another four in Ravenstein. Forty of these farms were located in two quarters (Kappelhof 1986, 245-247). The rest of the real estate owned by the *Geefhuis* comprised meadows and pasture close to the town of 's-Hertogenbosch, along the Meuse and near Empel (Adriaenssen 2007, 288-289).

In the sixteenth century a third of all farmland and farms in the Bailiwick was owned by residents of or by institutions based in 's-Hertogenbosch (Adriaenssen 2007, 286). They enjoyed a large part of the profits of the countryside via the collection of rent, tributes and tithes. In addition, there were those who received interest on the royal domains in Brabant, which were dependent for their income upon taxes and leasing the hunt, and *houtschat*. These urban owners and pensioners are collectively referred to as persons of independent means.

As said in the previous sections, not all the land in the Bailiwick was cultivated. In the later Middle Ages these lands were divided into *gemeintes* or *gemene gronden*, areas of common ground with implicit borders and designated users. The *gemeinte* is a complex concept, which led Vera (2011) to write his thesis on the legal aspects thereof and Van Asseldonk (2002, 159-204) to devote a chapter of his thesis to the administrative aspects. What is important in relation to the argument in this chapter is that these lands were used mostly for grazing and peat-cutting. Special provisions were made to regulate estovers (tree-felling), turbary (peat-cutting) and piscary (fishing) on the *gemeint*. On some *gemeintes* the latter activities were not allowed at all, as the privilege rested with the lord who owned them. Sometimes farmers or other inhabitants of the Bailiwick had to pay for the use of the 'gemeintes'. The payment for grazing was less than for fishing, tree-felling or peat-cutting. In most cases the *gemeint* was intensively used for all sorts of activities from extraction (peat, sand and loam) to hunting, fishing and poaching. Trees were planted and felled and tanners dug their tanning pits. Moreover, the *gemeint* was where the roads were situated which connected the various settlements in the Bailiwick (Vera 2011, 82).

Sometimes rights to a *gemeint* were granted to the entire population of a village. This gave all inhabitants the right to graze their animals there. However, sometimes newcomers to a village were denied this right. If the rights to a *gemeint* were granted to an entire population, the costs and the privileges were divided as equally as possible. Anyone who wanted more privileges had to contribute more to the costs. The *gemeintes* could still be of some value to particular people or villages as a whole, despite the fact that they could not be cultivated. The Duke of Brabant was the first lord to start leasing *gemeintes* in 1286, local lords followed suit during the fourteenth century. The reason why the Duke and the local lord took this step has been the subject of debate. Theuws (1989, 193-205) argues that the *gemeintes* were leased out for economic reasons, and specifically to guarantee the supply of wool for the cloth industry in the Brabant towns, as they were used to pasture sheep. By granting the rights to the *gemeintes* the Duke could prevent the cultivation of the heaths. However, it is not clear whether many sheep grazed on the *gemeint* in this early period. Even before the issuing of the *gemeintes*, the Duke had sold pieces of common ground to local farmers and local lords and monasteries.

The issuing of the *gemeintes* probably had a more pragmatic reason, and concerned the need for money. This is suggested by the fact that the *gemeintes* were only issued for fixed periods and not indefinitely. In other words, the local lords could let out their land for cash without losing their influence over it forever. Though this is a well-tried method for capitalizing on possessions it did not raise large sums of money. However, it may be that if rights to one *gemeint* were granted, rights to other *gemeintes* in the same area were granted soon afterwards because the people who were accustomed to using the common ground might otherwise find themselves in a problematic situation. From the fifteenth century onwards *gemeintes* were also sold to individuals. The villages who administered the *gemeintes* and handled the sale had to ask the Duke's permission to sell. In some records the reason for the sale is mentioned. For instance, the raids by Maarten van Rossum had impoverished many villages, and only the sale of *gemeintes* could recoup some of the losses (De Bont 1993, 94; Van Asseldonk 2002, 164-165; Leenders 2002, 74-75).

This section has shown the way in which larger landowners influenced the economy of the countryside. As in other regions, people rented farms from the larger landowners, often paying in kind, usually in the form of cereals or another agricultural produce, which was then sold at market, and was possibly even bought by the self-same farmers. As land was needed to grow cereals hardly any was used for pasture. Instead the *gemeintes*, or common lands, were used for this purpose, mainly for grazing sheep. This is why the archaeological records for tenanted farms hardly show any signs of large herds of livestock. It may also explain why the sheep are largely 'missing' from the archaeological records. We know they were there because of the large amount of wool produced, but they do not appear in large numbers in the archaeological records. This section has further shown that the *gemeintes* were an invaluable resource and that they supported numerous activities, besides the grazing of sheep, which were essential to the medieval way of life. It is therefore important when studying the countryside to look not only at the cultivated fields but also the uncultivated common lands. Together with the town, the market and the particulars of land ownership, the availability of *gemeintes* dictated how farmers worked, what they grew and the kind of livestock they kept. The interdisciplinary

use of archaeological and archival evidence can therefore create the most complete picture of these varied but important parts of medieval life.

3.2.4. LOCATION, LOCATION, LOCATION

Section 3.1.2. focused on the importance of landscape and soil conditions for the production of raw materials as an economic factor. However, the landscape not only determines the produce that can be grown but also the transport possibilities (via, for example, navigable rivers) and the need to defend land against an enemy. Apart from costing lives, war could have a seriously detrimental effect on the availability of produce as a result of clearances, destruction and the lack of a workforce. This section will investigate the economic effects of these factors.

The previous section on landscape mentioned the presence of many rivers in and immediately around the Bailiwick. Obviously, rivers, if navigable, were an important transport channel. However, the larger rivers in particular were also a source of danger if they were not properly taken care of. Certain people, such as the sheriff or quarter-sheriff, were put in charge of maintaining all waterways. In the event of negligence the capitals of the quarters (Oisterwijk, Helmond, Oss and Oirschot) had to pay for the repairs. Most of the care and attention was lavished on the rivers that were most vital for transport and livelihoods, the Meuse and the Aa (Coopmans 1975, 102-103). Kuijer (2000, 194) argues that it was the rivers that made 's-Hertogenbosch the social and economic heart of the Bailiwick, and that the rivers were probably one of the main reasons why the Duke of Brabant had chosen this particular site for his new town 's-Hertogenbosch (Rutte 2005a, 76). Trade centred on the town because the rivers Aa and Dommel came together at 's-Hertogenbosch on their way to the Meuse. The importance of the river network and the road network will be dealt with in detail in sections 4.1.1., 5.2. and 5.3., as this information forms an essential part of the discussion on the interregional and regional trading links between 's-Hertogenbosch and its Bailiwick. This section will now focus on the other important factor influenced by location, *viz.*, military defence.
Because of its situation on the northernmost border, the town of 's-Hertogenbosch was the most important link in the defence of the Bailiwick. Therefore, the stronghold of 's-Hertogenbosch was not only a line of defence for the town but also for the Bailiwick as a whole (Kuijer 2000, 255). The town could therefore depend on the inhabitants of the countryside to support and maintain the stronghold (with cash or payment in kind). The Duke introduced the plough tax in 1338, which enabled 's-Hertogenbosch to raise taxes every four years to strengthen its defences. This tax was divided among the people according to the number of ploughs they owned. If someone did not own a plough, the amount of land he owned was the decisive factor in the tax he was charged (Sassen 1865, 13, no. 81). As a result of later charters, tax was levied on corn and malt milled inside the town and on imported beer to increase the amount of money that the town could spend on reinforcements. Subsequently every house in the Bailiwick had to send one person for one day a year to work on the defences of 's-Hertogenbosch. Failure to comply resulted in a fine payable to the town and lord (Sassen 1865, 18, no. 126). The town was also allowed to order the building of particular structures and the demolition of houses and other buildings if deemed necessary to improve the defences. Moreover, the town was allowed to collect wood throughout the Bailiwick, even if it belonged to religious institutions (Sassen 1865, 24, no. 183). After the destruction of Oss in 1387, these rules were repeated and all towns and villages in the Bailiwick were required to send men to help with the defensive structures of 's-Hertogenbosch. The towns of Eindhoven and Helmond as well as the villages and freedoms in the neighbourhood paid money so they did not have to fulfil this request (Sassen 1865, 33, no. 250).
As with the administrative and economic issues (see section 3.2.1.) there were problems with defence issues between town and countryside. The town usually took the lead during military actions and the leaders of the army were recruited from the urban and rural ruling classes (Adriaenssen 2007, 42, 45). The urban ruling classes were logically connected to the town. However, the rural ruling classes were usually involved in urban life as well through residence or a second profession or function. The countryside became increasingly antagonized by the percentage of taxes they had to pay and the people they had to send to contribute to the upkeep of the town's defences and started to resist. In 1578 the town took hostages to force the countryside to pay. Only with the help of the Prince of Orange was the Bailiwick able to free them (Coopmans 1975, 104-105).

As mentioned in a previous section of this chapter, not all settlements in the geographical region of the Bailiwick were an integral part of the Bailiwick itself. There were many independent seigniories, particularly in the Maasland quarter along the north-eastern border, which was also the Bailiwick's border with Guelders. These seigniories were therefore often on the frontline of the war and were of significant strategic importance. It was largely from the town of Grave that Guelders launched its raids on the Bailiwick. Accordingly, it was essential for the Bailiwick to secure this town first (Kuijer 2000, 255). This illustrates the importance of controlling the geographical region, including areas not officially under one's control.
This section has shown the importance of location from an economic and a defensive point of view. As the introduction has illustrated, however, the defensive point also has economic implications. War or other military actions are expensive and lead to the loss of lives and possessions. During wars livestock was killed and crops were razed either by the defenders to prevent the attackers from using them or vice versa. Either way, the livestock or crops were no longer usable even in peace time. Moreover, the loss of lives, especially men, reduced the work-force and undermined the ability of families to fend for themselves. And, because war cost so much money, less was spent on for instance the upkeep of roads and waterways. In addition, taxes which had to be raised to pay for the war, reduced many people to poverty.
All in all, the ability to defend a country from invasion and protect the people, livestock and crops were extremely important for the economic well-being of a town and region.

3.3. TO WHAT DEGREE WERE TOWN AND COUNTRYSIDE ECONOMICALLY INTERDEPENDENT?

The previous sections of this chapter have hinted at several arguments for and against the hypothesis that town and countryside can be studied as two separate entities that were interdependent. For interdependence to exist there has to be two-way dependence: dependence of the countryside on the town and dependence of the town on the countryside. In this section, the arguments in favour for the former will be discussed first, followed by the arguments for the latter. Finally a combination of arguments will show whether we can really speak of interdependence.

3.3.1. THE COUNTRYSIDE DEPENDED ON THE TOWN

Traditionally, medieval historians have maintained that the countryside depended on the town. This idea was voiced by, amongst others, Le Goff in *The Town as an Agent of Civilization*, in which he argued that the town was the motor behind the medieval economy (Le Goff 1971). Since historical sources only mention chartered markets and fairs, which were always located in a town, and because guild regulations leave the impression that production only took place within the town-walls, it is not surprising that the focus on the town has dominated the medieval historical debate for so long.
In the Bailiwick there is evidence which could be interpreted as dependence of the countryside on the town. However, it is probably more accurate to talk about domination of the countryside by the town. This is, for instance, suggested by the practice of bringing all voluntary cases before the aldermen's bench in 's-Hertogenbosch since the thirteenth century, even when both parties came from the same village or area. People from all over the Bailiwick used the weekly market at 's-Hertogenbosch to trade and do administrative tasks. This is also true for the protective measures 's-Hertogenbosch issued to safeguard its own production. In addition, 's-Hertogenbosch tried to divide all costs between itself and the Bailiwick in such a way that the town benefited.
The section on land ownership (3.2.3.) has illustrated the domination of the countryside by the town. A large percentage, around 33%, of the land in the countryside was owned by inhabitants or institutes in 's-Hertogenbosch (Adriaenssen 2007, 286). This means that those areas were subjected to the interests of the urban rather than the rural population. Despite all of this, the monopoly by 's-Hertogenbosch need not necessarily have had only negative effects. The Bailiwick could profit from the central organization of weights and measures, toll freedoms, market and fair charters and the upkeep of roads and waterways.
However, as the previous sections have shown, the judicial and administrative arrangements changed considerably at the end of the fifteenth and the beginning of the sixteenth century. The monopoly of 's-Hertogenbosch declined considerably on all these fronts, as the next section will show.

3.3.2. **THE TOWN DEPENDED ON THE COUNTRYSIDE** Financial issues became the dividing issue between 's-Hertogenbosch and its Bailiwick at the end of the fifteenth and the beginning of the sixteenth century. Even though (financial) monopolies had worked in other areas, such as Antwerp, Ghent and Bruges, from the fifteenth century, by making the countryside dependent on the town, the attempts by 's-Hertogenbosch to make the Bailiwick share the financial burden without conceding any financial benefits had the opposite effect. From the middle of the sixteenth century, the Bailiwick Council had been holding their meetings without 's-Hertogenbosch, because they wanted to be financially independent and because they believed that they could be, in the economic sense.
As a result of the privileges granted to new settlements, the population in the countryside increased, and more importantly, so did the density, which is a sign of growing villages and urbanization. This can also be seen as the result of the endogenous growth in the means of existence. As a result of these new freedoms, 's-Hertogenbosch started to lose its grip on the countryside. Even if the ruling classes of 's-Hertogenbosch had wanted it, they could not have prevented the rise of rural industries. As evidenced by the cloth industry in the countryside, 's-Hertogenbosch could not exercise any exceptional economic influence on its rural hinterland (Blondé and Limberger 2004, 320). Maybe this is why this area was ideal for fattening the lean oxen from Northern Europe before being sold at the Lier market. 's-Hertogenbosch had to start working with the countryside and stop working against it. In order to prevent the Bailiwick from becoming a serious competitor 's-Hertogenbosch had to win over the countryside. 's-Hertogenbosch needed its countryside.
The section on produce has also shown that the town depended on the countryside and that the latter could, in effect, be relatively self-sufficient. In other words, the countryside did not need to rely on produce imported through the port of 's-Hertogenbosch to feed its population. Even though the smaller landowners in the countryside possessed only limited arable land from the fourteenth until the sixteenth century they could survive more easily than would have been possible in earlier centuries thanks to improved fertilization methods and proto-industrialization. This meant that they could grow more crops on a smaller piece of land and make money from other, non-agricultural activities, such as wool trade (Vangheluwe 1999, 395). The Bailiwick Council in a sense was therefore correct in assuming that it could be economically independent. 's-Hertogenbosch, on the contrary, was dependent on the countryside to feed its population. In addition, the villages and the countryside had enough financial means to build their own stone churches and other stone buildings, which is another indication of their independence. Apparently, there was no need to rely on funding from 's-Hertogenbosch for these costly building projects. Moreover, even though 's-Hertogenbosch at first still managed to persuade the Bailiwick to pay its expenses, enough money was left to fund these buildings. Though this chapter has not paid much attention to this important economic connection, the existence of markets and fairs in the town and countryside ensured the distribution of produce and crafts throughout the Bailiwick. Chapter 5 will deal with this theme and discuss how the town depended on the more rural markets and fairs for the bare essentials.

3.3.3. **THE TOWN AND COUNTRYSIDE DEPENDED ON EACH OTHER** As the previous paragraphs have shown, town and countryside depended on each other. But does that necessarily imply interdependence? Interdependence literally means mutual dependence. However, it really hinges on the relationship under investigation. In one relationship the countryside might be more dependent on the town, whereas in another the town might depend on the countryside. In this chapter we have seen that the town needed the countryside to supply its produce, workforce and revenue, whereas the countryside needed the town for its international contacts, commercial opportunities and its unifying influence. In other words, one needed the other. When all of these relationships are taken into account they more or less balance each other out and we should therefore indeed speak of an interdependent town and countryside. It has been said before in this chapter, that because of this interdependent relationship, town and countryside should not be studied separately but together. Leaving out one will result in a subjective and possibly incorrect view of the medieval or early-modern town and countryside.

CONCLUSION It is now possible to evaluate the central hypothesis in this chapter, which is that though town and countryside are linked in different ways, they can be studied as two separate, non-subsidiary entities.
As this chapter has shown, the relationship between 's-Hertogenbosch and its Bailiwick changed significantly between the twelfth and the sixteenth century. During the thirteenth century, the countryside was largely subservient to 's-Hertogenbosch; in the fifteenth and sixteenth century the countryside became more independent, especially in a financial sense. There was certainly a relationship between town and countryside but it was characterized by interdependence of two separate entities not by subordination of one to another.
This chapter has set the stage for the rest of this thesis. By concluding that town and countryside were separate but interdependent entities, the next chapters can investigate their relationship further. The next chapter will analyse how the Bailiwick and the town of 's-Hertogenbosch maintained interregional economic contacts and investigate the ways in which the town and countryside cooperated economically. The final core chapter will illustrate how 's-Hertogenbosch's own economy manifested itself within the townscape.

The relationship between town and countryside was characterized by interdependence of two separate entities not by subordination of one to another.

4

THE BAILIWICK FROM AN INTERREGIONAL PERSPECTIVE

In the medieval economy there were three types of merchant: the local merchant, the regional merchant and the long-distance merchant. The local merchant focused on retail and subsistence trade, whereas the regional merchant focused mostly on wholesale trade in foodstuffs and semi-manufactured goods which were not available in the direct vicinity of the town. Long-distance merchants traded mostly in bulk, except in cases where retail trade was especially profitable (e.g. luxury textiles and spices). Long-distance merchants were banned from other retail fronts by local merchants (Irsigler 1985, 391-394).

Although this typology is relatively clear in an analytical sense, it is still difficult to differentiate between local and regional and between regional and long-distance trade. When does local become regional and when does regional become long-distance? There are no clear-cut boundaries. However, for the purpose of this thesis, it is important to decide on one. Since this chapter discusses interregional trade it is important first and foremost to decide on a boundary between regional and interregional (or international) trade. Weststrate (2008) argues that the boundaries between different regions can be traced relatively easily for river transport. This is because merchants were encouraged to transport their goods between markets of the highest order and sell their wares there. These 'highest-order markets' were the main markets in a region. That enables the various regions to be traced. In practice this guideline has not been strictly adhered to, but it can provide at least some indication of how the system of markets and fairs was meant to function (Weststrate 2008, 101).

Trade between markets of the highest order can therefore be labelled as interregional. Trade between a highest-order market and its own region can be labelled as regional trade and trade within a highest order-market as local trade.

The current literature on medieval economic history[19] assigns the greatest economic importance to interregional trade. It is argued that in order for a town to survive economically it was essential for it to make the most of interregional import and export. A town could not survive on regional or local trade alone. In this thesis it is hypothesized that the two other forms of trade, regional and local, were of much greater importance than previously assumed. To test this hypothesis, it is essential to research the scale and importance of the interregional trade of 's-Hertogenbosch and its Bailiwick before examining the regional (Chapter 5) and local trade (Chapter 6). Chapter 3 has already established the interdependence of town and country. This chapter will bear this interdependence in mind when investigating the interregional economic relationships of the Bailiwick as a whole and 's-Hertogenbosch (and the other towns and villages) in particular. These relationships will be placed in a spatial context to show the range and directions of the Bailiwick's interregional connections. The numerous excavations in 's-Hertogenbosch have opened up potential for archaeologically-based research into 's-Hertogenbosch's interregional trading partners. Complemented by a wide array of archival evidence, it is possible to reconstruct 's-Hertogenbosch's place in the international trading network. This chapter, like the others in this thesis, will focus mainly on the fifteenth and sixteenth century with a few excursions into earlier periods as the evidence allows, however not before 1180, the year when 's-Hertogenbosch was founded.

This chapter will contribute to the testing of the central hypothesis of this thesis by answering the central question whether the countryside of the Bailiwick of 's-Hertogenbosch had a share in interregional trade and whether it influenced the character of this trade, or whether the interregional trade was solely influenced by the town of 's-Hertogenbosch. In the process it will also focus on the potential differences or the potential symbiosis between town and countryside.

The first section considers the ways in which 's-Hertogenbosch and/or the Bailiwick can be linked to other regions. The second focuses on the export side of the Bailiwick's interregional contacts, while the third focuses on the import side. The fourth section looks at whether 's-Hertogenbosch or the Bailiwick can be regarded as a transit port. The final section uses all this information to answer the central question of this chapter: what importance can be assigned to the interregional trading contacts of the Bailiwick as a whole and of the town of 's-Hertogenbosch in particular?

4.1. IN WHAT WAYS WERE 'S-HERTOGENBOSCH AND/OR THE BAILIWICK LINKED TO OTHER REGIONS?

Before determining the products that the Bailiwick imported and exported and whether these related only to the town of 's-Hertogenbosch or to the Bailiwick as a whole, we need to find evidence that the Bailiwick and/or 's-Hertogenbosch had interregional connections. This is necessary since various factors can result in a biased picture of the exports, or more importantly, the imports. The entire import and export industry therefore needs to be discussed in order to paint an accurate and general picture of the Bailiwick's interregional contacts. This can be achieved by looking at evidence that is not related to products. Various types of evidence are available that fall into this category.
First, there are the descriptions of the various trade routes that criss-crossed Europe, some of which ran through the Bailiwick. These routes give insight into the areas of the Bailiwick that were directly connected to areas further afield and thus indicate the goods flows it could access directly.
Secondly, there is historical and archaeological evidence from pilgrimages. Even though, in essence, this pertains to the religious links between various areas, the discussion of this material will point to the existence of economic relationships.
The third type of evidence that will be discussed comes from the tolls. Some toll stations did not charge merchants from 's-Hertogenbosch or the Bailiwick a toll for the goods they were trading. Moreover, some traders from other areas were not charged a toll either if they came to trade in 's-Hertogenbosch. It is thought that these exemptions might provide some indication of the areas with which 's-Hertogenbosch and its Bailiwick had extensive trading contacts.
The fourth and final type of evidence comes from coins. Coins provide a good source of evidence of trading links between areas, especially since their use was very often regulated. Moreover, coins, along with pottery, are one of the most regularly unearthed archaeological finds.

4.1.1. TRADE ROUTES

As stated in the introduction to this section, trade routes can provide insight into the areas of the Bailiwick which were connected to areas further afield and into the flows of goods to which the Bailiwick had direct access. In order to explore this topic successfully, this section will first discuss the difference between land and water transport, especially in relation to the cost. Secondly, it will discuss the evidence of land routes through the Bailiwick and the actual roads. Thirdly, it will ascertain what the trade-route evidence can tell us about the (interregional) trade in the Bailiwick.
When speaking of trade routes, we first have to distinguish between routes by land and routes by water. In the Middle Ages goods could be transported by either. However, the proportion of land and water transport has been subject to debate. The problem when it comes to estimating the amount of transport by road and by river is the difference in the level of transport costs.
Limberger has shown that the transport of millstones by river was about five to fifteen times cheaper than by road (Limberger 1999, 233). However, the price of road transport depended largely on the distance. The cost of transporting goods across a distance of one kilometre was, on average, significantly higher than transporting them across a distance of between five and fifteen kilometres. Despite the fact that river transport was significantly cheaper than road transport, the latter was preferred until the end of the fifteenth century. This was because not all areas could be easily reached by river. Secondly, loading or unloading heavy and bulky items from or onto a vessel was impossible at many ports or, at least, not without risks. The extra costs of transferring, for instance, the millstones, would then be an argument for choosing the more reliable option of transport by road.
Despite new inventions and improvements to road and river facilities, the cost of transport still correlated with that of foodstuffs, such as rye. The only thing that became significantly cheaper during the sixteenth century was the cost of loading and unloading (Limberger 1999, 233). The question is, however, whether studies about millstones (Ballaux 1999; Ballaux and Blondé 1999; Limberger 1999) are actually representative for the transport industry as a whole. According to Limberger (1999, 233), the transport of millstones is comparable with the transport of chalk and paving stones. Either way this still does not provide us with more accurate information on what it cost to transport more everyday products in the Middle Ages.
Masschaele (1993), on the other hand, has worked out a real cost comparison between land, river and sea transport by relating transport costs to the cost of grain. His calculations indicate that transport by land was twice as expensive as transport by river and eight times as expensive as transport by sea (Masschaele 1993, 273). Even though water transport was obviously the cheaper option, the cost of land transport was still low enough not to have been an insurmountable obstacle to the development of trade. In relating the cost of transport by land to the price of grain, it was calculated that the price of grain would rise by four per cent for every ten miles that it was transported over land. This is certainly not cheap, but that ten miles would have given most producers access to a market or an inland waterway which would have increased their sales. Masschaele claims that, with this research, he has taken the edge off the argument that the cost of transport was one of the main obstacles to economic growth and the development of a market economy in the Middle Ages. Researchers must look elsewhere for obstacles, or else the market economy was indeed stronger than has previously been claimed.
In his article Masschaele (1993) also argues that the debate on transport costs is plagued by hindsight and that this is why medieval transport has often been labelled as inefficient and prohibitively expensive, especially for bulky goods, when compared with our current global market. His research, on the other hand, does show that transport costs in fourteenth-century England were remarkably low. Moreover, there was very little change in the relative cost of land transport in particular in the period from the fourteenth to the eighteenth century.
Masschaele's research is complemented by a study by Harrisson (1992), which shows that the number, quality and dense concentration of bridges in medieval England is evidence of anything but a primitive road network.

[19] See Chapter 1 for the debate on the importance of interregional trade.

This supports the view of many medievalists who have argued that a large proportion of the traffic in the Middle Ages was by road and that the road network was sufficiently adequate to meet the requirements (Harrison 1992, 254). Harrison contests Van Uytven's and Ballaux's view that the roads in the fifteenth and sixteenth century were in a bad state and were nothing more than dirt tracks (Van Uytven 1997, 474; Ballaux 1999, 271). However, despite that, Ballaux and Blondé (2008, 47) do argue that transport by land to Italy remained a good alternative to a long journey by sea. In addition, during the sixteenth century, there was an increase in transport by land to Germany and the Iberian Peninsula (Van der Wee 1963, dl 2, 328,; Van Uytven 1997, 490).

It can therefore be concluded that river transport was cheaper than road transport. However, whether this holds for all products is disputable. It is evident that river transport was much more advantageous for bulk goods that needed to cover longer distances. On the other hand, it was impossible to reach all the destinations by river and some transport by road was necessary for door-to-door deliveries. It is also uncertain whether transport was actually cheaper by river than by road for luxury retail products.

However, transport costs not only depended on the mode of transport but also on the distance and the difficulty of covering it. The distances that could be covered in a day depended on local topography, road conditions and the weather or season. In some seasons river transport was simply impossible because of high or low water levels, ice or currents. Distances are usually measured as the crow flies, which is always less than the distance actually travelled. In order to calculate the distance actually travelled we need to know the course taken by the roads. The difference between a distance measured as the crow flies and the actual distance will be quite large, especially for nearby destinations (Masschaele 1993, 273). But the cost of transport was also determined by the difficulty of the route. The number of horses required to pull the load also pushed up the costs. The next section examines the actual course of the roads in the Bailiwick to provide more accurate information about the distances that could be covered.

The trade routes which are mapped in this section are only the land routes. As rivers do not change course in such a dramatic fashion, river routes are relatively easy to trace. This is why they did not need to be mapped as meticulously as the land routes. Unfortunately, land routes are less easy to trace. Since the toll-registers and other fiscal records usually only mention place names and river crossings it is sometimes difficult to find the exact traced-out road that the route followed. Anyway, there may never even have been only one traced-out road. During bad weather some roads could become impassable so most routes ran along various roads with only a few static points such as bridges and fords in common. It was at these static points that tolls were usually levied. Whichever road the merchants took, they always had to pass a particular bridge or ford and pay a toll. The geographical features of the landscape meant that straight roads were non-existent and all roads were winding. In addition, some roads could only be used permanently by pedestrians or horses, which meant that people travelling between the same towns with a horse and a heavily loaded cart had to take a detour (Peeters 1954, 155).

It is of course inevitable that the further back one goes in history, the fewer the number of roads that one can successfully identify. The more local, unpaved roads are the most difficult to identify. On the other hand, the main roads, i.e. the roads along which the interregional trade routes ran and which were used for long-distance trade and travel remain identifiable for the longest period of time. Moreover, because local roads were sometimes so local that they did not even connect to the local roads of nearby villages, journeys to the regional market also had to be made via the main roads (Hanson 2009, 3). Focusing on the main roads will provide a clearer view of the ways in which the towns in the Bailiwick were linked to other regions and will highlight the importance of some towns above others. However, even small hamlets could become important if they were located on a trade route, as will be explained in a later section. Many of the inhabitants of areas along one of the main trading routes found work in the international transport sector (Ballaux and Blondé 2008, 47).

Unfortunately, there are hardly any comprehensive studies on the medieval road network of North Brabant apart from Horsten's *Doorgaande Wegen in Nederland* (2005). Horsten has created true-to-scale road maps of the Netherlands in 1600, 1810 and 1848, using a combination of antiquarian maps and a modern base plan. He has also noted and researched inaccuracies on some of the antiquarian maps and thus enabled a more informed use. Another publication by Hezemans (1986), a more popular study on the dirt tracks and the postal roads, connects the main town of North Brabant with Maastricht, Cologne and Liège.

In addition, there are publications which deal with North Brabant indirectly or with one of the roads in North Brabant (Peeters 1954; Thiadens 1989; Van Uytven 1997; Blondé and Van Uytven 1999; Van Asseldonk and Leenders 2003).

The sources for mapping the medieval roads consist mainly of antiquarian maps such as those by Huys (1631), Hondius (1633), Danckert (1635), Van Geelkercken (1639), Sgrooten (1573), Ortelius (1591), Visscher (1625), and those in the *Itinerarium Orbis Christiani* (1579).[20] These sources and this literature enabled us to retrace the course of the sections of the medieval trade routes which ran through the Bailiwick and the actual traced-out roads that they followed (Figure 7). There is some discrepancy between the findings of the various authors on the actual traced-out roads for some of the routes. Since Horsten's sources could be followed more accurately using the antiquarian maps and additional literature, his traced-out roads were adhered to rather than Hezemans', who offers no sources for his estimates (Hezemans 1986; Horsten 2005).

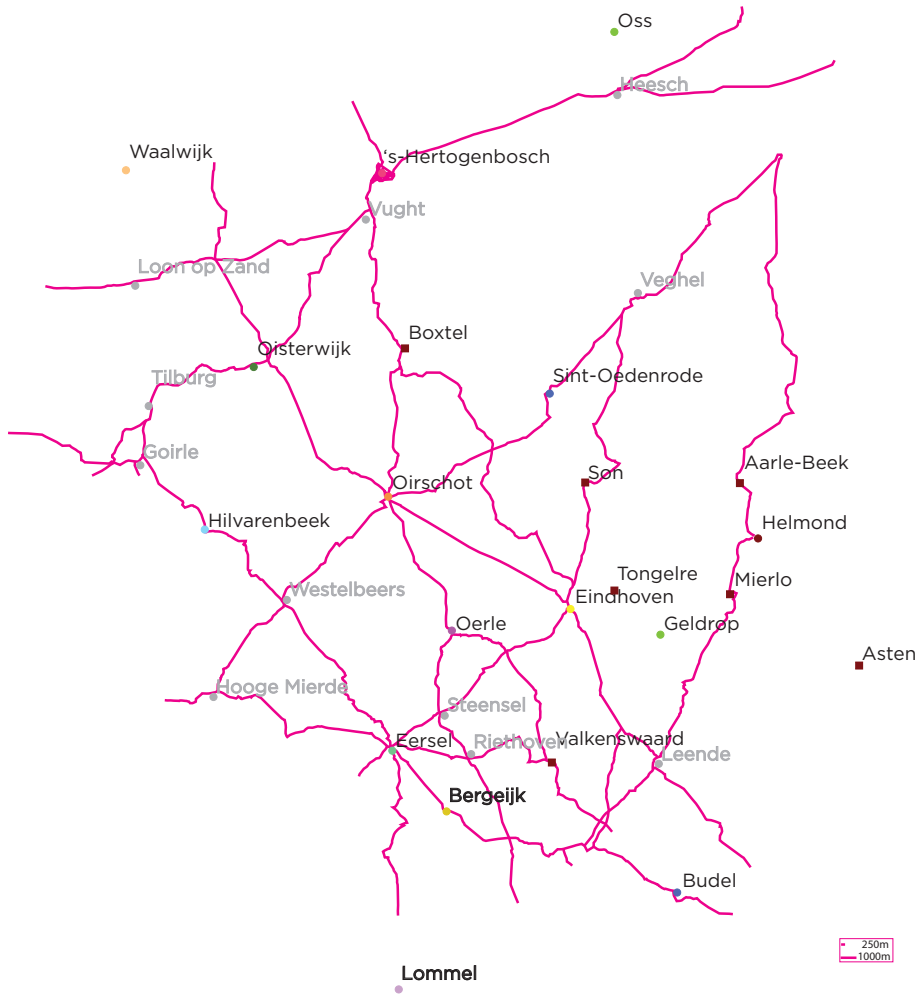


Figure 7: Traced-out roads of the trading routes crossing the Bailiwick in 1550.

[20] Databank Topografisch-Historische Atlas, Brabant-Collectie, Library Tilburg University, Royal Library The Hague, National Archives The Hague.

Figure 7 illustrates the complex pattern of roads that ran through the Bailiwick. Since this is only a map of the Bailiwick itself the interregional connections might not be immediately apparent. The interregional connections will therefore be made explicit in this section. These descriptions, of course, also apply in reverse. From 's-Hertogenbosch it was possible to reach Liège via the roads through Boxtel, Oirschot and Borkel, and to reach Maastricht, Aachen and Cologne via the roads through Boxtel and Eindhoven. Roads linked up with roads from other settlements to connect with the interregional trading network. A road from Heusden (Holland) connected Oisterwijk and Oirschot at Eindhoven with the main road to Maastricht and the Rhineland, as well as connecting Oirschot with the road to Liège. The road from Hooge Mierde to Budel via Eersel, Bergeijk and Borkel was part of a route between Bergen op Zoom, Antwerp and Cologne (Van Asseldonk and Leenders 2003). The settlements in the Bailiwick were not only connected to the Meuse- and Rhineland. The road which ran between Tilburg, Oisterwijk, 's-Hertogenbosch, Heesch and Grave was part of the interregional trading route between Bruges and Hamburg (Van der Vaart 1989, 6).
This relatively complicated pattern of roads illustrates the way in which many settlements, and not only the larger ones, or those with a market or fair, were directly connected to the main trading routes which ran through the Bailiwick. The interregional network consisted not only of settlements that were located on the direct routes linking the Bailiwick with Flanders, Holland, the Rhineland, Maasland and Hamburg but also of settlement that were located on minor roads, which linked the various trading routes.

The research on the establishment of roads and trade routes has shown that these roads and trade routes are closely related to the establishment of settlements. Roads changed course or were extended as a result of the establishment of new freedoms. The main traced-out road between Hooge Mierde and Budel gained a crossing at Eersel when a new road was laid between Eindhoven and Lommel after the town of Eindhoven was founded in the first quarter of the thirteenth century (Van Asseldonk 2002, 434).
The opposite was true as well. The establishment or relocation of settlements could in itself be prompted by a nearby road or route. Towns were indeed sometimes relocated over a short distance to take advantage of a trade route. This was because towns on trade routes became more important and assumed new functions when trade started to flourish. Van der Vaart argues (1989, 9-10) that relocation occurred, for instance, at 's-Hertogenbosch when the Duke preferred to found a town on new location instead of continuing the settlement at Orthen. Huijbers (2010, 26), however, has argued that it was not Orthen but Vught which was the predecessor of 's-Hertogenbosch, in which case Vught would have remained at a key location in the system of traced-out roads in the Bailiwick. Indeed, the crossroads of the roads to and from Breda, Eindhoven and Oirschot and further afield is not in the centre of 's-Hertogenbosch but at Vught, about four kilometres outside the walls of 's-Hertogenbosch. This led to the three-forked road on the central market place at 's-Hertogenbosch (towards Vught, Orthen and Grave), which channelled the flows of goods and people in an orderly fashion.
The interdependence of roads, routes and settlements is also observable on the map of 1550 (Figure 7). At this juncture, certain points need to be made in anticipation of Chapter 5, which deals in greater detail with the establishment and regional spread of markets and fairs in the Bailiwick. All of the market and fair towns were situated on one of the main roads. Some towns were merely a point along a route whereas others, such as Oirschot, Eindhoven, Oisterwijk, 's-Hertogenbosch and Eersel, were situated at a crossroads. Would it then be implausible to observe that four of those crossroad towns were also the first to have a market? Accessibility was therefore the key factor in the establishment of markets and fairs. That said, good accessibility does not automatically create a market, as the villages of Westelbeers (on the crossroads between Hilvarenbeek and Eersel and Oirschot and the southern border of the Bailiwick) and Leende (on the crossroads between the southern border of the Bailiwick from Eindhoven and Mierlo) illustrate. This situation suggests that the establishment and profitability of markets and fairs are influenced by other factors than accessibility alone. On the other hand, the importance of accessibility has shown that the establishment of a market or fair was definitely not solely due to a random choice by a local lord.
It can be concluded that the traced-out roads of the trading routes influenced the location

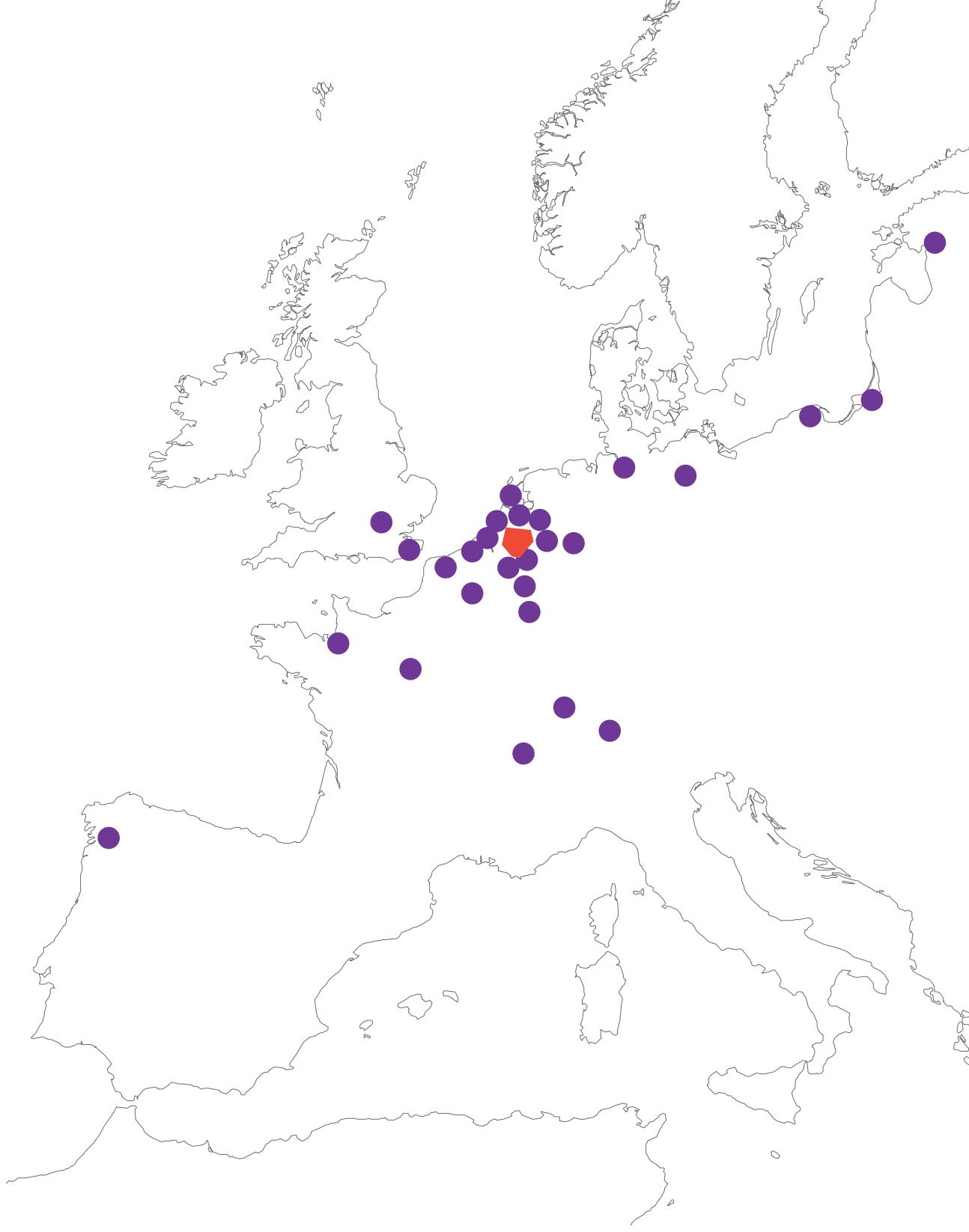


Figure 8: Religious links of the Bailiwick (Koldeweij *et al.* 2009).

[20] Databank Topografisch-Historische Atlas, Brabant-Collectie, Library Tilburg University, Royal Library The Hague, National Archives The Hague.

of new settlements, but also that the same traced-out roads were influenced by the foundation of new settlements with markets and fairs. Settlement on or near a main road provided far greater openings for participation in interregional trade either as a transporter – which was more common – or as a merchant.

The next section will analyse a different type of source, *viz.* the evidence of pilgrimages.

4.1.2. **PILGRIMAGES** This section begins with some background on the pilgrimages. Secondly, the sources of evidence for pilgrimages as well as their suitability for research and any problems will be discussed. Thirdly, the actual interregional relationships the pilgrimages show will be analysed.
In the medieval period pilgrimages were an integral part of religious life. Pilgrim's badges, small metal objects usually depicting some religious scene that defined a particular site are evidence of pilgrimages. These badges were bought by or given to pilgrims as a souvenir or as proof that they had completed a pilgrimage. They were particularly important for miscreants who had been ordered to go on a pilgrimage as a penance.
The archaeological evidence in the form of pilgrim's badges is complemented by archival evidence from the *Book of Miracles of Our Dear Lady of 's-Hertogenbosch* (Hens *et al.* 1978), which records the visits of pilgrims to the shrine of Our Dear Lady in St John's Church in 's-Hertogenbosch from the fourteenth to the sixteenth century. The *Book of Miracles* also lists other pilgrimage sites dedicated to Mary which those pilgrims had visited but which had failed to deliver a miracle.
Evidence of actual medieval travel is scarce. Information is usually derived only from indirect sources, such as the pilgrim's badges. The *Book of Miracles*, on the other hand, gives concrete information about the roads travelled by medieval pilgrims and is therefore an ideal source for historico-geographical research (Kruip 2010, 27).

Information about the finding places of badges from particular pilgrimage sites can give some insight into the distances people travelled and the areas they were in contact with. Most of the pilgrim's badges found in 's-Hertogenbosch were unearthed in the excavation at the Tolbrugkwartier (Koldeweij 2007). The website of *Kunera* (Radboud University, Nijmegen) compares data on the pilgrim's badges for 's-Hertogenbosch with the locations mentioned in the *Book of Miracles of Our Dear Lady.* These are plotted with a GIS system to offer a more visual insight into the destinations and origins of pilgrims visiting 's-Hertogenbosch (Koldeweij *et al.* 2009). This research has already cited examples in which archival evidence complements archaeological findings. Metal can only survive in humid conditions cut off from oxygen, so no badges were found at any of the locations mentioned in the Book of Miracles. Moreover, the distance that 's-Hertogenbosch pilgrims were willing to travel was much greater than the distance that pilgrims from other areas were willing to travel to visit Our Lady of 's-Hertogenbosch.

The question that arises when discussing artefacts from pilgrimages is whether they can serve as evidence of economic contact between regions. The contacts that they show are, in essence, of a religious rather than an economic nature.
Previous research has attempted to answer this question by showing that pilgrim's badges were not only transported by the pilgrims themselves but also by processions, by pilgrims from other areas and by merchants (van Heeringen and Koldeweij 1988, 37-38; Koldeweij 2007, 163). It is more than likely that pilgrims who travelled the farthest to get to 's-Hertogenbosch did not do so with the sole purpose of visiting the shrine. They probably had more than one religious goal or, more likely, a commercial goal (Kruip 2010, 30). However, even if pilgrim's badges cannot be used as direct evidence of an economic relationship between certain areas they can be still used in comparisons and to answer certain questions, such as whether people travelled farther for a pilgrimage than for trade, or whether the same areas were visited for trade as for pilgrimages. Political, economic and religious interests were invariably intertwined. Fairs were usually held to mark religious feast days. For instance, the oldest fair in 's-Hertogenbosch (*Sint-Jansmarkt* / St John's market) was held around the feast of St John the Baptist (24th June), the main religious feast in 's-Hertogenbosch.
Most of the locations mentioned in the *Book of Miracles* and most of the locations where pilgrim's badges from 's-Hertogenbosch were found lie within a hundred-kilometre radius of 's-Hertogenbosch or at least within the Low Countries. The sites of the finds outside this radius are the Baltic Sea (the coasts of Germany, Poland and Estonia), England (London and Canterbury), Switzerland (Bern and Einsiedeln), northern France (Thann, Mont-Saint-Michel, St-Claude, Boulogne sur Mer, St Josse sur Mer and Champmol), and Spain (Santiago de Compostela). However, most of these sites report only one find relating to 's-Hertogenbosch or received only one mention in the *Book of Miracles.*

Pilgrimages also took in sites that were situated in relatively close proximity to one another. A popular combination would, for instance, be Aachen, Maastricht and Kornelimünster (van Heeringen and Koldeweij 1988, 38).

Local and regional variations play an important part in the decision to make a shorter pilgrimage. The destinations for long-distance pilgrimages do not show any local or regional variation (van Heeringen and Koldeweij 1988, 41). The same pattern can be discerned when we discuss economic rather than religious links. Local and regional links can be seen anywhere, but interregional links are forged only with specific areas, such as the rest of Brabant, the Rhineland, England and the Baltic. Similarities between the pilgrims' origins and destinations and the economic relationship between the Bailiwick and other areas become immediately apparent. For instance, according to Van Heeringen and Koldeweij (1988, 38-39), the pilgrimage to Canterbury should be seen in the context of the extensive trading contacts with England. This link between religious and economic contacts is especially evident in long-distance pilgrimages, which all occur in the proximity of a sea port. For instance, the *Book of Miracles* mentions miracles happening to men from Gdansk, Elbing and Königsberg, all port cities in the Baltic, which may signify that 's-Hertogenbosch was part of a trading network stretching all the way to the Baltic.
Closer to 's-Hertogenbosch, many pilgrimage sites were located near or on the main rivers of the Rhine and the Meuse, which, of course, were also areas of extensive trading. The pilgrimage sites in these areas did, of course, have a specific religious function and need not necessarily have been trading posts as well. Even so, these religious sites and the trading posts were located in one and the same geographical area.

There was rigorous competition between the various pilgrimage sites. Pilgrimage sites allegedly wanted as many worshippers as possible to be able to share in the benefits and to show as much veneration as possible for their relic. 'Hidden' economic considerations played a much more important role in attracting worshippers as they generated revenue for the church and the local people. Pilgrim's badges are therefore also a sign of economic relationships and might even be called a marketing ploy.

In conclusion it can be said that the evidence from pilgrimages has uncovered particular areas that 's-Hertogenbosch was in contact with. Since this chapter is concerned with interregional contacts any regional bias will be negligible. 's-Hertogenbosch was in contact with the Rhineland, the Baltic Sea area, England, Switzerland and the north of France. The following sections will show that these areas were also commercially linked to the Bailiwick, or at least to 's-Hertogenbosch, either directly or indirectly through the fairs in Antwerp, Bruges or Bergen op Zoom.
The next section explores the interregional economic relationships in more detail by focusing on the toll-registers and toll exemptions.

4.1.3. **TOLLS** Tolls were mentioned briefly in the section on trade routes, as they are obviously a source of evidence for the course they followed. Tolls also provide evidence for transport by water or land and for the relationships promoted by particular regions: the fact is that people from some towns or regions were exempt from paying certain tolls. One lord would make an agreement with another lord for mutual toll exemption in order to promote trade and, of course, people were exempt from tolls in their own region and in any areas owned by the same lord. It is known who owned, who had to pay, and who was exempt from a large number of tolls and sometimes one or more of the actual tariffs are known as well (De Boer 1998, 212).
Two separate types of sources will be used to make the best use of the information provided by the tolls: first, the documents which attest to the various exemptions, and secondly, the toll-registers, which list the passing traffic at the toll stations. Since these sources of evidence are different by nature they can provide the researcher with different types of information about interregional trade. The exemption agreements can be seen as evidence of trade

between certain areas. However, because exempt traders are not recorded at the various toll stations, the size, frequency and type of trade cannot be determined. This is possible only for the second type of evidence in which some particular flows of goods can be examined, and thus only for those traders who were not exempt.
Because of the exemptions and their location on interregional routes, toll-registers cannot provide any evidence for any local trade that took place. By their very nature they record passing and not local traffic. However, some boats did pass the toll stations on the river but with only a small quantity of products for which they paid hardly any toll. It seems logical that these products were meant for a local market after all (Weststrate 2008, 100). Aside from these exemptions, toll records are hardly ever complete and therefore cannot usually provide proper insight into, for instance, all the products that passed a toll station (De Boer 1998, 212). Moreover, toll-registers cannot provide any indications of the reach of merchants from particular towns, apart from the fact that they passed a certain toll station (Weststrate 2008, 99). However, the toll-registers can be illustrative of particular flows of goods and specific interregional relationships. In addition, some entries in the toll-registers can be linked to actual individuals in the *Book of Miracles of 's-Hertogenbosch*, merchants in particular, and illustrate the movement of goods. De Boer's article (1998, 215) cites examples of one sailor from 's-Hertogenbosch and one from Harderwijk who donated money to Holy Mary in 's-Hertogenbosch as a token of gratitude for surviving a shipwreck. The following example illustrates that these exemptions did indeed have an effect on interregional trade. The introduction to this chapter mentioned the compulsory transport between the highest-order markets. However, because of the exemptions granted to merchants from particular towns or regions, this system did not always operate as it should. Instead of transporting goods to the next large market, it was sometimes more lucrative for merchants to sell their wares at a transit port where they did not have to pay any tolls or where the toll would at least be lower than if they were to take the goods to the final destination themselves. Other merchants at these ports would then take the goods to the final destination because they were exempt from tolls or paid much less. This, for instance, applied to merchants from Dordrecht. Because they had to pay high tolls in Cologne they transhipped their goods in Nijmegen, which then became exceedingly important as a hub between the two staple ports at Dordrecht and Cologne (Weststrate 2008, 98).
The Duke of Brabant seems to have been intent on creating greater freedom for merchants from Brabant, and especially from 's-Hertogenbosch. This is evident from the toll exemption for the townspeople of 's-Hertogenbosch. The Duke of Brabant had arranged privileges for 's-Hertogenbosch shortly after it was founded. These were privileges on the Rhine (since 1196), in the whole of Brabant (since 1195), in the whole of Guelders (since 1203), and in Holland (since 1213). Moreover, separate agreements were made between towns about privileges, such as the one between 's-Hertogenbosch and Dordrecht in 1303. In 1366 's-Hertogenbosch was granted privileges for Skåne in southern Sweden and was allowed to set up a trading post there (Camps 1979, I, no 83-84, 99-100; Hoogma and Steketee 1996, 64-65). As a result, 's-Hertogenbosch had privileges for many of the main ports, including Dordrecht, Tiel and Nijmegen. This made interregional travel by river and also by sea financially attractive for merchants from 's-Hertogenbosch (Niermeyer 1968, no. 9 & 10). It is clear from the toll privilege of Heusden from January 1251 (Camps 1979, no. 241), which exempted all inhabitants of 's-Hertogenbosch from paying a toll when they crossed Heusden's territory either by land or water, that merchants used the Meuse and the Rhine, the main rivers, to transport goods. It can, for instance, be deduced from that record that men from 's-Hertogenbosch rafted timber down the Rhine.
However, it is not only merchants and bargemen from 's-Hertogenbosch who feature in the toll-registers. The appearance of men from Eindhoven in the registers of Heusden, Dordrecht, Bergen op Zoom and Cologne (1994, 97-98) shows that other towns also had inter-regional contacts.
In conclusion, it can be said that interregional contacts were strongly influenced by financial arrangements such as toll exemptions. It was the toll exemptions that gave structure to the flows of goods and determined whether products were transferred in particular towns or whether the same merchants carried them farther.
The last form of evidence for interregional economic contacts that will be discussed in this chapter relates to coins.

4.1.4. **COINS** Coins are another type of artefact, like the pilgrim's badges, which are not a traded product. Coins are found quite often in archaeological excavations, especially since the use of metal detectors became more widespread. As in the case of the other types of evidence, it is important to determine how useful coins are and what they can actually tell us about interregional contacts.

Coins and associated items, such as coin-weights and counting tokens, are an obvious source of evidence for the economic relationships an area maintained, without being a traded product themselves. Moreover, coins are evidence of a monetary economy and the existence of administrative regions, many of which had their own legal tender.
This immediately touches on one of the advantages of using coins as evidence of interregional relationships. As there was no single coin in use, coins had to be changed to the local legal tender. Finds of coins other than local coins in a particular settlement therefore point to contacts with another region. Finds of foreign coins in reasonable amounts suggest more frequent interregional connections. Moreover, many coins carry a year so their use is relatively easy to date in comparison with other archaeological finds.
However, as with any evidence, there are problems. Many coins are found without a context as they have been simply lost on the way. They can be seen as evidence of a trade route but not of who was trading with whom. Moreover, when coin-heards are incidentally unearthed, it is open to question whether they are actually evidence of trade and a monetary economy or of something else entirely since the coins in coin-heards were not in use but hoarded. In 's-Hertogenbosch one such coin-heard was unearthed at the excavation site of *Achter het verguld harnas* in 1998. A stoneware jug was found containing 2,118 silver coins and one silver buckle, buried probably between 1304 and 1310. The coins were French silver coins and pennies from Brabant and Holland (Janssen and Treling 2011). This collection points to a trade with the French fairs in the south and the neighbouring Dutch and Lower-Rhine area. Gold coins and English coins are almost entirely absent in this early period (Janssen 2007, 114-115). The coin-heard was found at the heart of the financial district of thirteenth-century 's-Hertogenbosch, and quite possibly belonged to Jewish money traders (Janssen 2011, 39-43).
Whether a coin-heard can be used as evidence of trade or a monetary economy therefore depends entirely on the context.

To deal with the many different coins from many different regions, special coin-weights and scales were produced which determined whether coins still had their original weight. Most of the weights found in archaeological excavations date from the sixteenth and seventeenth century, but a few date from the medieval period. Some seventeenth-century weights bear a tree symbol, which means that they were manufactured in 's-Hertogenbosch. It has previously been argued that no weight manufacturers resided in 's-Hertogenbosch since there are none on the written record (Nijhof 2007a, 220). But the archaeological evidence now suggests that weight manufacturers were in fact present there from at least the seventeenth century. Their absence in the written records of the fourteenth, fifteenth and sixteenth century could similarly be disproven by the finding of weights from those centuries in new archaeological excavations. Around twenty small scales, dating from the late thirteenth to the early fifteenth century, have been found, which were used to compare the coin-weights with the actual coins. A balance folded in a box complete with ropes and dishes which can be dated to the first half of the fourteenth century (Janssen 1983c, 265) has been preserved from the excavations in the old town centre of 's-Hertogenbosch. Some merchants or money changers used counting tokens to count large quantities of coins. A large number of these have also been found in 's-Hertogenbosch. These counting tokens not only show their place of origin but also the king or prince who was in power when they were minted. They originate from Nuremberg, France and England amongst other places.
However, coins were sometimes not exchanged at all. Since it was known how much a particular coin was worth, the exchange rate was calculated at point-of-sale rather than at a separate coin exchange. Many foreign coins came into circulation in this way and could be used in exchanges between two native merchants (pers. com. Jos Benders).
Coins have also been found at excavations outside 's-Hertogenbosch; for example, several coins were discovered at the excavations on the Heuvelterrein in Eindhoven (Arts 1994, 221-224). Only ten coins have been found from the medieval period, the earliest dating to the

thirteenth century. Most date from the second half of the sixteenth century onwards. The medieval coins are from Brabant, Flanders, Guelders, France and one from Genoa. The post-medieval coins show a similar pattern, with the addition of coins from Holland. Coin-weights were also found in these excavations. The earliest, and presumably also the only medieval one, dates from fourteenth-century France. On the excavation site of Eindhoven's castle several fifteenth- and sixteenth-century coins were found from the same regions as the coins found on the Heuvelterrein, in addition to coins from Overijssel and Holland, and two gold coins, one from Spain and one from Portugal (Arts 1992, 162). Not only in Eindhoven but also in other settlements, such as Bladel, Boxtel, Laarbeek, Oss and Sint-Michielsgestel, have coins from Brabant, Holland, the Rhineland and France been found, as is evident from the registrations in (*NUMIS*), a continuously updated database with descriptions of coins found in the Netherlands. (*NUMIS*) also contains details of all coin-heards and of single coin-finds dating from before 1600. Some coins found in rural settlements even came from as far afield as Scotland and Venice. These were almost all metal-detector finds and one-offs and could well have been lost by merchants or other people who were passing through. It is not certain that they refer to actual physical trade relations between these settlements in the Bailiwick and the regions mentioned. Unfortunately, it is not possible to pinpoint any other regions where coins from 's-Hertogenbosch might have been used. This is because 's-Hertogenbosch did not have its own mint until 1581 (Mosmans and Mosmans 1907, 44; Van Sasse van Ysselt 1975). Before that, the coins used by traders in 's-Hertogenbosch were minted in other locations. For instance, according to the town accounts, the coins for 's-Hertogenbosch were minted in Dordrecht in 1538 (Stadsrekeningen 1538-1539 part 1, p. 553) and in Antwerp in 1566 (Stadsrekeningen 1566-1567 part 1, p. 754). It is therefore impossible to say which coins travelled from 's-Hertogenbosch to other regions.
To conclude, it can be said that the coins found during excavations in 's-Hertogenbosch show many interregional links between 's-Hertogenbosch and other regions only as far as northern France and the Rhineland. The other products discussed in this chapter, such as cloth, pottery and foodstuffs, show much more distant links with, for instance, the Iberian Peninsula, Sweden and the Baltic. The lack of coins from these regions may then suggest that no actual trade took place with them, or that products were exchanged rather than bought or sold with coin. Or, like any other material evidence they may simply be waiting to be found. A large percentage of coins found in 's-Hertogenbosch come from one coin-heard, so it is likely that this particular person was not involved in long distance trade. The more likely explanation is that foreign traders came to 's-Hertogenbosch and exchanged their coins for local coins. It is therefore not surprising that the foreign coins are from 's-Hertogenbosch's interregional trading partners.

4.2. WHAT GOODS WERE EXPORTED FROM THE BAILIWICK, WHERE DID THEY COME FROM AND WHERE WERE THEY EXPORTED TO?

This section and the following sections on import and transit will use archaeological and archival evidence of the export, import and transit of particular products in and out of the Bailiwick and especially the town of 's-Hertogenbosch. Since it is impossible to analyse the interregional trade of all products, these sections will focus on those which can be called typical for the interregional trade of the Bailiwick. The export, import and transit sections will all analyse the trade in linen and woollen cloth. The export section will also focus on the export of metal products, the import section on the import of pottery, and the transit section on the import and subsequent export of leather and fur products.

The town was not big enough as an outlet for most crafts, so many craftsmen looked towards expanding their market elsewhere. As we shall see later in this section, smiths in 's-Hertogenbosch were already exporting in 1302 and shoemakers in 1304. Other occupations – in the cloth trade, for example – exported goods as a cooperative (Van den Heuvel 1946b, 201). As Van den Heuvel recounts, many products were exported from 's-Hertogenbosch, such as cloth, metal objects, leather goods, oil, wine, salt, livestock, beer, mead, soap and fish (Van den Heuvel 1946b, 342-423). These were exported either as products of the Bailiwick or as products made in the Bailiwick from imported raw materials, or as transit products that were passing through 's-Hertogenbosch on their way to another destination. This section will focus on the two main products which were exported from the Bailiwick, *viz.* cloth and metal objects. Section 4.4. on 's-Hertogenbosch as a transit port will focus on leather products and fish.

4.2.1. **CLOTH** This section will discuss the production and export of cloth from the Bailiwick. It will first present evidence for the actual production of cloth and then examine the evidence for the export trade in the form of cloth-markers and other archival material.

Sheep, which would have provided the wool for the woollen cloth, are largely absent from the archaeological records. In the past, this absence has been used to show that a large percentage of wool was imported into 's-Hertogenbosch from outside the Bailiwick. Janssen (2007, 108), for instance, stresses that skeletons of goat and cattle were found in an excavation of a tannery in the centre of 's-Hertogenbosch but no skeletons of sheep. Sheep, however, are seldom tanned. In order to tan animals it is essential to kill them beforehand, so it is only logical that skeletons of goat and cattle were found in the excavated tannery within the walls of 's-Hertogenbosch. It is obviously not necessary to kill sheep for their wool, so sheep remains do not need to appear in archaeological records of 's-Hertogenbosch. Section 3.2.3. has provided some evidence to contest Janssen's point that a large percentage of wool was imported from outside the Bailiwick (Bijsterveld 1989; Theuws 1989; Dekkers 1998; De Wachter 2000; van Dijk 2011).
To summarize, barely any archaeological evidence has been found for sheep because they were grazing on the *gemeint* most of the time and not on farms. When farms are excavated hardly any or no remains of sheep are found. Some have argued that the possibility of keeping sheep would have been an important financial motive for landowners since the wool was in such high demand.
As section 3.2.3. has shown, there were sufficient sheep in the Bailiwick to provide enough wool for the production of cloth. However, as section 4.4.1. will illustrate, wool was also imported because of the difference in quality with locally produced wool. The cloth-markers and sheep have shown that cloth was indeed produced in the Bailiwick. The questions still to be answered are where it was produced and where it was exported to.
The rise of rural industries in the Bailiwick is probably an early phenomenon. Many farmers did some industrial work on the side. Because of the low wages and the absence of strict guild regulations produce was unlimited and cheaper than in the towns. Despite the fact that a tax was levied on cloth from outside 's-Hertogenbosch, this inferior product, according to the Bosch' guilds, still flooded the Bosch' markets and prompted the linen weavers' guild to ask for measures to counteract this unfair competition (Van den Heuvel 1946b, 356). In 1335 Duke John III of Brabant prohibited the production of cloth in the Bailiwick outside of the freedom of 's-Hertogenbosch (Van den Heuvel 1946a, 24-26, no.12). But this prohibition did not apply in areas governed by other lords or in areas governed jointly by the Duke of Brabant and another lord, or in the towns of the Bailiwick. As a result, the use of looms was, for instance, not prohibited in Tilburg, Goirle, Geldrop, Eindhoven, Helmond or Oisterwijk (Van Gurp 2004, 32). A charter of 1547 mentions woollen cloth from Tilburg, Oisterwijk and Geldrop being sold at the markets and fairs of 's-Hertogenbosch (Sassen 1865, 124, no. 813). Excavations in Eindhoven have unearthed fullers' pits and weaving weights which suggest the existence of a thirteenth-century wool industry (Arts 1994, 181). Evidence from the freedom of Oisterwijk demonstrates the importance of the trade and manufacture of woollen cloth. This freedom only ever had one guild: the wool-weavers guild, which had been granted its privileges in 1414. Even though Oisterwijk never had a clothmakers' hall as such, it did have a building in which cloth-markers were attached to cloth manufactured in Oisterwijk (Hendriks 1992, 431). This shows the importance of manufacturing quality in even the more rural settlements. From the end of the fifteenth century the weaving of woollen cloth started to disappear from the town of 's-Hertogenbosch and was found only in the countryside. The cloth industry in 's-Hertogenbosch focused mainly on dyeing, and the trade in wool and finished cloth (Van den Heuvel 1946b, 371-374; Kuijer 2000, 327-329).
Cloth that had been woven and fulled in the Bailiwick underwent further processing in 's-Hertogenbosch before it was resold (Van den Heuvel 1946b, 374). These sections have shown that cloth was produced on a large scale in the Bailiwick and in the town of 's-Hertogenbosch.

Having discussed the production of cloth, the next step is to ascertain whether it was exported and to which destinations. Cloth needs specific favourable soil conditions to survive and is

therefore not a usable form of evidence on its own. Cloth-markers, on the other hand, are a more common find. Cloth-markers can point to a local textile industry but also to the import of cloth. The presence of local markers indicates the first, the spread of these markers outside 's-Hertogenbosch or the Bailiwick is a sign of the second. The origins of foreign markers provide indications of import. Cloth-markers are hallmarks which were attached by inspectors to a particular piece of cloth as a guarantee of its quality. It is not known when the use of cloth-markers became common practice across western Europe; all that can be said is that the earliest surviving cloth-marker dates from 1275 and is attributed to the town of Leiden. In archaeological excavations in 's-Hertogenbosch around 250 cloth-markers were found dating from the medieval and early-modern period (Nijhof 2007a, 233).
A combination of archaeological and written sources must therefore provide the evidence for the export of cloth from the Bailiwick of 's-Hertogenbosch, as no cloth-markers from 's-Hertogenbosch have been found in other regions to date. Fourteenth-century Skåne (Schonen) in southern Sweden was the main transit port for woollen cloth produced at 's-Hertogenbosch (Van den Heuvel 1946b, 364). In the second half of the fourteenth century cloth from 's-Hertogenbosch was sold to Hanseatic merchants (Van den Heuvel 1946b, 366). Finally, at the end of the fourteenth century, mention is made of cloth from 's-Hertogenbosch in the books of merchants who sold their wares at the market in Frankfurt-am-Main (Van den Heuvel 1946b, 366-367). In the fifteenth century woollen cloth was sold by merchants from 's-Hertogenbosch in Skåne, Prussia, Frankfurt-am-Main, Lubeck, Hamburg, Bremen and Rostock. During the second half of the fifteenth century the importance of Skåne as a trading post diminished. From then on the sale of cloth from 's-Hertogenbosch became more important in the cities of the Hanseatic League. Figure 9 shows the spread of exported cloth in comparison with the other products and sources of evidence discussed in this chapter. Not only cloth produced in 's-Hertogenbosch was exported. For instance, the cloth produced in Eindhoven was not intended only for the regional market either. Woollen cloth from Eindhoven is mentioned in 1378-1379 at the toll station at Heusden, and in the fifteenth century, linen from Eindhoven is mentioned in connection with Florence and London. Oisterwijk's cloth is also mentioned at the toll station at Heusden at the end of the fourteenth century and there is evidence of trade with Gorinchem, Schoonhoven and Antwerp at the end of the fifteenth and the beginning of the sixteenth century. Cloth from Tilburg was also traded outside the Bailiwick. It has been mentioned in connection with Geertruidenberg in the sixteenth century (Van Gurp 2004, 33).

This section has illustrated the size and importance of cloth manufacturing for the Bailiwick of 's-Hertogenbosch. Since it was cheaper to manufacture cloth in the countryside a shift occurred from primary production in the town of 's-Hertogenbosch in the fourteenth century to primary production in the countryside at the end of the fifteenth century. Moreover, it has shown the large number of areas that cloth from 's-Hertogenbosch was exported to. As the following sections will show, cloth was not only produced for the export market but was also imported and sold within the region and in the town itself. Some items were, however, produced in 's-Hertogenbosch solely for the export market, particularly knives, which will be discussed along with other metal products in the next section.

4.2.2. **METAL OBJECTS, ESPECIALLY PINS AND KNIVES** There is some evidence that iron was produced from iron ore in the Bailiwick in the thirteenth century. Iron ore was available in abundance in thick layers on the banks of the many rivers and streams in the area surrounding 's-Hertogenbosch. Wood, the basis for charcoal, essential for the production of iron, was still plentiful in this period (Leenders 2002). Many archaeological excavations have unearthed iron slags, remnants of melting and forging iron, in waste layers, pits or rubbish dumps from the end of the twelfth century. Already in 1302, the export of 'smithed products' to areas outside the Bailiwick is mentioned in the charter of the smiths' guild to which the cutlers and pyners belonged (Van den Heuvel 1946a, no. 5 art. 4, page 6-7).
Knives forged in 's-Hertogenbosch, recognized by the tree mark and known by the name of Bolduc in Spain, were not found anywhere in the Bailiwick, but they were found further afield, as far away as Middelburg, southern England and even Spain (Nijhof and Janssen 2007, 193-198). During the fifteenth and sixteenth century, Bruges, Antwerp and Bergen op Zoom were the main markets for the pyners and cutlers from 's-Hertogenbosch. Figure 9 illustrates the export market for the metal products in comparison with the other products and sources of evidence discussed in this chapter. Quality was the most important factor in export products. The origin of a product meant more to a buyer or a merchant than the actual maker. Exporting good-quality products was important for the reputation of the town. Origin was so important that the smiths of Amsterdam copied the 's-Hertogenbosch mark onto their own products and passed them off as products from 's-Hertogenbosch (Van den Heuvel 1946b, 219). The use of particular raw materials was therefore regulated to ensure a good finished product. When other towns outside the Bailiwick started to produce knives, the government of 's-Hertogenbosch, in a charter dated 27 November 1510, forbade pedlars from 's-Hertogenbosch, at other times than at the markets and fairs, from selling any knives other than those from 's-Hertogenbosch. During the markets and fairs they were, however, allowed to sell knives from Brussels, Louvain, Antwerp and Mechelen or from the northern part of the Duchy of Brabant at all times, but not from any other region (Van den Heuvel 1946a, no. 111 item 2, p. 443-444).
This section has shown the importance of the metal trade for 's-Hertogenbosch. No evidence has been found to suggest that the countryside was engaged in any large-scale production of metalwork for export. Unlike cloth production, metalwork could not be done as a job on the side by farm workers because of the special skills and equipment that were required.
The Bailiwick of 's-Hertogenbosch not only exported products, but imported them as well. These products will be discussed in the next section.

4.3. **WHAT GOODS WERE IMPORTED BY THE BAILIWICK, WHERE DID THEY COME FROM AND WHERE WERE THEY IMPORTED TO?** Products were usually imported because they were not available in the Bailiwick, and not because the imported version was cheaper than a local product. Import would apply to certain raw materials, exclusive products and other wares that were not available in the Bailiwick because of the techniques involved.

4.3.1. **CLOTH** Though 's-Hertogenbosch and its Bailiwick produced cloth themselves, as we have seen in section 4.2.1., they still imported cloth from other regions. That section also mentioned that cloth-markers can provide evidence not only of a local textile industry but also of the import of cloth. Indeed, this is suggested by medieval and early-modern Dutch and foreign cloth-markers found at the Tolbrugkwartier excavations in 's-Hertogenbosch (Nijhof 2007a, 238-239). Most of the Dutch markers originate from Leiden, followed by Haarlem and Amersfoort. Markers from Gouda and Delft were also found, but only once. The foreign markers originate mainly from England, more specifically from Colchester, Worcester and Exeter. A second group of foreign cloth-markers originated from Germany: one each from Augsburg and Meiningen. A third group points to the import of cloth manufactured in the southern Netherlands: in Brussels, Mechelen, Turnhout and Lier. Finally, two markers come from northern France (Arras and Hondschoote). Since these cloth-markers were all found within the town of 's-Hertogenbosch, they only provide information about import into 's-Hertogenbosch itself and not about import into the Bailiwick.
Cloth-markers have, however, also been found at excavations in Eindhoven. The cloth-markers that were found in the town centre excavation and which could actually be deciphered originated from Amersfoort, Reims and Weert. However, they all date from the seventeenth and eighteenth century and therefore provide no information about the interregional relationship of Eindhoven during the fifteenth and sixteenth century (Arts 1994, 225). Cloth-markers from the fifteenth and sixteenth century as well as cloth-markers from the seventeenth and eighteenth century have been found at the site of a seigniorial residence. No parallels are known for the fifteenth- and sixteenth-century ones, which still bore a visible image. It is therefore impossible to say where they originated; all we know is that they were imported (Arts 1992, 169).
As we have seen in section 4.2.1., a tax was levied on cloth sold at the 's-Hertogenbosch markets which was not produced in other parts of the Bailiwick and not in 's-Hertogenbosch. This tax was lower than the tax on cloth from places outside the Bailiwick such as England and Flanders (Van Gurp 2004, 33). This shows that measures were in place to protect the local production. However, these 'foreign' cloths were still popular enough to be sold on the 's-Hertogenbosch market despite the higher

taxes on the one hand and the higher prices that were charged for the superior quality on the other.
This section has shown that cloth was imported, besides being produced locally. Unfortunately, no evidence could be found for the import of cloth into the Bailiwick, though it was imported into the town of 's-Hertogenbosch itself, and possibly into a seigniorial site at Eindhoven. It is therefore plausible that the imported cloth was such a luxury product that it could only be found at more wealthy sites. However, perhaps evidence of the import of cloth into the countryside of the Bailiwick simply has not been found yet.
Pottery is found in abundance during archaeological excavations. The import of this product will be discussed in the next section.

4.3.2. **POTTERY** Pottery is the main type of artefact found at archaeological excavations in the Netherlands. Most of it was imported as Dutch-made pottery was not readily available until the fifteenth century. Extensive research carried out on the origins of pottery found at excavations (Bartels 1999) has resulted in a distinct phasing of imported pottery. This phasing has enabled pottery to be used for dating purposes in archaeological excavations. Between 1100 and 1300 most imported pottery was fired in the Meuse Valley. Stoneware, which even in the early-modern period could not be produced in the Low Countries because the right clay was not available, was imported from the Rhineland from the twelfth century until well into the nineteenth and early twentieth century (Verhoeven 1990).
Verhoeven (1990, 275) has analysed the origins of the twelfth- and thirteenth-century ceramics found in a settlement in the Bailiwick of 's-Hertogenbosch. He focused his research on settlements in the Kempen, *viz.*, Bergeyk, Dommelen, Oerle and Bladel. Ceramics from Andenne (Meuse Valley), Schinveld-Brunssum (South Limburg / Meuse) and Paffrath (Rhineland) started to occur simultaneously at the beginning of the twelfth century. Towards the end of the twelfth century, Andenne and South Limburg provided 90% of the settlement ceramics. Ten per cent of the ceramics at this time originated from an as yet unidentified localized production centre in the province of Brabant. Ceramics dating from the period around the foundation of Eindhoven were found at excavations on the Heuvelterrein in Eindhoven (Arts 1994, 202-219). About 50% of the pottery is Elmpt-ware (Rhineland) and the other 50% is made up of stoneware and pottery from the Meuse Valley, and red-baked pottery as well as greyware from Flanders. During the excavations in the centre of Sint-Oedenrode (Peters 2010) a large cache of imported ceramics, mainly from the Rhineland and some from the Meuse Valley up until 1350 was discovered, after which the red- and greywares become very popular. It is, however, not known where these red- and greywares were produced: in the local ovens of 's-Hertogenbosch or Heusden, or further afield in Oosterhout or Bergen op Zoom, or even further afield than that?
The presence of imported ceramics in Sint-Oedenrode, Eindhoven, and even in the small settlements in the Kempen region shows that imported ware not only reached the main town in the Bailiwick – 's-Hertogenbosch – but the countryside as well. The origins of the pottery – Rhineland and the Meuse Valley – already hint that it was transported to the Bailiwick via the rivers Rhine and Meuse. The origins of the imported pottery are shown in Figure 9 and compared with the origins of the other products mentioned in this chapter.
These types of imported pottery have been found in other excavations in the Netherlands. However, every region has its own particular assembly of imported wares, and certain items of pottery do occur more in some regions than in others. Verhoeven (1990) has tried to argue for a relationship between the Meuse potteries and the many religious institutions in the Bailiwick that had numerous monasteries in the Meuse Valley and which not only owned the raw materials required for the production of pottery, clay and wood but also secondary assets such as capital and transportation equipment. Another frequently cited example is the Andenne pottery which was owned by a religious institution, the chapter of secular canonesses there. The assumption is that ceramics would probably have found their way to the Bailiwick through the religious market. However, as section 4.3.4. will show, these religious institutions did not import stones from their own quarries either. A closer look at these religious institutions suggests that it is only the ownership of landed estates that connected the Bailiwick property to the Meuse Valley, as the monks at the motherhouse never travelled to their religious houses in the Bailiwick. Any connection between the location of religious institutions and the origin of pottery seems therefore very much of a coincidence and without causal significance. Moreover, since the same types of Meuse Valley pottery also occur in parts of the Netherlands where there were no religious institutions with a motherhouse in the Meuse Valley, any such argument is essentially flawed.
Like pottery, not all foodstuffs could be produced in the Bailiwick and were therefore imported as the next section will show.

4.3.3. **FOODSTUFFS** Section 3.2.2.1. on produce has already discussed the crops grown in 's-Hertogenbosch. Crops do not, however, account for the entire array of botanical remains found during archaeological excavations in 's-Hertogenbosch. As a result, and because we know some produce simply could not be grown in the Bailiwick, this suggests that some produce had to be imported. All the spices which were used in late-medieval and early-modern cooking or for medicinal use were imported from other regions. This is in sharp contrast with herbs, which were grown locally or at least regionally. A much wider variety of spices and herbs was used in medieval and early-modern cooking than in modern-day cooking. Spices were added to almost every dish (pers. com. Caroline Yeldham). During the fourteenth and fifteenth century most spices were imported through Bruges, and during the sixteenth century through Antwerp. 's-Hertogenbosch merchants bought these spices in Bruges and Antwerp and sold them on in 's-Hertogenbosch itself, the Bailiwick, and in the border regions of Holland and Guelders. Spices were already being imported at the end of the thirteenth century, but they have not been found in the archaeo-botanical records. Their presence in 's-Hertogenbosch is described in the weighing-house deed of 's-Hertogenbosch, which lists products that had to be weighed and includes pepper, ginger, cumin, bay, juniper berries, figs, raisins and weld (ONB nr. 576). This source does not note where these products came from, but Bruges seems the most probable option. Sources cited by Pirenne and Van den Heuvel (Van den Heuvel 1946b, 367; Pirenne and Formsma 1962, 27) also mention Frankfurt as a fair where spices were among the products purchased. Excavations at the 'castle' of Eindhoven have unearthed remains of one spice, 'grains of paradise', from an archaeological trace dated between 1500 and 1610. This spice, a member of the ginger family with a pungent peppery flavour, would have had to be imported from western Africa (Luijten 1992, 238). In the same trace a coconut was found, which must also have been imported. Other remains found during these excavations point to the possible import of figs, olives, mulberries and grapes. These could also have been grown in the Bailiwick, but because they thrive in a warmer climate it is more than likely that they were imported (Luijten 1992, 240). These excavations took place at the site of the 'castle' of Eindhoven, which was not a castle in the conventional sense but a defended manor house and therefore an affluent site.
The import of these foodstuffs should therefore be seen within this rich context and treated as a sign of wealth rather than of common availability in the Bailiwick. At the excavations in the medieval town centre of Eindhoven, on the other hand, a few remains of imported vegetable produce were found (Luijten 1994, 305), consisting of dill (from south-west Asia) and hyssop (from southern Europe), dating from between 1225 and 1350. Remains of exotic fruits such as figs, grapes and peaches might also point to importation, but they could have been cultivated locally, as mentioned before. These came from traces dated between 1225 and 1500. The combined findings from a manorial and a more common location imply that imported products, spices in particular, were available but not in great quantities or varieties.
Another foodstuff which had to be imported was fish. Saltwater fish is a logical import product since the Bailiwick does not border on the sea. Freshwater fish was also imported. As will be discussed in section 4.4.2., 's-Hertogenbosch merchants acted as middlemen for the sale of plaice and herring. It was, however, decreed that any fish which was landed in 's-Hertogenbosch had to be brought to market there first before it could be sold on. In other words, providing for the urban community was seen as more important than having enough fish to export. If this decree had not existed a merchant could have bought up the entire stock before the locals had a chance to buy fish for their own consumption at a fair price (Van den Heuvel 1946b, 351). 's-Hertogenbosch was not a transit port for other types of fish, which, however, were still imported through other channels. The records testify to the import of sturgeon, cod, salmon, sea hog, sparling and eel in 1435 (Van den Heuvel 1946b, 352). It is presumed that the many waters in the Bailiwick contained a variety of fish, which were caught for consumption.

Moreover, many of the religious institutions had fishponds, which provided enough fish for their needs on Fridays (De Jong 1992, 228). These local fish were mostly carp, bream, bass and pike. Again we can see that imported foodstuffs are different from what was locally available. At the excavations at Eindhoven the remains of molluscs such as mussels, cockles and oysters were also found. These are sea creatures and must therefore have been imported (De Jong 1992, 229, 1994, 291-292).
This section has shown that the people of the Bailiwick and of 's-Hertogenbosch in particular had to rely on imports for particular foodstuffs. Spices were largely imported. These were much more widely used and in a wider variety than in modern everyday cooking. As the area was land-locked, fish, and in particular saltwater fish, had to be imported.

4.3.4. **TUFA** As section 3.2.2.3. on building materials has mentioned, tufa, usually used for the building of churches, had to be imported as it was not available in the Bailiwick. Tufa is a heavy and bulky product to transport, which is why it was mostly transported by river if possible. However, if required, it could be transported by road across shorter distances, e.g. from the river to the final destination. Not many stretches of the rivers in the Bailiwick were navigable by ships of the size required to transport large quantities of stones, and some rivers were not navigable at all. It is therefore not surprising that the most tufa is found along the rivers Maas and Dommel.
Tufa was used mainly for church-building during the eleventh, twelfth and thirteenth century, but brick was sometimes used as well because it was usually more readily available. This is why tufa from the old church was sometimes re-used in the building of the new one (Strijbos 1996, 12). The recycling of tufa is not a medieval phenomenon; it was already happening in Roman times and would happen again in the industrial age.
The tufa which was used in Roman times and from the tenth century onwards was cut in the quarries of the Brohltal and the Pellenz in the German Eifel area near Andernach. From the fourteenth century, tufa from Hohenleie was also used (Van Kempen 1997, 104). Many of the owners of tufa buildings, i.e. religious institutions, came from the Meuse Valley. As mentioned in section 4.3.2., even though pottery was imported from that particular area, the religious institutions had chosen not to import their local stone but to import tufa from the German Eifel area instead. It appears therefore that there was no real link between the import of pottery, the import of building stones and the origin of the landowners in the Bailiwick.

4.4. WAS THE BAILIWICK A TRANSIT PORT FOR PARTICULAR GOODS?

The previous section has already mentioned that the Bailiwick imported raw materials because they were not, or not readily, available. Sometimes these raw materials were not used to produce goods for the Bailiwick itself but were earmarked to produce goods for export. In a sense one could say that the Bailiwick served as a transit port. The people of the Bailiwick created 'added value' for the raw materials.

4.4.1. CLOTH, LINEN AND LEATHER

This section follows on directly from the sections on the export (section 4.2.1.) and import (section 4.3.1.) of cloth. Some of the raw materials, flax, wool, or hides (for leather), were imported into the Bailiwick. Flax, the raw material from which linen, carpets and tapestries were made was imported from the land of Heusden and Altena, Zeeland and Holland during the late Middle Ages according to written sources (Van den Heuvel 1946b, 396). Archaeological sources, on the other hand, suggest that flax was actually grown in the Bailiwick, but primarily for the linseed from which linseed oil was extracted to bake linseed cakes (Van Haaster 2009, 71). The linen cloth woven in the Bailiwick was exported to the transit port of Skåne in southern Sweden where it was further distributed.
Besides flax, wool was imported. It has been stated that whereas, previously, local wool from the Kempen was used for the production of cloth, imported wool from at least England was also being used from the thirteenth century (Steurs 1993, 359-362). The decree of 1403 on the cutting and selling of cloth mentions the import of wool from England and Scotland (Van den Heuvel 1946a, no. 33, art. 8-9, page 74). In 1471 again only English and Kempen wool is mentioned (Van den Heuvel 1946a), but from 1529 there are also references to use of Spanish wool (Van den Heuvel 1946a, no. 127, art 1, page 483). This imported wool, as well as the regular wool from the Kempen, was then made into cloth. The imported wool from England was of a much higher quality than the local Kempen variety and was used to produce luxurious

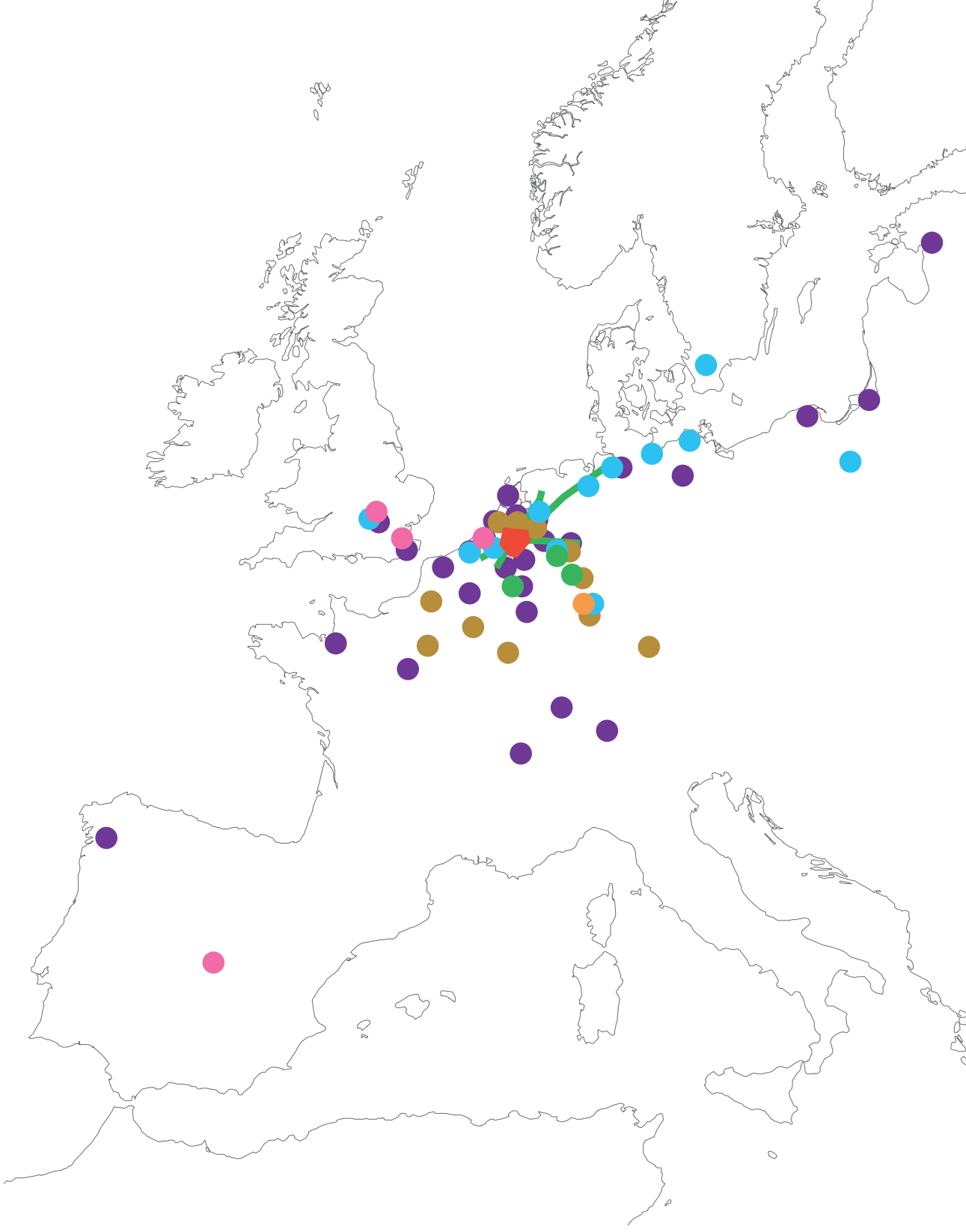


Figure 9: Interregional contacts of the Bailiwick from the various sections (In legend: purple: pilgrim's badges; ochre: coins; blue: cloth; pink: metal; green: pottery; orange: tufa; green lines: trade routes; red: the Bailiwick).

cloth, whereas Kempen wool was used to produce cloth of a more basic quality. This woollen cloth was sold in Bruges, Antwerp and Bergen op Zoom, which was also a transit port where merchants from the Netherlands, Nuremberg, Augsburg, Frankfurt, London and Cologne bought woollen cloth manufactured in 's-Hertogenbosch (Van den Heuvel 1946b, 370).
The tanners in 's-Hertogenbosch obtained their hides from the lands of Guelders and Overmaas. The regulations of the tanners' and shoemakers' guild specified the raw materials that could and could not be used in the production of wares. Raw materials from particular areas were sometimes (temporarily) forbidden (Van den Heuvel 1946b, 206). In the fourteenth century the sale of leather products, in particular shoes, took place, for example, at Cologne (Van den Heuvel 1946b, 379-381).
This section has discussed the role of 's-Hertogenbosch and its Bailiwick as an importer of wool as a raw material and an exporter of a finished product, i.e. cloth. It seems that 's-Hertogenbosch's credentials as a transit port were based not only on the import of raw materials and the export of finished products, but also as a meeting place for middlemen who imported a product and sold it on to a third party. This happened, for example, in the case of cloth, as cloth from Leiden was sold on to Westphalia (Van den Heuvel 1946b, 371).
This section has shown that imported wool was used besides local wool. This did not lead to a conflict of interest, because the imported wool was used to produce goods of a much higher quality than would have been possible with the local wool. The two finished products were used by different markets, the wealthy and more common market respectively. Like the cloth made from local wool, the higher-quality cloth made from imported wool was widely exported. Besides adding value to imported raw materials and converting them into finished products, 's-Hertogenbosch served as a transit port for finished cloth.

4.4.2. **FISH** There is a sixteenth-century source that recounts the buying and selling of fish by merchants from 's-Hertogenbosch. In his *Visboeck* the Scheveninger fisherman, beachcomber and auctioneer Coenen (1577) recounts from his own experience, anything to do with fish, including the history of the sale of plaice. When Coenen was young (during the 1520s) plaice was directly shipped from the Dutch coast to the Antwerp fairs, where it was sold on to merchants from Cologne, Mainz and Strasburg. Around the 1550s, however, 's-Hertogenbosch merchants travelled to the North Sea coast and bought plaice to sell themselves in 's-Hertogenbosch and further east. The role of these merchants was eventually taken over by merchants from Nijmegen (Coenen 1577, 280-281).
Besides plaice, herring too was a transit product. 's-Hertogenbosch merchants first bought herring back with them from Skåne but later bought it directly from fishermen on the North Sea coast. 's-Hertogenbosch had good links with the main fishing ports of Den Briel and Zierikzee. Herring was re-cooped in the town. This had to be done properly since any herring which was off had to be returned to the point of origin and could not be sold (Van den Heuvel 1946b, 348).
Any fish other than plaice and herring bought by 's-Hertogenbosch merchants was not sold on to third parties but was imported only for the inhabitants, as discussed in section 4.3.3.
This section has illustrated that 's-Hertogenbosch merchants acted as middlemen in the buying and selling of fish, just as section 4.4.1. has shown for the buying and selling of cloth. They must have seen this as an ideal way to supplement their income from selling products from the Bailiwick.

CONCLUSION: WHAT IMPORTANCE DID THE INTERREGIONAL TRADING CONTACTS HAVE FOR THE BAILIWICK AS A WHOLE AND FOR THE TOWN OF 'S-HERTOGENBOSCH IN PARTICULAR? The previous sections have shown that the Bailiwick as a whole and 's-Hertogenbosch in particular had many interregional economic contacts. The central questions of what this all means and what importance these interregional trading contacts had for 's-Hertogenbosch still remain to be answered.

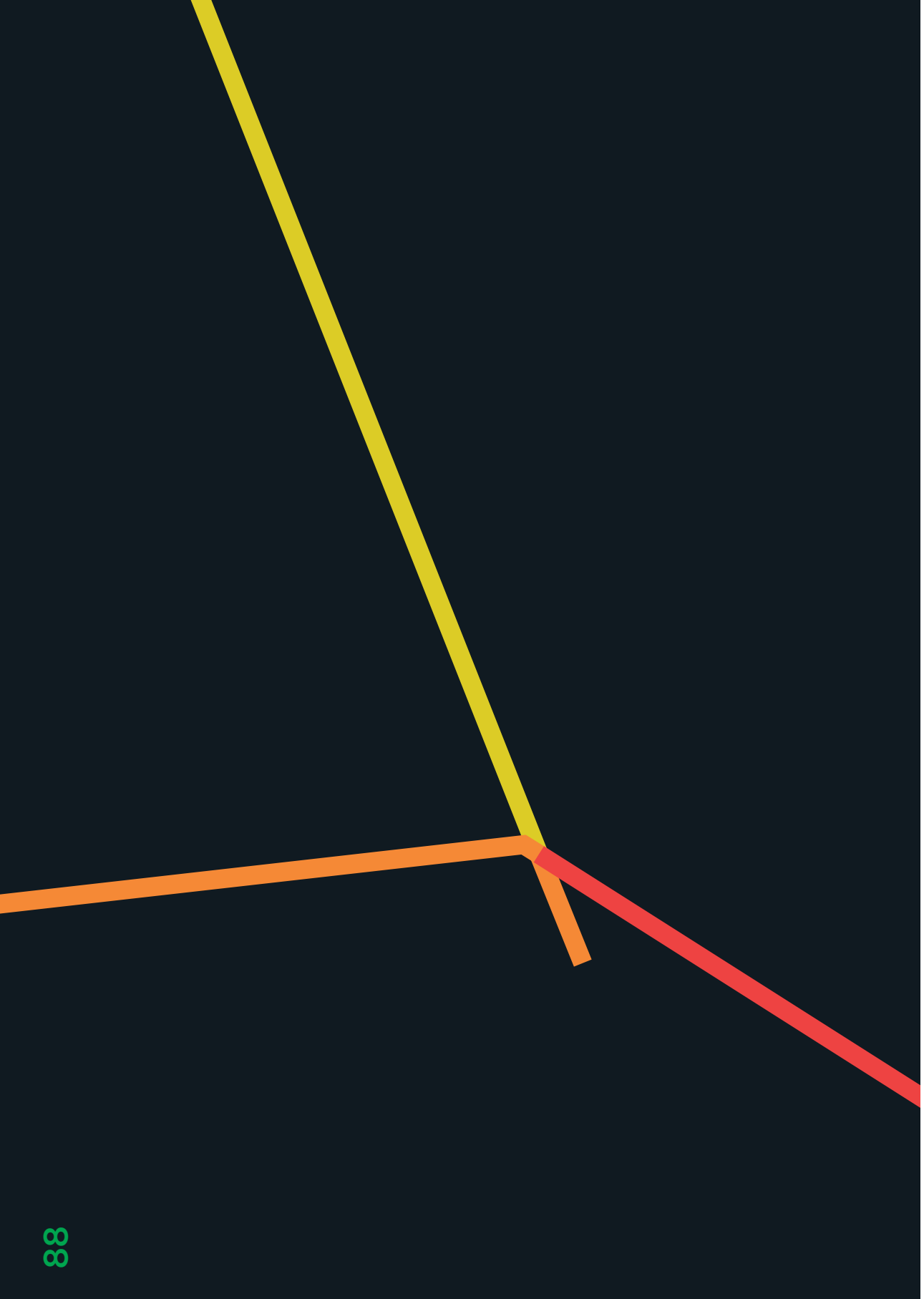
Figure 2 shows the origins and destinations of the products mentioned in sections 4.2., 4.3. and 4.4., as well as the interregional links discussed in section 4.1. Even though the general pattern of interregional contact seems somewhat similar across the board, there are many subtle differences between the product categories. Interregional contacts with a particular area do not automatically imply exclusive trading with that area. Quality and 'branding' were already extremely important in this period and products were not used simply because trade was already taking place in that area and one could therefore save on transport costs for example. Building materials were imported from the Rhineland but pottery was at first imported mainly from the Meuse Valley area. The pottery imported from the Rhineland consisted only of the more exclusive stoneware products.
Quality was seen as crucially important, especially for wool products as the weavers in 's-Hertogenbosch were allowed to use only one type of wool for a particular and strictly regulated type of cloth. Even if they had been able to buy cheaper wool from elsewhere they could not have used it to produce cloth as it would not have passed the quality control checks.
Interregional relationships were therefore very much determined by the quality of the wares that could be imported and one's own reputation in export products. Distance, to some extent, was not a real issue. This is, for instance, evident from the contacts the 's-Hertogenbosch merchants had with the Baltic Sea area and with Skåne.

The central question asked by this section, i.e., whether the countryside had a share in the interregional trade of the Bailiwick of 's-Hertogenbosch and whether it had any influence on the character of this trade or whether the interregional trade was influenced solely by the town of 's-Hertogenbosch is still difficult to answer with the available sources. Some archival and archaeological sources have hinted that the countryside had interregional contacts, but there is not enough evidence to prove a direct link with other regions, as these contacts would, most probably, have occurred through 's-Hertogenbosch anyway. The sources do, however, show that the Bailiwick was not deprived of import products, even though the luxury items turned up mostly in the town and wealthy sites.

Finally, it is important to link the results of this section to one of the central themes of this thesis: the relative importance of interregional versus regional and local trade. Was it the interregional trade that held the greatest economic importance for a town as previous authors have suggested, or was it the regional and local trade as this thesis aims to show? Having so far analysed only the range and types of interregional trade, it is really only possible to discuss the importance of regional trade on its own. From this chapter alone the interregional contacts do seem very important, especially since many products were manufactured mainly, or solely, for the export market. The comparison with the content of the next two chapters on regional and local trade will unveil its real importance. Moreover, it needs to be stressed that only the export market is of financial importance, since it is the export of products that makes money whereas the import only costs money. Hence the import market primarily concerns products that the Bailiwick could not produce or grow itself. These are all products that are found as import products in almost all Dutch regions. 's-Hertogenbosch and the Bailiwick did not need to have special economic ties with certain regions to be able to import these wares as they were bought mainly through the central markets of Bruges, Antwerp and Frankfurt.

The next chapter will analyse the regional trade that occurred in the Bailiwick as a whole and pave the way for the first comparisons between interregional and regional trade in terms of economic importance.

Quality and 'branding' were already extremely important in this period.



A MEDIEVAL CONURBATION?

STUDYING THE MEDIEVAL URBAN NETWORK[21]

5

The medieval economy has always been a popular subject among historians and archaeologists, not least because of the abundance of material as well as written evidence. As we have seen in Chapter 3, research on the medieval economy has centred on the town rather than the countryside. Towns in the Middle Ages would not, however, have been able to exist without a countryside to provide them with support in the form of foodstuffs and of raw materials for construction and other industries. To gain a more complete understanding of the medieval economy this chapter will investigate how town and countryside were linked through these economic relationships and the ways in which they formed a network between town, villages and countryside to create a conurbation[22] *avant la lettre*.

Markets and fairs have always been considered a good indicator of urban networks and economic relationships (von Thünen 1863; Unwin 1981; Britnell 1996; Stabel 1997). However, was there such a thing as an actual network of markets and fairs that linked town and countryside within a region? In previous articles (Craane 2007, 2009a,b) I have argued that topology – the mathematical properties of a particular place without taking geography or architecture into account – constitutes the main explanation for the location of economic space.

21 A previous and shorter version of this chapter has been published in 2009 (Craane 2009a).
22 Dutch: *agglomeratie*

Economic space is understood as the areas in which economic activity such as the production and sale of crafted products, the organization of markets and fairs and so on takes place. This chapter will explore whether topology also provides the main explanation for the links between town and countryside and for the establishment of a medieval urban economic network.
Despite the popularity of urban networks and town-countryside relationships as topics in medieval studies, no models have been defined for studying the topological relationships since those proposed by Von Thünen, Christaller and Berry (von Thünen 1863; Christaller 1935; Berry 1967). Space Syntax moves on from those models and will be used to create a schematic representation of a concrete example, the region of the Bailiwick of 's-Hertogenbosch in the Netherlands, to show whether the markets and fairs in this particular region were linked to form the economic system upon which the regional medieval economy was based. Recent research has already shown that Space Syntax can be used not only in the analysis of the internal structure of settlements and buildings but also in the analysis of twentieth-century settlement patterns and urban networks (Van Nes 2009a). The case-study for this analysis is the Bailiwick of 's-Hertogenbosch because of the large amount and wide range of evidence available for this region and because of its geographical make-up.
The hypothesis in this chapter is that the medieval towns and their surrounding villages were linked in what amounted more or less to a conurbation, and that therefore, the concept of conurbation may apply in other contexts besides modern capitalist cities. To test this hypothesis this chapter will first ascertain which markets, fairs and other economic institutions existed within the Bailiwick. Secondly, the spatial and temporal distribution of the markets and fairs will be analysed to determine any logical patterns. The demographic, economic, topological and institutional determinants of the locations will be investigated. Since the topological explanations for the locations of markets and fairs are expected to figure most prominently, they will be investigated in greater detail. The third section will therefore focus on a reconstruction of the late-medieval infrastructure of the Bailiwick of 's-Hertogenbosch to determine the degree to which the emergence of an urban network was influenced by transport and infrastructure.
The fourth section will discuss the results of the Space Syntax analysis. Finally, the conclusion will bring together all the findings and try to answer the central question whether there was a medieval urban network, and if so, how it manifested itself, how we can best analyse it and whether there is such a phenomenon as a medieval conurbation.

5.1. MARKETS, FAIRS AND OTHER ECONOMIC INSTITUTIONS IN THE BAILIWICK OF 'S-HERTOGENBOSCH

The market and fair charters are the main sources for the study of the medieval markets and fairs in the Bailiwick. Fortunately, many of these charters, or copies thereof, have survived for the markets and fairs in the Bailiwick. There are only a few towns where the situation is unclear. The next section will discuss these in more detail. However, it is impossible in almost every case to say whether the year in which a market charter was issued is the same year in which the market or fair was first held, or whether the market or fair had been in existence for much longer but had simply never been granted a charter. It is therefore important to note that the years quoted in this chapter signify the year in which the market or fair was first mentioned rather than the year in which it was first held, even though both events may have happened in one and the same year.
The main reason for issuing market charters was to allow local lords to exact taxes from buyers and sellers. Many lords established markets to provide themselves with extra income. It is presumed that there were also many unchartered markets, where no taxes were exacted. These markets were in essence illegal but, as far as is known, no legal action was taken against them. Because these markets were unchartered, no evidence is available for them, save for the occasional mention in legal documents (Britnell 1996). These unchartered markets cannot therefore be taken into account in analyses of the systems of markets and fairs within the Bailiwick. This chapter therefore focuses solely on the chartered markets.
People were also told to attend the markets and fairs in the charters. Even miscreants who feared arrest could attend them, as the charters provided freedom from prosecution for buyers and sellers alike. This freedom usually started at noon on the day before the weekly market and ended at noon on the day after. Most yearly markets had a longer period of freedom, usually lasting about a week (Jacobs 2000).

So far, markets and fairs have been named and discussed as one item. There are, however, significant differences between the two. These differences will now be explained to validate their separate treatment in the following sections.
If a town in the Bailiwick had a weekly market (from now on referred to as a market) it was held on one specific day. This is in contrast to some of the larger towns in England (Farmer 1991, 335) which held markets on several days a week. Despite the market day being officially chartered, religious feast days took precedence. If the market day happened to fall on a religious feast day, the market was cancelled. In 's-Hertogenbosch it was decided that, from 22 August 1515, the Thursday market, if it coincided with a religious feast day, would be held on the preceding Wednesday (SAH 3877 = SASSEN 700: d.d. Brussel 1515 aug 22). In Helmond a similar decree was passed on 10March 1544. Helmond's Saturday market would be held on the preceding Friday if Saturday was a religious holiday. Before this decree was passed, the market would simply have been cancelled if it happened to fall on a religious holiday (Frenken 1975, 82). Markets were never held on Sundays. Fairs, however, sometimes were. Helmond and Valkenswaard, for instance, had fairs which were held on a Sunday.
Yearly markets (from now on referred to as fairs), on the other hand, were always held on a set date associated with a specific saint's day or other religious feast. The fair was always registered by the saint's day, e.g., two days before the feast of St John the Baptist (22 June), or on the eve of St Nicholas (5 December), rather than the actual calendar date it would be held on. Most towns which had fairs held several throughout the year.
Markets provided an opportunity for people to sell their surplus produce and buy what they needed. Whereas markets provided the main opportunities for buying and selling staple food, fairs were the place to buy and sell livestock and bulk goods. The fairs were also an important source of farming tools (Farmer 1991). Moreover, the large fairs (only the fair at 's-Hertogenbosch in this region) had a more international character and people would have been able to buy imported goods such as stoneware and wines there. Chapter 4 focused on these interregional aspects of the larger fairs. This chapter will focus on the more regional and local aspects as it is thought that fairs also played an important role in the regional (agrarian) economic network.
This section has illustrated the differences between markets and fairs. The following sections will first discuss the markets, the evidence that they existed, and the possible explanations for their temporal and spatial distribution. The same issues will then be discussed for the fairs.

5.1.1. MARKETS

The Bailiwick of 's-Hertogenbosch was divided into four quarters and the freedom of 's-Hertogenbosch, as shown in Figure 10. Each quarter had its own capital (see figure 10). There were about ninety-six towns and villages in total in the Bailiwick.
We know that fifteen of these had markets which had been granted their first charter between 1232 and 1544.
As is evident from Table 3, there were only two places with a Thursday market, 's-Hertogenbosch and Budel. Because of the popularity of the 's-Hertogenbosch market it was unwise for any other town or village to hold a market on that day. Budel, however, is located in the southernmost part of the Bailiwick around sixty kilometres from 's-Hertogenbosch and presumably far enough away not to be affected. It is also the case that the capital towns of the four quarters, apart from Oirschot, had their markets on either a Tuesday or a Wednesday. In Kempenland, Eindhoven had a Tuesday market, which seems to indicate that Eindhoven was more important than Oirschot as an economic centre of Kempenland, even though Oirschot was the political capital. It seems likely that the main towns in the four quarters had their markets on Tuesdays and Wednesdays so that traders could collect produce from the hinterland and take it to the market at 's-Hertogenbosch one or two days later.
This fits in with Unwin's point about regional market groupings (Unwin 1981, 241), i.e., that fewer markets on a particular day of the week usually denotes a larger market, whereas days with a larger number of markets usually denotes markets of a smaller size.
Moreover, as the table shows, by the end of the fourteenth century every quarter of the Bailiwick had its own weekly market: Eindhoven in Kempenland, Oss in Maasland, Oisterwijk in Oisterwijk and Helmond in Peelland and of course 's-Hertogenbosch itself. The quarters of Kempenland and Oisterwijk might possibly have had two markets by the end of the fourteenth century as the official foundation dates for the markets of Oirschot and Hilvarenbeek are not known.

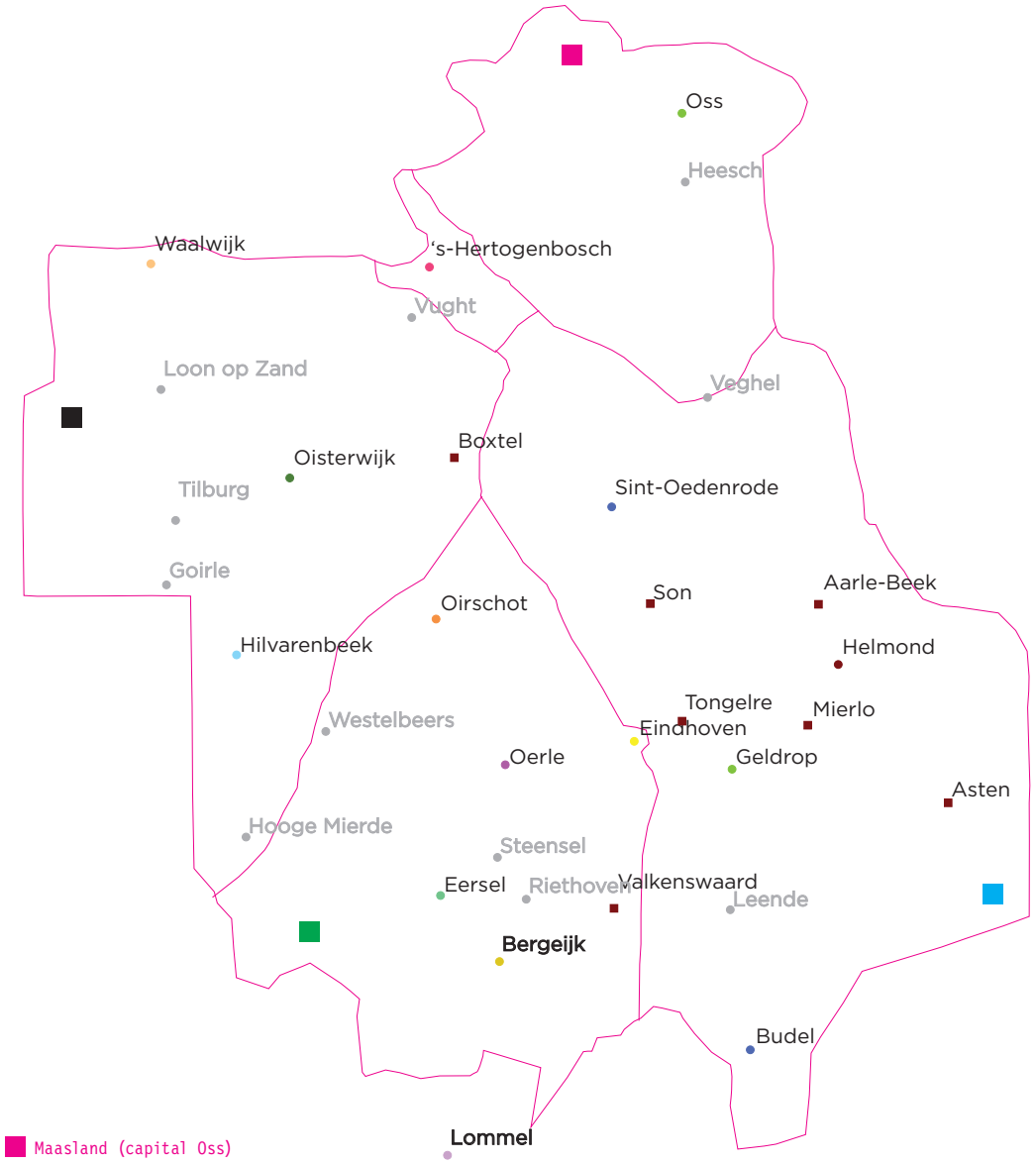


Figure 10: Map of the Bailiwick of 's-Hertogenbosch with its four quarters.

Table 3: First recorded appearance of a market in the quarters and settlements of the Bailiwick of 's-Hertogenbosch (capitals of the quarters in bold). Shaded from dark grey for the earliest markets to white for the more recent ones and those of unknown dates.[23]

Quarter	Town	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
's-Hertogenbosch	**'s-Hertogenbosch**				1328			
Kempenland	**Oirschot**						xxxx	
	Eindhoven		1232					
	Oerle (Zandoerle)	<1334						
	Lommel	1422						
	Bergeijk						1468	
	Eersel			1544				
Maasland	**Oss**		1399					
Oisterwijk	**Oisterwijk**			1355				
	Hilvarenbeek					<1400		
	Waalwijk					1516		
Peelland	**Helmond**		1376				1538	
	St-Oedenrode			1403				
	Budel				1534			
	Geldrop					xxxx		

Since new markets continued to be founded it seems evident that, with time, one market for each quarter would not be enough. It is, however, difficult to establish what would have been regarded as an adequate number. There could be various explanations for these extra markets. This chapter will attempt to identify them by investigating possible demographic, economic, topological and institutional explanations.

5.1.1.1. DEMOGRAPHIC EXPLANATION

A possible demographic explanation for the establishment of markets is suggested by the fact that only the largest towns in the Bailiwick had them. Markets are a feature of a commercial exchange economy, which prompts more and more people to migrate to towns and specialize in particular occupations. As these people would not be able (through lack of time or land) to produce all the foodstuffs they needed, it seems more likely that the larger towns in particular would have needed a market as the populations were larger there. The best way to determine the relationship between town size and the presence of a market is to find out the size of the population in the towns and villages that had one. This is where the registers of hearth taxes, previously explained in Chapter 3, will prove useful. I have listed the number of hearths (households) in particular settlements for every year these registers were compiled and have stated whether those settlements had a market and/or a fair.

Table 4 shows that the settlements with a market or a fair were not necessarily the largest ones. Heeze and Leende, Someren, Tilburg and Goirle, Vught and Cromvoirt, and Nuland and Rosmalen are all relatively large settlements in the Bailiwick but they had no market or fair. The settlements in the Kempenland quarter with a market or fair seem to have been much smaller than the towns with a market or fair in the other quarters. It seems therefore that demography is not the only explanation for the establishment of a market.

5.1.1.2. ECONOMIC EXPLANATION

A market might be set up to serve a large demand for produce in a particular settlement or to sell a large surplus of produce from the surrounding area. The previous section has already argued against the former. A large demand would occur only in a large town, and markets were held not only in large towns but in smaller ones as well . The only remaining plausible economic reason so far is that there was a large surplus of produce from the countryside. The surplus produce from the Kempen evidently provided everyday essentials for a large number of towns in the Bailiwick including 's-Hertogenbosch. The Sheriff's Protocol of 's-Hertogenbosch mentions the delivery of (or payment in) flax as one of the conditions for nearly every tenancy. This continuous supply of flax from the surrounding countryside secured the continuity of the manufacture of cloth in 's-Hertogenbosch.

[23] Appendix 4 lists all the data about the markets in more detail. This table has been compiled from the tables in Van Uytven (1992), Van Asseldonk (2002), 276 as well as the following primary sources: SAH 3876 = SASSEN 45: d.d. Brussel 1328 mrt 26 ONB no. 165: d.d. 1232 april 9 – 1233 april 2, BHIC 8 Leen- en Tolkamer van 's-Hertogenbosch, no. 139, p. 167 ARAB 642 ARK, no. f 1r 1544 okt, BHIC 7362 Oss Stads bestuur, no. 1 SAH 79 = SASSEN 1782: d.d. 1403 Brussel 10 Augustus p.143 Kappelhof (1997), 18 (or 54 f 137r) BHIC 7633 Dorpsbestuur Sint-Oedenrode (1232) 1315-1811, no. 91, RHCE A-258 Gemeentebestuur Budel 1307-1810, no. 1-a-1-15 c-007, and the following secondary sources: Van Oudenhoven (1670b), Krom and Sassen (1884), Frenken(1975) , Melssen (1994), Kappelhof (1997), Hoozemans (1998).

Table 4: Number of hearths in the settlements in the Bailiwick and whether they had a market or a fair.[24]

Town	Quarter of the Bailiwick	1374	1438	1464	1472	1480	1496	1526	market	fair
Aalst and Waalre	Kempenland	74	141	164	164	154	142	167		
Aarlebeek and Rixtel	Peelland	190	162	286	289	180	234	327		x
Alem	Maasland	85	56	46	37	37	25	54		
Asten	Peelland	150	265	261	271	267	250	281		x
Bakel	Peelland	70	194	215	207	103	157	204		
Bergeijk, Westerhoven and Riethoven	Kempenland	96	440	508	503	407	443	479	Bergeijk 1468	x
Berghem and Duren	Maasland	89	122	136	103	124	106	136		
Berlicum	Maasland	173	200	184	136	118	86	168		
Blaarthem below Oerle	Kempenland	0	23	26	30	31	29	40		
Bladel	Kempenland	55	186	207	202	242	158	171		
Boxtel	Oisterwijk	300	330	349	349	316	340	417		x
Budel	Peelland	0	245	0	0	0	0	0	1534	x
Deurne and Vlierden	Peelland	98	316	413	286	327	299	316		
Drunen	Oisterwijk	129	145	153	147	138	94	165		
Eersel Duizel and Steensel	Kempenland	90	275	325	306	288	259	259	Eersel 1544	x
Eindhoven and Zeelst	Kempenland	245	294	306	277	272	234	295	Eindhoven 1232	x
Empel and Meerwijk	Maasland	128	73	65	64	53	51	85		
Erp	Peelland	234	234	267	207	200	209	254		
Esch	Oisterwijk	70	48	48	49	45	41	60		
Gansoijen	Oisterwijk	3	54	39	0	5	4	2		
Geffen	Maasland	136	163	128	131	124	162	170		
Geldrop	Peelland	25	109	99	99	106	116	135	xxxx	x
Gestel, Strijp and Stratum	Kempenland	87	162	185	180	176	168	258		
Heeswijk-Dinther, Nistelrode and Heeschr	Maasland	422	562	566	431	389	325	554		
Heeze and Leende	Peelland	586	415	429	429	531	535	748		
Helmond	Peelland	153	280	333	282	327	275	394	1376	x
Helvoirt	Oisterwijk	104	114	111	101	107	96	116		
Hilvarenbeek, Diessen, Riel and Westelbeers	Oisterwijk	482	724	716	740	650	625	747	<1400	x
Hooge and Lage Mierde and Hulsel	Oisterwijk	158	201	205	209	214	179	219		
Hoogeloon, Hapert and Casteren	Kempenland	46	187	208	205	189	184	195		
Kessel	Maasland	137	48	39	41	25	39	43		
Liempde	Peelland	35	123	137	137	102	128	142		
Lierop	Peelland	91	116	125	98	100	120	108		
Lieshout	Peelland	70	145	132	134	133	132	148		
Lith and Lithoijen	Maasland	233	239	75	52	50	40	97		
Lommel	Kempenland	100	244	291	298	246	250	256	1422	x
Loon op Zand	Oisterwijk	84	127	143	143	91	85	221		
Maren	Maasland	133	71	68	61	35	60	81		
Mierlo and Opthout	Peelland	152	236	226	220	225	211	239		x
Moergestel	Oisterwijk	139	193	161	161	151	155	172		
Nuenen, Gerwen, Nederwetten and Tongelre	Peelland	171	346	353	353	346	327	385		x
Nuland and Rosmalen	Maasland	246	276	261	272	286	132	288		
Oirschot	Kempenland	375	659	728	703	640	591	774	xxxx	x
Oisterwijk, Haaren, Belveren, Udenhout, Berkel, Enschot and Heukelom	Oisterwijk	309	684	682	660	694	763	973	1399	x
Oostel- and Middelbeers	Kempenland	80	110	118	118	111	112	119		
Oss	Maasland	497	361	321	199	229	243	374	1399	x
Reusel	Kempenland	72	118	129	136	105	105	125		
Schijndel	Peelland	193	263	284	280	241	248	287		
's-Hertogenbosch	's-Hertogenbosch	3647	2883	2335	2351	2930	3456	3643	1328	x
Sint-Michielsgestel and Gemonde	Oisterwijk	100	175	170	170	136	177	218		
Sint-Oedenrode	Peelland	252	467	446	436	372	364	416	1403	x
Soerendonck and Maarheeze	Peelland	45	192	209	182	166	132	209		
Someren	Peelland	238	287	373	250	316	261	338		
Son and Breugel	Peelland	121	290	328	325	386	255	286		x
Stiphout	Peelland	50	74	86	67	65	69	89		
Tilburg and Goirle	Oisterwijk	385	542	520	396	426	379	618		
Valkenswaard and Dommelen	Kempenland	79	158	187	170	187	163	168		x
Veghel	Peelland	153	273	282	245	240	214	278		
Veldhoven, Zonderwijk, Oerle and Meerveldhoven	Kempenland	147	239	254	246	217	191	207	Zandoerle < 1334	x
Vessem, Knegsel and Wintelre	Kempenland	80	159	174	173	193	159	156		
Vught and Cromvoirt	Oisterwijk	328	252	239	259	252	237	309		
Waalwijk	Oisterwijk	140	118	137	124	113	121	146	1516	x
Woensel	Kempenland	60	153	161	161	140	135	194		
Zonderwijk and Veldhoven	Kempenland	55	107	118	109	104	102	111		

[24] The full list of hearth-counts can be found in Appendix 1.

Frequent mention is also made of rye, wheat, barley, hops and beeswax. The first four products would support the food provision in 's-Hertogenbosch whereas the beeswax would provide the raw material for the oil-crushers and soap-boilers (Van de Ven 1993, 12). However, almost all the wool produced in the Kempen was used in rural textile production and not in the town of 's-Hertogenbosch. Most of the wool used by the weavers in 's-Hertogenbosch was imported English wool which produced a finer cloth than was possible with wool from the Kempen (Van de Ven 1993, 12). Iron ore was also sourced in the Kempen. Presumably, it was used in 's-Hertogenbosch to make pins, nails, knives and locks (Van de Ven 1993, 12). With the sources at our disposal, however, it is impossible to verify whether there was an overall surplus production in the countryside. Even though the archival records stipulate that tenant farmers had to provide for the towns, there is no conclusive evidence that this actually occurred.

So it remains unclear what products particular farmers actually supplied. It is only possible to give an overall idea of the produce grown. An economic explanation cannot be verified.

5.1.1.3. TOPOLOGICAL EXPLANATION

Could a topologically determined pattern underlie the establishment of these later markets? At the end of this chapter, spatial analysis will be used to analyse the roads and waterways of the Bailiwick. This will also shed some light on the establishment of markets. However, one other 'spatial' way of checking this out would be to apply the limits of short-haul marketing to illustrate the coverage of each market. For this we may refer to the Englishman Henry of Bratton, judge of the King's Bench from 1247 to 1250 and again from 1253 to 1257, who argues in his legal treatise, which was compiled between 1235 and 1259 and which is a rational description of English law, that six and two-third miles (10.67 kilometres) would be the limit for short-haul marketing. This was because the seller or buyer would otherwise be unable to get to market and back home in a single day (Woodbine, vol 3 p.198-199). It should be noted that his theories relate to the geographical and infrastructural situation in England, which of course is different from that in the Bailiwick of 's-Hertogenbosch. However, his measures can be used as a rough indication of the influence of a market. On the other hand, it should also be borne in mind that sometimes, and especially in times of good weather or high prices, sellers were prepared to travel much farther. This became a realistic option if the seller could make use of river rather than land transport. However, because of the limited resources many sellers preferred to sell small amounts over shorter distances than large amounts over longer distances (Unwin 1981).

When we draw Bratton's maximum reach for each market (10.67 kilometres) on the map of the Bailiwick, the existence of a possible need for more markets during the fifteenth century is immediately apparent. Most of the early markets did not cover the quarter in which they were situated let alone the entire Bailiwick. Moreover, since these new markets were located outside the maximum reach of the established markets there was a ready-made clientele. This would then explain the later establishment of the markets at Lommel, Oerle, Bergeijk, Budel, Oirschot, Hilvarenbeek, Waalwijk and Sint-Oedenrode. Moreover, it would explain why the Maasland quarter only had one market, Oss, since the maximum reach of this market nearly covered the entire quarter. However, it does not explain the establishment of the markets at Eersel during the sixteenth century. Bratton's patterns of maximum reach have thus provided plausible reasons for the establishment of the markets in the Bailiwick. Will this also help to solve the anomalies in some of the charters, such as confusion about dates and proximity to other markets? Take, for instance, the problem with Geldrop's market. At the beginning of this chapter it was stated that there were fifteen markets in the Bailiwick. However, there is no firm confirmation of the date of the charter for Geldrop's market. By 1670 Geldrop had a market but it was stopped as a result of wars and the plague (Van Oudenhoven 1670b). The question remains when exactly it was held. It is possible that Geldrop was granted a charter for its market at the same time as for its fairs in 1371. Unfortunately, no sources confirming an exact period have been found to date. The disappearance of Geldrop's market can possibly be explained by the market-reach map, which shows that Geldrop's market did not serve a specific niche and that nearly all of its area was covered by neighbouring markets. Compared with all the other market locations in the Bailiwick Geldrop had the least amount of territory that was not covered by any other market. This might explain why Geldrop's market was discontinued.
As in the case of Geldrop, the year in which Oirschot was granted its first market charter is also unknown, as the original charter is believed to have been lost in a church fire in 1462. It is presumed on the basis of an entry in a ledger of 1524 that Oirschot had been granted a charter before this date (Lijten 1991, 194). This is why it is included in the list of fifteen markets for which we have certainty about the year of the first charter (Van Asseldonk 2002, Appendix 5). However, an examination of the available evidence on other markets seems to indicate at first that there could not have been a chartered market at Oirschot. A second glance at Bratton's market-reach map proves that this is incorrect, as the following explanation shows. The 1538 charter reaffirming the rights of Helmond suggests that the Helmond market was moved from a Tuesday to a Saturday because none of the towns in the Bailiwick had their market on a Saturday and because it might have competed with the Tuesday market in Eindhoven (Frenken 1975).

Figure 11: Market reach of all the Bailiwick markets taking Bratton's 10.67-kilometre limit as an indicator. Coloured dots signify the towns with markets and fairs. Red squares are the towns with fairs alone (legend: dots = towns with market and fairs; squares = towns with fair; other settlements without market or fair are in grey).

This could indicate that Oirschot's Saturday market was not in direct competition with Helmond's Saturday market. Figure 11, which shows the maximum reach of these markets on the basis of Bratton's 10.67-kilometre limit, suggests that this is actually the case as Helmond and Oirschot lie outside each other's circle. The same would apply to Bergeijk's market in relation to the markets at Helmond and at Oirschot. Bergeijk's market was held on a Saturday since 1468, but it also lies outside Helmond's and Oirschot's circle. This implies, therefore, that the town councils of the Bailiwick of 's-Hertogenbosch must have been aware of a similar maximum market-reach value as Bratton's, since it appears that when new markets were established, the markets that were held on the same day but were located at too great a distance were clearly ignored as they would not be able to compete.

There is, however, an anomaly in the case of Bergeijk's market as testified by the vidimus of the Eersel market. Eersel was granted its Wednesday market in 1544, as is evident from a vidimus of 1613. This document states that Eersel could have a market because there was no other market within three hours' travel with which it could compete. However, the village of Bergeijk had had a market for seventy-six years and Bergeijk is within two hours' travel of Eersel. By 'competing markets within the three-hour radius', Eersel's charter presumably only meant markets held on the same day. The other possible explanation is of course that Bergeijk's market was never officially granted a charter, a possibility which will be addressed in the next section.

Figure 12 shows a similar map to Braxton's reach map. However this map is not based on Braxton's 10.67-kilometre limit; in the three hours of travel the vidimus for the Eersel market seems to have found an appropriate limit outside which markets could exist. This limit shows that within three hours of Eersel there was a market not only at Bergeijk and Oerle, but also at Lommel and Oirschot. Again, this shows that markets were regarded as competitive only if they were held on the same day. This is why there is no perceived conflict with any of these four markets, and it is also why the Eersel market could be founded in 1544 after the others had been in existence for an average of one hundred years.

5.1.1.4. INSTITUTIONAL EXPLANATION

The possibility that Bergeijk's market might never have been officially granted, as stated at the end of the previous section, seems to point to another cause than simply non-existence. Perhaps the village magistrates twisted the facts slightly to get the markets they wanted. If they had told the truth about any nearby markets, they would probably have not been granted their own market because that would have signified unwanted competition for the older market. Once the new market was established any protests from the organizers of the neighbouring market would be futile.

Settlement	Date of first mention of privileges	Market	First fair
's-Hertogenbosch	1184-1196	1328	+/- 1356
Oisterwijk	<1212	1355	1355
Eindhoven	1232-1233	1232	<1555
Sint-Oedenrode	1232-1233	1403	1232
Helmond	<1241	1376	1376
Hilvarenbeek	<1331	<1400	1524-1555
Mierde	<1340		
Waalwijk	1303	1516	1303
Oerle	<1334	1334	1334
Lommel	<1340	1422	1422
Eersel	<1340	1544	<1316
Oirschot	1355-1372	XXXX	<1340
Oss	1399	1399	<1340
Bergeijk	1468	1468	1468

Table 5: Date of town charters, markets and fairs (partly after Van Asseldonk 2002).

Figure 12: 3 hours market reach.

This can be seen as a possible institutional explanation for the distribution of the markets. It would, however, be difficult to prove. Another institutional explanation might be that markets appeared only in places with privileges and those were settlements classed as freedoms or towns. Privileges were usually granted by the Duke of Brabant or a local lord for a political, economic or strategic reason. Exempting towns or their inhabitants from particular tolls would win loyalty and influence commercial traffic. The Duke regulated and stimulated trade in his towns (Rutte 1999, 9; Van Asseldonk 2006, 247). The table below lists all the settlements and the first mention of their privileges, as well as the date of their markets or (first) fairs.

It is immediately apparent that there is a strong correlation between the granting of privileges and markets or fairs. Only one settlement had privileges but no market or fair (Mierde), and only two had a market but no privileges (Geldrop and Budel). In some cases the market or fair charters were issued at the same time as the privileges. This, for instance, was the case in Eindhoven, Waalwijk, Oss and Bergeijk. Sint-Oedenrode was also granted a fair at the same time as its privileges but its market seems to stem from a later date (Van Oudenhoven 1670b, 18). Though this appears to explain why some places were granted markets and others were not, it raises the question of why these places and not others were granted privileges in the first place. The argument then returns to an earlier section in which it was explained that it was not necessarily the larger places that had markets. It therefore follows that it was not necessarily the larger places that were granted privileges.
The previous sections have indicated that topology appears to be an important factor in explaining the patterns of markets in the Bailiwick of 's-Hertogenbosch besides the more traditional economic, institutional and geographical factors. The next section will explore whether the topological explanation is also important with regard to the pattern of fairs in the Bailiwick of 's-Hertogenbosch.

5.1.2. FAIRS

5.1.2.1 SPATIAL DISTRIBUTION

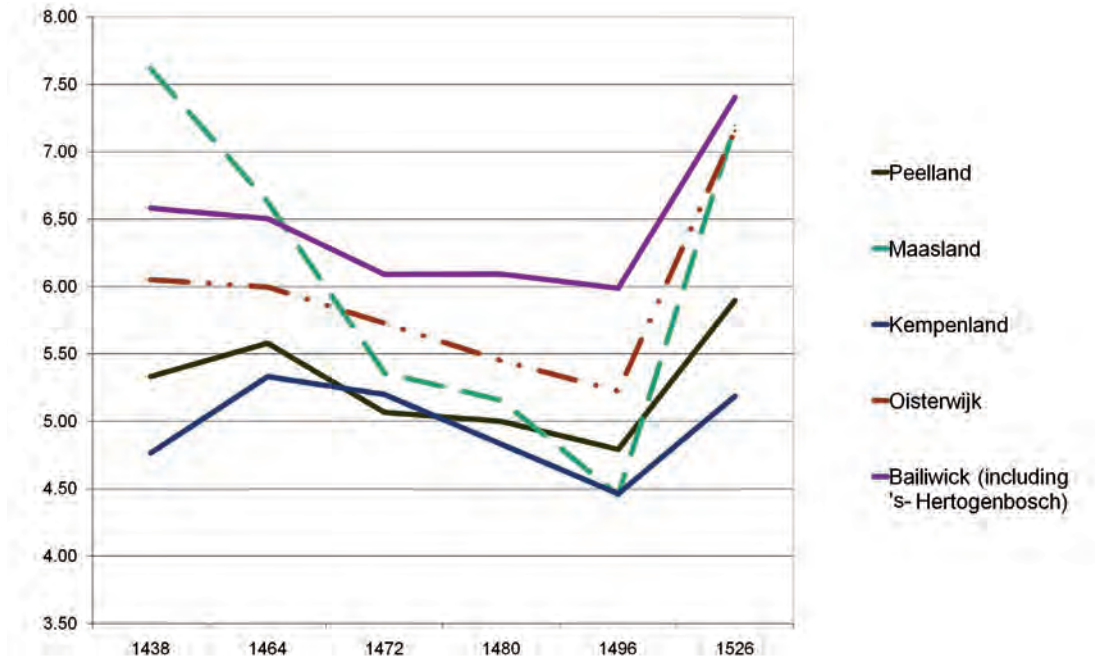
During the later Middle Ages there were more settlements with fairs than with markets. They numbered twenty-two in total. A full list of all the fairs held in the Bailiwick can be found in Appendix 2. However, the year in which some of them began is not known (before 1670). All the settlements with a market also had a fair, but not the other way around. However, the market and the fair did not necessarily originate in the same year. Most fairs seem to have originated at an earlier date than the markets. All settlements which had fairs but no markets were located in the Peelland quarter, apart from one in the Oisterwijk and one in the Kempenland quarter. None of these had been granted urban privileges. Since many more fairs were situated in the Peelland than in any other quarter, the distribution of fairs was anything but equal. Whereas the markets seem to have been relatively evenly distributed, the fairs were not. This far higher number of fairs may have been due to demographic, economic, geographic, topological, and/or institutional factors, which will be discussed successively. Moreover, because fairs occur only on specific dates throughout the year and on the same day of the week, the temporal distribution may provide an important explanation for the geographical distribution. The temporal distribution will therefore be explored after the various spatial explanations.

DEMOGRAPHIC EXPLANATION If there is a demographic explanation for the unequal distribution of the fairs within the Bailiwick, it could lie in the fact that the population density in the Peelland area was higher than in the other quarters. In order to test whether this was the case the hearth taxes which were used to rank the largest settlements were used again, but this time to calculate the total number of hearths (households) in each quarter. These totals were then divided by the surface area of the Bailiwick to calculate the number of hearths per square kilometre. The surface area of the Bailiwick was calculated with the *Regionale Kerncijfers Nederland* of the *CBS* (Statistics Netherlands) for the year 2008.[25] The surface area of all the municipalities within the medieval borders of the Bailiwick were added together to arrive at totals for their respective medieval quarters. This is the quickest and most accurate way of calculating the surface area. Since it was used merely to compare one quarter with another any slight variations will have no significant impact on the outcome.

Graph 4 shows that the population density was roughly similar for all the quarters. 's-Hertogenbosch has been omitted from the graph as it had a much higher population density because of its urban nature (49 to 76 hearths per square kilometre) and, if included, would have prevented the differences between the quarters from showing. If the Peelland quarter did indeed have a high population density it would have shown in the graph as the upper line. However, in this case, the Peelland quarter falls within the lower ranks, which means that a high population density is not a likely reason for the unequal distribution of the fairs.
Another possible demographic explanation is that the larger settlements all had fairs and that there were simply more larger settlements in the Peelland quarter. If we refer back to Graph 1, there is indeed a larger number of large settlements in the Peelland quarter. However, as in the case of the markets, larger settlements need not necessarily have a fair. For instance, Heeze and Leende (748 hearths), Heeswijk-Dinther, Nistelrode, and Heesch (554 hearths), Deurne and Vlierder (316 hearths) do not have a fair, whereas Geldrop (135 hearths), Valkenswaard and Dommelen (168 hearths) and Veldhoven, Zonderwijk, Oerle and Meerveldhoven (207 hearths) do. Having ruled out these two demographic explanations for the unequal distribution of fairs in the Bailiwick it is unlikely that the main cause of this unequal distribution was demographic. The next section will explore whether it could have been economic.

ECONOMIC EXPLANATION Another reason for the high number of fairs in the Peelland quarter could be the relatively high agricultural production. As explained in section 3.1.2., the soil composition of the Peelland quarter did not differ significantly from that of the Kempenland and Oisterwijk quarters. Most of the soil in the Bailiwick was sandy with some high concentrations of peat (www.bodemdata.nl). There are more peat areas in the Peelland quarter than in the rest of the Bailiwick. Peat, however, is not an indicator of larger agricultural production in this area. Moreover, the economic reasons put forward for the establishment of markets do not explain the unequal distribution of fairs either.

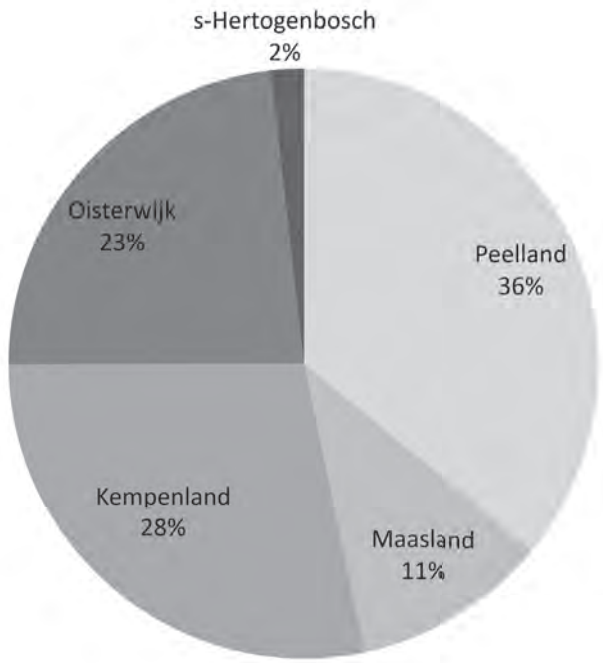
GEOGRAPHICAL EXPLANATION According to Unwin (1981, 240), rivers formed an obstacle for regional trade in medieval England, which usually went across land rather than water.

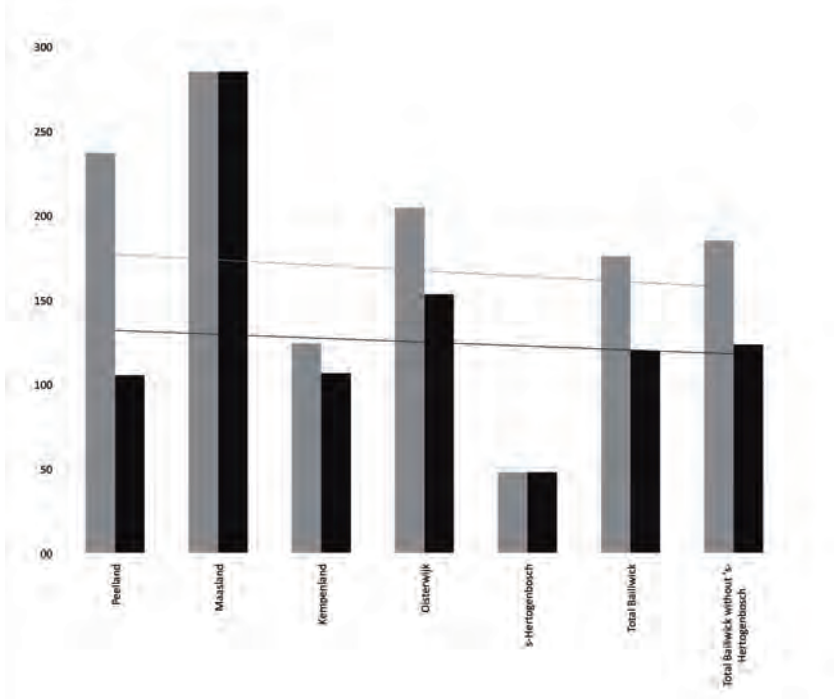


Graph 4: Number of hearths per square kilometre in the four quarters of the Bailiwick.

[25] For more details about surface areas and hearth taxes see Chapter 3.

Graph 5: Surface area of the four quarters of the Bailiwick and the freedom of 's-Hertogenbosch as a percentage of the total surface area of the Bailiwick.





Graph 6: Number of hearths per square kilometre in the four quarters of the Bailiwick.

Rivers formed an obstacle because they had to be crossed and this was only possible at a bridge or a fordable place. Otherwise a longer road would have been necessary to go from a settlement on the left bank of a river to a settlement on the right bank. Settlements on either side of a river could therefore easily have held markets on the same day of the week without competing with each other. Unwin also argues that administrative boundaries, at least in Nottinghamshire, also acted as economic boundaries due to geographical and economic constraints. In contrast, it appears that in the Bailiwick rivers were less of a constraint and more of a means for reaching a fair. Many settlements in the Bailiwick relied on the river as the main transport route. Because of the expected importance of the topology in explaining the location of markets, we must explore whether this elucidates the distribution of the markets (as well as the fairs) in greater detail in the last section of this chapter. This section will combine the evidence of the spatial location of the markets and fairs and the evidence of the roads and waterways and use the Space Syntax methodology to determine whether there is any topological explanation for the distribution of markets and fairs.

TOPOLOGICAL EXPLANATION The Bratton method is not able to provide a topological explanation for the distribution of fairs in the Bailiwick. This is due to the uneven distribution of fairs throughout the region with a relatively large percentage in the Peelland quarter.
However, when we examine another spatial property – surface area – in Graph 5, we discover a possible explanation for the high number of fairs in the Peelland quarter: the Peelland quarter has the largest surface area of the four quarters of the Bailiwick.

Surface area on its own, however, does not mean much as we need to look for a possible correlation between surface areas and the total number of fairs in a quarter. Or in other words, we need to calculate the amount of square kilometres served by each fair (or market) per quarter. The results of these calculations can be seen in Graph 6.

This graph shows that the fairs in the Peelland quarter served a less than average area. In other words, there are more fairs per square kilometre here than in other areas. The graph also shows that fairs in the Kempenland quarter served a smaller than average area. The fairs in the Oisterwijk quarter, and even more so in the Maasland quarter, served a much larger than average area. Since the number of settlements with a fair is greater than those with a market, the fairs, on average, serve fewer square kilometres. The large difference between the number of fairs and markets is most pronounced for the Peelland quarter.

INSTITUTIONAL EXPLANATION Which institutional factors might have influenced the establishment of a fair in a particular settlement or village? The first consideration might have been whether that settlement or village had privileges, giving it a higher administrative status. The second might involve the local lord, who may have established fairs to increase his revenue. These two factors will be discussed successively.
Table 5 lists the names of settlements with privileges. Most of them had a fair, apart from Mierde. However, there are nine that had fairs but no privileges (Aarle-Beeck, Asten, Boxtel, Budel, Geldrop, Mierlo, Son, Tongelre and Valkenswaard). There are, however, a few problems regarding the privileges. It has been argued that more settlements had been granted privileges but had not survived, as a result of which there is no record of exactly what these privileges might have entailed (Van Asseldonk 2002). Because of the lack of certainty as to which settlements had privileges and which had not, privileges can hardly be considered as an adequate explanation for the establishment of a fair.
The other possible institutional explanation for the establishment of fairs is ownership. Markets and fairs were an important source of income for the local lord because of the taxes which were charged to buyers and sellers. It was advantageous for a local lord to issue market and fair charters as they increased his income. However, this still does not adequately explain the larger number of fairs in the Peelland quarter. If the Duke of Brabant had wanted to increase his income he could have established more fairs in every quarter of the Bailiwick. Granting charters for fairs, however, is not only a source of income but also a means of stimulating trade. Market and fair freedoms encouraged more people to move to particular settlements because of the tax advantages. The Duke of Brabant may have wanted to promote a more equal spread of inhabitants

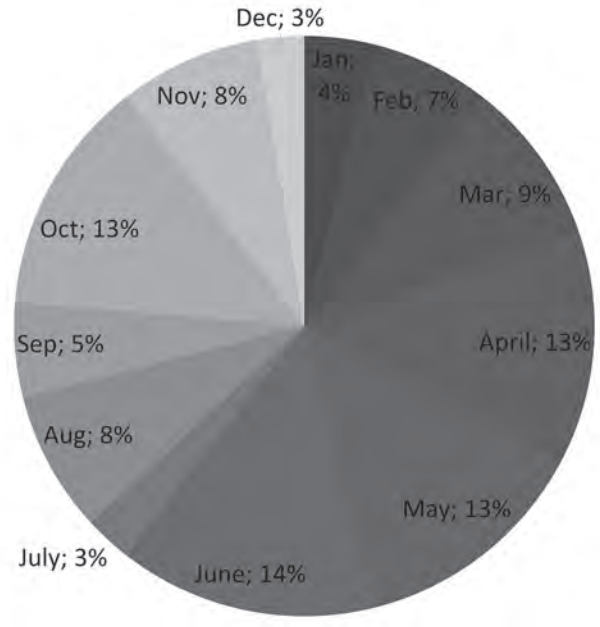
across the Bailiwick. By establishing more fairs in the Peelland quarter he may have tried to promote trade and settlement in that particular area. Rutte (2005b, 151), however, argues that it was political rather than economic motives that were the decisive factor in the establishment of towns during the thirteenth century: they provided the Duke of Brabant with a means of extending his influence. As a result, only a few settlements managed to become economically viable in the following centuries.
So far, the demographic, economic, geographical and institutional factors have not provided a conclusive argument to explain the unequal distribution of fairs in the Bailiwick of 's-Hertogenbosch. The topological factor, however, is inconclusive and will be explored further in the final section of this chapter.
The possible importance of the temporal distribution of fairs that we hinted at earlier will now be explored further.

5.1.2.2. **TEMPORAL DISTRIBUTION** As the previous section has shown, we know where the fairs were organized. This section will show that we also have a rough idea when some of the fairs originated and an even better idea of the dates in the year when they were held. This makes it possible to create a calendar of all the fairs in any one year. Since the dates of most fairs are recorded with the liturgical calendar – which varies from the present-day civil year (calendar year) because the dates of Easter, the most important feast of the year, are variable – it is impossible to create a single calendar which can be used every year. The dates of Easter and the connected feasts and periods of Lent, Ascension Day, Pentecost and Corpus Christi could vary by about a month. The fairs, which are recorded on the basis of a recurrent day, such as the feast of St John, still change from year to year, as the Tuesday before the feast of St John does not fall on the same date every year. As a result of this recording method some settlements seem to have more fairs than they actually held. For instance, a seventeenth-century historian (Van Oudenhoven 1670b) writes that a fair in the village of Son was held on the Sunday after Assumption (15 August), whereas a later historian (Mastboom 1935) says that it was held on the Sunday before St Bartholomew (24 August). This is actually the same day. This situation occurred for several fairs. A simple list of fairs would have noted two fairs for the village of Son in August whereas there was only one.

To be able to analyse the cycle of fairs correctly it is essential to create some sort of calendar with the primary aim of finding out whether there was any particular order in the fairs of the Bailiwick. Did merchants, for instance, travel from one market to the next in one continuous loop? It would of course have been possible to create a calendar for every single year between 1185 and 1568, but that would have been far too time-consuming and would not have significantly improved the understanding of the cycle of fairs. Here I used samples of seven years, distributed over 50-year intervals. I chose 50-year intervals because this period is short enough to witness changes in the number of fairs being held and long enough to include many years in which no changes occurred. The first sample year is 1255, because this is when the first markets were established, the next are 1305, 1355, 1405, 1455, 1505 and 1555. In this way I could exclude the round years 1250, 1300 etc. as they could be leap years. Moreover, some fairs were established in the years just after the turn of a century and in this way the fairs would be included in a close sample rather than one from 50 years later. To create these seven calendars I used Strubbe and Voet's (1960) publication on the chronology of the Netherlands in medieval and modern times. As a result of the liturgical calendar, some fairs clashed in one year but not the next, but even if they did not clash entirely, many were held in the same periods throughout the year. The weeks around Ascension Day, Pentecost and Corpus Christi were especially popular, as well as Lent and the month of October, which was to be expected since it is the main month for the harvest of fruits, at which time, if the year had been good, many people would have had a surplus of produce to trade or sell.
The seven calendars[26] are useful for highlighting the cycle of fairs within the Bailiwick. They also highlight clearly the clustering of fairs in particular weeks of the year. They do not, however, enable us to see at a glance how fairs were staggered throughout the year. One way to illustrate the equal staggering of fairs is to average out the changeable feast days to Ash Wednesday in February, Reminiscere Sunday in March, Easter in April and Pentecost in May. Table 6 shows the staggering of fairs in the period with the most fairs, viz., the middle of the sixteenth century, whereas Graph 7 shows the temporal distribution of fairs in the same period in percentages.

Table 6: Distribution of fairs throughout the year in the middle of the sixteenth century.

Town	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
Aarle-Beeck			1			1							2
Asten		1			1								2
Bergeijk				1		1				1			3
Boxtel				1									1
Budel					1	1				1	1		4
Eersel			1	1				1			1		4
Eindhoven	1	1		1		1	1		1	1			7
Geldrop	1			1		1			1				4
Helmond			1		1					1			3
Hilvarenbeek		1		2		1			1				5
Lommel				1	1					1			3
Mierlo			1								1		2
Oerle		1	1		1	1	1	1					6
Oirschot	1			1	1						1		4
Oisterwijk					1			1		1			3
Oss						1			1				2
s-Hertogenbosch			1	1		2		1		1		1	7
Sint Oedenrode					1					1			2
Son			1					1			1		3
Tongelre					1					1		1	3
Valkenswaard		1				1					1		3
Waalwijk					1			1		1			3
Totals	3	5	7	10	10	11	2	6	4	10	6	2	76
Percentage	4%	7%	9%	13%	13%	14%	3%	8%	5%	13%	8%	3%	100%



Graph 7: Temporal distribution of fairs in percentages of the total number of fairs in the Bailiwick.

[26] See Appendix 3.

The number of fairs peak in the months of April, May and June and in October. Most settlements had a reasonably even temporal spread of fairs, and only the settlements of Hilvarenbeek and 's-Hertogenbosch had two fairs in one month.

This relatively logical temporal distribution already provides an indication that fairs could not just be held on any date. In principle, they were not allowed to clash with another fair in the vicinity. Moreover, even if one particular fair did not clash with another within the Bailiwick it might have still found itself in direct competition with one just outside it. Indeed, Oirschot was denied a fair on the first Thursday and Friday after Easter because there was already a fair in Hoogstraten on these days, even though Hoogstraten was situated outside the Bailiwick. Oirschot was therefore granted a fair on the Monday and Tuesday after Low Sunday. Moreover, one of 's-Hertogenbosch's fairs was moved in 1464 from 19 to 22 October to 23 to 31 October because the earlier dates clashed with those of the market in Arnhem (SAH 3882 = SASSEN 513: d.d. Brugge 1463/4 jan 2). This shift, however, caused a clash with Oisterwijk's October fair, but this apparently was of no consequence.

's-Hertogenbosch's August fair also clashed with Oisterwijk's fair. In addition, Sint-Oedenrode's October fair clashed with Tongelre's. These were the only clashes. Because of the popularity of the spring months and October, clashes between fairs seem to have been inevitable but they only occurred on three occasions. It therefore appears that there was some temporal planning involved in the establishment of fairs, especially in view of the temporal closeness of the fairs in October at Helmond – Budel – Tongelre, and in June at Helmond – Budel - Eindhoven – Oss - Lommel - Geldrop – Hilvarenbeek. The fairs at Helmond and Budel seem to have been related in a temporal sense.
This section has shown that fairs were planned temporally as well as spatially. In other words, they were not organized at random and there seems to have been a clear pattern behind them. It is of course conceivable that this pattern evolved organically but it is more likely that someone with an overview of the entire Bailiwick, such as the Duke of Brabant and his administrative entourage, organized the markets and fairs and only granted rights to new markets and fairs if they fitted in with the system of markets and fairs that had already been established. Markets and fairs were,

Settlement	Weighing House	Clothmakers' Hall	Meat House	Bread House
's-Hertogenbosch	1299	1275	1310	(1520?)
Oss		1340		
Eindhoven	1340	<1340	1339	
Oisterwijk	1340	(1441?)		
Oirschot	1659 (but probably earlier)	1340	Meat sold at the market at least from 1489	
Tongelre		Built from 1340		
Sint-Oedenrode	1403			
Helmond	1425			
Lommel	1415-1427			

Table 7: Other economic institutions in the Bailiwick of 's-Hertogenbosch.[27]

[27] Mainly after Van Asseldonk (2002), 284 and Van Uytven (1992), 78, but also Frenken (1975), 168, Indekeu (1990), 91, Lijten (1991), 104-105, 195, Van de Ven (1993), 11, Arts (1994), 96-97 and BHIC 1107 Microfiches van archivalia in Algemeen Rijksarchief Brussel over Noord-Brabant / Hertog van Brabant: cijns - en leenbocken, no. 5038, p. 91v and ONB no. 576: d.d 1299 jan 15 and no. 825: d.d. 1310 aug 6

however, not the only location for buyers and sellers to trade in the Bailiwick. The next section will explore the other economic institutions.

5.1.3. **OTHER ECONOMIC-ADMINISTRATIVE SPACES** Apart from markets and fairs, there were other locations where buyers and sellers could trade in the Bailiwick, such as weighing houses, clothmakers' halls, meat houses, bread houses and mills. The first four were only found in the settlements and villages whereas the fifth could also be found outside the immediate boundaries of the settlements.
These facilities are mentioned in the archival records because rent had to be paid for them. The archival records specify whether rent had to be paid for the entire facility or only for the part owned by the Duke of Brabant.
Table 7 lists the settlements which had a weighing house, a clothmakers' hall, a meat house and/or a bread house and the year in which they first appear in the archival records. This table shows that, roughly speaking, the towns that were among the first to have a market were also the towns that played host to one or more of the other economic institutions. Most of the economic institutions were located in the capitals of the quarters. However, once again, Eindhoven seems to have taken precedence over Oirschot in the Kempenland quarter. Moreover, it appears that a weighing house was established in Helmond only twenty years after one had been established in Sint-Oedenrode, though both settlements are situated in the Peelland region. Sint-Oedenrode, however, was granted its market-charter some twenty-five years after Helmond. Table 7 also shows the importance of cloth production in the Bailiwick, since there was at least one clothmakers' hall in each quarter save for the Peelland. Meat houses do not seem to have been particularly popular as only the two larger settlements of 's-Hertogenbosch and Eindhoven had one. It is likely that meat was sold at the market in the other settlements, as in the case of Oirschot from 1489.

5.2. **INTEGRATING MARKETS AND FAIRS** Products do not appear at a market or fair by themselves; they need to be transported from the producer to the market or fair, or from one market or fair to another, or from the market or fair to the consumer. In the medieval period there were two possibilities for transporting goods and integrating markets, fairs, producers and consumers: road or river. These will now be discussed.

5.2.1. **THE ROAD SYSTEM** Chapter 4 discussed how the map of the major roads in the Bailiwick had been drawn and focused briefly on the interdependence of roads, routes and settlements. This interdependence will now be explored primarily in relation to settlements with a market and/or a fair.

All the market and fair settlements were situated on one of the main roads. Some were merely a point along a route whereas others, such as Oirschot, Eindhoven, Oisterwijk, 's-Hertogenbosch and Eersel, were situated at a crossroads. Would it then be implausible to observe that four of those crossroad settlements were the first to have a market? Accessibility appears to have been a key factor in the establishment of markets and fairs. However, good accessibility did not automatically lead to the establishment of a market, as the villages of Westelbeers (on the crossroads of the roads between Hilvarenbeek and Eersel and Oirschot and the southern border of the Bailiwick) and Leende (on the crossroads of the roads to the southern border of the Bailiwick from Eindhoven and Mierlo) illustrate. This suggests that the establishment and profitability of markets and fairs are influenced by other factors as well . On the other hand, the importance of accessibility has shown that the establishment of a market or fair was definitely not due solely to a random choice by a local lord. Campbell has shown that urbanization was already linked to the development of regional specialization and integration in the thirteenth century (Campbell 1988). Hence, the essential urban institutions of markets and fairs can also be linked to this regional integration and an integrated transport system. The final section of this chapter will discuss the integration of urbanization, markets, fairs and street systems in more detail.

5.2.2. **THE SYSTEM OF WATERWAYS**
Road transport was not the only means of transport within the region. Waterways were important for regional as well as interregional transport. The three main rivers in the Bailiwick of 's-Hertogenbosch are the Aa, the Dommel and the Leij.[28] These rivers – all rainwater rivers – join at 's-Hertogenbosch to form the Dieze. All the rivers and streams in the

[28] I will discuss their navigability later on in this section.

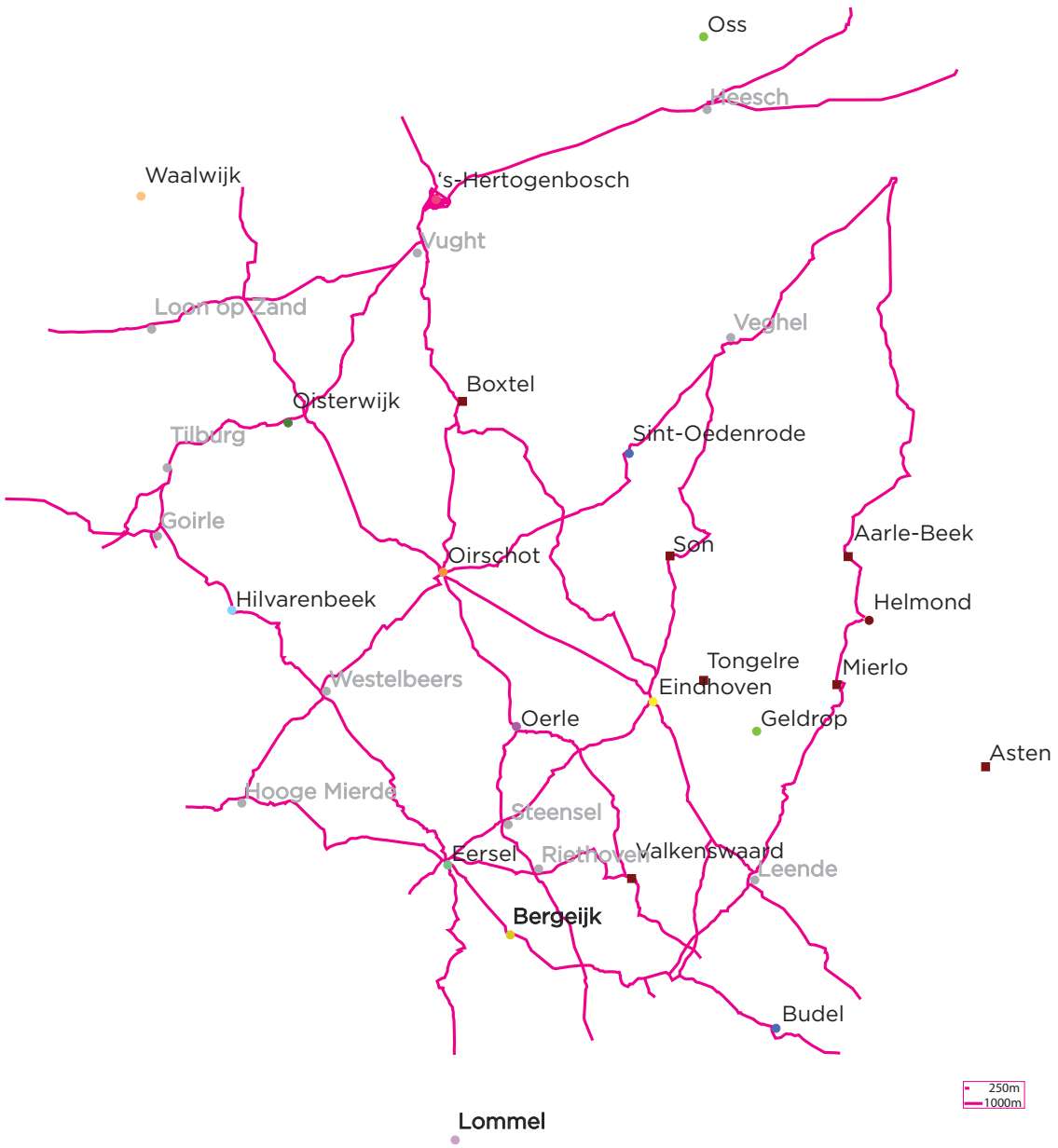


Figure 13: Trade routes in the Bailiwick in 1550.

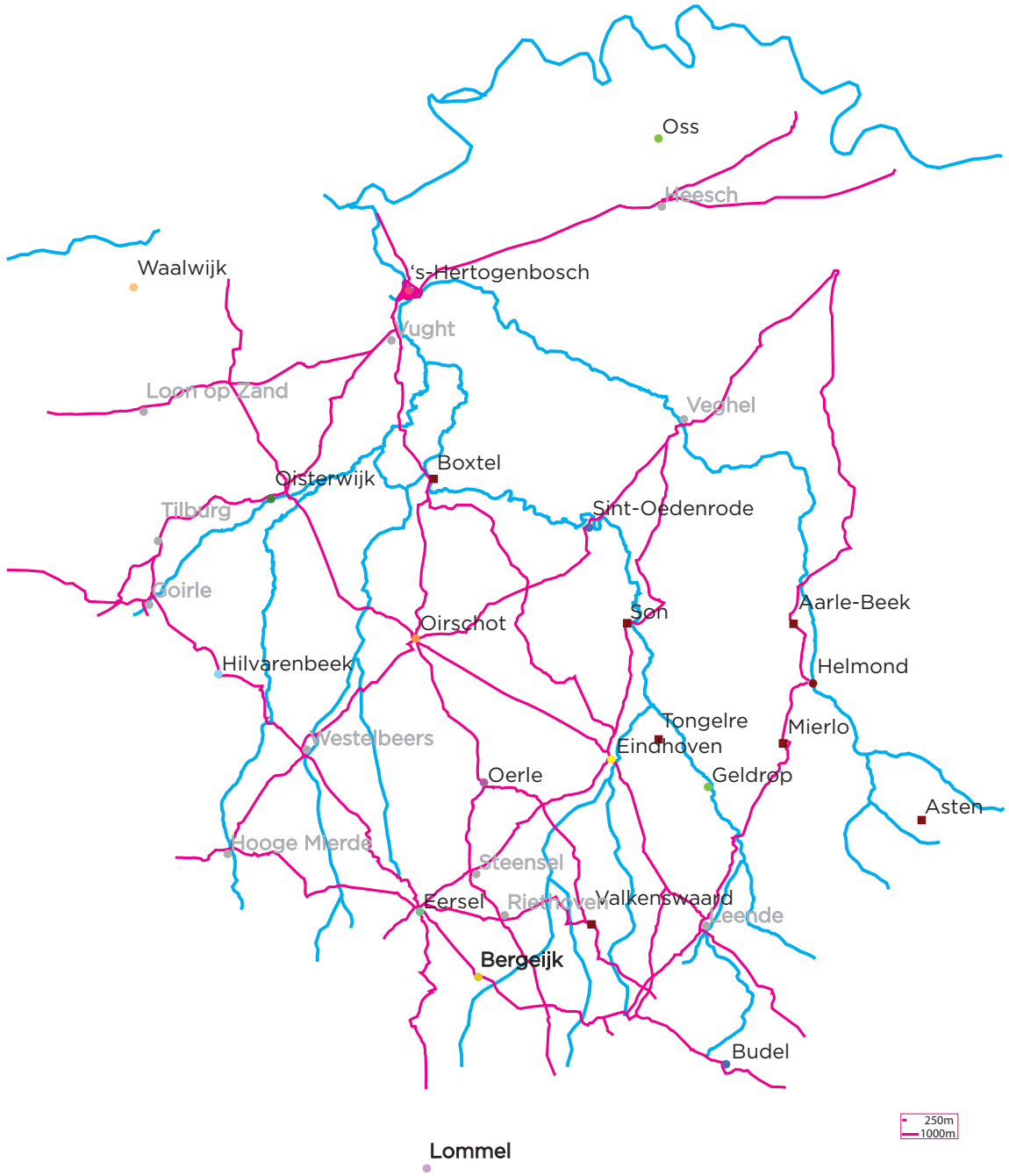


Figure 14: Waterways and roads in the Bailiwick of 's-Hertogenbosch (legend: red lines = roads in 1550; blue lines = rivers; squares = towns with fair; dots = towns with market and fairs; grey = settlements without market or fair).

Bailiwick flow to the north-west, connecting the Bailiwick with the river Meuse, which gave 's-Hertogenbosch access to many interregional contacts, as Chapter 4 has illustrated. The seaways and ports of Zeeland and Holland (Dordrecht in particular) and the river Meuse connected 's-Hertogenbosch with Bruges, the main economic hub in Europe (Blockmans 2010, 275-282). Moreover, 's-Hertogenbosch was linked with the Rhineland (Cologne), the Meuseland, and even Norway and Sweden through the rivers Meuse, Rhine and Waal (Verhagen and Kerckhoffs 1998, 22).

's-Hertogenbosch was ideally situated at the confluence of the regional rivers Aa, Dommel and Leij as well as the interregional rivers Meuse, Waal and Rhine. However, this prime position had some serious disadvantages. 's-Hertogenbosch and its surrounding areas are located at the lowest point of the Meuse. When the Meuse broke its banks in springtime because meltwater carried by the Rhine had spilled over into the connecting river between the Rhine (Waal) and the Meuse, the entire area often flooded. This could have been prevented by blocking the direct connection between the Waal and the Meuse at Heerewaarden but the economic importance of this connection was considered so important by successive settlement councils of 's-Hertogenbosch that they simply put up with the inconvenience (Hoogma and Steketee 1996, 63). Waterways, and also roads, had to be maintained by the users of the adjoining plots. Administrators and controllers from the community performed bi-annual inspections (schouw) of the maintenance of all waterways and roads, and anyone who had failed to maintain the piece of infrastructure they were responsible for was fined and ordered to repair any damage. If they continued to default the inspector himself arranged for the repair to be carried out at the user's expense (Van Zalinge-Spooren in preparation, 113). A similar structure was in place for the larger rivers but it was ordained by the town of 's-Hertogenbosch (Van Zalinge-Spooren in preparation, 116). This shows that 's-Hertogenbosch relied on the river Aa as a transport route.

This raises the question whether the waterways of the Bailiwick could actually be used for anything other than irrigation, as we need to consider the possibility that some of them may actually have been unnavigable in medieval times. In fact, most of these waterways are currently unnavigable for reasonably sized vessels, but this was not the case in the medieval period. Most of the evidence for the navigability of rivers comes from sources and literature on the transportation of wood and peat. In the Middle Ages fuel accounted for a large percentage of the bulk goods that needed to be transported, and peat and wood were the main source of fuel. Since these two types of fuel were transported by river within the Bailiwick and because evidence of their transport has survived they represent an important source of evidence for the navigability of the river. First, the evidence for the peat transport will be discussed and secondly the evidence for the wood transport.

5.2.2.1. THE TRANSPORT OF PEAT

The demand for large supplies of peat rose dramatically during the fourteenth and fifteenth century because the ever-increasing population of 's-Hertogenbosch needed fuel. Fortunately, there are some sources that provide some indications of how 's-Hertogenbosch was supplied with peat (Boeren 1963; Hoogma and Steketee 1996; Van der Lee 1999; Van Asseldonk and Leenders 2003). Some publications focus on western Brabant but can provide some indirect references (Leenders 1983, 1986).

The Peel area, on the eastern border of the Bailiwick, was the main source of peat for the Bailiwick as a whole and 's-Hertogenbosch in particular. River transport along the Aa from the Peel area was, in principle, possible, but highly problematic. Regular sailings using 'pleyten' – flat-bottomed boats fourteen metres long and two metres wide – were possible only as far as Erp (just east of Veghel) (Hoogma and Steketee 1996, 83). The currents were much faster compared with the Dommel because of the difference in altitude between the Peel and the settlement of 's-Hertogenbosch. The presence of windmills, fords and different local interests hampered improvements that would have made the river more suitable for transport. During the wars with Guelders and the Eighty Years' War the need to control this transport route became increasingly urgent (Adriaenssen 2007, 101). Though agreement was reached on widening the Aa at a convention on 5 August 1535, it was not until the seventeenth century that anything was actually done (Hoogma and Steketee 1996, 86).

It was mainly the fords which hindered the improvement. Because these fords were points where busy roads crossed the river Aa, the river could not be deepened there without the addition of extra facilities such as bridges.

The other main river in the Bailiwick was the Dommel. Millers blocked this river south of Boxtel with their dams because the steady flow and the fall made it suitable for the building of watermills upstream (Boeren 1963, 249). The Dommel was, however, navigable between Boxtel and 's-Hertogenbosch for ships with a shallow draught. The freighters also used 'pleyten' to transport their wares between the settlements and the countryside. Because of the many meanders in this stretch of river, the Dommel had to compete with the road between Boxtel and 's-Hertogenbosch (Boeren 1963, 250).

The Dieze was extremely important for the supply of bulk goods to 's-Hertogenbosch. The sheriffs of Oisterwijk and 's-Hertogenbosch were made jointly responsible for the upkeep of the Dieze by Duke John III (Van de Ven 1993, 13). The Dieze, however, fell into disrepair from the beginning of the fifteenth century. In order to improve the transport link between the Dieze and the Meuse a new canal was dug to the west of the Dieze between Engelen and the Vughterstroom crossing and the second wall in 's-Hertogenbosch between 1441 and 1449. From around 1420 a canal had been dug between Loon op Zand and 's-Hertogenbosch, primarily for the transportation of peat. Despite its shallowness and the many locks and ownership struggles it was very well used and was able to supply 's-Hertogenbosch with peat well into the sixteenth century, when the peat bogs of Moergestel, Loon op Zand, 's Gravenmoer and the Moerputten started to become depleted (Van der Lee 1999).

Peat could be used only as fuel. Wood, on the other hand, had many more uses and was therefore required in even greater quantities than peat. Because it was so bulky, wood was also transported mainly by river.

5.2.2.2. THE TRANSPORT OF WOOD

The settlement of 's-Hertogenbosch and the main institutions (convents, leper house, hospital) owned plots of land which furnished them with timber, firewood and wood for utensils. They either used the wood to provide for their own needs or they sold it. These plots were located in the Bailiwick in places such as Schijndel, Vught, Rosmalen and Gestel (near Eindhoven). The main type of wood grown and sold was oak (for timber), but birch (for utensils and firewood), walnut (for meat benches), willow (for clogs, scaffolding and mills), alder and poplar also appear in the records. Apart from using their own wood, settlements and institutions bought wood, but seldom from a local source. Most wood was imported from further afield. Imported oak was of a better quality than local oak (Vink 1990). Some of the transport routes for the imported wood ran across land but most made use of the main and local rivers. Some of the wood was bound together to form a raft which could then carry the rest. Most of it came through Wesel (where all the wood from the Rhineland area was collected) and through Dordrecht (which had the staple right for wood in the later Middle Ages). During the fifteenth and sixteenth century 's-Hertogenbosch started to import its own wood. Most of the wood in the Bailiwick was landed in Voorne, Maren or Lith and transported further inland by road or by the river Dieze to 's-Hertogenbosch. The records mention many occasions on which wood was transported over shorter distances by horse and cart. Wood was normally transported by river over longer distances. Many times, however, the records mention that the river was too shallow for the transport to go ahead. If the rivers were deep enough it would have been possible to reach most places within 's-Hertogenbosch because the Dieze cut through most parts of the town (Vink 1990).

Having shown the navigability of at least part of the rivers, let us return now to the relationship between settlements, roads and waterways.

Figure 14 shows the rivers in the Bailiwick as well as the roads and the main settlements. It illustrates the relationship between settlements and roads, as explained in the previous section, and their relationship with the waterways. A large number of the main settlements in the Bailiwick were situated on a crossroads or on the crossing of a road and river or even on both. Settlements were never just situated on a river. These observations apply to settlements with a market or a fair as well as those without. This illustrates the fact that settlements were often founded at 'strategic' points (Lilley 2007, 232-233), such as a bridge or a ford. However, as discussed in the section on roads, the opposite is not necessarily true either: if a settlement was situated at a strategic location, this did not automatically mean that it had a market or a fair.

Being situated at a 'strategic' point was particularly important for 's-Hertogenbosch as the link with the main rivers Meuse and Rhine connected the hinterland and the town itself with the wider world. Goods had to be transferred between the smaller vessels that

29 For more information about the interregional connections of 's-Hertogenbosch and the Bailiwick see Chapter 4.

sailed the rivers of the Bailiwick and the larger vessels which sailed towards the Rhineland, Holland and England.[29] The 's-Hertogenbosch infrastructure had to be constantly adapted and improved so that it could continue to play this important role in the distribution of goods (Janssen 2011, 17-18). A harbour was established, and waterways were kept open and the flow managed by canalization (Hoogma and Steketee 1996). More information about the waterways and the harbour of the town of 's-Hertogenbosch is provided in Chapter 6.

5.2.3. **ROAD OR WATERWAY?** This section has discussed the possibilities for road and river transport in the Bailiwick of 's-Hertogenbosch, but it has not really provided any evidence for the importance of one form of transport over the other. Ballaux and Blondé (2007, 58) have stressed that transport by road and inland waterways was not as primitive or as expensive as previously thought. As Chapter 4 has illustrated, road transport during the fourteenth century was relatively cheap, even compared with the eighteenth century, and transport rates by land and by river were comparable, especially in areas where roads were metalled and river transport was difficult. Unfortunately, land transport was nowhere near as well organized as transport via the inland waterways (Ballaux and Blondé 2007, 65). The lack of detailed information about the former therefore makes it difficult to make a direct comparison between the two. Interregional trade was important but it did not 'fuel' a city (Galloway et al. 1996). The fuel (wood, peat, charcoal etc.) had to come from the immediate hinterland and the easiest and cheapest way to transport it was usually by road. A large percentage of transport therefore took place over shorter rather than longer distances. The need for fuel influenced the transport market more than the need for food or building materials.

Farmers usually chose to transport their goods by road because of the availability of relatively cheap modes of transport on their farms. Moreover, it was easier to transport goods from door-to-door by road than by river (Ellmers 2007, 166). Transport by road was also more flexible and not restricted to a particular course. However, strong price fluctuations make transport difficult to cost. The cost of transport using horses for instance depended on the level of agricultural prices because the horses needed to be fed (Blondé and Van Uytven 1999, 148). I endorse the current viewpoint of most medievalists that medieval roads were adequate for the requirements of the economy and that there was quite a high level of internal trade (Harrison 1992, 240). The use of horses instead of oxen for drawing carts also increased the speed and range of market transactions (Harrison 1992, 254).

The previous sections have highlighted the possibilities of river and road transport within the Bailiwick of 's-Hertogenbosch. Road transport must have been the main type of transport for door-to-door deliveries and for smaller items.
Our analysis of the infrastructure of the Bailiwick of 's-Hertogenbosch has already emphasized some of the possible topological reasons behind the establishment of markets and fairs in this region. Spatial analysis can, however, provide more substantiated arguments as it can highlight the hidden topological framework within a settlement or region. Space Syntax, as a form of spatial analysis, can therefore complement this research on the network of markets and fairs by drawing attention to hidden topological factors. This is important because previous authors, such as Campbell (1988), have already mentioned the integration of urbanization and the economy, but so far this has not been analysed in detail. Spatial analysis or Space Syntax can fill this gap.
Since both the road and the river network play an important part in the transport of goods it is important to analyse both. However, there are no precedents for the use of Space Syntax on river networks. This is because Space Syntax started out in The Social Logic of Space (Hillier and Hanson 1984) as an analysis based on complex manual calculations. The use of computers has speeded up these calculations and enabled the analysis of large settlements as well. However, the capacity requirements are so great that the analysis of even larger systems (such as whole regions) has only been possible in recent years (Turner 2009). It is therefore still only an assumption that Space Syntax can be used to analyse a waterway network as well. This assumption will be tested in this chapter. As stated, Space Syntax has been used before to analyse regional road networks, although not historic ones. The remainder of this chapter will first focus on the analysis of the road network because the results can be placed in a broader theoretical framework, and then, on the analysis of the network of waterways, and finally, on a joint analysis of the road and river network.

5.3. SPACE SYNTAX RESULTS[30]

5.3.1. **ROAD NETWORK** The map of the Bailiwick created in Chapter 4 was used for the Space Syntax analysis. As explained in Chapter 2, segment angular analysis will be applied. These segment maps are based on the fewest-line axial map. The first two maps (Figure 15) are a local normalized mean depth graph (radius 400, all of the settlements in the Bailiwick separately but as part of a region), and a global normalized mean depth graph (radius n, the entire Bailiwick as a whole).On the more local scale (radius 400) 's-Hertogenbosch has the highest integration value, which indicates that it was economically important in its own right and not only because of its region. The global graph (radius n) shows a high integration value for Oirschot but also for the road to Eindhoven and part of the road to Oerle.
This illustrates the importance of Oirschot as an economic centre for the region and the economic centrality of these roads. It does not mean that Oirschot was an important economic centre in itself; it was important only because of the Bailiwick that surrounded it.
These normalized mean depth graphs, however, are not sufficiently detailed or precise to substantiate these observations to a meaningful extent. The choice graphs will show more detail and fine-tune this analysis. This is also why choice graphs are favoured above normalized mean depth graphs in more recent publications, especially those that focus on regional analysis (Turner 2009; Vaughan et al. 2009). The normalized mean depth graphs do, however, provide a good first indication.

The choice graphs in Figure 16 therefore show a generally similar pattern: high choice values for 's-Hertogenbosch at the more local scales and high choice values for Oirschot at a more global level. However, the choice graphs show far greater detail, especially when zoomed in to the three typical settlements in Figure 17. 's-Hertogenbosch is the large settlement, Oirschot the mid-sized settlement, and Eersel the small settlement. This figure illustrates the point made in the previous section that 's-Hertogenbosch was economically important on its own, and not only because of its region. The normalized mean depth graphs are not sufficiently detailed to make the regional importance of 's-Hertogenbosch immediately apparent; the choice graphs do show this regional importance as 's-Hertogenbosch has high choice values across all scales. The location of the high choice values, however, does shift from the centre of 's-Hertogenbosch towards the road leading to Vught, showing its link with the Bailiwick. This is a logical shift because choice graphs highlight the main routes for the selected scale. A local scale will therefore show a focus on the topology within the town, especially for the larger settlements, whereas a global scale will show a focus on the region. In other words, analysis of a whole region on a local scale, i.e., within a set perimeter, is not as helpful when exploring the way the region functioned as a whole since the large number of streets in a large town will be the only ones that will be analysed. The analysis of a region on a local scale will therefore provide similar results to the analysis of a town on a global scale, i.e., the scale which analyses the behaviour of people visiting the town. Since 's-Hertogenbosch is the largest settlement by far in the Bailiwick any analysis with a scale lower than the size of the town itself will be useful for the analysis of the town's economic space but will make the results of the rest of the region less pronounced.

The zoomed-in choice graphs also show how the different settlements fit within a regional network. There are the larger settlements such as 's-Hertogenbosch which are economically important by themselves but also as part of the region. There are the mid-sized settlements, such as Oirschot, which are not economically important by themselves but are economically important for their immediate hinterland and the region as a whole. The smallest settlements, such as Eersel, are of economic importance only for their immediate hinterland and not by themselves or for the region as a whole.
Besides the information about the position of the various settlements the Space Syntax analysis provides information about the region as a whole. The choice values also seem to indicate that the main route from 's-Hertogenbosch to Eindhoven ran via Oirschot rather than the perceived shorter route via Boxtel.

The Space Syntax graphs can also shed light on the more administrative and economic factors of the Bailiwick, such as the markets

30 See Chapter 1 for more information on the theory behind Space Syntax and Chapter 2 for the methodology.

RADIUS 400 METRES

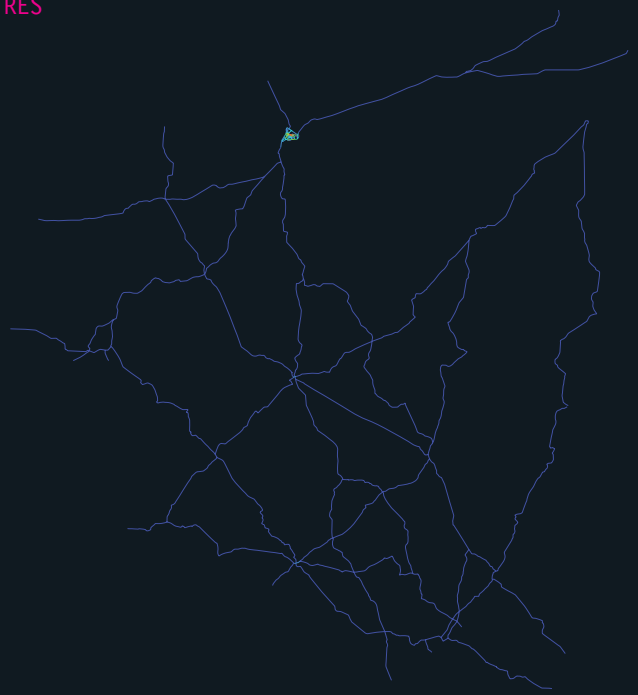
Figure 15a: Integration radius 400 metres of the Bailiwick of 's-Hertogenbosch in 1550.

RADIUS n

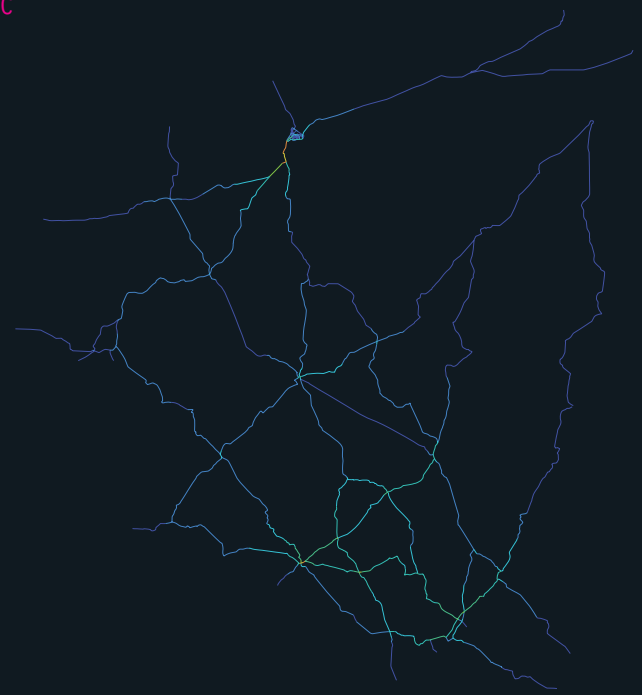
Figure 15b: Integration radius n of the Bailiwick of 's-Hertogenbosch in 1550.[31]

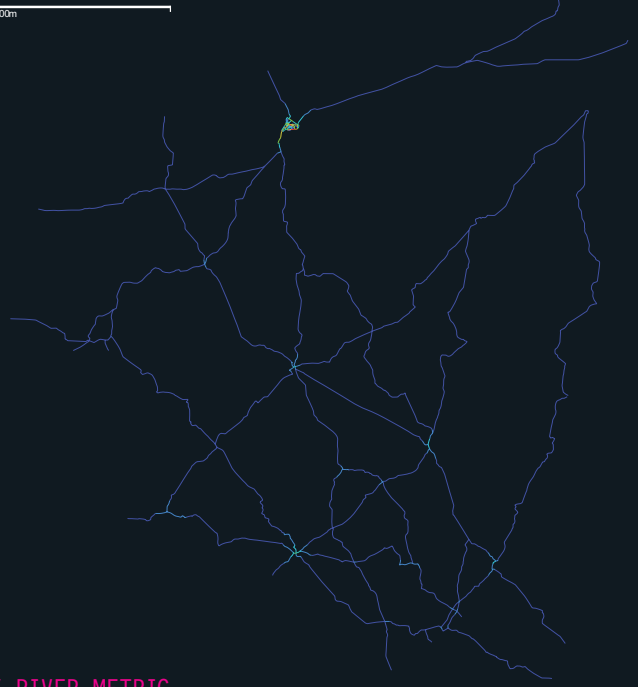
[31] Unfortunately, the changes to the scale caused by the export and import of the maps into the different analysis and GIS programmes could not be rectified. All measurements should therefore be multiplied by 20 to be correct (i.e., 400 metres corresponds to 8 kilometres). This explains why radius 2,000 metres corresponds to radius n (infinite) in this regional system. This scale problem occurs in all Space Syntax maps in this chapter. In order to be able to replicate the analysis using the same dataset it was thought best to keep using the original measurement and provide this explanation.

RADIUS 50 METRES

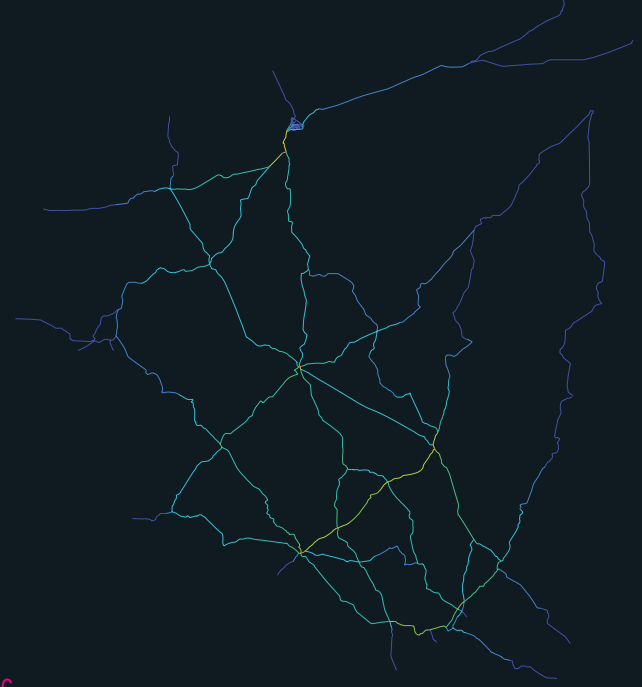


RADIUS 400 METRIC





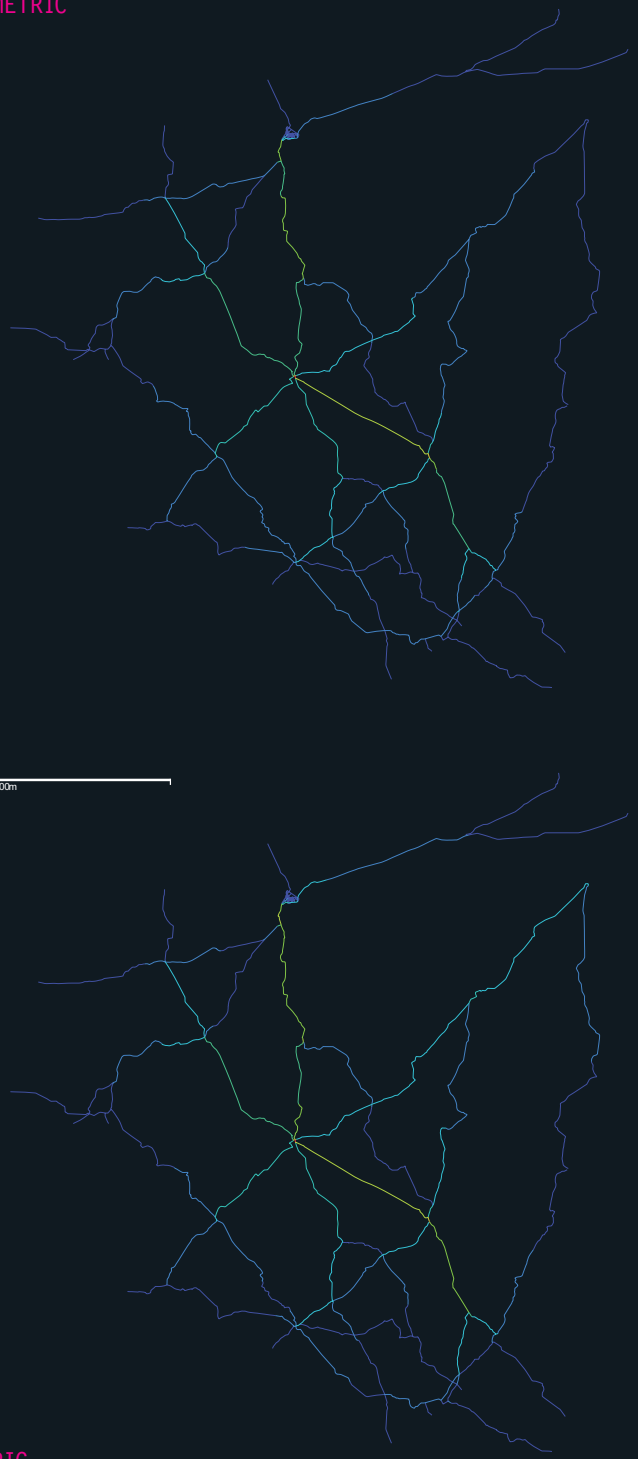
RADIUS 100 BY RIVER METRIC



RADIUS 800 METRIC

Figure 16: Choice graphs radius 50, 100, 400, 800, 2000 and n metric of the Bailiwick of 's-Hertogenbosch in 1550 (see footnote 31).

RADIUS 2000 METRIC



RADIUS n METRIC

METRIC RADIUS	's-Hertogenbosch	Oirschot	Eersel
50 M	Very high	Low	Very low
100 M	Very high	Low	Medium
400 M	High	Medium	High
800 M	High	High	High
2000 M	High	Very High	Low

Figure 17: Comparing choice values for three settlements (see footnote 31).

Integration radius n

Choice radius n

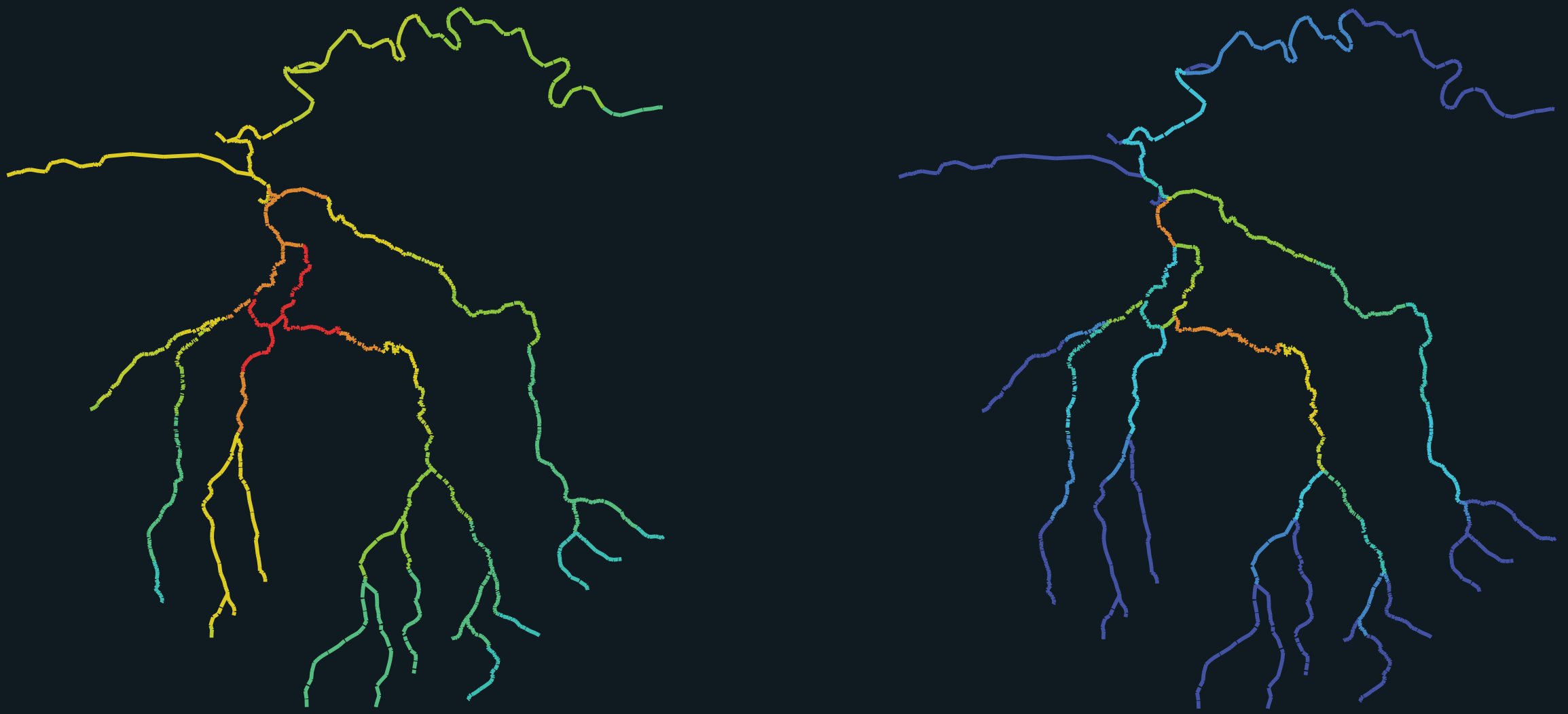
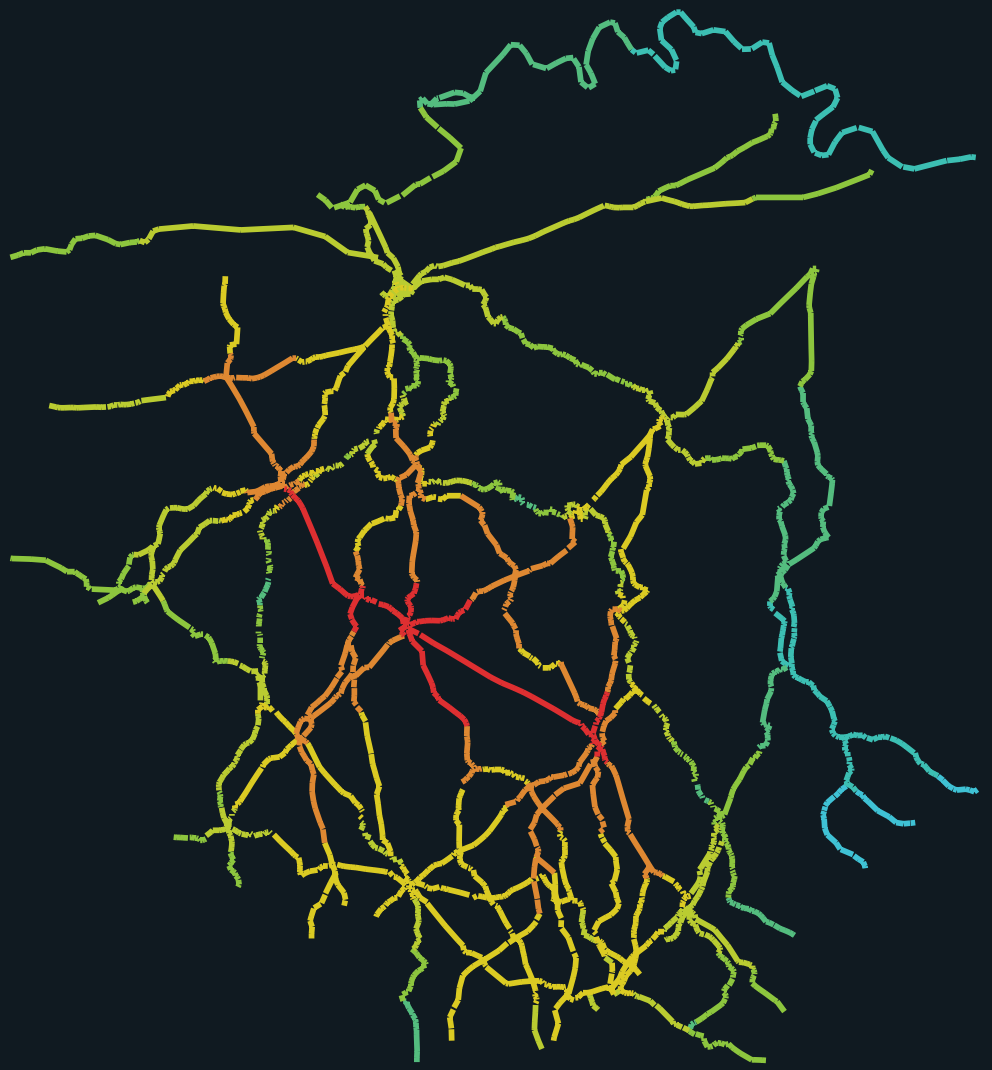


Figure 18: Space syntax analysis of the river network.

Integration radius n



Choice radius n

Figure 19: Space Syntax analysis of the road and river network together.

and fairs. The Space Syntax graphs confirm the central function of the settlement of Eindhoven within the Bailiwick. Eindhoven was not the capital of the Kempenland quarter in which it was situated. That was Oirschot. Eindhoven's Tuesday market and its integrated location within the Bailiwick, which were comparable with those of Oirschot, both suggest that the settlement was more important than was previously supposed. The high levels of archaeological finds in the area surely testify to the settlement's importance during the later Middle Ages.
Space Syntax also explains the absence of markets or fairs at Westelbeers and Leende which, despite being located on crossroads, were fairly remote. In addition, as expected, Maasland, especially the area north of the road between 's-Hertogenbosch and Oss, appears to be a very segregated region. This area had suffered economically from the wars with Guelders and from frequent flooding due to its situation near the river Meuse. It had a larger percentage of poor than all the other quarters.
Since goods were transported not only via the road network, the river network needs to be analysed as well to arrive at the most complete conclusion possible.

5.3.2. **RIVER NETWORK** As explained in the introduction to this section, Space Syntax analysis has never been used to analyse a network of waterways. The results are therefore more difficult to interpret. The waterway system has been analysed only on a global scale as it constitutes a long-distance rather than a short-distance means of transport.
The first observation that can be made on the basis of Figure 18 is that the values on the integration graph correspond to some extent with the navigability of the rivers in the Bailiwick. The Dommel was navigable as far as Boxtel as this stretch of river has the highest integration value. On the other hand the river Aa was navigable as far as Erp but the integration value on this stretch of river is not particularly high.
Moreover, since the river network is not as well connected as the road network there is a logical high integration where rivers meet and a high segregation where rivers rise. Because of the typical river pattern (tree shape with branches) the results of the Space Syntax analysis are heavily influenced by the type of network and are much less of an objective analysis of the actual integration of the system.
It should therefore be concluded that a Space Syntax analysis of rivers by themselves does not provide any new insights and that any analysis of the river network should be combined with an analysis of the road network. It is thought that this type of analysis will provide much more useable results as that type of system is a more regular system made up of interconnections rather than a tree-like system. This analysis will be discussed in the next section.

5.3.3. ROAD AND RIVER NETWORK

This and the previous chapter have paid attention to the discussion whether goods were transported by road or by river. By combining the river and road network maps of the Bailiwick we can add some more ideas to this discussion. As advised in the previous section, the two maps have been analysed as one to create a map suitable for analysis. The rivers and roads are linked at all locations where they cross, even though there might not have been possibilities for transferring goods from road to river or vice versa at that precise location. Like the graphs in the previous section, the analysis has been conducted only for an overall radius as rivers are used primarily for the long-distance transport of goods, and it would therefore not make sense to analyse only a smaller section of the network at a time by using a local radius. The results are presented in Figure 19.
In section 5.2.2.1. it was said that because of its many meanders the river Dommel had to compete with the road network. Both the normalized mean depth and the choice graph illustrate this, as in both cases the road network is much more integrated than the river network. Though perhaps less pronounced it seems that the rivers are more segregated than the roads that run in a similar direction. Does this therefore validate the earlier assumption about the importance of the road network over the river network? Even though the Space Syntax analysis has been performed on a global scale, i.e., for the entire system, this entire system is only as large as the Bailiwick itself and does not therefore include, for instance, any interregional links. It can therefore be said that in a regional context the road network was indeed more important than the river network. Transport by river across shorter distances is not economical simply because of the more expensive transhipment moments and the likelihood that parts of the journey would still have to be covered by road because not all destinations were situated along a river. These extra costs are negligible for longer distances because transport per kilometre was cheaper. However, it would require a Space Syntax analysis of a much larger area, from at least the North Sea coast up to the centre of Germany, to show the importance of the river network as opposed to the road network for interregional trade in a Space Syntax graph which, unfortunately, due to the complexity of such a system and time constraints, was not possible within the scope of this thesis.

CONCLUSION This chapter has provided various potential explanations for the network of markets and fairs in the Bailiwick of 's-Hertogenbosch. As hypothesized in the introduction, the topological explanation seems to be the most promising. This explanation was then explored further with Space Syntax. This spatial analysis highlights how the network of towns and villages is constructed and explains the difference between the large and small villages from the Space Syntax point of view. Moreover, it has shown that in a regional context the road network was more integrated than the river network, which is why it is essential to focus on the road network in order to explore and analyse the relationship between town and countryside.
It has further shown that spatial configuration matters for the location of markets. The higher the spatial integration on the various scale levels the more vital and the larger the market seems to have been. These results fit in with research results in which Space Syntax has been applied in a present-day urban and regional context (Hillier et al. 1993a; Hillier 1998; Van Nes 2009a).
This chapter is of course only a stepping stone in the continuing research into the medieval economy and the symbiosis between town and countryside. We have shown that the most likely explanation for the establishment of markets and fairs is the topological explanation and that markets and fairs were not established randomly but in relation to a spatial or temporal distribution pattern. This chapter gives a clear indication that in the medieval period some sort of conurbation existed in which the smaller settlements operated as suburbs of the larger ones. It has demonstrated the need for a more formal analysis of urban networks and has introduced a suitable methodology, which enables the visualization of this conurbation. However, the availability of more primary evidence, archaeological evidence in particular, will aid the creation of more complete network plans.
On the other hand, testing this methodology, a combination of Space Syntax and Conzenian Morphology, on the Bailiwick of 's-Hertogenbosch has shown the potential of clear and more workable concepts of urban space by being able to analyse a built environment's spatial properties independently of the historical and archaeological socio-economic data. Recent advances in IT have enabled the analysis of larger systems, and soon it will be possible to analyse areas the size of countries and beyond. It will then be possible to use Space Syntax for the analysis of interregional trade and pave the way for research into the difference in the importance of the road and river networks for the different scales of trade – local, regional and interregional.

Spatial configuration matters for the location of markets. The higher the spatial integration on the various scale levels the more vital and the larger the market seems to have been.

THE MEDIEVAL URBAN 'MOVEMENT ECONOMY';

PATTERNS OF ECONOMIC SPACE IN A MEDIEVAL TOWN[32]

6

The central question asked in this chapter is whether there is a logical explanation for the spatial distribution of production and trade in a sixteenth-century town. The premise is that a specific combination of factors exists which explains the distribution of economic space viz., the areas in which economic activity such as markets and fairs took place, and the locations where crafted products were made and sold. This chapter will investigate the way in which these areas are distributed, paying particular attention to the factors which could explain it. The investigation of this premise requires some detailed analysis of source material and the use of complex analytical tools, which is why a decision has been taken to focus primarily on only one year, 1552.

For decades scholars have researched the town and its development. Previous authors (Barley 1976; Biddle 1976; Hindle 1990; Lilley 1998, 2002) have discussed the categorization of medieval towns into towns that are planned and towns that have grown naturally. This division is not useful since order and structure are present in all towns to a certain degree. The question is therefore not whether a town was planned but rather the degree to which it was planned (Hanson 1989b, 40). The positioning of new buildings is never random and is always decided in relation to the already existing buildings and infrastructure.

32 A previous and shorter version of this chapter has been published in 2009 (Craane 2009b).

Some towns have a visibly planned appearance. For example, checkerboard patterns always suggest a more planned environment. However, this does not rule out the existence of structure and order in other towns. It is my contention therefore that towns are never completely organic in nature and that there is clear logic behind their spatial development.
This is because towns are not just about the buildings but also about the way they are defined by open spaces. Urban life is and never has been about architecture, artefacts, and rules and regulations alone, but about how they were used and experienced by people in the space around them. It is the topology which defines the urban environment. There is no direct way of determining exactly how space was used in the past but inferences can be drawn through physical remains, such as written documents and archaeological finds. It is, in any case, in the nature of history and archaeology to study the physical remains of the past and not intangible and non-visible remains. It is, therefore, essential to find techniques from non-historical disciplines to aid our task.
A combination of historical disciplines with a discipline which researches the modern use of space may enable us to analyse the centrality of economic space in the late-medieval and early-modern town.

As explained in Chapter 2, Space Syntax is based on the premise that human societies use and configure space. Analyses of space should therefore be able to tell us something about society. Though Space Syntax has been used primarily in modern cities, it may also prove advantageous in the analysis of historic cities and shed some light on how urban society functioned in the past. Larkham (2006, 130) realized the great potential of using Conzenian Morphology with Space Syntax when he said that "a great opportunity clearly exists for exploring the potential complementarities of the different traditions of Space Syntax and Conzenian Morphology" in a historical setting. At the 6th International Space Syntax Symposium in Istanbul in 2007, the Space Syntax community itself noted this potential when it invited Jeremy Whitehand to present a paper on *Conzenian Urban Morphology and Urban Landscapes* (Whitehand 2007). Griffiths (2005) and Craane (2007) have already produced the first results of a combination of Conzenian Morphology and Space Syntax and have shown the potential contribution that Space Syntax can make to historical and archaeological research.
One of the main findings of Space Syntax is that the space between buildings structures the movement of people around the town, and that spaces with high movement, in turn, correlate strongly with the presence of economic space.

> "Well functioning cities can therefore, it will be suggested, be thought of as 'movement economies'. By this it is meant that the reciprocal effects of space and movement on each other (and not, for example, aesthetic or symbolic intentions), and the multiplier effects on both that arise from patterns of land use and building densities, which are themselves influenced by the space-movement relation, that give cities their characteristic structures, and give rise to the sense that everything is working together to create the special kinds of well-being and excitement that we associate with cities at their best."
> (Hillier 1996b, 113-114)

Taking the previous discussions into account, the central question in this chapter can therefore be re-phrased as follows: In what way did the 'movement economy' manifest itself in a medieval town? By combining archival evidence, toponymy, archaeology and spatial analysis, we shall try to answer this question from as many different angles and as comprehensively as possible. Moreover, as shown in section 1.5, Hillier (1996b) has argued that the urban fabric is made up of three layers: a topological, a cultural and a geographical layer, all of which contribute to the specific urban form of a given town. The second part of this chapter will discuss whether and how these layers influenced the location of economic spaces in the town of 's-Hertogenbosch.

Two types of data are essential before one can say that a medieval town is a 'movement economy'. First of all, it is necessary to know the topology of the town in question, as Space Syntax relies solely on topological data. Secondly, it is important to know the location of the economic spaces, i.e., the areas in which economic activity took place such as markets and fairs, and the production and sale of crafted products and so on, so that these can be compared and contrasted with the findings from the Space Syntax maps.

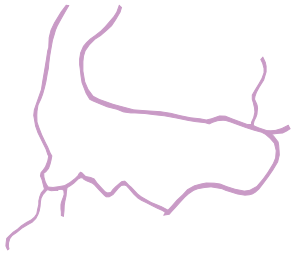
Certain lower level questions will therefore need to be answered. What did the topology of 's-Hertogenbosch look like? What evidence do we have on the spatial distribution of the crafts, markets and fairs in 's-Hertogenbosch? What factors can explain the distribution of these economic spaces? Institutional, economic, geographical or topological factors? Or a combination? Can spatial analysis shed an additional or different light on the distribution of economic spaces?
To present a logical argument, these questions will be discussed consecutively. First, the historical topology of 's-Hertogenbosch will be reconstructed using Conzenian Morphology as introduced in Chapter 2. This will highlight the transformations that have taken place in 's-Hertogenbosch as well as the need to study archaeological artefacts and historical documents in their correct topological context. Secondly, the archival, toponymic and archaeological evidence of the medieval economy will be discussed. This will provide insight into the information about the medieval urban economy available in the archives and depots. The final section will provide cultural, geographical and topological explanations for the spatial distribution of trade uncovered in the previous section. The final section will also present the Space Syntax maps of 's-Hertogenbosch, which will be compared with the evidence from the previous sections to illustrate the presumed relevance of topology for explaining the spatial distribution of medieval economic spaces. The conclusion will bring together all these findings and discuss how medieval economic space manifested itself in the medieval town. It will also address the questions whether the use of Space Syntax has helped to clarify the spatial distribution of trades and whether the medieval urban 'movement economy' did or did not exist.

6.1. THE HISTORICAL TOPOLOGY OF 'S-HERTOGENBOSCH

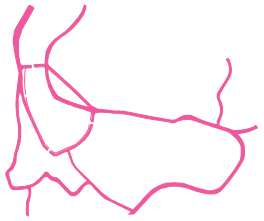
In order to use spatial analysis we need to reconstruct 's-Hertogenbosch's topological past. Topology is the science of place and is not the same as topography, which is the science or practice of describing a particular place, city, town, manor, parish or tract of land so as to provide an accurate and detailed delineation and description of a locality. Topology, in contrast, describes only the mathematical properties of a particular place, city, town, manor, parish or tract of land without its geography or architecture. In other words, we needed to create plans of 's-Hertogenbosch that showed only the open spaces (streets, squares, alleys) and the *insulae* without any extra information on function or suchlike.
These maps, as illustrated in Figure 20, were created with Conzenian Morphology[33] starting with the 1830 map by Drossaers (dark blue). Blaeu's map of 1645 was then combined with Drossaers' map and some historical and archaeological information to create the map of 1650 (light purple). A similar process was applied to obtain the map of 1550 by using Van Deventer's map of 1560. The earlier maps were created solely from archaeological and historical evidence about the expansion of 's-Hertogenbosch and were derived mainly from publications by Janssen, Verhees, Van Drunen, and Kuijer (Janssen 1983b; Boekwijt and Janssen 1988, 1997; Verhagen and Kerckhoffs 1998; Kuijer 2000; Kuyer 2001; Verhees and Vos 2005; Van Drunen 2006).
The situation in 1000 AD shows the area of 's-Hertogenbosch before the establishment of the town. By 1200 AD a small town with fortifications had been established on top of a blow-sand ridge surrounded by many small rivers and streams (Janssen 2011, 13-14). By 1250 the town had grown and low-lying parts of the landscape had been elevated and new fortifications built from at least 1318. Recent archaeological excavations have shown that the new fortifications were built in stages. At one stage the first and second were connected by a wall at the Vismarkt (fish market). This wall was demolished together with the first fortifications when the new fortifications were complete (Nijhof 2008, 152-153). The area between the two fortifications filled rather quickly, though the convents and monasteries were shielded from public use. By 1650 's-Hertogenbosch had fortifications, some of which, especially those on the eastern and western side of the town, had been dismantled by 2003. The map of 2003 also shows the disappearance of the monasteries and the military barracks from the town.

Since the most comprehensive and readily available archival sources about the economy of 's-Hertogenbosch date from the middle of the sixteenth century, the map of 1550 will be used in the spatial analysis of the street pattern and to show the distribution of economic spaces in the town. The main aim of using Conzenian Morphology was also to create the map of 1550. The older maps merely provide extra insight

[33] For more information about the Conzenian Morphology Methodology see section 2.2.1.



1000

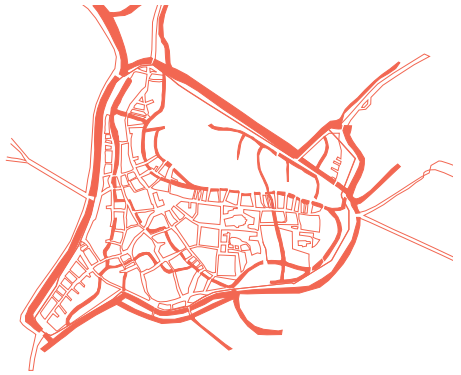


1200

1250

1300

1350



1400

1450

1500

1550

1650

1830

2003

Figure 20: 's-Hertogenbosch in 1000, 1200, 1250, 1300, 1350, 1400, 1450 1500, 1550, 1650, 1830 and 2003 (from top left to bottom right).

into the development of 's-Hertogenbosch as a town and will therefore not be used in such great detail in this thesis as the map of 1550. They can, however, be used for any future research into the economy of 's-Hertogenbosch in the earlier periods, as it is essential when using spatial analysis to have a town plan of the correct period on hand.

6.2. EVIDENCE OF A MEDIEVAL ECONOMY

The introduction to this chapter drew attention to the importance of ascertaining the location of the economic spaces in 's-Hertogenbosch before tackling the central question whether there is such a thing as a medieval movement economy. In this next step the location of the economic spaces (mainly the places where crafted products were produced and sold) will therefore be plotted on the reconstructed map of 's-Hertogenbosch. But before we can do that we need evidence of the production of crafts and goods that were bought and sold in 's-Hertogenbosch. This evidence will be sought in the archival records such as tax-registers and charters, in which crafts and other professions are listed,. The accounts of the town are available only from 1496, but the accounts of the *Bossch' Geefhuis* (the Table of the Holy Ghost, an institution for poor relief), are available from 1435. Unfortunately, all the accounts from the medieval monasteries situated within the walls of 's-Hertogenbosch have been lost (Kappelhof 1988, 85). Street-names (from 1300 onwards) can be used as some streets were named after a profession. Finally, archaeological evidence can be used for the period from the town's foundation, as excavations can highlight the location of production and consumption. In this chapter evidence from the tax-registers will be discussed first, followed by all other written evidence. The archaeological evidence will be discussed last.

6.2.1. PROFESSIONAL GROUPS ACCORDING TO THE TAX-REGISTERS

By the end of the fifteenth century, as a result of the Guelders Wars, the finances of 's-Hertogenbosch were in a dire state, and six 'good men' were employed to do everything in their power to improve them. One of the measures they applied was the *gemene zetting* or a capital tax on the property and income of individual people. A tax collector visited all the houses in 's-Hertogenbosch taking a route that is still traceable. He recorded the name and profession of the head of the household. It is therefore possible to link a particular property to a particular person in the register and to his profession. This tax had to be paid by all the inhabitants of the town, but the actual amount depended on their means. The capital tax was collected almost every year and most of, or perhaps all of the registers have survived in the town archives (Hoekx *et al.* 2004). It would be impossible to consult all these registers. Blondé (1987) has selected five (1502, 1505, 1511, 1547, and 1552) to use in the analysis of the changing social stratification of 's-Hertogenbosch during the first half of the sixteenth century. My selection was also determined by his publication.

For the purpose of this research I used the tax-register of 1552 to trace the location of particular professions. Time constraints prevented similar use of the other tax-registers. These have been used only for quantitative comparisons to check for significant increases or decreases in the number of specific professions during the first half of the sixteenth century. This ensures that the outcomes of my research are representative. For the details of the tax-register of 1552 I am also able to refer to the research of Jord Hanus (2010).

Before we discuss where particular professions were located and when they first appeared in 's-Hertogenbosch, we must check whether the tax-registers are indeed a reliable source for the research into occupations. Blondé (1987, 39) argues that the tax-registers of 1502, 1505, 1511, 1547 and 1552 which he used are an unreliable source. He argues that the different professions are neither proportionally nor accurately represented, i.e., the number of practitioners of a particular profession expressed as a percentage of the total population of 's-Hertogenbosch is inaccurate. He illustrates this inaccuracy by quoting the example of the linen weavers, which number only between 17 and 22 in the registers, which is around 3% of the population of 's-Hertogenbosch, even though it is an accepted fact that 's-Hertogenbosch had a booming linen industry. As we shall see later in this section, if one adds up all the crafts involved in the linen industry they account for about twenty-five per cent of all the professions in the registers. Linen crafts thus constitute the largest group of professions and also the largest group of crafts. One should therefore not discount the tax-registers on the basis of one occupation alone but take the entire occupational group into account as many different occupations may be involved in the same trade. Analyses of the different occupational groups also indicate that some occupations appeared and others disappeared with the result that the total number in a particular occupational category remained roughly the same. This again validates the use of occupational categories rather than single occupations as the main tool for analysing the professional make-up of the population of 's-Hertogenbosch. The categories and how they were compiled will be discussed later in this section.

Moreover, it has been argued that when the tax-collector asked people to state their profession, it was perceived as more important to stress the membership of a guild rather than the actual place in the production process, such as master, apprentice or servant. The tax-registers are therefore a useful source for research into the crafts and professions of 's-Hertogenbosch in particular as long as the correct questions are asked of the evidence.

In addition, it is obvious that in the tax-registers the rich were identified less by their occupations than the poor (Blondé 1987, 40). This was not because rich people did not want to disclose their profession but because poor people were usually known by a profession and rich people by a surname. In any case, some rich people did not have a profession and simply lived from their fortune. For the purpose of the tax-register everyone had to be identified as exactly as possible. Without a Registry of Births, Deaths and Marriages, professions were the best way to do this. This does not create significant problems for the use of tax-registers as a source of evidence for the occupational composition of 's-Hertogenbosch. It is evident from the tax-registers that people from all classes were asked to state their profession and that they would simply state 'gentleman' if they were too rich to have one.

Summarizing, it can be concluded that the tax-registers can be used as evidence but only for the purposes outlined in the previous paragraphs. In that way they will provide a reliable source for the professional make-up of 's-Hertogenbosch and the size of the different professional groups.

Table 8 summarizes the main data from the tax-registers of 1502, 1505, 1511, 1547 and 1552. It shows an approximation of the number of households in 's-Hertogenbosch (as derived from the hearth taxes[34]), the total number of taxed people in the register (heads of households), the number of people (heads of households) listed with a profession, and the respective percentages. I have listed the number of households rather than the number of inhabitants because there is still much discussion on the number of people in a household, and multiplication would raise the error factor (Schuttelaars 1998; Hanus 2010). Table 8 shows that the tax-registers provide us with a large enough sample of the 's-Hertogenbosch population to be able to

Table 8: Main data on the tax-registers.

	Tax Registers (*Gemene Zetting*)				
	1502/1503	**1505/1506**	**1511/1512**	**1547**	**1552**
n households	3,500	3,520	3,550	3,780	3,800
n taxed[35]	2,759	2,395	2,898	2,902	3,081
n professions[36]	645	518	820	425	1786
% taxed/ households	79%	68%	82%	77%	81%
% professions/ taxed	23%	22%	28%	15%	58%
%professions/ households	18%	15%	23%	11%	47%

34 The hearth taxes are lists of the number of hearths (households) in a town, which determined the amount of taxes a town had to pay. This is why the number of taxed heads of households is compared with the number of households rather than the number of people in 's-Hertogenbosch. villages These hearth taxes were compiled in various years, viz, 1374, 1438, 1464, 1472, 1480, 1496 and 1526]. Many authors including Hanus (2010), Van de Hammen and Sassen (1894), Cuvelier (1912), Schuttelaars (1998) have compiled lists of these hearth taxes, and some transcriptions are available in the archives (BHIC 307-41, 42, 45, 46, BHIC 8 – 381, 383, 384). For more information see Chapter 3.

35 Only the head of the household was recorded in the register. This is why the number of taxed heads of households is compared with the number of households rather than the number of people in 's-Hertogenbosch.

36 Professions are all jobs including the crafts.

make some deductions about the professional make-up of the town. Apart from the register of 1505/1506, all tax-registers list about 80% per cent of all households in 's-Hertogenbosch. The row with the number of professions shows, however, a noticeable change in the details of each tax-register. Between 1502 and 1547 a profession was listed for only 15 to 28% of those taxed. This can be explained by the observation that in certain years (such as 1547) the registrars apparently did not assign the same importance to recording a profession as in, for instance, 1552. They did not therefore record professions as often as in the previous registers and especially the later 1552 register. The tax-register of 1552 was obviously compiled in minute detail and contains many more professions (47%). It is therefore assumed that this is the most accurate and most useful register. As a result, I decided to focus the spatial analysis of the distribution of professions on the year 1552.
However, since the tax-register of 1552 lists a far greater number of professions than those in Table 8, there is a possibility that it shows a different professional make-up in 's-Hertogenbosch compared with the four previous tax-registers. To anticipate this potential problem we decided to compare the professional make-up from the tax-register of 1552 with those from the earlier registers, before focusing on the tax-register of 1552 in the rest of this chapter. We began by grouping the professions in the registers of 1502/1503 up to 1552 into categories. This categorization will also be used for the tax-registers in the spatial analysis in the second section of this chapter. The categorization method will now be explained.
First of all, occupations which are the same but were spelled differently in the registers were given the same Dutch spelling. Some entries in the tax-register listed two occupations for the same person. In these cases the first listed occupation was used as it was perceived as the more regular of the two. These Dutch occupations were then translated into English with the aid of dictionaries, English-language publications on occupations, and encyclopaedias of occupations.[37] In the absence of a suitable translation, one was pieced together from the various elements of the Dutch word. Once the English name of the occupation was established a further grouping was made in which, for instance, the female and male versions and the servant and master versions of particular professions were combined. This is because this research focuses on economic sectors rather than the participation of different genders in or the professional status of a particular craft. Blondé (1987, 38) has also argued that in the fifteenth and sixteenth century membership of a particular profession mattered much more than status as a master or a servant. People were used to stressing that they were a carpenter or a nailor and did not describe themselves as a carpenter's servant or a master nailor. Grouping by profession is therefore more accurate than by professional status. Moreover, the research for this thesis does not focus on social hierarchy as previous authors such as Blondé (1987) and Hanus (2010) have done, but on the crafts of 's-Hertogenbosch and their location in the urban fabric. All of the records and choices that have been made can be found in Appendix 5.

Since we are interested in the kind of work people did and in the products they worked with it was decided that the occupations would be categorized according to economic sector. A form of categorization entitled the *HIStorical international Classification of Occupations* was selected (HISCO) (van Leeuwen *et al.* 2002). HISCO is a database of the 1,000 most frequently used occupational titles in datasets of different countries[38], spanning the period 1690-1970. HISCO classifies each occupation by a number denoting the economic sector it belongs to. Only the major and minor groups of the HISCO tree are used, because the aim is not to codify each occupation but to determine the economic sector to which it belonged. Almost all the occupations from the tax-registers were listed in HISCO under either their Dutch or their English name. If a particular occupation could not be found using the definition from *Oude Nederlandse Beroepsnamen* (Glasbergen 2007) it was allocated to the appropriate major and minor group. Since this research focuses mostly on product groups, a decision was also taken to group minor HISCO codes into a new and larger category. For example, the HISCO group 'spinners, weavers, knitters, dyers and related workers' (75) is lumped with 'tailors, dressmakers, sewers, upholsterers and related workers' (79) into a group entitled textile workers. However, the two sub-groups are still shown as separate entries in the table and on the maps to illustrate the type of trade that people were employed in – in this case textile trade. The HISCO categorization also

Table 9: Count of people employed in the various occupational groups in 's-Hertogenbosch as a percentage of the total number of people with a profession listed in the tax-registers.

Category	HISCO code	1502	1505	1511	1547	1552
Sales workers in the food & beverage industry	42	1%	2%	1%	1%	3%
Sales workers in the textile industry	42	0%	0%	0%	0%	4%
Sales workers in the leather industry	42	0%	0%	0%	0%	0%
Sales workers in the metal industry	42	0%	0%	0%	0%	0%
Sales workers in other industries	42	3%	4%	3%	3%	4%
Total Sales workers		**4%**	**6%**	**4%**	**4%**	**10%**
Spinners, weavers, knitters, dyers and related workers	75	10%	5%	13%	8%	8%
Tailors, dressmakers, sewers, upholsterers and related workers	79	14%	15%	13%	8%	9%
Total Textile workers		**24%**	**21%**	**26%**	**16%**	**17%**
Tanners, fellmongers and pelt dressers	76	1%	0%	1%	0%	4%
Shoemakers and leather goods makers	80	4%	4%	5%	4%	3%
Total Leather workers		**4%**	**4%**	**5%**	**5%**	**7%**
Working proprietors (catering, lodging and leisure services)	51	0%	0%	0%	0%	2%
Food and beverage processors	77	12%	12%	10%	14%	11%
Total Food & Beverage processors and catering workers		**12%**	**12%**	**10%**	**14%**	**13%**
Wood preparation workers and paper makers	73	0%	0%	1%	0%	0%
Cabinetmakers and related woodworkers	81	11%	14%	11%	11%	6%
Total woodworkers		**11%**	**15%**	**12%**	**11%**	**6%**
Metal processors	72	2%	1%	1%	1%	2%
Blacksmiths, toolmakers and related metalworkers	83	7%	8%	8%	10%	9%
Precision-instrument makers and precision metalworkers	84	4%	5%	6%	4%	6%
Plumbers, welders and sheet-metal preparers	87	2%	2%	1%	3%	1%
Jewellers and precious metal workers	88	2%	2%	1%	1%	1%
Total metalworkers		**17%**	**18%**	**17%**	**20%**	**19%**
Material Handling and related equipment operators, dockers and freight handlers	97	0%	0%	0%	0%	0%
Transport equipment operators	98	5%	5%	4%	4%	3%
Total Transporters		**5%**	**5%**	**4%**	**4%**	**3%**
Chemical processors and related workers	74	0%	1%	0%	1%	1%
Glass Formers, potters and related workers	89	2%	1%	1%	2%	1%
Printers and related workers	92	0%	0%	0%	0%	0%
Painters	93	0%	0%	0%	1%	0%
Production and related workers not elsewhere classified	94	2%	2%	1%	2%	1%
Total Other producers		**4%**	**4%**	**3%**	**5%**	**4%**
Farmers	61	0%	0%	0%	0%	0%
Agricultural and animal husbandry workers	62	1%	1%	0%	0%	0%
Fishermen, hunters and related workers	64	1%	1%	1%	0%	0%
Total Agricultural Occupations		**2%**	**2%**	**1%**	**0%**	**0%**
Stone cutters and carvers	82	0%	0%	0%	0%	0%
Bricklayers, carpenters and other construction workers	95	8%	8%	6%	10%	6%
Total Construction workers		**8%**	**8%**	**6%**	**10%**	**6%**
N/A		0%	0%	0%	0%	4%
Medical, dental, veterinary and related workers	6	1%	0%	2%	0%	0%
Jurists	12	0%	0%	0%	0%	2%
Teachers	13	0%	1%	0%	0%	0%
Workers in Religion	14	0%	0%	4%	1%	1%
Authors, journalists and related writers	15	0%	0%	0%	0%	0%
Composers and performing artists	17	0%	0%	0%	1%	1%
Legislative officials and government administrators	20	0%	0%	0%	0%	1%
Managers	21	0%	0%	0%	0%	0%
Supervisors, foremen and inspectors	22	0%	0%	0%	0%	0%
Clerical and related workers, specialization unknown	30	0%	0%	0%	0%	1%
Government executive officials	31	0%	0%	0%	0%	0%

For more information see Chapter 3.

37 Glasbergen (2004), Glasbergen (2007).anscriptions are available in the archives (BHIC 307- 41, 42, 45, 46, BHIC 8 – 381, 383, 384).
38 Belgium, Britain, Canada, France, Germany, the Netherlands, Norway and Sweden.

Category	HISCO code	1502	1505	1511	1547	1552
Bookkeepers, cashiers and related workers	33	0%	0%	0%	0%	0%
Mail distribution clerks	37	0%	1%	1%	1%	1%
Clerical and related workers not elsewhere classified	39	0%	0%	0%	0%	0%
Cooks, Waiters, Bartenders and related workers	53	1%	1%	1%	0%	0%
Maids and related housekeeping service workers not elsewhere classified	54	0%	0%	0%	0%	0%
Building Caretakers, charworkers, cleaners and related workers	55	0%	1%	1%	1%	1%
Hairdressers, barbers and related workers	57	2%	2%	2%	3%	1%
Protective service workers	58	0%	0%	0%	0%	0%
Service workers not elsewhere classified	59	0%	0%	0%	0%	0%
Workers not elsewhere classified	99	1%	0%	1%	1%	1%
Total Other occupations		**8%**	**7%**	**13%**	**10%**	**15%**
Total		**100%**	**100%**	**100%**	**100%**	**100%**

allows salespeople and service providers such as innkeepers to be studied separately from producers. Even though the occupational titles and economic sectors in HISCO are derived from sources written between 1690 and 1970, it is felt that these can still be applied to sixteenth-century sources such as these tax-registers because the general economic sector to which an occupation belongs has not changed significantly through time.

Table 9 shows the number of people in each of these economic sectors as a percentage of the total number of people listed as employed in the tax-registers of 1502, 1505, 1511, 1547 and 1552. Some occupational groups appear in this table with values of 0%. This is because only a small number (1 or 2) fell into this group, which was then rounded down to 0%. At least one person was employed in each of the groups listed in Table 9 in one of the tax years mentioned.

One of the reasons for grouping these professions from all these tax-registers is to check whether the tax-register of 1552 shows a professional make-up similar to those in earlier tax-registers. This is more or less the case. Table 9 shows the high percentage of inhabitants of 's-Hertogenbosch that worked in the textile and metal industries, i.e., between 16 and 26% and between 17 and 20% respectively. They are closely followed by the woodworkers (6 to 15%) and workers in the food and beverage industries (10 to 14%). There is, of course, still a wide variety of jobs within these categories but all the people in these groups worked with the same type of product. Around ten per cent of people listed with employment in the tax-register worked in sales, mostly in textiles or food and beverages. The guild-charters, which are discussed in the following section, show that the production and the sale of cloth was divided between different professions whereas the tasks for other products such as leather and metal were carried out by the same person. These products are not therefore entered in the sales category.

The high number of people working in the metal and textile industries corresponds with the results of previous research, as metal and textiles have always been named as the main products from 's-Hertogenbosch. The percentage working in the textile industry, however, dropped sharply between 1512 and 1547.

The figures in Table 9 also show that 's-Hertogenbosch was an urban settlement. In urban settlements, in contrast to rural settlements, very few people worked in agricultural professions. In addition, the number of people employed in the 'service' industry, i.e., non-production occupations, was rising, which is another characteristic of urbanization (Britnell 1996, 8, 79-81).

To show the spatial distribution of each of the categories, individual maps were created for all occupational groups. These maps will be presented and discussed in the second part of the chapter. However, since the research in this chapter focuses on the location of economic space, the categories that involve the production and/or sale of a particular physical product (i.e., the crafts), will receive detailed attention in the following sections.

6.2.2. OTHER WRITTEN SOURCES AS EVIDENCE FOR PROFESSIONAL GROUPS AND THE LOCATION OF ECONOMIC SPACE

The tax-registers clarify the professional composition of 's-Hertogenbosch during the first half of the sixteenth century. They do not, however, paint a complete picture of the distribution of the economic space in 's-Hertogenbosch as they only provide information on the location of the dwellings of craftsmen and producers and not on other economic spaces. Other archival records, such as guild-charters, market-charters, secondary literature such as Van den Heuvel, (1946a) and street-names can, however, provide this information. They will help us to identify the guilds that were present in 's-Hertogenbosch and the date when they were founded, as well as the markets, fairs and other economic institutions and their locations. This information will help to complete the picture of the complex distribution of economic space in 's-Hertogenbosch.

Guild-charters were granted to certain professional guilds by the Duke of Brabant and set out some of the rules and regulations pertaining to, for instance, where and when guild members could sell their produce, when they could work, when they could become a master and so on. However, some guilds may have existed without a charter. This is because charters were not an essential part of a guild, nor anything like a constitution. Charters were for solving problems and were issued only when regulations were actually needed. It is therefore possible that some guilds existed without them.

The first available guild-charter dates from the early fourteenth century (see Table 10). The first guild chartered in the records is the blacksmiths' guild in 1302. During the next three centuries a large number of the occupations in 's-Hertogenbosch formed a guild and were granted a charter.

Guilds[39]	Date of first charter
Blacksmiths	1302
Tanners and shoemakers	1304
Cloth-cutters	1321
Butchers	1327
Cabinetmakers, turners, coopers and wheelwrights	1354
Dyers and blue-dyers	1360
Fullers	1377
Weavers	1421
Bakers[40]	1428
Glovers, lacers, bag, purse, whittawers and parchment makers	1448
Linen weavers	1473
Furriers	1475
Grain merchants	1476
Fishmongers	1482
Pedlars and pewterers	1493
Goldsmiths	1503
Cutters	1504
Dry-shavers	1504
Cabinetmakers, coopers, wheelwrights, bodgers and carvers	1509
Linen and tapestry weavers	1510
Blacksmiths and knifemakers	1541
Painters, cutters, glaziers, embroiderers and tapestry weavers	1546
Oil-crushers and millers	1550
Barbers and chirurgeons	1553
Pynners and girdlers (until 1481 in Lacers' guild)	1553
Hatters	1557
Carpenters, bricklayers, masons, paviours and slaters	1560

Table 10: Guilds and their first charters in 's-Hertogenbosch 1300-1568 (Van den Heuvel 1946b).

39 Particulars from Van den Heuvel (1946a).
40 This concerns a new charter so there must be an older one.

The first official overview of all crafts in 's-Hertogenbosch listed in a charter dates from 20 December 1494 (SAH 953 = SASSEN 647: d.d. 1494 dec 20) (Van den Heuvel 1946a, 337-338). It appears in a document which records the acceptance by the town's population of a new town council as recorded by commissionaires appointed by Duke Philip of Brabant. This charter provides some information on the rules and regulations of particular craft guilds, which will be discussed later in a section on the cultural explanation for the distribution of crafts, more specifically, in relation to location.

Charters were used not only to regulate guilds but also markets and other economic-administrative spaces such as the meat hall and clothmakers' hall. The economic landscape of 's-Hertogenbosch was created not only by the location of the various tradesmen, but also by the location of the markets and other economic institutions. It is therefore important to examine these other charters as well. The export of products, whether interregional or regional, as we have seen in Chapters 4 and 5, was important for 's-Hertogenbosch because the local market was far too small for the quantities of products that were produced. Even though the guilds had a monopoly on the sale of the products they produced, people could trade freely at markets and fairs where the guild monopoly was broken. Thanks to the many markets and fairs, free trade was possible for about a third of the year.

As we have seen in Chapter 5, 's-Hertogenbosch had a Thursday market since 1328 (SAH 3876) and seven fairs, the earliest dating from 1356 (Jacobs 1986, 144). However, this does not mean that there was one general market. As in any medieval town, the market space was strictly defined with specific locations for the sale of fish, fruit and vegetables, meat and other products. These can be seen in Figure 21 and will be discussed in the following paragraphs to paint a fuller picture of the distribution of economic space in the town of 's-Hertogenbosch.
In 's-Hertogenbosch there was only one location where these perishable goods could be sold because it was easier to carry out stringent safety checks there (Van den Heuvel 1946b, 99).
The bread halls and meat halls had been erected specifically so that these safety checks could be performed. These buildings could house only a certain number of masters, which is why the number of masters was regulated; additional masters were simply unable to sell their wares in the hall. Some products, however, were not sold at the markets of 's-Hertogenbosch, or in a hall, but directly from the artisans' homes. This would, for instance, be the case for pewterers and cobblers (Nijhof 2007a, 218).
Moreover, some wares could be sold only at markets which had a special right to sell them. For instance, 's-Hertogenbosch had had the right to hold a salt and grain market since 1458. It also had the right to sell cattle at market. This cattle was, however, only for immediate local consumption and was usually bought by butchers as it could not be sold as livestock. The butchers already had a guild in 1327 and it is presumed that this cattle market dates from around this time. The butchers slaughtered the cattle, and the meat was sold to the inhabitants of 's-Hertogenbosch and the immediate surroundings from the benches in the meat hall. The trade in cattle was therefore anything but lively and it was not worthwhile for farmers from further afield to travel to the market in 's-Hertogenbosch. The majority of cattle designated as livestock was sold at the fairs (Kuijer 2000). Staple right for cattle was held by the town of Lier, and all cattle taken to market in Brabant first had to be presented for sale in Lier.
The waters in and around 's-Hertogenbosch were a good source of fish and the fish market was therefore one of the largest markets in 's-Hertogenbosch. It used to be situated just outside the Leuven Gate, later the Prisoners' Gate (Van Oudenhoven 1649). However, it was moved to the site of the town's harbour at the bridge, which was reconstructed and enlarged in 1522 to create a large square on which the fish market was held. Fish stalls were located on this square and along Waterstraat towards the main marketplace (Van Heurn C18).
Some foodstuffs were allowed to be sold on days other than the weekly market day, at either the marketplace or on the streets in front of the houses as long as the neighbours were not inconvenienced. These foodstuffs were mainly perishable products such as milk, cheese and butter as well as some vegetables, which normally would not last a week. This is why, for instance, there was a daily butter market in 's-Hertogenbosch (Van den Heuvel 1946b, 178; Jacobs 2000).

In Chapter 5 we saw that apart from the markets, which took place every week or more often, 's-Hertogenbosch and other settlements had fairs, which were held once a year. These fairs were all related to a specific saint's day, albeit sometimes only to the specific days the fair was held, as some fairs were actually named after the product that was sold there, such as cattle, lean cattle or young animals. Not all the privileges of these fairs have survived. This is why it is not known how long some of them had been held. Authors (Jacobs 2000, 129) have argued that the St John's Fair, the Our Lady Fair and the St Nicolas Fair had been in existence since the thirteenth or fourteenth century. In its privilege the Zuij-markt is named as a new market in 1403 and the other three would have had to have originated from before that date. St John's fair and the Our Lady Fair can actually be seen as one fair since they were held back-to-back.

The location of the various markets is often stipulated in the charters and will be discussed in the second part of this chapter. No information has been found on the exact location of the fairs. This is probably due to the fact that many of the original fair privileges have been lost.

As mentioned, the sale of many products was restricted to a particular location so that stringent safety and quality checks could be performed on the goods sold. All the halls, the clothmakers' hall, the meat hall and the bread hall were located in the same building block on the marketplace of 's-Hertogenbosch (see Figure 21) (Van Drunen 2006, 42-45). The clothmakers' hall (*Gewant-* or *Lakenhuis*) was originally located in the largest building in this block. Only cloth-cutters (*gewantsnijders*) could sell cloth produced in 's-Hertogenbosch and they had to sell it from the benches in this hall. This was regulated in the first charter granted to the cloth-cutters in 1321. Since the cloth industry expanded rapidly, the clothmakers' hall soon became too small to house all the cloth-cutters and extra room was rented in an adjoining building. From 1335, the cloth-cutters were also allowed to sell cloth from their homes except on the weekly market day (Thursday) when they had to sell it in the hall (SAH 3475 = SASSEN 70: Brussel 1335 dec. 8). As a result, the clothmakers' hall lost its importance and in 1419 John IV of Brabant decided to convert the ground floor of the building into a meat hall. The first floor remained in use for the sale of cloth. The meat hall had been located in another smaller building in the same block since 1310. The bread hall was located directly

Fair	When it was held	Since when	Sources
St John's Fair	3 days before St John the Baptist's Eve (20/06) until 3 days after the nativity of St John the Baptist (27/06)	1356?	(Jacobs 1986, 144)
Our Lady Fair	8 days before the procession until 8 days after the procession (on the first Sunday after 24 June and from 1515 on the first Sunday after 2 July)	Probably since the 13th or 14th century	(Jacobs 1986, 144)
Bartholomew Fair	From St Bartholomew's Eve (23/08) until St Giles's Eve (31/08)	1403	(SAH 3881, Sassen 291: Brussel 1403 Sept 25)
Cattle Fair	A day after St Luke (19/10) until St Severijn (22/10) but from 1465 a day after St Severijn (23/10) until All Saints (01/11)	Probably since the 14th century but definitely before 1465	(SAH 3882, Sassen 513: Brugge 1463/4 jan 2)
St Nicolas Fair	3 days before St Nicolas's Eve (2/12) until 3 days after St Nicolas (9/12).	Probably since the 13th or 14th century	(Jacobs 1986, 144)
Zuij-markt	Saturday before the 3rd Sunday in Lent until the Saturday before the 4th Sunday in Lent (freedom). The fair was held on the Monday, Tuesday and Wednesday before Mid-Lent Sunday	1403	(SAH 3881, Sassen 291: Brussel 1403 Sept 25)
Lean Cattle Fair	Saturday before Palm Sunday until Holy Saturday	July 1540	(SAH 3884, Sassen 790: Brussel 1540 July)

Table 11: Fairs in 's-Hertogenbosch.

adjacent to the meat hall. The bread hall occupied the smallest building in the block and had the shortest lifespan of the three halls. It was first mentioned in 1339 and had already lost its function by 1373, when the hall was divided into four parts and sold to private persons.
The entire building block was originally owned by the Duke of Brabant but was let to the different guilds at various stages, so they could maintain the building themselves, or it was sold to private persons.
The whole point of halls was to ensure that the products sold were of a particular quality. Quality, however, is not the only controllable factor in the sale of products; weight is too. The right to have a weighing house had to be granted. A town with a weighing house was regarded as a reliable place to trade. The central marketplace was not only the site of the various halls but also of the town's weighing house since 1286. However, it was not located in the same building block as the halls but in a building on the Schapenmarkt.

Not all products sold at the markets and fairs in 's-Hertogenbosch were from 's-Hertogenbosch or its Bailiwick. Many products were imported. These were originally landed on the north side of the central marketplace but after the extension of the town in the early fourteenth century, a new harbour was built on the north-west side (Nijhof 2007a, 218). The new harbour (with crane) dated from 1442 (Van Oudenhoven 1670a). Some goods were, of course, directly shipped to their destination via the Dieze. There were public landings at many places around the town. There were also private landings and landings for specific (religious) institutions, such as the Dominicans (*Predikheren*) and the *Geefhuis* (Hoogma and Steketee 1996, 68). A quay was also constructed near the site of the new church to land imported stone. Because of the large number of quays it is difficult to say where imported goods were landed, unless the exact location is mentioned. It can definitely not be said that all imported goods were landed in the harbour.

Street-names can be used besides tax-registers and charters to analyse the spatial distribution of particular trades. Most of the 'trade' streets did not keep their names forever. The street-names usually only expressed a temporary abundance of a particular trade in that street. However, a comparison between streetmaps by Mosmans (Mosmans and Mosmans 1907), who have collected evidence on all street-names and house names in 's-Hertogenbosch, and the maps created from the 1552 tax-register should point to any link between the name of a street and the dominant profession there.
It turns out that a large number of street-names in 's-Hertogenbosch have a religious background, such as Torenstraat (tower street) or Postelstraat (named after the sanctuary of the Postel Abbey). The streets which are named after a profession or a product refer to a market held there, such as Vischmarkt (Fish Market) or Schapenmarkt (Sheep Market). Other 'trade' streets are Karrenstraat (Kart or Wagon street), Kuipertjes wal (Coopers' quay), and Verwersstraat (Dyer street). Verwersstraat was indeed the centre of the cloth production in 's-Hertogenbosch, and was actually called Colpertstraat (after the sellers of old clothes) before 1450, which denotes that the textile trade, even if not the actual production, had been part of the economy of 's-Hertogenbosch for a longer time. Karrenstraat did not get its name from the wagons produced there, but from the large number of wagons parked in the street as numerous inns were located in that area. Merchants parked their carts there and went into an inn for a drink. Moreover, many country folk who came to town to sell their wares made merry on their carts in that area (Mosmans and Mosmans 1907, 14).
The names of the streets with a trade connection do correlate with the archival evidence of professions located in those streets. However, the number of 'trade' streets in 's-Hertogenbosch is rather small and cannot give full insight into the location of economic space.
In conclusion, it can be said that there is plenty of written evidence on professional groups and the location of economic space in 's-Hertogenbosch, but it is not always clear, especially in relation to the latter. We know, for instance, that certain markets were held but we do not know their exact location. It is fortuitous that 's-Hertogenbosch had various halls (clothmakers' hall, bread hall and meat hall), for which the location is obviously clear. Section 6.3.2 will analyse the evidence from this chapter in detail and try to discover whether, for instance, the locations of the guilds as stipulated in their charters represent the actual spread of the various occupations.

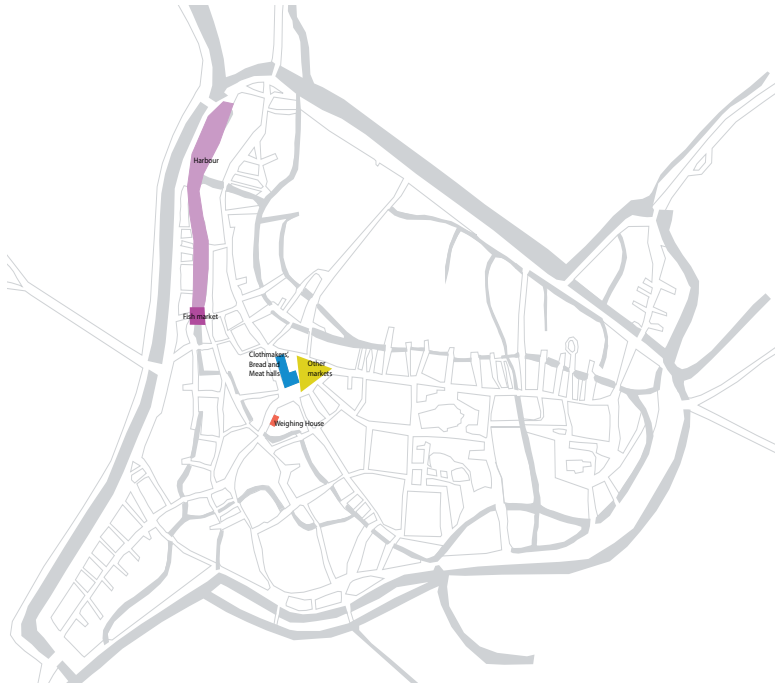


Figure 21: Map with the location of several markets, the hall, weighing house and harbour discussed in section 6.2.2., projected on the reconstructed plan of 's-Hertogenbosch of 1550.

6.2.3. ARCHAEOLOGICAL EVIDENCE

Up until now, we have concentrated primarily on the written evidence of economic activities in 's-Hertogenbosch. There is, of course, another type of evidence, which by its nature points to production and consumption, *viz.*, archaeological evidence. The findings from the many archaeological excavations in 's-Hertogenbosch greatly enhanced our knowledge of the history of the town. This is why the archaeological evidence is discussed in this chapter. However, despite being a useful indicator of production and consumption, archaeological evidence is useable as an indicator of trade only to a certain degree. Products may be classed as trade if they are definitely produced outside the town. Only a small group of objects used by craftsmen, such as tools, are an indication of actual trade activities. Archaeology can provide evidence of local production centres if actual workshops, semi-manufactures and production wastage are discovered.
Pottery is the largest category of products found in archaeological excavations. However, most pottery was imported in 's-Hertogenbosch and evidence of local pottery production exists only from the fourteenth century onwards. During the excavations of Loeffplein traces of a pottery were unearthed (Nijhof 2007b, 69-74; Treling 2007, 63-68) consisting of an oven and fifteen pits with fragments of misfires. Archival evidence shows that this pottery was owned by Robbrecht de Potter and was in operation between 1437 and 1461. Near the marketplace an earlier and a later oven were also found which seem to have been used to produce the same kind of pottery. This suggests that the potter moved his pottery to another location. Another pottery was discovered near the old St Peter's Church in 1984. These potters were among the first to move from country to town during the fourteenth century. Prior to that, potters settled near the source of their raw material. Not until the fourteenth century did potters start to settle near the areas where they sold their wares. Because of the fire risk involved in the baking of pots, most potteries had to be located on the outskirts of town. The pottery in the *Tolbrug*-quarter, however, was located near the town centre. When the pottery was built, this area was vacant and still developing. Moreover, like most of 's-Hertogenbosch, it was very watery. It is presumed that it is because of the water that the risks were seen as minimal and the pottery was allowed to settle there. Despite this local

production, imported wares still accounted for most of the pottery found (Nijhof 2007a, 224-225). Besides pottery and moulds, wastage and semi-manufactures of metal and bone have been found in layers dating from the fifteenth century onwards. A casting cone indicates the presence of bronze or brass founders. After bronze or brass items were founded, the casting cone and ventilation shafts were removed from them. These were usually melted down, but this casting cone escaped. A strip of three brass buttons, two clothing-hooks, and a chest mount were found. These semi-manufactures prove that these products were also made by craftsmen in 's-Hertogenbosch. The remains of bone production are usually found in sixteenth-century contexts and all over the town. Bone was used primarily for the production of rosary beads and buttons. The metatarsals of cows were the most frequently used raw material. However, large pieces of bone were sometimes used as well (Nijhof 2007a, 226).
Coins and weights are, of course, a sign of trade, and the fact that they were found in large numbers in archaeological excavations indicates that 's-Hertogenbosch was a hive of economic activity. This peaked between the thirteenth and fifteenth century but many coins were also found from later periods (Nijhof 2007a, 218-221). Merchants also used weights. Most of the weights found date from the sixteenth century. A *Boschboom* (a 's-Hertogenbosch tree) was engraved on both the regular weights and the coin-weights to denote the town in which they were used. The presence of this tree does not mean that the weight was actually made in 's-Hertogenbosch. It simply denotes that it referred to the 's-Hertogenbosch system of weights and measures and that it was used in that town. 's-Hertogenbosch had its own weight, the *Bossche Pond* (a Bossch pound). From the thirteenth century, the money trade was centred around the economic heart of 's-Hertogenbosch (the market and the harbour area). Many coins, weights and coin-balances have been found in this area. The most notable find is the treasure unearthed on the street Achter het Verguld Harnas (Behind the Gilded Harness) (Janssen 2011, 39-43).
Cloth-markers are evidence of locally produced but also imported cloth. The discovery of Bossch cloth-markers is also evidence of the export of Bossch cloth. The Chapter 4 discussed the cloth-markers evidence in detail.
Specialized tools can also serve as an indication for specific crafts (Nijhof 2007a, 218). Archaeological excavations have unearthed many craftsman's tools. However, these are difficult to date because they were purely functional. If it works, why change it?
Ovens for firing bricks were located on the outskirts of 's-Hertogenbosch in Engelen, Bokhoven (also tiles and possibly roof tiles), Orthen, Empel and Deuteren during the fifteenth and early sixteenth century. Moreover, archaeological evidence seems to indicate that bricks and roof tiles were fired in the town itself. Most of these bricks were destined for buildings in the town, but sometimes for manors in the Bailiwick. From the fifteenth century, roofs, especially those within the town walls, were laid with tiles. This was imposed by the local government, who wanted to get rid of thatched roofs to reduce the risk of fire spreading quickly. Roof tiles, however, came in many different forms including ridge tiles (*vorsten*) and flat rectangular tiles (*tyghelen*) (Kappelhof 1988).
As Chapter 3 has shown, archaeo-botanical research can tell us a lot about the type of produce that was grown and eaten in the Bailiwick. The main cereals grown in the Bailiwick were rye and buckwheat, whereas oats were grown in the nearby Land van Heusden. The assortment of fruit and vegetables expanded enormously between the thirteenth and sixteenth century. Den Dungen, a settlement in the freedom of 's-Hertogenbosch, was seen as the city's kitchen garden. More details about the produce in the Bailiwick can be found in section 3.2.2.1.
The archaeological and archaeo-botanical evidence has shown the kinds of products that were produced and consumed in 's-Hertogenbosch and sometimes where raw material or produce came from. The evidence is, however, not specific enough to give any clues about the spatial distribution of economic spaces. It does, on the other hand, provide some more clues on the food and beverages that were being bought and sold and the items that were being crafted within the walls of 's-Hertogenbosch.
The following section will use and combine the evidence discussed in sections 6.2.1 to 6.2.3 in order to explain the distribution of economic spaces in 's-Hertogenbosch

6.3. EXPLAINING THE DISTRIBUTION OF ECONOMIC SPACES IN 'S-HERTOGENBOSCH

The central question in this chapter is whether there was an identifiable pattern in the distribution of economic spaces in 's-Hertogenbosch, and if so, how it materializes and how it can be explained. This pattern could materialize in one or more of the three layers (topological, cultural, geographical) which together make up the specific urban form of 's-Hertogenbosch. The idea that an urban form is made up of three different layers was explained in section 1.5. These layers will be discussed in reverse order, beginning with the most specific, the geographical layer, followed by the more generic cultural layer, and finally, the most generic topological layer. It was felt that this approach would highlight the importance of this research on the topological aspect of the urban fabric. Since this layer is generic the results can be used for research into the urban fabric of towns worldwide.

The following maps show the location of all occupations within one occupational group in 1552. One map, for instance, shows the residences of all the people involved in the metal trade, whereas another shows the residences of all the people in the leather trade. Each colour represents a particular occupation within the group. These maps visualize the spread of those occupations to gain insight into the location of the various trades practised in 's-Hertogenbosch.

6.3.1. GEOGRAPHICAL LAYER

The geographical layer is different for each town depending on its geographical location, whether in the mountains, on the seafront or beside a river. As explained in section 1.5, this is the most specific layer. The conclusion of this section therefore applies only to 's-Hertogenbosch and not to other towns.
The most important geographical element of 's-Hertogenbosch is the river Dieze. This river and associated waters crisscrossed most of the town, as can be seen in Figure 23, so nearly all the plots were situated close to running water. However, since 's-Hertogenbosch was situated on low-lying ground, most of the town was subject to flooding. The use and management of water therefore played an important role in the urban fabric of 's-Hertogenbosch.
Geography, in particular, has an influence on urban economic spaces that either require water or which would truly benefit from proximity to water.

TEXTILE

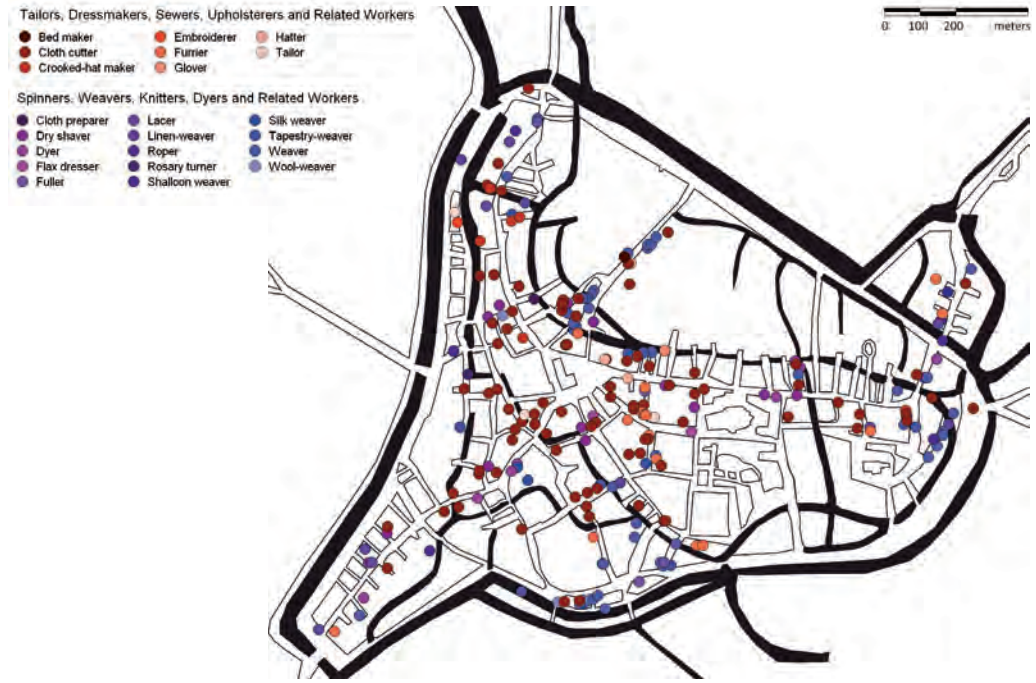
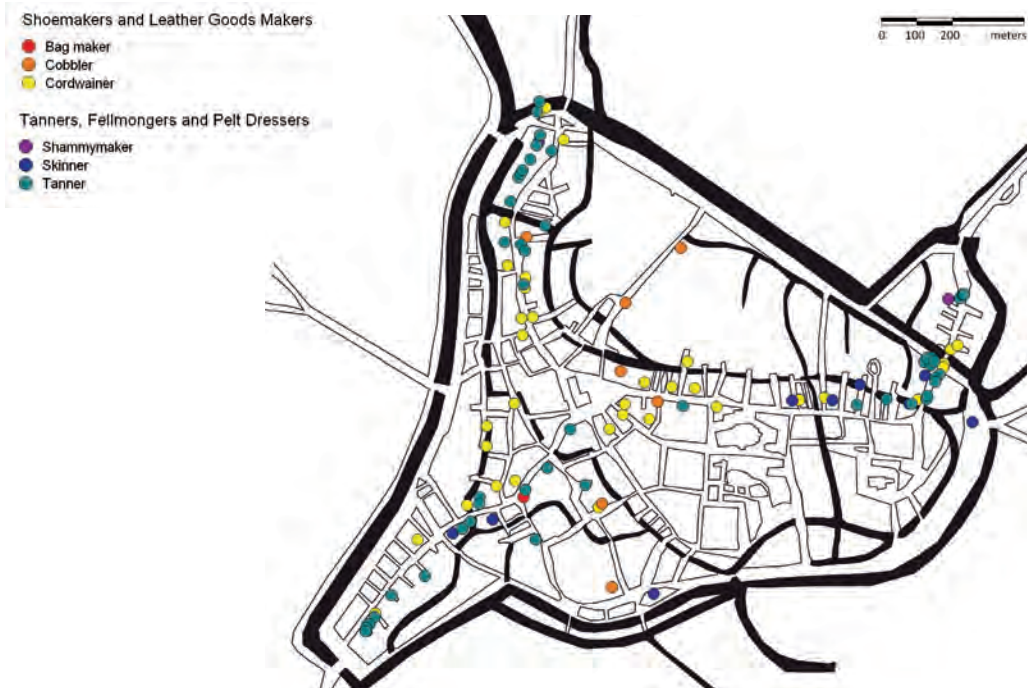


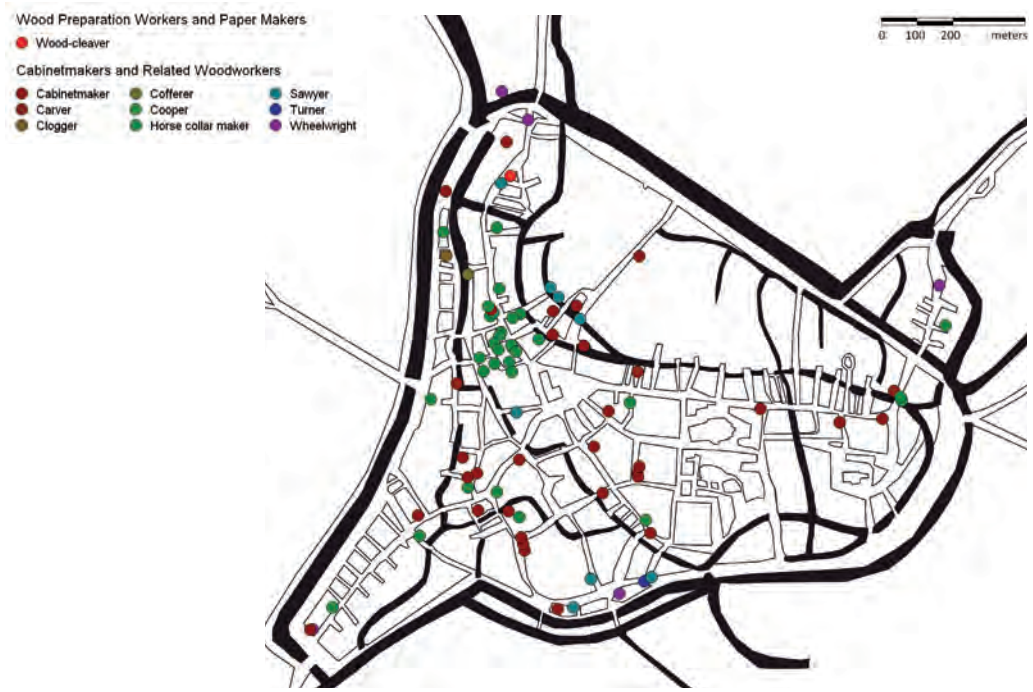
Figure 22: Spatial Distribution of the various occupations in 's-Hertogenbosch in 1552 within their occupational categories[41].

[41] I want to thank Jord Hanus (University of Antwerp) for creating these maps according to my specifications.

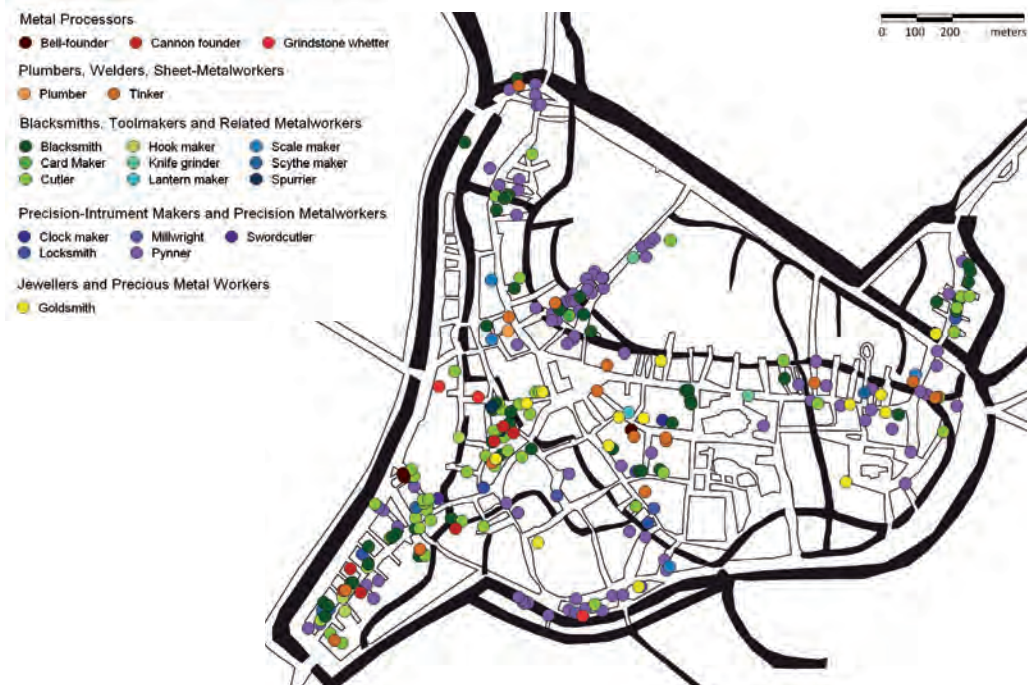
LEATHER



WOOD



METAL



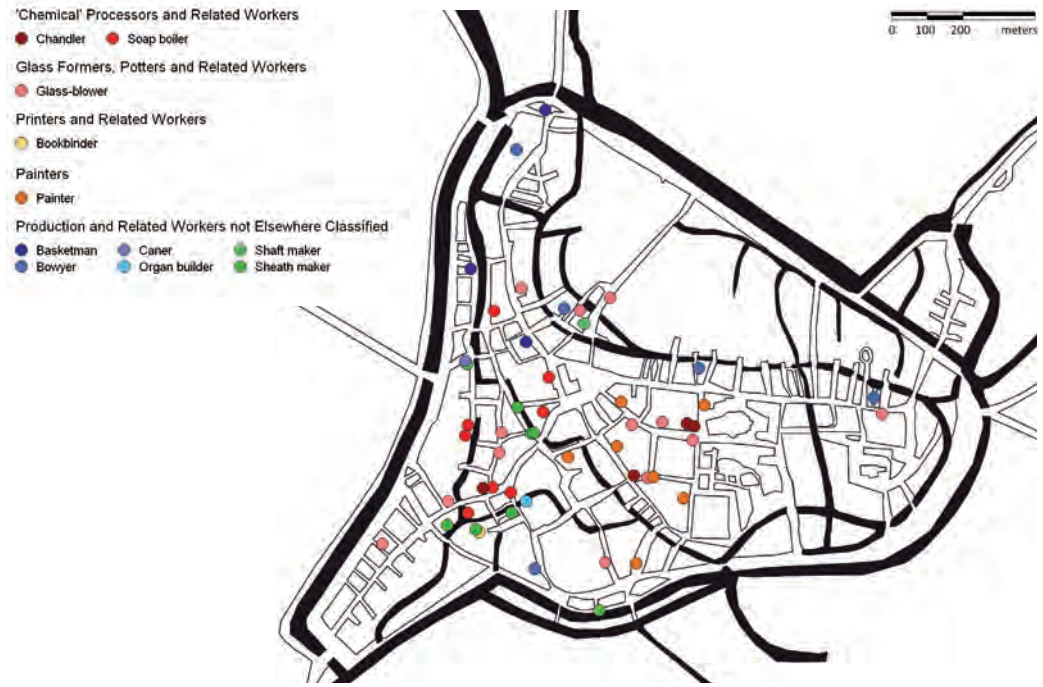
SALES WORKERS

FOOD & BEVERAGE

TRANSPORTERS

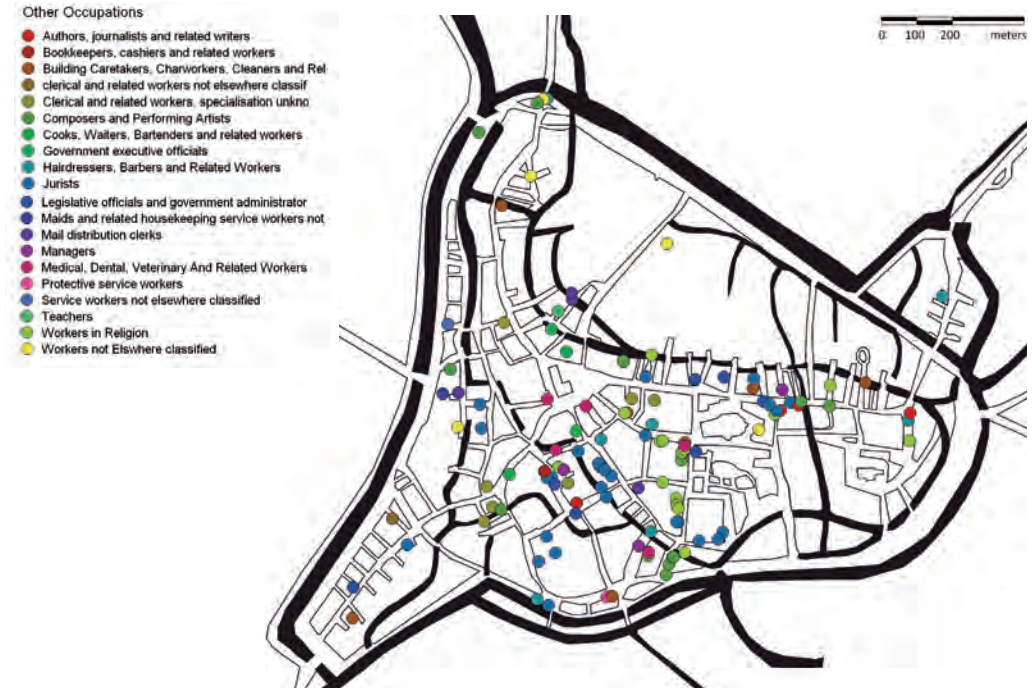
CONSTRUCTION WORKERS

OTHER PRODUCERS



AGRICULTURAL OCCUPATIONS

OTHER OCCUPATIONS



The first category covers occupations which needed water for washing or cooling, such as dyers, fullers, tanners, cloth preparers and brewers. These occupations could then be divided into two groups; the dirty crafts (such as fulling and tanning), and the clean crafts (such as brewing). The second category consists of professions which use a furnace, oven or other open fire and therefore carried a high fire risk, such as blacksmiths, founders, glassblowers (who also used water for cooling) and bakers.

Another important geographical element which influences settlement patterns as a whole and not only the location of economic spaces is the height of the landscape in relation to the rivers. In other words, does the landscape flood often? As we have seen in Chapter 3, 's-Hertogenbosch was first established on the highest part in the region. This area within the first town-wall became rapidly overcrowded during the beginning of the thirteenth century (see Figure 20) and work was quickly started on the second town-wall and on making the low-lying parts of 's-Hertogenbosch habitable. From then on, this geographical element had no influence on settlement patterns or on the location of economic space.

It can therefore be concluded that geographical conditions imposed almost no constraints on the establishment of economic spaces. This is because, from the thirteenth century, every plot was situated high enough to avoid regular flooding and because nearly every plot was in close proximity to water. Those professions which relied on water were therefore not restricted by geography in their choice of plot. The only way in which geography might have exerted any influence on the location of economic spaces stems from the distinction between the dirty and clean crafts. Certain professions had to be located at a point where they had access to water appropriate for their needs. Brewers required clean water but tanners did not as they would pollute it anyway. For health and safety reasons it was better to locate the tanners as far downstream as possible. However, since the Dieze flowed across the entire town, there were still many feasible locations for these and similar professions (Hoogma and Steketee 1996, 42).

The location of economic spaces in 's-Hertogenbosch is therefore barely influenced by the geographical layer, and mainly by the cultural and / or the topological layer. These will now be explored, revealed and discussed.

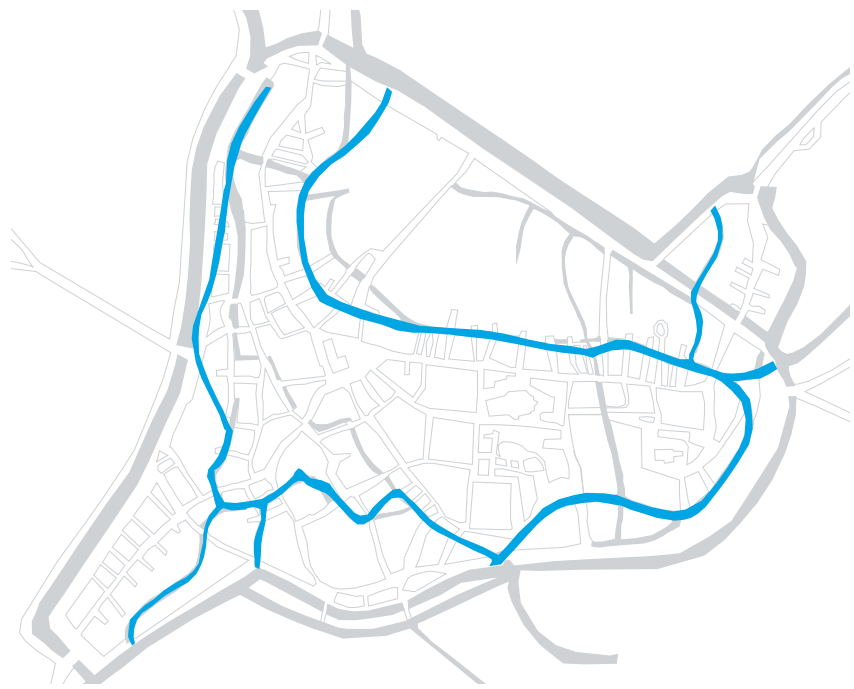


Figure 23: The river Dieze and associated waters (Hoogma and Steketee 1996, Appendix).

6.3.2. **CULTURAL LAYER** The cultural layer is one of the three layers which make up the urban fabric of a town. Evidence of cultural aspects is difficult to find. However, some aspects of urban fabric are distinctly European and set 's-Hertogenbosch apart from contemporary towns in Asia and South America. The importance of guilds in medieval European towns – like the shopping patterns of modern Europeans – can be seen as a cultural aspect for which evidence can be sought.

As stated in the section on written evidence (6.2.2.), many guilds had charters which, for instance, stipulated where the members had to practise their professions or could sell their wares. This section will examine whether the regulations of these guild-charters correlate, for instance, with the maps derived from the tax-registers that show the location of the various crafts, or whether they correlate with toponymic or archaeological evidence.
We can see on the maps compiled from the tax-register of 1552 that some textile professionals listed in the tax-registers were located in areas which correspond with the areas stipulated by the guild-charters. Some were located around Weavers' Square (Weversplaats), the economic heart of the textile trade. In one of the stages of linen manufacturing a piece of cloth is stretched on a frame to attain the required size. This stretching also allowed inspections to be performed for flaws and was therefore incorporated in the guild regulations. These linen frames were positioned on Weavers' Square near the St Barbara Chapel in 1471 (Van den Heuvel 1946b, 54). The name Frame Alley (Raamstraatje) harks back to this custom.
There are, however, far too many textile professionals living and working outside this particular area to conclude that there is a clear correlation between the locations stipulated in the guild-charter of the linen weavers and the location according to the tax-register of 1552. Van den Heuvel (1946b, 54) argues that a 'trade' street, i.e., a street named after a particular profession, also functioned as a 'labour market' for that same profession as it was a logical place for supply and demand to meet. Weavers, for example, had to meet in Weavers' Square as stipulated in the 1421 charter of the weavers' guild (Van den Heuvel 1946a, 88 no. 41-12). This labour market was often held on a set date. This can be seen in the 1304 charter of the tanners' and shoemakers' guild, who held their labour market the day after Epiphany (7 January) and the day after the feast of St. Peter and St. Paul (30 June) (Van den Heuvel 1946a, 11 no. 6-6).
As stated in the archaeological section, money traders appear to have congregated on the area around the market. Since many money traders were also goldsmiths or silversmiths, these occupations can also be found in this area, and even include goldsmiths and silversmiths who had no secondary occupation as a money trader. However, there was another concentration of goldsmiths at the eastern end of Hinthamerstraat.
Despite what appears in the guild-charters, there is no evidence for either the compulsory or free settlement of new tradesmen. Van den Heuvel (1946b, 55) suggests that it is unlikely that tradesmen were forced to live in a particular street or neighbourhood. He argues that the grouping of particular trades is simply a reflection of a sense of community. In other towns, such as Frankfurt and Lübeck, the location of tradesmen was formally regulated in the guild statutes (Van den Heuvel 1946b, 55). Janssen (2011, 39) sees a development in the concentration of particular crafts. At the beginning of the fourteenth century there was hardly any concentration of crafts as this did not occur until later in the fourteenth century and during the fifteenth century. At the beginning of the fourteenth century many agrarian businesses can be found outside the first fortifications but within the area which was later enclosed by the second fortifications. There were many smaller workshops (producing, for instance, metal and cloth items) that were combined with animal husbandry. Janssen gives no explanation for this change, but it could be due to the commercialization of the economy. At the beginning of the fourteenth century the guilds had only just started and it was not until later that they realized the potential of creating craft neighbourhoods. Moreover, soon after the establishment of the second fortifications, the area filled and there was no opportunity for farming within the town-walls. Markets grew and became more numerous and people could now buy what they would otherwise have had to grow themselves. That way, they could focus entirely on a craft without having to engage in agricultural activities as well.
As stated earlier in the chapter, only the sellers of certain wares were obliged to sell these at a market. This was particularly true of foodstuffs, such as fish and meat. It was therefore neither essential nor advantageous for producers of other products to be located near the market. Transport normally accounts for a large percentage of the costs charged to the customer. Suppressing the transport costs therefore played an essential role in the efforts to undercut the competition. Almost all the raw materials came from outside the town and were transported to 's-Hertogenbosch by road or water. Since the river Dieze runs through the entire town, most plots were within easy reach of transport opportunities.
The guild regulations discussed in the previous section of this chapter mention that certain charters stipulate the location of particular items, officials or buildings. It would then seem logical that most of the traders in that guild would locate near these regulated places. After all, it would not make sense for a clothmaker to carry his cloth all the way across town to have it stretched and checked for quality. But a great many craftsmen did live and work elsewhere However, there were some locations that simply had to be adhered to, such as the markets and various halls. These locations could not simply be swapped for another.
To summarize, it appears that crafts from the same occupational group did cluster, but not only at the locations preferred by the guild-charters. Although craftsmen in medieval 's-Hertogenbosch saw the advantages of clustering, they decided against congregating at one place. Some of the crafts were located in the 'trade' streets or in the streets stipulated by the guilds, but no convincing correlation can be ascertained between the locations in the tax-register and the charters and the toponymic evidence.
Another type of 'cultural' clustering – clustering by status – emerged in Amsterdam, Lier and Mechelen (Blondé 1992; Lesger 2007; Ortmans 2009) in the eighteenth century, but it is difficult to discern any signs of this in sixteenth-century 's-Hertogenbosch. Recent centuries have seen a far greater divergence in shops for the rich and poor members of a community. Expensive items were, of course, available during the sixteenth century (precious metal, clocks etc.) but there were no separate shopping districts for the rich and poor. When we look at the occupational maps, we see that goldsmiths (included in the metal group in Figure 22) are located across town with a large contingent in the larger commercial axes radiating from the central marketplace. This spread might be similar to the one seen in the previously mentioned eighteenth-century towns. However, some of the goldsmiths in sixteenth-century 's-Hertogenbosch are located in much more segregated streets, away from the hustle and bustle of the busier thoroughfares. No statement can be made about the spatial distribution of clockmakers since there is only one. In other words, it is impossible to make any definite statement about whether the grouping of professions with a clientele of a similar status was the reason for the spread of particular occupations in 's-Hertogenbosch.
We can therefore say that the location of economic spaces was only partly influenced by the cultural layer. The location of the crafts does not seem to have been noticeably influenced by the cultural layer either. The location of markets (and probably fairs but we will never know because of the absence of fair-charters) and halls was, however, affected. They could not take place just anywhere as the location for the sale of perishable goods in particular was strictly regulated and could not be changed because of geographical influences alone. It is, however, still conceivable that the topological layer influenced the rules and regulations on the sale of products before they came into effect.

6.3.3. **TOPOLOGICAL LAYER** The final layer still to be discussed is the topological layer, the most generic of the three. The observations made in this chapter should therefore be applicable to all towns across all regions.
To be able to study the topological framework of a town it is important to create a schematic representation of the town's street pattern, so that the analysis is not influenced by the location of particular features in the town. Space Syntax uses straight lines of sight through the entire street pattern to analyse the centrality and connectivity of particular street segments. (See section 2.2.1.2. for a detailed discussion of the Space Syntax methodology and section 1.4.5. for the discussion of the theories behind Space Syntax.)
As commented in Chapter 2, this chapter uses a form of Space Syntax called segment angular analysis, which analyses street segments (from one crossroads to another) rather than whole streets. This is the most accurate means of analysis as there is no bias for longer streets. Moreover, the topological system is analysed with different radii. A radius determines the part of the settlement that is analysed. A high or infinite radius (radius *n*) analyses the whole town. The results of this analysis

'S-HERTOGENBOSCH 1550: INTEGRATION RADIUS n
TO-MOVEMENT

'S-HERTOGENBOSCH 1550: CHOICE RADIUS n
THROUGH-MOVEMENT

100m

Figure 24: Space Syntax maps of 's-Hertogenbosch in 1550 both with an infinite radius.[42]

[42] Unfortunately, the changes to the scale caused by the export and import of the maps into the different analysis and GIS programmes could not be rectified. All measurements should therefore be multiplied by 3 to be correct (i.e., 100 metres corresponds to 300 metres). This explains why radius 300 metres almost corresponds to radius n (infinite) in. This scale problem occurs in all Space Syntax maps in this chapter. In order to be able to replicate the analysis using the same dataset it was thought best to keep using the original measurement and provide this explanation.

correspond with the ways in which visitors to 's-Hertogenbosch used its urban form. A low radius, on the other hand, only analyses neighbourhoods in a town within a set distance from the starting point of the analyses. These results correlate with the ways in which the inhabitants of 's-Hertogenbosch used its urban form.
The measures I calculated are integration and choice. The results of the integration measure are presented in a graph that shows the street segment which is the most likely destination when people walk through 's-Hertogenbosch from any starting point. The most likely destination – which is also the most integrated one – is coloured red in the graphs, whereas the least likely destination – which is also the most segregated one – is coloured blue. The graphs for choice, on the other hand, show the street segments which are most likely to be on a route when people walk through 's-Hertogenbosch from any starting point to any destination. The street segment which forms part of most routes is coloured red and is the most chosen route whereas the street segment that is hardly ever part of a route is coloured blue and is the least chosen route.

To enable us to discuss the influence the topological layer might have had on the location of the economic space in 's-Hertogenbosch, the results of the Space Syntax analysis of 's-Hertogenbosch will be presented before they are compared with the sources of evidence discussed in sections 6.2.1. to 6.2.3.
The maps in Figure 24 show the results of the segment analysis of 's-Hertogenbosch in 1550 with radius n (infinite). The integration graph shows the popularity of the area around the central marketplace for visitors, whilst the choice graph shows the main routes they took to get there: Hinthamerstraat (from the east) and Vughterstraat (from the south). Orthenstraat (from the north) was apparently less popular, which might be explained by the fact that the main land routes to 's-Hertogenbosch entered the town at either Hinthamerpoort or Vughterpoort. Orthenpoort was more popular for the river transport route.

Figure 25 presents the choice values for the map of 1550. These show a changing pattern from the lower radii, which highlight, as expected, a clear focus on the smaller community centres which inhabitants of 's-Hertogenbosch frequented, towards a global integration pattern with a strong focus on the central marketplace and the first part of Hinthamerstraat, which is the main part of town that visitors travel to. On a global scale the typical street pattern of 's-Hertogenbosch, a junction of the three main streets of Orthenstraat, Hinthamerstraat and Vughterstraat, is clearly visible as highly integrated. This shows the importance and the centrality of this triangular pattern within the urban form of 's-Hertogenbosch since it enables the town to pull visitors in from different directions towards the hub, the central marketplace.

The occupational maps in Figure 22 indicate that the various occupations were differently distributed across town. When these maps are considered individually it is not immediately obvious why this is the case and whether there is an underlying pattern. When they are compared with the results of the Space Syntax analysis, as presented in Figure 25, any influence of the topological layer will come to light. This comparison leads to the following observations about the locations of the various craftsmen.
Food and beverage processors were distributed across the town, with a slight focus on the most integrated streets. This pattern corresponds with the choice graphs of all radii. In other words, the food and beverage processors were situated at locations which were popular among local dwellers as well as visitors. The working proprietors, on the other hand, were situated almost entirely at locations which are highly integrated at the highest radii; in other words, for visitors from outside the town. Moreover they were all found either at the central marketplace or near the gates, the places most accessed by visitors.

The textile workers were located nearly everywhere in the town in a distribution that correlates with both the local and global integration; hence, for both inhabitants and visitors. There does not seem to be a strong focus of textile producers around Verwerstraat, the traditional textile neighbourhood. However, a large percentage of the textile sales workers were located on and around this street. The fullers were located on the outskirts of the town, no doubt because of their environmentally-unfriendly occupation. A large number of weavers was centred around Weavers' Square, but several were also situated around Tolbrugstraat and Hinthamereind. The distribution of people employed in a leather profession shows an entirely different pattern. They were located mainly on one of the three main roads radiating from the marketplace, *viz.*, Vughterstraat, Hinthamerstraat and Orthenstraat, which correlates with the choice graphs on radii 100, 200 and 300. These were the streets with the highest through-movement of visitors to the town. Even the tanners, who also had an environmentally-unfriendly occupation, were located along these streets albeit mostly towards the gate end rather than the market end. In other words, they chose a highly integrated location with a low population density so that they could profit from footfall and minimize the environmental burden at the same time.
Most of the metal producers were located at the ends of the town, albeit on streets with the highest through-movement, probably because of the fire risk. Since the Dieze flows through most of the town, water is always nearby. A strong concentration of pynners can be found around Tolbrugstraat. This coincides with the results of archaeological excavations at that location which include the remains of metalworking activities (Nijhof 2007a, 226).
The coopers were located mostly around the fish market where they could find a ready clientele. Fishermen, on the other hand, are logically located near the harbour. However, it is difficult to say anything about the location of the other agricultural occupations. Woodworkers, other than coopers, were spread throughout the town in no particular pattern. Most of the sales workers were located on the most integrated, i.e., on the most popular streets for visitors. This is especially true for the workers in the 'other' category, mostly pedlars. The transporters, especially those involved in the transport of goods by river (the bargees), were almost all found near the harbour. Passing trade and a need to be located on most integrated streets does not seem to have been important for the transporters. Transporters were, in essence, freelance workers who needed to solicit for work by themselves; people requiring transport would rarely have come to them. It was therefore essential to be close to the place where most goods had to be transported. That way, they could respond to any transport jobs that might be required. Occupations which did not rely on passing trade or people actually coming to their residence, such as construction workers, could be found in the most segregated streets of 's-Hertogenbosch. The profession of construction workers was very different from that of the metal or textile workers discussed in previous paragraphs. They worked with timber, stone and similar products but they did not sell them. What they sold was their ability to make something out of them, such as a wall or a floor. Moreover, as mentioned previously, they did not usually work at a workshop that was frequented by customers, but at construction sites. It is therefore not surprising that the location of these construction workers correlates with the segregated parts of the Space Syntax graph, i.e., those parts of 's-Hertogenbosch which were least frequented by either visitors or inhabitants.
Apart from the locations where craftsmen worked, there were other economic locations in town such as the markets, fairs, halls and harbour. To analyse their locations we need to compare the Space Syntax graphs in Figures 24 and 25 with the locations of the markets, halls and harbour in Figure 21. Even though these locations were decided by the Duke of Brabant, they were situated in the most integrated part of 's-Hertogenbosch. The decision on where to locate the markets and halls would therefore have been influenced by the topological framework of 's-Hertogenbosch. The locations of the markets, halls and harbour were not on a through-route themselves but at the beginning or end of a through-route, depending on the perspective, as can been seen in Figure 25. The central marketplace was mostly reached by a route via Hinthamerstraat from the east and to a degree from Vughterstraat from the south. Since the market and harbour are both located in the town, the route between the central market and the harbour was also important at a more local level. This implies that these economic spaces in 's-Hertogenbosch were actually the goals of the visitors rather than just places they passed through to get from one side of the town to another. For the inhabitants of 's-Hertogenbosch, however, they were very much passing places as well.
Summarizing these results, it can be said that the topological layer determined the location of economic spaces in the town of 's-Hertogenbosch. The craftsmen who relied on footfall were located on the street segments with the highest choice value, or in other words, the highest through-movement. The markets, halls and harbour, on the other hand, were located on the street segments with the highest integration values, in other words, the highest

RADIUS 10 METRES

RADIUS 20 METRES

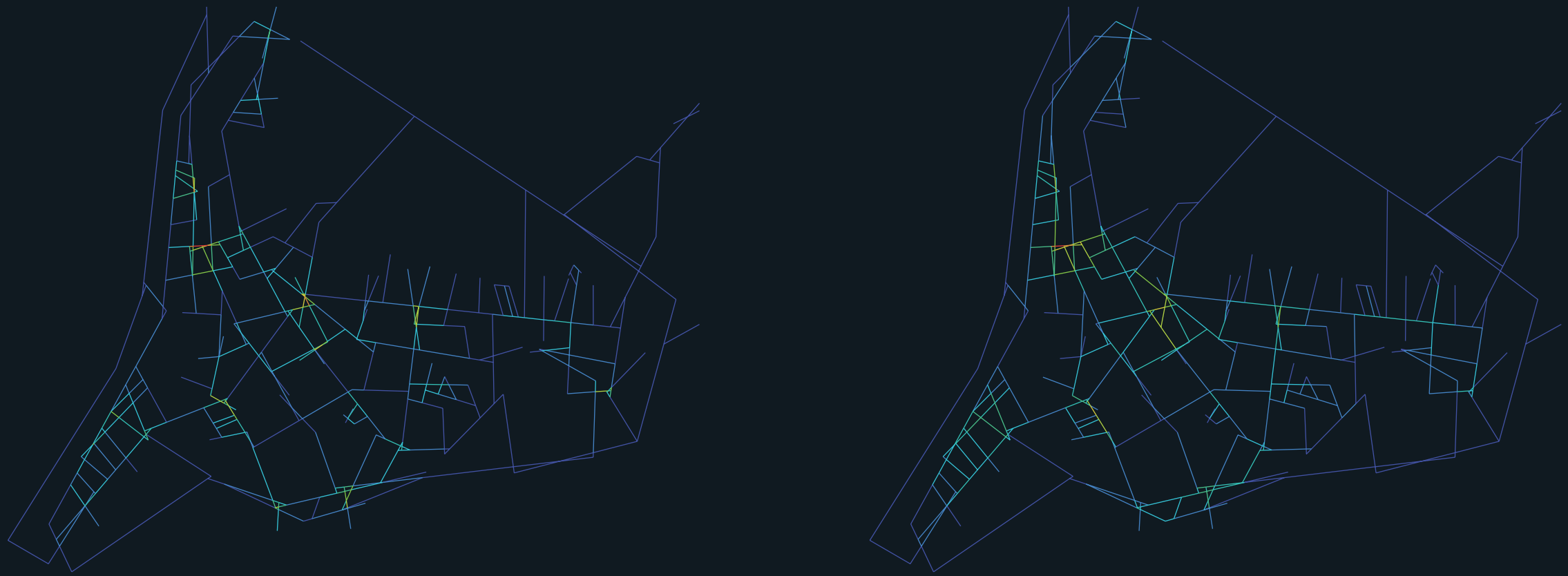


Figure 25: Choice values with radius 10, 20, 50, 100, 200 & 300 metres (through-movement).

RADIUS 50 METRES

RADIUS 100 METRES

Figure 25: Choice values with radius 10, 20, 50, 100, 200 & 300 metres (through-movement).

RADIUS 200 METRES

RADIUS 300 METRES

Figure 25: Choice values with radius 10, 20, 50, 100, 200 & 300 metres (through-movement).

to-movement. They were located at the end of the highest through-movement lines. They can therefore be seen as actual goals rather than passing places.

CONCLUSION The primary aim of this chapter was to determine whether there is a logical explanation for the spatial distribution of production and trade in a sixteenth-century town. This has been done by analysing the location of economic spaces in 's-Hertogenbosch and seeing how the results confirm or contradict our understanding of this spatial distribution. We used three layers – geographical, cultural and topological – which together make up the urban form, to explain the pattern of economic space. This chapter has shown that all three layers contribute to the distribution of economic spaces around the medieval town albeit in various degrees. The geographical layer has shown the importance of the proximity of water and high ground for the choice of plot. However, it has also shown that after the building of the second fortifications both were available in abundance and did not restrict the choice of plots as such. The only small influence from the geographical layer was that workers who needed clean water (such as brewers) were at a distance from workers who polluted it (such as fullers and tanners).

The cultural layer showed that the centres of trade that are mentioned in the guild-charters and which can be deduced from the toponymic records do not correlate with the locations of craftsmen as recorded in the tax-registers. Some craftsmen were, of course, located in 'trade' streets and in guild centres but nowhere near all of them, so one cannot speak of a correlation. One way in which the cultural layer affected the location of economic spaces was through the markets (and presumably fairs) and the various halls. Their locations, times and other particulars were stipulated in the charters and could not be deviated from. However, they may not necessarily have been decided on the basis of cultural factors.

This chapter has shown that the topological layer had the greatest influence upon the location of economic space. In a previous article (Craane 2007) I showed a strong correlation between market space and integration levels in medieval Utrecht. This correlation is again visible in sixteenth-century 's-Hertogenbosch. In addition, I have shown in this chapter that other economic spaces, such as the locations of the various crafts, can be explained topologically. As in modern times, economic space correlates with movement, and one could therefore argue that there is such a thing as a 'medieval movement economy'. A comparison between the various occupational categories and choice graphs of different radii indicates the customers – local or visiting – which the profession focused on. Whereas the food and beverage category correlates with all scale levels, and therefore served the locals as well as the visitors, the working proprietors category (inns and taverns) was more targeted at visitors. Other observations can also be made. The food profession was situated in a very segregated part of the town and located close to the point of arrival of goods (the harbour), rather than the main point of sale (the marketplace). The leather profession is also located on the streets with the most footfall, which is surprising given the stench emitted by tanning. The tanners were, however, situated on streets with a high footfall but at the same time were farthest away from the town centre. The other economic spaces (markets, halls and the harbour), on the other hand, were situated at the end of the streets with high choice values and in areas with high integration values. In other words, they were located in streets that were goal rather than routes for visitors to the town of 's-Hertogenbosch.

This chapter has shown how the three layers fit together to make a unique town. It led to the interesting discovery of the distribution of the metal profession across the more popular streets in the town of 's-Hertogenbosch. Given the fire risks metalworking has always been perceived as a profession that would be located in segregated, out-of-the-way locations. However, thanks to the proximity of the river Dieze to almost all town locations and the general low-lying relief of 's-Hertogenbosch, any fire risk was reduced to a minimum. Fire-prone professions, such as bakers and founders, could therefore be located anywhere they wished and were not restricted by geographical factors. The example of fire-prone professions shows the combination of all three layers. The geographical layer makes it possible to establish a foundry or a bakery in all areas of the town; the cultural layer stresses the importance of being located near water; and the topological layer shows that the relevant professions were able to find a location with a much higher footfall. In this way the combination of the three layers explains the distribution of economic space in 's-Hertogenbosch.

It is in medieval towns that the three layers are more comparable in terms of importance, even though the topological layer has the greatest influence. In modern towns, public transport, fire-fighting equipment and rules and regulations all ensured that the topological layer was of much greater importance than the other two for determining the pattern for the location of economic activities. These differences between modern and medieval settlements, as well as the contribution made by Space Syntax to our understanding of the medieval and early-modern urban form, will be further explored in Chapter 7.

It is in medieval towns that the three layers (geographical, cultural, topological) are more comparable in terms of importance, even though the topological layer has the greatest influence.

CONCLUSION:

DISCUSSION AND GENERALIZATION ABOUT THE LOCATION OF ECONOMIC SPACE

7

Chapters 4, 5 and 6 discuss the different scales on which the economy influenced the spatial lay-out of the Bailiwick of 's-Hertogenbosch in general and the town of 's-Hertogenbosch in particular. We have seen how the region and the town were connected to other regions, how the region itself was connected in a system of markets and fairs, and how the economic spaces in the town of 's-Hertogenbosch were distributed. All these facets of late medieval life were discussed from a spatial point of view and in the latter two instances by applying a form of spatial analysis, which is relatively new to the field of archaeology and especially history. However, one of the underlying aims of this thesis has been to show the light that an entirely different technique can shed on our past. Most studies of historical built environments make statements that apply only to that particular built environment. Any sound hypothesis, theory or method, however, must be clearly formulated and able to be applied to more than one case for it to be falsifiable and testable.

Because Space Syntax operates independently from the context it can be applied to all types of built environments in the past, present and future and across the globe. Consequently, even though this thesis has focused on the Bailiwick of 's-Hertogenbosch as a case-study for Space Syntax, the results will prove useful and will serve as a stepping-stone not only for researchers of this region alone. This chapter will illustrate this point by extrapolating the findings of this thesis into the wider context of late medieval and early modern Europe and uncovering what the results of the analysis of the Bailiwick of 's-Hertogenbosch can teach us about the spatial make-up of medieval urban and regional society in general. Moreover, this chapter will illustrate the way in which this research is in line or out-of-line with any previous Space Syntax research of past, present and future built environments. It is further hoped that this wider context will help to create a more positive attitude towards these new techniques and demonstrate their potential value for research on historical space and society.

To discuss the contributions of this research successfully, in light of both the more traditional historical and archaeological debate and the constantly evolving field of Space Syntax, this chapter is divided into three parts. The first will discuss the results of this research in light of the historical and archaeological research fields discussed in Chapter 1 and determine how they have added to our knowledge of economic space and urban form. Section 7.2 will discuss the Space Syntax findings of this thesis in relation to previous Space Syntax studies on the Dutch city, the historical environment and the region, and to Space Syntax studies in general. The last section will discuss whether, and if so, how Space Syntax can and should be used in future historical and archaeological studies.

7.1. IN WHAT WAY HAS THE USE OF SPACE SYNTAX PROVIDED NEW FINDINGS ABOUT THE LOCATION OF MEDIEVAL AND EARLY MODERN ECONOMIC SPACE?

Chapter 1, the theoretical background, dealt with the various debates which constitute the underlying framework of this research. Having used Space Syntax, which is a relatively new technique in historical and archaeological research, it is important to reflect on the debates mentioned in that chapter in order to determine how this research and the use of a new technique have added to them. This will be done by comparing and contrasting my research with earlier research from the fields of those debates.
The four debates will be discussed consecutively and in the same order as in the first chapter. Section 1.4.5 on Space Syntax will not, however, be discussed in this section, for obvious reasons. The contributions of this research to the field of Space Syntax will be discussed separately in section 7.2.

7.1.1. TOWN AND COUNTRYSIDE

The theme of this thesis, the symbiosis between town and countryside, was developed largely from the central debate about rural-urban relationships. The primary aim was to determine observable levels of dependency. Moreover, as the time period in this thesis follows on from a period of intensive urbanization, it asks questions about the ways in which this process of urbanization is linked to the economic developments in the Bailiwick of 's-Hertogenbosch. Despite the many settlements in the Bailiwick, there is only one 'real' town to speak of, *viz.*, 's-Hertogenbosch. Accordingly, the urbanization question focuses primarily on this town, the reasons behind its foundation, and its urban development.
Rutte (2005a, 73) contributes to the debate on the concepts of town and countryside and the urbanization process by arguing that three essential preconditions need to be in place for the formation of a town: economic potential, enterprising individuals, and a ruler who is intent on organizing society in a different way or at a different location. However, in order to flourish, a town needed more than a stimulating economic climate. It also needed a suitable location where natural resources were readily available, where an old land route crossed a waterway, where there was a large enough consumer market and where fortifications could be easily built. This thesis, and Chapters 3 and 5 in particular, have discussed these prerequisites in relation to 's-Hertogenbosch and its Bailiwick. As far as the actual measurable and falsifiable prerequisites go, we have seen that 's-Hertogenbosch was able to feed itself and was not solely reliant on imports. Moreover, it was located near the river Meuse along interregional trading routes and at the same time downstream from the rivers and rivulets in the Bailiwick and along the main routes. The Bailiwick was large enough for the produce of 's-Hertogenbosch to be marketed successfully, but it was also able to use its interregional trading links to expand its 'hinterland'. Surrounded by low-lying lands which were prone to flooding, 's-Hertogenbosch was easily defendable – and defence was of prime importance. The inhabitants of the Bailiwick were therefore obliged to help with the upkeep of the fortifications. The presence of enterprising individuals has not been specifically discussed in this thesis. However, since Rutte (2005a, 74) relates this to a large population growth, which was, of course, the case in this region and which was discussed in section 3.1.4., it can be said that this precondition was present. The goal of the Duke of Brabant is another theme which has not been specifically discussed. Since many authors have already discussed the fact that 's-Hertogenbosch, as well as Eindhoven and Helmond, were the result of a specific policy pursued by the Duke of Brabant to found towns, it was felt that it was not necessary to cover this ground again in this thesis. Rutte (2005a, 76) further argues that the possibility of economic growth was not quite so essential as a precondition for towns which were founded as part of a ruler's policy, but our analysis shows otherwise. Many, if not all, towns that were the result of such a policy were founded on a strategic spot, not necessarily in military terms but definitely in economic terms. This certainly holds for 's-Hertogenbosch, as outlined in the previous paragraph. Chapter 5 illustrated the importance of topology for the economic relationships between town and countryside, and it is perfectly plausible that the Dukes were well aware of the key importance of locality for economic success.
The debates mentioned in section 1.4.1. also include the feudalism versus capitalism debate. This debate, at least as far as the relationship between town and countryside is concerned, is about the rationale behind the links between the two. Courtney (2007) argues that these links stem from feudal factors, whereas Swanson (1999) argues the opposite and attributes them to capitalist marketing. Van Bavel (2010) takes a central position by arguing that though town and countryside are separate entities, they are not quite as separate as previous authors have argued because the links they share are essential for the survival of both. I mentioned in Chapter 1 that this would be my chosen hypothesis for the Bailiwick and the discussion in Chapter 3 showed that the Bailiwick fits into Van Bavel's framework. 's-Hertogenbosch and its Bailiwick functioned independently on some fronts, mainly in administrative terms, especially from the end of the fifteenth century, but they needed each other for economic and other reasons. This thesis, particularly Chapter 3, has shown this entwinement of town and countryside. Various authors have stressed the mutual dependency of urban and rural societies (Swanson 1999; Boucheron *et al.* 2003; Blockmans 2010). Dyer (2005), in turn, has stressed the important role played by a regional urban economic network to enable the trade between town and countryside to flow and flourish. Chapter 5 showed the importance of the regional urban network of the Bailiwick of 's-Hertogenbosch and that it included settlements of different sizes, each with a differently sized hinterland. Despite the importance attributed by scholars to the urban-rural relationship, Blockmans (2010, 13) has correctly drawn attention to the gap between urban and rural historical research, as there are only a few publications that discuss the interaction between town and countryside, such as Limberger's study on Antwerp (Limberger 2008) and Van Bavel's study on the Low Countries in general, in which the Kempen region is one of the case-studies (Van Bavel 2010). One of the aims of this thesis was to bridge this gap and discuss the developments in town and countryside simultaneously while using sources of evidence and literature from archaeological, historical and geographical disciplines. This enabled me to paint the most comprehensive picture possible of the late medieval and early modern economy in the Bailiwick of 's-Hertogenbosch from a spatial perspective. Soens *et al.* (2012, 87-88) have argued that the rural world is connected to the urban world but not shaped by it.
This is what we have seen in the Bailiwick of 's-Hertogenbosch: the town of 's-Hertogenbosch had a profound urban impact on its countryside. However, the countryside was also shaped by many endogenous factors such as specialization and commercialization, which will be discussed in section 7.1.3. These factors were so important that it would be too far-fetched to say that the countryside was influenced by this large settlement alone. As that section will show, the rise of commercial activity in the countryside went hand in hand with a growing conurbation of towns linked by markets and other centres of trade.
To summarize, one can say that although they were separate entities, town and countryside functioned interdependently to a considerable degree but needed each other to flourish.
In this debate it is not important why or by whom a town was founded, but how both town and countryside flourished and how both were important and essential elements in the medieval economy.

7.1.2. LOCATION THEORY

There are two distinct approaches in studies of urbanism: those that look at the inner workings of a city on the assumption that the individual city is a microcosm of the larger urban sector as a whole; and those that look into the relationships between cities (Van der Woude *et al.* 1990, 1). Instead of focusing on one approach this thesis used both to create as comprehensive a picture possible of the Bailiwick of 's-Hertogenbosch. Section 7.1.4. will focus on the findings of this thesis from the first approach and this section will focus on the findings from the second.
The analysis of settlement patterns involves the study of relationships between the different towns, villages and hamlets in a region and is collectively referred to as location theory, with Von Thünen's isolated state model (1863) and Christaller's central place theory (1935) as the best-known models. Central place theory focuses strongly on the economic side of urbanization and is therefore useful for analysing the correlation between urbanization

and the economy or, more specifically, between the demographic growth or decline of a settlement and its economic success or failure respectively. According to Bintliff (2002) and Dyer (1996), these theories of central place and urban hierarchy offer appropriate frameworks for understanding the role of an ancient and medieval market town respectively. Even though the central place and urban hierarchy theories are designed for nineteenth-century and twentieth-century systems with a market economy, application of these models show that in the medieval period there were already societies with a high degree of market orientation. Towns could exist because of the high level of production in the countryside. Towns, on the other hand, provided functions and products that were not available in the lower-level towns (villages), and therefore the towns connected the lower-level towns together. However, the relationships between town and countryside are not conditioned only by economic laws, but also by geographical and social links. In addition, there is always a certain element of unpredictability in the choices people make and the specialisms towns decide to develop (Dyer 1996, 35).

Chapters 3 and 5 of this thesis showed the ways in which town and countryside depended upon each other during the late medieval and early modern period and how the markets and fairs of the Bailiwick were organized to create an urban system, referred to in Chapter 5 as a 'conurbation'. In the Bailiwick, while the town of 's-Hertogenbosch depended on its countryside for its supply of raw materials, the countryside depended on the town for administrative and legislative continuity and for the maintenance of its contacts with central places in other regions. One can, therefore, definitely speak of an interdependency of town and countryside.

However, one cannot say that town and countryside and, for instance, the interregional contacts discussed in Chapter 4 were all connected on the same level. The system of markets and fairs clearly showed the supremacy of 's-Hertogenbosch over the other settlements in the Bailiwick during the late medieval and early modern period. These settlements were, on the other hand, connected in a network of markets and fairs and an accompanying traffic infrastructure in which 's-Hertogenbosch was a hub, but 's-Hertogenbosch also functioned independently. These linkages between settlements and the underlying urban cities are evident from the flows of goods and services which became increasingly vital after various settlements started specializing in particular services and products (Kooij 1988, 365). 's-Hertogenbosch was then connected on a different level with the major markets such as at Cologne, Ghent and at Bruges.

A similar pattern, for instance, can be seen in the town and region of Hoorn in the province of North Holland, which was researched by Clé Lesger (1990) for his PhD thesis. Lesger uses the theories of network systems and central place to explain the rise of Hoorn until the end of the seventeenth century and its decline well into the nineteenth century. Hoorn is just one example, as there are many parallels in the surrounding area. Amsterdam is the main exception. Lesger's research showed that there are many levels of settlement patterns: the local region of Hoorn, in which Hoorn was the central place, and the larger region in which Amsterdam was the central place, as well as the way in which Amsterdam was linked to other towns of a similar stature. Because these levels of settlement patterns are all linked, they explain the economic development of the region of Hoorn. The towns surrounding Amsterdam produced the goods which were traded in Amsterdam and provided all sorts of products which were essential for overseas trade. It became a closely knit settlement system (Rutte 2006, 30). When Amsterdam lost its prime position on the overseas market - mainly to London – it was the smaller towns that suffered most. More often than not, these towns specialized in one product and when the demand for that product dropped, the entire town suffered as a result. During the eighteenth century people left these towns as more products started to be produced. As it is simply not possible for any urban society to produce all the food, clothing, shelter and heating it requires by itself, most of this, if not all, is produced or provided by the countryside. The production process for most products, on the other hand, does not take up a lot of space, except for firewood, and an ample supply of firewood was usually the foremost concern of any settlement. Hence, central place theory locates the firewood-producing zone just outside the inner zone, which would provide perishable products. However, when settlements grew, the conflict between the need for agricultural land and woods grew as well (Van der Woude *et al.* 1990, 8-9). As wood became less and less available, peat became more and more important as a source of fuel (Van der Woude *et al.* 1990, 10). When Van der Woude discusses these issues he considers them in general terms and not in relation to one specific settlement. This thesis has, however, shown that the fuel supply was key for 's-Hertogenbosch and its Bailiwick. Galloway highlights the crucial importance of fuel when he speaks of 'fuelling this city' in his publication on this topic for the City of London (Galloway *et al.* 1996). As we have seen in section 3.2.2., when 's-Hertogenbosch was founded, the area was still very forested but by the later Middle Ages most of the trees had been felled for timber or firewood. It was around this time that people started using the *gemeintes* for peat-cutting. 's-Hertogenbosch was ideally situated, close to the peat-lands of Peelland (see section 3.1.2.) and, as a result, had a readily available additional source of fuel. This fuel was necessary not only to heat homes and bake bread. Two of the main crafts in 's-Hertogenbosch relied on the availability of an ample supply of fuel. The potters and metalworkers needed it to heat their ovens to fire clay and melt metal respectively. In other words, part of the economy in 's-Hertogenbosch depended on the availability of fuel, and thus illustrates the essential importance of Galloway's allusion to 'fuelling the city'.

This section has shown that despite the abstract nature of location theory it very much holds true for the historical situation of 's-Hertogenbosch and its Bailiwick. However, it is very difficult to use location theory convincingly precisely because of its abstract nature and the specific characteristics of every region . Space Syntax, on the other hand, enabled us to analyse the Bailiwick and the operations of its settlement network. This has resulted in a less abstract application of a network theory with its schematic lines and dots but which is directly related to the roads of the Bailiwick. In other words, it has analysed the specific characteristics of the Bailiwick region and the way in which its specific settlement network compares with other regions by creating a schematic representation of a concrete example. Section 7.2.3. will elaborate on this further. To summarize, it can be said that the use of Space Syntax has enabled a far more detailed analysis of the way in which town and countryside were related and of the interconnections between the various networks in the Bailiwick than would have been possible with the more abstract location theory alone.

7.1.3. **COMMERCIALIZATION** Section 1.4.3. discussed the emergence of the two most important changes in the medieval economy: the penetration of commercial activity into the countryside and the coalescence of towns and rural markets into a series of integrated regional trade networks.

First, it can be concluded that both changes did actually occur in the Bailiwick of 's-Hertogenbosch. We have seen some production, especially cloth production, move to the countryside, where things were much cheaper. At a certain point there were hardly any weavers left in 's-Hertogenbosch as the town had turned its attention to the finishing of cloth rather than the actual manufacturing. Table 9 shows a general decline since 1511 in the number of workers in the textile trade, while the number of workers in textile sales actually rose towards 1552. Unfortunately, no hard figures are available for the rise of the textile trade, but the debate in sections 4.2.1., 4.3.1., and 4.4.1. clearly showed the rise of production in the countryside. Besides the migration of commercial activity to the countryside we saw the coalescence of towns and rural markets into a regional network. Chapter 5 showed that the Bailiwick had an integrated system of markets and fairs while Chapter 4 showed that it was linked to a wider system of interregional contacts through 's-Hertogenbosch.

The Bailiwick was therefore on a par with the regions around the North Sea and Northern Italy. On the other hand, in Germany, France and Scandinavia, a system of self-sufficiency existed well into the modern period (Van Bavel 2008, 7). This appears to be related to the rise of tenant farming, which was very competitive, as landowners wanted the highest possible yield and the highest possible rent. If a tenant farmer lost his land, he had no other option than to seek employment as a labourer either in the countryside or, more likely, in town. This process of transformation from self-sufficiency to a market economy occurred much faster in the region we currently know as the Netherlands than in other European regions (Van Bavel 2008, 10). The population burgeoned, the degree of urbanization increased, and the gross territorial product as well as the disposable income rose. This does not, however, point to a rise in prosperity as these developments were not accompanied by a sharp rise in life expectancy or body length, both of which are regarded as signs of good nutrition (Van Bavel 2008, 12-14). This shows that the transformation

from a self-sufficient to a market economy was anything but a success for the people caught up in it. Van Bavel (2008, 22) stresses the importance of a social context to enable a successful transition. This is in line with the different links which had been formed between town and countryside by administrative and judicial processes, raw materials, landownership and defence, and which were discussed in section 3.2. Even though these links were not intrinsically economic they all had an important economic component as discussed in that same section. Blockmans (2010, 379) focused on one of these four links, raw materials, by stressing the importance of agrarian production (including regional soil fertility, production of food, and industrial resources for the rise and growth of cities).

Despite the fact that the town's main economic processes – the penetration of commercial activity into the countryside and the coalescence of towns and rural markets into a series of integrated regional networks of trade – occurred in the Bailiwick, it is open to debate whether a direct link exists between this increased demand and the growing tendency towards specialization in both the town and the countryside. It has been observed that the increased demand encouraged the development of specialized occupations in the town (Britnell 1996, 79). Chapter 6 showed the degree to which specialization occurred in the Bailiwick. The question raised by Blockmans (2010, 247-248) is whether there is a direct link between urban demand and rural specialization. As shown in section 3.2.3. on landownership and section 4.2.1. on the export of cloth, the evidence about the export of wool from the Bailiwick in the fourteenth and fifteenth century stems only from a small number of large estates. Sources about the smaller farms are available only from the sixteenth century. The question therefore remains whether the increased demand from 's-Hertogenbosch and, through 's-Hertogenbosch, from other regions for lesser quality wool had any effect on small farmers (Soens *et al.* 2012, 85). Large landowners were able and more than eager to fulfil this demand but it cannot be said for certain whether this was also true for small farmers in the fourteenth and fifteenth century. As mentioned in section 1.4.3., the relationship between demography and commercialization is too complex to be labelled as an example of direct cause and effect (Britnell 1996, 360; Masschaele 1997, 227-229).

Section 7.1.1. discussed the importance of the town and countryside relationship. As a result of high population levels within the confines of a town, people did not have enough space to produce all of the food, fuel and commodities they required (Stabel 1997, 158). Even though there was some agricultural activity in most towns a reciprocal relationship between town and countryside was essential to secure the survival of the settlement. Towns had to actively pursue and maintain this relationship. This was certainly made easier by the availability of a network of markets and fairs and a transport network (Masschaele 1997). This thesis has described the integrated network of markets and fairs in the Bailiwick and the part played by 's-Hertogenbosch in it. Section 7.1.2. discussed the importance of this integrated network in detail.

To conclude, it can be said that the town of 's-Hertogenbosch could never have come about or grown without the economic dynamics that were taking place simultaneously in the surrounding countryside. Even when this mutual dependency grew as the town increasingly managed to dominate its Bailiwick economically, administratively and legally, the surrounding countryside underwent an independent development of such magnitude that it reasserted its political and economic independence in the sixteenth century.

7.1.4. **URBAN FORM** Section 1.4.4. set out the problems in defining the concept of 'town' and explained the various ways in which urban form has been and can be analysed. For instance, it argued against grouping settlements according to their foundation or form and advocated instead a morphological approach. Keith Lilly (2000) was the first to spell out a methodology for Conzenian Morphology, which had been developed four decades earlier by Conzen (1960). To Lilley's surprise, very few large towns had been analysed in Britain and Ireland with Conzenian Morphology despite the promising results it had delivered in the smaller settlements. He hoped that by providing a transferable methodology he would generate more interest, especially among the historians and geographers who were researching the larger medieval settlements. I am not sure whether the size of 's-Hertogenbosch is also the size Lilley had in mind despite the fact that his step-by-step methodology for Conzenian Morphology has been essential for the spatial analysis of 's-Hertogenbosch and its Bailiwick. Without the reconstructed medieval maps of 's-Hertogenbosch it would have been impossible to make accurate Space Syntax graphs. Moreover, the use of Conzenian Morphology and Space Syntax enabled me to analyse the urban form of 's-Hertogenbosch on its own, without necessitating comparisons with other settlements via categorization, which does not usually provide useful results. The following example will illustrate this. Rutte (2005a, 76), for instance, has categorized Dutch towns by the manner of their foundation. He assigns 's-Hertogenbosch to the category of towns which were founded between 1200 and 1270 as a result of the local ruler's policy on the foundation of towns. The urban form of this type of town usually consisted of a town-wall built at the time of the town's foundation and a regular street grid. The town plan for most of the towns in this category was laid out in a new plan or by restructuring an older pre-existing plan. If Rutte is right, 's-Hertogenbosch must be the exception to this rule because its street grid is far from regular, especially if compared with those of, for instance, Heusden, Vianen, Buren, Elburg, Leiden, Delft and Enkhuizen. Moreover, this street grid was not dictated by the town's founder but rather by the geographical conditions in the area in which 's-Hertogenbosch was situated. It is not known whether the crossroads in the town plan for 's-Hertogenbosch existed already or whether it was created. Admittedly, 's-Hertogenbosch had a town-wall built at the time of its foundation, but it was soon demolished and replaced by a new one with a greater circumference, since 's-Hertogenbosch quickly outgrew its original size. Having summarized why 's-Hertogenbosch does not fit into a particular category, it is clear that the example of 's-Hertogenbosch supports my own and Taverne's (2005, 181) opposition to categorization of any kind.

This example also shows that the categorization of towns is not very useful, as there are always exceptions. If it is placed in its own category, with no other towns, what use is categorization in the first place? It is much more useful to analyse the urban development and compare and contrast the different stages with those of other settlements. In that way, more informative observations can be made about urban form. For instance, most of the towns in the area currently known as the Netherlands expanded rapidly during the thirteenth and fourteenth century. Towns outside the county of Holland were expanded only sporadically during later centuries. (Rutte 2006, 31-41). In 's-Hertogenbosch, however, marginal expansions were still occurring during the fifteenth century. On the other hand, most of the expansion of 's-Hertogenbosch had indeed already occurred in the fourteenth century as a result of the building of the new fortifications, which enclosed in one go a significantly larger area than the first fortifications. Because of its unique geographical location, the urban form of 's-Hertogenbosch differs from that of other Dutch cities. One recurrent pattern in Dutch cities shows parallel canals with a street in the middle to create two building blocks. This pattern is observable in, for instance, Leiden, Gouda and Delft. In 's-Hertogenbosch such a regular plan was not possible because of the triangular marketplace and the river Dieze which crisscrossed the town in anything but a linear fashion. One could even say that this is a specific trait of Dutch urban development. Because of geographical constraints, Dutch towns were often unable to expand linearly. Instead, whole areas expanded at a time after they had been made habitable and flood-proof (Read 1997). These specific traits can be analysed and witnessed by Space Syntax, as section 7.2.1. will illustrate.

This thesis has paid little attention to the identity of town founders and the reasons for founding towns in the first place. The use of Space Syntax has shown that the previously proven topological patterns apply despite any geographical, cultural or historical differences. In other words, the founder of a particular town is not relevant to the discussion about urban form or the spatial relationships between town and countryside. A discussion of such aspects can only distract from the actual patterns that are present in every town and across all time periods. A categorization of towns on the basis of their foundation or visual layout can therefore be regarded as superfluous, since all towns have the same underlying topological framework and therefore belong to the same all-embracing category.

This section has shown the way in which the use of Space Syntax has aided the study of urban form. However, to be able to use Space Syntax, an additional technique, such as Conzenian Morphology, is still essential. On the other hand, the need for town categorization has become superfluous since there is really only one all-embracing category in which all towns fit. Studying the topological patterns of a town therefore enables comparisons between towns of all shapes and sizes and in all time periods.

7.2 IN WHAT WAY DOES THIS RESEARCH LINK WITH PREVIOUS SPACE SYNTAX RESEARCH?

The discussion of the theory (section 1.4.5.) and methodology (2.2.1.2. and 2.2.2.) behind Space Syntax made brief mention of many previous studies which have started to explore new uses of Space Syntax. By new uses I mean analysis of other periods and systems than the modern town in which Space Syntax has been most applied. However, apart from mentioning that other researchers have analysed whole regions (Hanson 2009; Van Nes 2009a; Turner 2009) or past societies (Hanson 1989b,a; Vaughan 2007; Griffiths 2009; Van Nes 2009b; Stöger 2009, 2011), not a lot has been said about their findings and how they compare with the findings of this research. This was omitted from the previous core chapters because it was felt that any comparisons would overcomplicate the results, all the more so since the use of Space Syntax is relatively new in the field of history and archaeology. It was more important to focus on explaining the results of this research than to compare them straight away with previous research.

This section will redress the balance by discussing the specific Space Syntax results of my research and by comparing them with the results of other research to ascertain the ways in which they link with the earlier findings and to determine how the results of this research on the Bailiwick of 's-Hertogenbosch could assist research in other time periods or regions.

7.2.1. SPACE SYNTAX AND THE DUTCH CITY

During discussions on Space Syntax one of the first questions usually asked by non-spacesyntaxticians is how it can be applied to cities across the world and across different time periods, because if one compares, for instance, Asian, African and European cities, they turn out to be very different. Of course, they are all very different in a cultural, political and geographical sense, but their basic topological function is very much the same. Hillier (1996b) tried to explain this divergence by stating that the urban fabric is made up of a topological, a cultural and a geographical layer, all of which contribute to the specific urban form of a given town. This concept was discussed in section 1.4.5. of this thesis, and was used to explain the urban fabric of 's-Hertogenbosch in section 6.3. Since only one town within the geographical boundaries of my research area was large enough to be examined with Space Syntax, it is difficult to ascertain whether, for instance, any of the effects discussed in section 6.3. are a result of 'Dutchness', if such a phenomenon exists. Does the urban form of 's-Hertogenbosch 'behave' like the urban form of any Dutch town, or is it quintessentially different owing to the wide regional divergences, which result from the historical and geographical diversity of the Netherlands? This question may be answered with a twofold comparison: first, by comparing 's-Hertogenbosch with other Dutch cities and secondly by comparing Dutch cities with foreign cities. In my article on Utrecht (Craane 2007) I used Space Syntax analysis to compare the locations of the late medieval markets with the patterns in the Space Syntax graphs. Stephen Read (1997) has researched the nature of the function-space relationship in the Dutch city by applying Space Syntax analysis and by using neighbourhoods in the cities of Amsterdam, The Hague, Haarlem, Alkmaar and Zaanstad as case-studies. He states that 'organic' linear growth along arterial roads hardly ever occurred in the Netherlands because large swathes of the Dutch landscape are located around sea level. Entire areas of land were drained and prepared for habitation and developed at the same time. As a result, urban growth usually occurred in clusters rather than in a linear manner. This is evident in seventeenth-century Amsterdam (Read 1997, 02.4), and can also be seen in medieval Utrecht (Craane 2007). A similar development is discernible in 's-Hertogenbosch in the sixteenth century. As the maps in section 6.1. of the reconstructed topology of 's-Hertogenbosch show, the expansion of 's-Hertogenbosch was not linear. After 's-Hertogenbosch was founded in the late twelfth century, on the natural, highest part of the landscape – called a *donk* – the town quickly outgrew the available habitable land. Areas surrounding this *donk* were made habitable one by one, as is evident from the maps in Figure 20. First the area to the south and the north-east, followed by the south-west and the east, were made habitable and filled with buildings and public spaces. On the sixteenth-century maps the north-eastern part of the town does not look developed since no streets have been drawn. This area, however, was almost entirely taken up by various religious institutions and was not accessible as a public space, so it is not included in the topology. The highly irregular and non-linear expansion of 's-Hertogenbosch is illustrated, in particular, by the expansion to the east during the fourteenth century. This is set square onto the already existing Hinterhamerstraat, which was one of the town's main thoroughfares. This expansion must have been subject to geographical constraints as it is not the most logical choice from an urban morphological point of view.

These different expansion patterns, the result of geographical constraints, do show in the Space Syntax graphs. According to Read (1997), there are proportionally fewer long, highly integrated lines in Dutch towns than, for instance, in London or Paris, because of the different way in which towns have expanded through the ages. Long lines, such as those that can be seen in London's Oxford Street or the boulevards of Paris, do not occur in Dutch cities, even when the difference in scale between the metropolises of London and Paris and small-sized Dutch towns is taken into account. Even though Dutch towns do have long streets, such as Hinthamerstraat in 's-Hertogenbosch (running east from the central marketplace), these are hardly ever entirely highly integrated. This similarly applies to Hinthamerstraat as only the part nearest the central marketplace shows high levels of integration and choice on a global scale. This indicates that 's-Hertogenbosch did not expand linearly along those lines but by means of neighbourhoods as a whole.

Moreover, building density is much higher in Dutch towns as result of this particular kind of expansion, which makes it possible to build and plan much more densely than in linear expansions. In addition, because of the nature of this characteristically Dutch version of urban expansion (whole areas at a time rather than linearly), Space Syntax graphs show that neighbourhoods are far less connected to other neighbourhoods. Many neighbourhoods are, for instance, surrounded by canals or other waterways with usually only a limited number of crossing points as these were expensive and not deemed necessary. Hence, we can see that new neighbourhoods, particularly those that resulted from twentieth-century urban expansions, are nowhere near as well connected to the outside world as the original (medieval) town centres. This effect can also be seen in sixteenth-century 's-Hertogenbosch. The Space Syntax graphs visualizing the local choice values (for a more detailed explanation about these values see section 2.2.1.2.) are known to highlight the neighbourhoods as part of the entire town. These patterns correlate with the various areas which were drained and made habitable. Moreover, these neighbourhoods do have a slightly lower global integration, signifying segregation from the rest of the town. Because of the limited size of 's-Hertogenbosch this difference is not very pronounced but it does demonstrate the importance of local analysis in the analysis of Dutch towns, given that the neighbourhood effect (Read 1997, 02.11) is more pronounced in the Netherlands because of the historical and geographical conditions that influenced the expansion and development of settlements.

Space Syntax has been most frequently applied to British towns and larger metropolitan areas such as London, Paris and Tokyo. Read's research confirms that, despite the particular developmental characteristics of Dutch towns, the Space Syntax graphs still correlate with occupation densities (Read 1997). In other words, despite the differences in the development of urban form, Space Syntax can certainly be used for Dutch towns, not least because it also highlights these differences.

7.2.2. SPACE SYNTAX AND THE HISTORICAL BUILT ENVIRONMENT

The possibilities for using Space Syntax in a historical setting quickly became apparent to researchers of the built environment. Within five years of the publication of *The Social Logic of Space* (Hillier and Hanson 1984), Julienne Hanson published her PhD thesis on the *Morphological History of London* (Hanson 1989a). Chapter 3, which deals with the plan for rebuilding London after the Great Fire of 1666, was published as an article (Hanson 1989b). In the other chapters of her thesis Hanson (1989a) uses the wide body of available evidence to chart the morphological history of London from the effects of the Roman street grid on the morphological development of the city to the changes in Saxon and medieval times, the relationship between the parishes, and the urban grid in Restoration London. She also included a detailed analysis of seventeenth-century London and a comparison of four maps, bringing the reader up to modern-day London. She found that, contrary to assumptions of previous authors writing on the history of London, the urban grid did not correspond to social groupings. Neither was London a collection of natural neighbourhoods. The sub-areas that existed in London stemmed from historical rather than social factors. London is made up of a combination of areas, all planned and designed at a specific time in a specific fashion. The city was not designed as a whole but it definitely did not grow organically either (Hanson 1989a, 384-385). Hanson found that, in the

early modern period, streets were not taken up by single professions, but were inhabited by a mix of different professions. Rich and poor were differentiated only by the fact that the rich houses were more often than not near major routes but they still overlooked the poorer houses from the back. The nature of the street grid ensured a good mix of locals and visitors. This is essential as "the spatial logic of a market economy is to take advantage of the 'passing trade'" (Hanson 1989a, 391). For this to occur, an intelligible movement interface needs to exist between local inhabitants and strangers passing through. The streets were the focus of everyday encounters and transactions.
The comparison between Hanson's findings for London and my research on 's-Hertogenbosch reveals some interesting similarities. The previous section on the Dutch city has already discussed the way in which new areas in 's-Hertogenbosch were laid out and their segregation from the rest of the urban grid. This is similar to what occurred in London, albeit over a longer period of time and on a larger scale. New areas were planned with the conventions typical of the time and perhaps with a different orientation. These areas were not socially defined. Craftsmen were a socially coherent group through the guild they belonged to and the guild hall where they met. However, they were not a coherent group spatially as they did not live in close proximity to one another or close to their guild hall. This pattern can also be seen in 's-Hertogenbosch, where we did not observe a strong spatial clustering of particular crafts despite a very strong guild structure. Of course craftsmen were located in the areas in which most of the joint (regulated) activities took place, but it was not the case that all craftsmen in the same profession lived together in the same area.

The Great Fire of London of 1666 afforded a unique opportunity for redesigning the City of London. Despite this and the numerous plans for geometrizing the City, the new plan closely resembled the plan from just before the Great Fire. The only substantial changes concerned the straightening and widening of many streets, mostly to comply with the new fire regulations. This shows the continuity of public spaces, and it is upon this assumption that Conzenian Morphology is based. It enables us to reconstruct the medieval street grid from nineteenth-century cadastral plans, since street grids do not usually undergo significant changes (Conzen 1960, 1968, 1981, 1988; Lilley 2000; Conzen 2004). Hanson has shown that this assumption is also true for the City of London. Even a disaster the size of the Great Fire did not deliver an opportunity for substantial changes in the layout of the streets. Early modern cities might be more integrated on a global level when compared with their medieval counterparts. On a more local level, however, the medieval town is much more integrated than its early modern equivalent. This is still the case even though the general structure of the town remains relatively unchanged. A similar conclusion can be drawn from the other chapters in Hanson's thesis, which show a continuity in the street grid from Roman times to the modern age. There are, of course, slight changes, but the grid retained its east-west organization and the same streets were important. Moreover, seemingly minor decisions on, for example, the path of a wall around a Roman town, influenced the way in which the urban form developed (Hanson 1989a, 394-395). A similar development is observable in 's-Hertogenbosch, where the first urban form was dictated very much by the shape of the *donk* on which the town was founded. The gates in the first town-wall were built to open out onto the roads which connected 's-Hertogenbosch to its hinterland. These roads were also situated on higher parts of the landscape. After 's-Hertogenbosch had outgrown its first fortifications and more land was made habitable so that the town could expand, these main streets, and the triangular shape of the fortifications that they dictated, were retained and were not replaced by a more regular pattern.

The approach I followed in Chapter 6, by comparing the location of different occupations from the tax-register of 1552 with the Space Syntax graphs, was partly inspired by Laura Vaughan's approach in her research on the spatial distribution of Jews in London, and in Manchester and Leeds during the seventeenth and nineteenth century respectively (Vaughan 1994, 1999; Vaughan *et al.* 2005; Vaughan and Penn 2006; Vaughan 2007, 2008; Vaughan and Geddes 2009). Using either census data, or in London's case, also Charles Booth's map of London, in a way similar to the way in which I used the tax-register data for 's-Hertogenbosch, Vaughan was able to analyse whether a direct correlation exists between the levels of integration and the level of wealth in a particular street. Booth's map of London showed whether the residents of particular dwellings were wealthy, comfortable, poor or even, as he called it, 'semi-criminal'. Thanks to such a valuable source as Booth's map, it was relatively easy to compare historical information with Space Syntax graphs. As no such maps are available for many towns, the only source of information is the lists in the tax-registers or even the census. Vaughan's research found a strong correlation between poverty and spatial segregation and between wealth and spatial integration in London's East End in the nineteenth century. However, an improvement in spatial accessibility did not result in social improvements, as the poor simply moved to the most segregated areas (Vaughan 2007, 241-242). Even though this issue has not been addressed in this thesis, the information from the tax-register of 1552, and possibly tax-registers from an earlier date, can easily be used to examine the relationship between poverty, wealth and spatial segregation in late medieval and early modern 's-Hertogenbosch, and could provide interesting subject matter for a future paper.

As mentioned, despite having used a similar methodology, the social theme explored by Vaughan is very different to the economic theme explored in this thesis. Sam Griffiths, however, focused on a similar theme when he too examined the relationship between urbanization and significant economic changes, albeit during a period of industrialization and not commercialization. In his PhD thesis and related articles he explored the urbanization of Sheffield between 1770 and 1905 (Griffiths 2005, 2008, 2009). He found that, during the expansion of the town, localized intensification of the grid became embedded in the pre-existing historical road network of Sheffield's rural parish. The availability of accurate maps from three dates (1795, 1850 and 1905) enabled him to use Space Syntax to analyse an area across a time frame of just over a century. It is, of course, not essential to have maps of every year at one's disposal; maps at regular intervals would suffice in the analysis of the spatial development of an area through time. Research on earlier periods, such as the medieval and early modern period, is hampered by a serious problem with regard to the use of Space Syntax for examining changes across a longer period of time because there are no accurate maps for these periods. Conzenian Morphology, as used in this thesis, does enable the reconstruction of town plans across a longer period of time, especially when cartographic sources are available and can be combined with archaeological and historical evidence.

The creation of a regional map with Conzenian Morphology was a different matter. Due to the scale and the lack of the same level of evidence or research across the entire region it is very difficult to create maps of periods before the sixteenth century.
In addition to the development of urban form in Sheffield in the eighteenth and nineteenth century, Griffiths (2005) analysed the concepts of urbanization and industrialization. These are closely linked but their reciprocal influence has not been researched, as all previous studies on this topic lacked a historical spatial perspective. Even though Griffiths focused on a different historical period and a different geographical setting, his research connects very closely with the research in this thesis. Whereas Griffiths is concerned with the relationship between urbanization and industrialization, this research is concerned with the relationship between urbanization and an earlier economic process, i.e., commercialization. There was no historical spatial perspective in either situation in previous research. The use of Space Syntax to analyse the changing urban form through time has prompted Griffiths to write various papers on the use of Space Syntax methodology in the historical disciplines (Griffiths 2005, 2011, 2012), which are deeply relevant to the theoretical framework of this thesis. This subject will be discussed in section 7.3.
This section has shown that the results of this research fit in with the results of earlier Space Syntax research on the historical built environment. It shows that 's-Hertogenbosch has, as far as the topology is concerned, an explainable urban form. In addition, the spread of occupations is similar to the spread seen in London. Moreover, this explainable urban form makes it possible to use Space Syntax to look at other aspects of urban life, such as social practices and segregation. Space Syntax can deliver valuable insights as long as sources are available that can be compared with the Space Syntax graphs.

7.2.3. SPACE SYNTAX AS PART OF A REGIONAL PERSPECTIVE

As said previously, Space Syntax has not only been used recently in the analysis of towns from the past, but, thanks to advances in information technology, in the analysis of entire regions as well. Because so much calculation was required, metropolitan areas, such as London or Tokyo, were the largest systems that could be analysed and the analysis of large-scale systems, such as

regions, was not feasible for a long while.. Hanson (2009) researched the economic viability of provincial market towns in the south-east of England by examining their relative accessibility within a regional context. She explored the influence of each town on its hinterland and surrounding villages and hamlets, as well as the pull factors of neighbouring towns. This research was possible partly because of the existence of the Great South East Axial Map which had been produced by Space Syntax Limited. Hanson's methodology was similar to the one used in Chapter 5 of this thesis to analyse the Bailiwick of 's-Hertogenbosch, albeit on a different scale. Moreover, since Hanson's analysis of the current streets and roads of south-east England, far more data have been available and the spread of towns in the region has been much more even. In my research, 's-Hertogenbosch, being the only large settlement by far, did influence the data in such a way that small-scale analysis of the villages yielded far less pronounced results. Even in the case of the south-east of England Hanson felt that, given the great disparity between the intensified grids of the settlements and the loosely woven surrounding road network, more research was needed to interpret the prosperity of a town in relation to its neighbours. The size of a town seems to have some influence on integration and choice value, but this does not go without saying, since smaller towns could also be well integrated. The research on the early modern Bailiwick of 's-Hertogenbosch could aid further research on these aspects of regional analysis since the difference between town and surrounding hinterland is magnified to the extreme.

Turner (2009) analysed a region in the north of England, including the metropolitan areas of Manchester, Bradford, Sheffield and Leeds, by trialling the road-centre line method. I have discussed this method in section 2.2.2. He found a very strong correlation between the Space Syntax graphs created with the road-centre line method and movement, which is why I adopted his method in my research. However, he was not able to prove a strong correlation with population density and deprivation. It seems that, once again, some sort of problem arises during attempts to analyse a whole region with a different level of grid intensifications.

Van Nes (2009a) also analysed a whole region, the Randstad in the western Netherlands, by creating the axial map in a manner different from that of Turner and Hanson. Van Nes created axial maps of all the main towns in the Randstad and linked them by means of the main route network. In other words, all but the smallest settlements were drawn completely, but they were linked only by the main A roads. The theory behind this choice is that cities have a higher scale of movement network that connects the various urban areas with each other (Van Nes 2009a, 121:4). By analysing this main route network together with the local street network it was possible to see the degree to which a local street was connected to this main route network. The analysis shows that the Zuidas of Amsterdam is well linked to the main route network as well as to the local network, which is why it is such a popular location for large (multinational) companies and why attempts to make another area of Amsterdam (around Central Station, for example) more popular as a business location have failed (Van Nes 2009a, 121:11). Synergy between high local and global integration makes for the best economic centres. In the Bailiwick the same synergy between high local and global integration can be seen in the town of 's-Hertogenbosch. 's-Hertogenbosch is highly integrated on a local level, i.e., within the actual town, and also on a global level, i.e., as part of the Bailiwick, both levels being essential for the creation of a successful economic centre.

This section has shown the different ways in which regions as a whole can be analysed with Space Syntax. Depending on the available sources, the questions one wants to ask and the timescale, and the computer power or manpower at one's disposal, a suitable method can be chosen. Because of time constraints only a road-centre line map of the entire Bailiwick and a town plan of 's-Hertogenbosch could be drawn. A much more detailed plan of the Bailiwick showing each of the settlements in far more detail would have been preferable. A regional map at different time periods would have been even better. Unfortunately, due to the lack of source material for the earlier periods, only an accurate sixteenth-century map was feasible.

7.3. WHAT ARE THE MAIN GOALS FOR EXPANDING THE USE OF SPACE SYNTAX IN THE HISTORICAL DISCIPLINES?

Section 7.2.2. has shown that plenty of historical research has been conducted with Space Syntax. Despite that, Space Syntax has remained relatively unnoticed in mainstream urban history, as Griffiths (2012, 8193:2) has argued. Obviously, Space Syntax is not a 'must' for all urban historians, but I agree with Griffiths that the use of Space Syntax can enhance the understanding of historical spatial organization and how it correlates with urban society and economics. Griffiths uses Gaddis to argue that the different ways in which historians and social scientists research their subjects could go some way to explaining why historians have hardly ever embraced the Space Syntax theory (Gaddis 2002; Griffiths 2012). Historians use generalizations within particular narratives whereas social scientists embed particulars in generalizations. In other words, in history many theories are used to contribute to understanding sources from a particular time and place, whereas in the social sciences the theory itself is the main aim of research and specific examples are used as illustrations. We have seen this historical type of research in this thesis, which uses five different theories, including Space Syntax, to discuss the spatial patterns of production and consumption in the Bailiwick of 's-Hertogenbosch. Besides this more traditional research approach, I have focused on the theory of Space Syntax, in particular in Chapters 5, 6 and 7, to determine the implications of using it to advance the understanding of the historical spatial organization as a whole by using the region of the Bailiwick, including the town of 's-Hertogenbosch, as examples.

The main problems of using Space Syntax are not so much related to the methodology itself but rather to the information that is required to use it successfully, particularly 'accurate' maps for the period of study and a source of evidence (e.g. a tax-register) to compare the Space Syntax graphs with. This issue was raised in section 2.2. during the discussion of the methodology. The use of Conzenian Morphology enables plans to be created of a period for which no maps exist. It is, however, a very time-consuming process which does rely on the availability of complementary evidence from, for example, archival and archaeological sources. It was possible within the scope of this thesis to create plans of 's-Hertogenbosch at approximately 50-year intervals between 1200 and 1550. However, it was only for the year 1550 that enough evidence was available to discuss the Space Syntax results in relation to the actual economic spaces within the town. Such an exercise would not have been fruitful for the earlier years, since only a few locations of economic space were known and no statistically valid or definite conclusions could be drawn.

Another possible exercise would have been to compare the Space Syntax graphs of 's-Hertogenbosch in 1550 with those of the earlier periods to draw conclusions about the morphological development of 's-Hertogenbosch. It emerged, however, that because of the size of the town and the limited changes, no new conclusions could be drawn from such a comparison. This is not just the case when researching a medieval town such as 's-Hertogenbosch. The creation of multiple maps is equally difficult if not impossible for excavated towns from the Roman period amongst others. For instance, the only evidence for Pompeii relates to the town when it was hit by the pyroclastic flow after the eruption of Mount Vesuvius in 79 AD. It may be possible to create a town plan for the town of Ostia in the second century AD and the time of its abandonment two centuries later, but two plans would still be the largest number that could be reconstructed.

This thesis also used Space Syntax for a regional analysis. But because of the scale and lack of evidence it was possible to create only one historical map of the Bailiwick of 's-Hertogenbosch, which was valid for the middle of the sixteenth century. A direct comparison with earlier periods would have been useful, but was simply not possible due to the lack of sources. The entire system of markets and fairs and the interconnecting roads in western Europe as a whole in the late medieval and early modern period would prove another interesting area for the application of Space Syntax. Needless to say this would be a time-consuming process since mapping out all the roads in western Europe would be a mammoth task. One possible solution would be to create a map like the Roman *Tabula Peutingeriana* (Peutinger Map, fifth century AD (Talbert 2010)), which is more schematic and merely shows the routes rather than the actual roads between the Roman settlements and military outposts. It would be interesting to see what kind of results a Space Syntax analysis of such a map would deliver.

All of these options for Space Syntax centre on one question: Does a correlation exist between the historical information and the Space Syntax graphs? The research mentioned in section 7.2.2. and this thesis as a whole has shown that there is a correlation which is comparable with those observed in modern-day environments. Each of these studies has enlarged our understanding of urban form

in a specific time and place. Now that this knowledge has been built up, the application of Space Syntax in the historical disciplines should move on from these questions and aim for a more integrated approach by, for instance, examining the histories of space as Griffiths (2012, 8193:16) proposes. This would involve a detailed examination of the spatial configuration of towns (and perhaps even regions) through time, comparable with the way in which Space Syntax is used to plan and examine towns and neighbourhoods in our current society. This is only one example of a possible way forward for Space Syntax in the historical disciplines. However, what is required for the development of an integrated methodology and theory is a clearer understanding among historians of how space influences society, culture and economy. This will create a platform for more analytical applications of the Space Syntax theory in the analysis of historical space. One research topic which then becomes feasible is a critical examination of propositions relating to the social significance of changes, such as the creation of workers' neighbourhoods which quickly develop into slums during a rapid process of urbanization. Griffiths has already started work on this topic within the context of the Industrial Revolution in Sheffield (Griffiths 2008, 2009).

To conclude, despite the lack of appropriate sources for particular regions and towns, the increased use of Space Syntax in urban and regional history will result in the compilation of much more information about the use of historical public space. This will enable us to develop an integrated methodology to advance the use of Space Syntax in the historical disciplines. It is, however, essential that this aim to develop a generalized methodology be borne in mind throughout the research in question in order to make the best use of the results.

CONCLUSION This concluding chapter has shown how the research presented in this thesis fits in with the theories presented in section 1.4. Moreover, it has shown the contribution this thesis has made to the existing field of research by its use of Space Syntax, a relatively new methodology in historical and archaeological studies. In the last section I aligned myself with Griffiths by advocating a more integrated use of Space Syntax to enable a better understanding of historical spatial organization as a way forward from this thesis. This is because Space Syntax has enabled detailed and specific analyses of the spatial patterns involved in the late medieval and early modern economy of 's-Hertogenbosch and its Bailiwick. This has never been achieved previously nor was even possible. Previous studies have focused mainly on either the town or the countryside without exploring their interrelationships. Moreover, the theories which have examined settlement networks applied an abstract perspective, thus ignoring any regional specifics in the process. Space Syntax has enabled a network analysis of a specific region and thus encompassed these regional specifics. In addition, the use of Space Syntax has proven the existence of a general underlying topological framework in every town. This dispenses with the need to categorize towns according to the manner of their foundation or their morphological shape. All towns, in essence, belong to the same topological category. It is the cultural and geographical aspects that make us experience each one differently.

Section 7.2. showed that the results of this research correspond with the results of Space Syntax research on other Dutch settlements, other historical settings and other regions. Many similarities can be found across time and space. This means that it is time to take a step forward in the use of Space Syntax for the study of built environments from the past. There is no longer any need to research whether Space Syntax graphs correlate with historical sources. This correlation exists, whether it is in the Roman, medieval or modern period. Historians and archaeologists who are unfamiliar with Space Syntax should no longer require such comparisons to be able to 'trust' this methodology. Instead we need to move beyond checking for correlations and use Space Syntax to examine the historical spatial configuration of towns more closely in a similar process, as Space Syntax is used to examine and improve the current spatial configurations of towns. For this to happen, a more integrated approach between Space Syntax and the historical disciplines is required, as discussed in the previous section. This is the best way forward and the only way in which more analytical advances can be made in the study of historical urban form and related issues, such as social and economic patterns. This thesis has shown that a multi-disciplinary approach which applies Space Syntax in tandem with historical, archaeological and cartographic sources will create the most comprehensive and accurate picture of our past in general and of the late medieval and early modern economy in particular.

Summary

This thesis presents the results of multidisciplinary research into the late medieval and early modern economy of the Bailiwick of 's-Hertogenbosch from an interregional, regional and local spatial perspective. It answers the question of how far the spatial form and spatial pattern of urbanization correlated with economic development and it discusses how town and countryside functioned as one entity and as participants in an economic symbiosis on a local, regional and interregional level.

To be able to discuss these issues a number of hypotheses are made. It is assumed that town and country were closely linked and cannot be analysed separately. Moreover, we propose that town and country were much more alike in their material culture than has previously been assumed. As a result, towns should not necessarily be labelled as dynamic and countryside as conservative.

This town-countryside symbiosis resulted mainly from economic determinants. In addition, location theory, as discussed in Chapter 1, is used to show that in any one particular region there is never just one central place. Instead, there is a network of cooperating settlements, and as a consequence, a spatial logic between town and country may be discerned. Consequently, the location of production and consumption within a region has various geographical and economic determinants and is never the result of coincidence.

Moreover, we examine the relationship between economic development and urbanization.

We hypothesize that 's-Hertogenbosch and its Bailiwick in the later Middle Ages relied much less on imports and exports than previous authors have argued, since both were relatively self-sufficient to a degree. Rural settlements were instrumental in the economic development of the Bailiwick. I therefore assume that there is an underlying structure that determines the success of every medieval urban network and urban form. The perceived spatial logic within settlements, within the urban network and between town and country is based on spatial analysis, besides the findings from more mainstream studies of urban form. This helps to explain how material culture spread as a result of economic and social factors.

When one researches such large and complex issues as urbanization, production and consumption, and spatial patterns, further clarification of these terms, and their theoretical origins and development is required. These issues have been the subject of many debates and theories, five of which form the theoretical framework of this thesis. These are the town versus countryside debate, location theory, commercialization theory, theories of urban form and Space Syntax.

The discussion of these theories demonstrates the need for a study of the symbiosis of town and countryside. The town versus countryside debate and commercialization theory have stressed the economic importance of this symbiosis and the lack of detailed analysis of this feature of the medieval economy. Though other economic changes occurred during this period, such as the professionalization of the countryside, the strong marketing links between town and countryside are perceived as the main motor behind urban growth. It remains, however, important to examine the two issues – economic change and urbanization – separately to be able to answer the question of which caused which. Moreover, the discussion of urbanization theories shows that there are still many unanswered questions with regard to urbanization issues. In investigating the causal relationship between economic change and urbanization, I also shed light on the particulars of urban networks, urban form, and urban development. Most of the theories I discuss in Chapter 1 have some form of spatial element. This is why I have chosen to use Space Syntax in this thesis to shed light on the spatial aspects of economic change, urbanization and their causal relationship. The discussion of location theory shows that the spatial study of the town and hinterland relationship is more complex than models have previously allowed for. Space Syntax will refresh this town and hinterland model. Spatial analysis fits in neatly with the strong interdisciplinary focus of this thesis. Indeed, many authors have stressed the importance of interdisciplinary research on this particular topic.

Town and countryside or one Bailiwick?

Many authors have discussed the links between town and countryside, focusing mainly on administrative or specific economic links.[43] It appeared that in some regions, such as Antwerp, Bruges and Ghent, the countryside was largely dependent on, or in other words, was a subsidiary of the central town (Stabel 1992, 1997; Limberger 2008). Consequently, any links between town and countryside have been discussed primarily from the viewpoint of the town. Even though many researchers have come to the conclusions that the Bailiwick was not entirely a subsidiary of the central town, 's-Hertogenbosch, it is still argued that it was very much inferior to it, in keeping with the pattern observed in other regions. The main hypothesis of this thesis is not the dependence of the countryside on the town but the interdependence of the two, specifically in economic terms. Chapter 3 therefore argues that in the case of the Bailiwick, economically speaking, the countryside and its villages functioned relatively independently of 's-Hertogenbosch, but they still had to rely on each other for certain economic and other needs.

The mutual dependency between town and countryside may be expressed in many different ways, such as direct economic links, administrative and judicial ties, the transport of raw materials, land ownership and geography. The latter four, though not strictly economic, do have an economic connection and examining them will contribute to our understanding of the economic interdependence between the town and countryside. In addition, Chapter 3 argues that even though town and countryside were linked in several ways, each can be studied separately without one being considered a subsidiary of the other. At this stage, it is important to discuss the interdependence of town and countryside in this way to set the context for the following chapters, where the different scales of the economic relationship are discussed in more detail.
Throughout this thesis the term 'town' refers to 's-Hertogenbosch and the term 'countryside' to the entire Bailiwick, including all the other villages and towns. In order to test the hypothesis that town and countryside were interdependent and that there was no clear-cut hierarchy in which the Bailiwick was subordinate to 's-Hertogenbosch, this chapter addresses the following questions: How can town and countryside be defined in the Bailiwick? What links existed between town and countryside and how did they develop? To what degree were the countryside and 's-Hertogenbosch interdependent? Answering these questions provides the basis for the subsequent chapters. An understanding of the general characteristics of the Bailiwick and the specific links between town and countryside, as well as an awareness that the countryside was not entirely subordinate to the town, are all essential prerequisites for the arguments of the following chapters.

Chapter 3 shows that the relationship between 's-Hertogenbosch and its Bailiwick changed significantly between the twelfth and the sixteenth century. During the thirteenth century, the countryside was largely subservient to 's-Hertogenbosch; in the fifteenth and sixteenth century the countryside became more independent, especially in a financial sense. There was certainly a relationship between town and countryside but it was characterized by interdependence of two separate entities and not by subordination of one to another. As a result, Chapter 3 sets the stage for the rest of this thesis. By concluding that town and countryside were separate but interdependent entities, the next chapters can investigate their relationship further from an interregional, regional and local perspective consecutively.

The Bailiwick from an interregional perspective

In the medieval economy there were three different types of merchants: the local merchant, the regional merchant and the long-distance merchant. The local merchant focused on retail and subsistence trade, whereas the regional merchant focused mostly on wholesale trade in foodstuffs and semi-manufactures which were not available in the direct vicinity of the town. Long-distance merchants traded mostly in bulk, except in cases where retail trade was especially profitable (e.g., luxury textiles and spices). Long-distance merchants were banned from other retail fronts by local merchants (Irsigler 1985, 391-394).
Although this typology of merchants is relatively clear in an analytical sense, it is still difficult to differentiate between local and regional and between regional and long-distance trade. When does local become regional and when does regional become long-distance? There are no clear-cut boundaries between them. However, for the purpose of this thesis, it is important to decide on one. Since Chapter 4 discusses interregional trade it is important first and foremost to decide on a boundary between regional and interregional (or international) trade. Weststrate (2008) cites river transport to show that the boundaries between different regions can be traced relatively easily. This is because merchants were encouraged to transport their goods between markets of the highest order and sell their wares there. These 'highest-order markets' were the main markets in a region. That enables the various regions to be traced. In practice this guideline was not strictly adhered to, but it can provide at least some indication of how the system of markets and fairs was meant to function (Weststrate 2008, 101). Trade between markets of the highest order can therefore be labelled as interregional. Trade between a highest order market and its own region, can be labelled as regional trade and trade within a highest order market as local trade.

The current literature on medieval economic history assigns the greatest economic importance to interregional trade. It is argued that in order for a town to survive economically it was essential for it to make the most of interregional import and export. A town could not survive on regional or even local trade alone. In this thesis it is hypothesized that the two other forms of trade, regional and local, were of much greater importance than previously assumed. To test this hypothesis, it is essential to research the scale and importance of the interregional trade of 's-Hertogenbosch and its Bailiwick before examining the regional trade (Chapter 5) and local trade (Chapter 6). The interdependence of town and country has already been established in Chapter 3. This chapter bears this interdependence in mind when investigating the interregional economic relationships of the Bailiwick as a whole and 's-Hertogenbosch (and the other towns and villages) in particular. These relationships are placed in a spatial context to show the range and direction of the Bailiwick's interregional connections. The numerous excavations in 's-Hertogenbosch have opened up potential for archaeologically-based research into 's-Hertogenbosch's interregional trading partners. Complemented by a wide array of archival evidence it is possible to reconstruct 's-Hertogenbosch's place in the international trading network. Chapter 4, like the others in this thesis, focuses mainly on the fifteenth and sixteenth century with a few excursions into earlier periods as the evidence allows, however, not before 1180; the year when 's-Hertogenbosch was founded.

Chapter 4 contributes to the testing of the central hypothesis of this thesis by answering the central question whether the countryside of the Bailiwick of s-Hertogenbosch had a share in interregional trade and whether it influenced the character of this trade or whether the interregional trade was solely influenced by the town of 's-Hertogenbosch. In the process this chapter also focuses on the potential differences or the potential symbiosis between town and countryside.

Chapter 4 shows that the Bailiwick as a whole and 's-Hertogenbosch in particular had many interregional economic contacts. Even though the general pattern of interregional contact seems somewhat similar across the board, there are many subtle differences between the product categories.
Interregional contacts with a particular area do not automatically imply exclusive trading with that area. Quality and 'branding' were already extremely important in this period and products were not used simply because trade was already taking place in that area and one could therefore save on transport costs, for example. Building materials were imported from the Rhineland but pottery was at first imported mainly from the Meuse Valley. The pottery imported from the Rhineland consisted only of the more exclusive stoneware products.
Quality was seen as crucially important, especially with regard to wool imports as the weavers in 's-Hertogenbosch were allowed to use only one type of wool for a particular and strictly regulated type of cloth. Even if they had been able to buy cheaper wool from elsewhere they could not have used it to produce cloth as it would not have passed the quality control checks.
Interregional relationships were therefore very much determined by the quality of the wares that could be imported and one's own reputation in export products. Distance, to some extent, was not a real issue. This is, for instance, evident from the contacts the 's-Hertogenbosch merchants had with the Baltic Sea area and with Skåne.

43 See for instance Christaller (1935), Mitterauer (1971), Masschaele (1997), Stabel (1997), Hoppenbrouwers (2001), Van Asseldonk (2002), Blondé and Limberger (2004), Limberger (2008).

The question whether the countryside had a share in the interregional trade of the Bailiwick of 's-Hertogenbosch and whether it had any influence on the character of this trade or whether the interregional trade was influenced solely by the town of 's-Hertogenbosch is still difficult to answer with the available sources. Some archival and archaeological sources have hinted that the countryside had interregional contacts, but there is not enough evidence to prove a direct link with other regions, as these contacts would, most probably, have occurred through 's-Hertogenbosch anyway. The sources do, however, show that the Bailiwick was not deprived of import products, even though the luxury items turned up mostly in the town and on wealthy sites.

Was it the interregional trade that held the greatest economic importance for a town as previous authors have suggested or was it the regional and local trade, as this thesis aims to show?
Having so far analysed only the range and types of interregional trade, it is really only possible to discuss the importance of interregional trade on its own. From this chapter alone the interregional contacts do seem very important, especially since many products were manufactured mainly, or solely, for the export market. The comparison with the next two chapters on regional and local trade unveils its real importance. Moreover, it needs to be stressed that only the export market is of financial importance, since it is the export of products that makes money whereas the import only costs money. Hence, the import market primarily concerns products that the Bailiwick could not produce or grow itself. These are all products that are found as import products in almost all Dutch regions. 's-Hertogenbosch and the Bailiwick did not need to have special economic ties with certain regions to be able to import these wares as they were bought mainly through the central markets of Bruges, Antwerp and Frankfurt.

A medieval conurbation? studying the medieval urban network

The medieval economy has always been a popular subject among historians and archaeologists, not least because of the abundance of material as well as written evidence. Research on the medieval economy has centred on the town rather than the countryside as shown in Chapter 3. Towns in the Middle Ages would not, however, have been able to exist without a countryside to provide them with support in the form of foodstuffs and raw materials for construction and other industries. To gain a more complete understanding of the medieval economy this chapter investigates how town and countryside were linked through these economic relationships and the ways in which they formed a network between town, villages and countryside, to create a conurbation *avant la lettre*.
Markets and fairs have always been considered a good indicator of urban networks and economic relationships (von Thünen 1863; Unwin 1981; Britnell 1996; Stabel 1997). However, was there such a thing as an actual network of markets and fairs that linked town and countryside within a region? In previous articles (Craane 2007, 2009a,b) I have argued that topology – the mathematical properties of a particular place without taking geography or architecture into account – constitutes the main explanation for the location of economic space. Economic space is understood as the areas in which economic activity, such as the production and sale of crafted products, the organization of markets and fairs and so on takes place. Chapter 5 explores whether topology also provides the main explanation for the links between town and countryside and for the establishment of a medieval urban economic network.
Despite the popularity of urban networks and town-countryside relationships as topics in medieval studies, no models have been defined for studying these topological relationships since those proposed by Von Thünen, Christaller and Berry (von Thünen 1863; Christaller 1935; Berry 1967). Space Syntax moves on from these models and is used to create a schematic representation of a concrete example, the region of the Bailiwick of 's-Hertogenbosch in the Netherlands, to show whether the markets and fairs in this particular region were linked to form the economic system upon which the regional medieval economy was based. Recent research has already shown that Space Syntax can be used not only in the analysis of the internal structure of settlements and buildings but also in the analysis of twentieth-century settlement patterns and urban networks (Van Nes 2009a). The case-study for this analysis is the Bailiwick of 's-Hertogenbosch because of the large amount and wide range of evidence available for this region and because of its geographical make-up.
The hypothesis in Chapter 5 is that, in the medieval period, towns and their surrounding villages were already linked in what amounted more or less to a conurbation and that the concept of conurbation may apply in other contexts besides modern capitalist cities.

Chapter 5 provides various potential explanations for the network of markets and fairs in the Bailiwick of 's-Hertogenbosch. As already hypothesized, the topological explanation seems to be the most promising. This explanation is then explored further with Space Syntax. This spatial analysis highlights how the network of towns and villages is constructed and explains the difference between the large and small villages from the Space Syntax point of view. Moreover, it shows that in a regional context the road network was more integrated than the river network, which is why it is essential to focus on the road network in order to explore and analyse the relationship between town and countryside. It further shows that spatial configuration matters for the location of markets. The higher the spatial integration on the various scale levels the more vital and the larger the market seems to have been. These results fit in with research results in which Space Syntax has been applied in a present-day urban and regional context (Hillier *et al.* 1993a; Hillier 1998; Van Nes 2009a).
However, Chapter 5 is, of course, only a stepping-stone in the continuing research into the medieval economy and the symbiosis between town and countryside. We show that the most likely explanation for the establishment of markets and fairs is the topological explanation and that markets and fairs were not established randomly but in relation to a spatial or temporal distribution pattern. Chapter 5 gives a clear indication that in the medieval period some sort of conurbation existed in which the smaller settlements operated as suburbs of the larger ones. It demonstrates the need for a more formal analysis of urban networks and introduces a suitable methodology which enables the visualization of this conurbation. However, the availability of more primary evidence, archaeological evidence in particular, will aid the creation of more complete network plans.
On the other hand, testing this methodology, a combination of Space Syntax and Conzenian Morphology, on the Bailiwick of 's-Hertogenbosch, shows the potential of clear and more workable concepts of urban space by being able to analyse a built environment's spatial properties independently of the historical and archaeological socio-economic data. Recent advances in IT have enabled the analysis of larger systems, and soon it will be possible to analyse areas the size of countries and beyond. It will then be possible to use Space Syntax for the analysis of interregional trade and to pave the way for research into the difference in the importance of the road and river networks for the different scales of trade – local, regional and interregional.

The medieval urban 'movement economy'; patterns of economic space in a medieval town

Chapter 6 discusses whether there is a logical explanation for the spatial distribution of production and trade in a sixteenth-century town. The premise is that a specific combination of factors exists which explains the distribution of economic space, i.e., the areas in which economic activity takes place such as markets and fairs and the locations where crafted products were made and sold. This chapter investigates the way in which these areas are distributed, paying particular attention to the factors which could explain it. The investigation of this premise requires some detailed analysis of source material and the use of complex analytical tools, which is why a decision was taken to focus primarily on one year, 1552.

For decades scholars have researched the town and its development. Previous authors (Barley 1976; Biddle 1976; Hindle 1990; Lilley 1998, 2002) have discussed the categorization of medieval towns into towns that are planned and towns that have grown naturally. This division is not useful, since order and structure are present in all towns to a certain degree.
The question is therefore not whether a town was planned but rather the degree to which it was planned (Hanson 1989b, 40). The positioning of new buildings is never random and is always decided in relation to the already existing buildings and infrastructure. Some towns have a visibly planned appearance. For example, checkerboard patterns always suggest a more planned environment. However, this does not

rule out the existence of structure and order in other towns. It is my contention therefore that towns are never completely organic in nature and that there is a clear logic behind their spatial development.
This is because towns are not just about the buildings within them but also about the way they are defined by open spaces. Urban life is and never has been about architecture, artefacts and rules and regulations alone, but about how they were used and experienced by people in the space around them. It is the topology which defines the urban environment. There is no direct way of determining exactly how space was used in the past but inferences can be drawn through physical remains, such as written documents and archaeological finds. It is, in any case, in the nature of history and archaeology to study the physical remains of the past and not intangible and non-visible remains. It is therefore essential to find techniques from non-historical disciplines to aid our task. A combination of historical disciplines with a discipline which researches the modern use of space may enable us to analyse the centrality of economic space in the late medieval and early modern town.

As explained in Chapter 2, Space Syntax is based on the premise that human societies use and configure space. Analyses of space should therefore be able to tell us something about society. Though Space Syntax has been used primarily in modern cities it may also prove advantageous in the analysis of historical cities and shed some light on how urban society functioned in the past. Larkham (2006, 130) realized the great potential of using Conzenian Morphology with Space Syntax when he said that "a great opportunity clearly exists for exploring the potential complementarities of the different traditions of Space Syntax and Conzenian Morphology" in a historical setting. At the 6th International Space Syntax Symposium in Istanbul in 2007, the Space Syntax community itself noted this potential when it invited Jeremy Whitehand to present a paper on *Conzenian Urban Morphology and Urban Landscapes* (Whitehand 2007). Griffiths (2005) and Craane (2007) have already produced the first results of a combination of Conzenian Morphology and Space Syntax and have shown the possible contribution that Space Syntax can make to historical and archaeological research. One of the main findings of Space Syntax is that the space between buildings structures the movement of people around the town and that spaces with high movement, in turn, correlate strongly with the presence of economic space. "Well functioning cities can therefore, it will be suggested, be thought of as 'movement economies'." (Hillier 1996b, 113-114).

Taking the previous discussions into account, the central question in this chapter can therefore be re-phrased as follows: In what way did the 'movement economy' manifest itself in a medieval town? By combining archival evidence, toponymy, archaeology and spatial analysis, we try to answer this question from as many different angles and as comprehensively as possible. Moreover, as shown in section 1.5, Hillier (1996b) has argued that the urban fabric is made up of three layers: a topological, a cultural and a geographical layer, all of which contribute to the specific urban form of a given town. Chapter 6 shows that all three layers contribute to the distribution of economic spaces around the medieval town albeit in varying degrees.
The geographical layer shows the importance of the proximity of water and of high ground for the choice of plot. However, it also shows that after the building of the second fortifications both were available in abundance and did not restrict the choice of plots as such. The only small influence from the geographical layer was that workers who needed clean water (such as brewers) were at a distance from workers who polluted it (such as fullers and tanners).
The cultural layer shows that the centres of trade that are mentioned in the guild-charters and which can be deduced from the toponymic records do not correlate with the locations of craftsmen as recorded in the tax-registers. Some craftsmen were, of course, located in 'trade' streets and in guild-centres, but nowhere near all of them, so one cannot speak of a correlation. One way in which the cultural layer affected the location of economic spaces was through the markets (and presumably fairs) and the various halls. Their locations, times and other particulars were stipulated in the charters and could not be deviated from. However, they may not necessarily have been decided on the basis of cultural factors.
Chapter 6 shows that the topological layer had the greatest influence on the location of economic space. In a previous article (Craane 2007) I showed a strong correlation between market space and integration levels in medieval Utrecht. This correlation is again visible in sixteenth-century 's-Hertogenbosch. In addition I show in this chapter that other economic spaces, such as the locations of the various crafts, can be explained topologically. As in modern times, economic space correlates with movement, and one could therefore argue that there is such a thing as a 'medieval movement economy'. A comparison between the various occupational categories and topological choice maps of different radii indicates the customers – local or visiting – that the profession focused on. Whereas the food and beverage category correlates with all scale levels, and therefore served the locals as well as the visitors, the working proprietors category (inns and taverns) was more targeted at the visitors. Other observations can also be made. The food profession was situated in a very segregated part of the town and located close to the point of arrival of goods (the harbour), rather than the main point of sale (the marketplace). The leather profession is also located on the streets with the highest footfall, which is surprising, given the stench emitted by tanning. The tanners were, however, situated on streets with a high footfall but at the same time were the farthest away from the town centre. The other economic spaces (markets, halls and the harbour), on the other hand, were situated at the end of the streets with high choice values and in areas with high integration values. In other words, they were located in streets that were goals rather than routes for visitors to the town of 's-Hertogenbosch.
This chapter shows how the three layers fit together to make a unique town. It leads to the interesting discovery of the distribution of the metal profession across the more popular streets in the town of 's-Hertogenbosch. Given the fire risks, metalworking has always been perceived as a profession that would be located in segregated, out-of-the-way places. However, thanks to the proximity of the river Dieze to almost all town locations and the general low-lying relief of 's-Hertogenbosch, any fire risk was reduced to a minimum. Fire-prone professions, such as bakers and founders, could therefore be located anywhere they wished and were not restricted by geographical factors. The example of the fire-prone professions shows the combination of all three layers. The geographical layer makes it possible to establish a foundry or a bakery in all areas of the town; the cultural layer stresses the importance of being located near water; and the topological layer shows that the relevant professions were able to find a location with a much higher footfall. In this way the combination of the three layers explains the distribution of economic space in 's-Hertogenbosch.
It is in medieval towns that the three layers are more comparable in terms of importance, even though the topological layer has the greatest influence. In modern towns, public transport, fire-fighting equipment and rules and regulations all ensured that the topological layer was of much greater importance than the other for determining the pattern for the location of economic activities. These differences between modern and medieval settlements, as well as the contribution made by Space Syntax to our understanding of the medieval and early modern urban form, are further explored in Chapter 7.

Conclusion

Chapters 4, 5 and 6 discuss the different scales at which the economy influenced the spatial lay-out of the Bailiwick of 's-Hertogenbosch in general and the town of 's-Hertogenbosch in particular. They show how the region and the town were connected to other regions, how the region itself was connected in a system of markets and fairs and how the economic spaces in the town of 's-Hertogenbosch were distributed. All these facets of late medieval life are discussed from a spatial point of view and in the latter two instances by applying a form of spatial analysis which is relatively new to the field of archaeology and especially history. However, one of the underlying aims of this thesis is to show the light that an entirely different technique can shed on our past.

Most studies of historical built environments make general statements that apply only to that particular built environment. Any sound hypothesis, theory or method, however, must be clearly formulated and able to be applied to more than one case for it to be falsifiable and testable. Because Space Syntax operates independently from the context it can be applied to all types of built environment in the past, present and future and across the globe. Consequently, even though this thesis uses the Bailiwick of 's-Hertogenbosch as a case-study for Space Syntax, the results will

prove useful and serve as a stepping-stone not only for researchers that study this region alone. This chapter illustrates this point by extrapolating the findings of this thesis into the wider context of late medieval and early modern Europe and by uncovering what the results found in the analysis of the Bailiwick of 's-Hertogenbosch can teach us about the spatial make-up of medieval urban and regional society. Moreover, this chapter illustrates the way in which this research is in line or out-of-line with any previous Space Syntax research of past, present and future built environments. It is further hoped that this wider context will help to create a more positive attitude towards these new techniques and demonstrate their potential value for research on historical space and society.

The concluding chapter discusses the way in which the research presented in this thesis fits in with the theories presented in section 1.4. Moreover, it shows the contribution this thesis makes to the existing field of research by its use of Space Syntax, a relatively new methodology in historical and archaeological studies. In the final section I align myself with Griffiths by advocating a more integrated use of Space Syntax to enable a better understanding of historical spatial organization as a way forward from this thesis. This is because Space Syntax has enabled detailed and specific analysis of the spatial patterns involved in the late medieval and early modern economy of 's-Hertogenbosch and its Bailiwick. This had never been achieved previously, nor was even possible. Previous studies have focused mainly on either the town or the countryside without exploring their interrelationships. Moreover, the theories which have examined settlement networks have applied an abstract perspective, thus ignoring any regional specifics in the process. Space Syntax has enabled a network analysis of a specific region and thus encompassed these regional specifics. In addition, the use of Space Syntax has proven the existence of a general underlying topological framework in every town. This dispenses with the need to categorize towns according to the manner of their foundation or their morphological shape. All towns, in essence, belong to the same topological category. It is the cultural and geographical aspects that make us experience each one differently.
Section 7.2. shows that the results of this research correspond with the results of Space Syntax research on other Dutch settlements, other historical settings and other regions. Many similarities can be found across time and space. This means that it is time to take a step forward in the use of Space Syntax for the study of built environments of the past. There is no longer any need to research whether Space Syntax graphs correlate with historical sources. This correlation exists, whether it is in the Roman, medieval or modern period. Historians and archaeologists who are unfamiliar with Space Syntax should no longer require such comparisons to be able to 'trust' this methodology. Instead, we need to move beyond checking for correlations and use Space Syntax to examine the historical spatial configuration of towns more closely in a similar process, as Space Syntax is used to examine and improve the current spatial configurations of towns. For this to happen a more integrated approach between Space Syntax and the historical disciplines is required. This is the best way forward and the only way in which more analytical advances can be made in the study of historical urban form and of related issues such as social and economic patterns. This thesis shows that a multi-disciplinary approach which applies Space Syntax in tandem with historical, archaeological and cartographic sources will create the most comprehensive and accurate picture of our past in general and of the late medieval and early modern economy in particular.

Glossary

Translations for the occupations discussed primarily in chapter 6 can be found in the table in appendix 5. The meaning of the various Space Syntax measures can be found in section 2.2.1.2.

English <---------->	Dutch
Bailiwick	Meierij
Barley	Gerst
Bastion	Bolwerk
Blow-sand ridge	Dekzand rug
Book of Miracles	Mirakelboek
Brass	Messing
Buckwheat	Boekweit
Chapter	Kapittel
Clothmakers' hall	Lakenhal
Common lands	Gemeintes
Conurbation	Agglomeratie
Corn	Graan
County/shire	Graafschap
Cylindrical Jug	Jacobakan
Development plan	Bestemmingsplan
Dripping Pan	Vetvanger
Dutch auction	Afslag (hoog tot laag veiling)
Earth arch	Grondboog
Excise	Accijns
Fallow	Braakliggend
Fire cover	Vuurkorf
Folklore	Volkskunde
Foreland	Uiterwaard
Fortified city	Vesting
Freedom	Stedelijke Vrijheid
Globular Cookingpot	Kogelpotten
Grain	Koren
Grape	Graapje
Hearth-counts	Haardstedentellingen
Highest part of the blow-sand ridge that remained after the lowest parts had eroded	Donk
Low Sunday	Beloken Pasen
Manor/seigniory	Heerlijkheid
Minster	Munster
Pewter	Tin
Pitcher	Waterkan
Plaggen soil	Esdek
Reclamation	Ontginning
Rye	Rogge
Sheriff	Schout
Ship-yard	Werf
Skillet	Braadpan
Sparing Arch	Weerboog
Table of the Holy Ghost	Tafel van de heilige geest
Tennant farming	Pacht
Three-field system	Drieslag stelsel
Toll	Tol
Traced out roads	Tracé
Trade route	Handelsroute
Tribute	Cijns
Tribute-ledger	Cijnsboek
Viscounty	Burggraafschap

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BHIC = Brabant Historisch Informatie Centrum (Brabant Historic Information Centre)
ONB = Oorkondenboek Noord-Brabant (Camps 1979) (Chartulary Noord-Brabant)
RHCE = Regionaal Historisch Centrum Eindhoven (Regional Historic Information Centre Eindhoven)
RHCT = Regionaal Historisch Centrum Tilburg (Regional Historic Information Centre Tilburg)
SAH = Stadsarchief 's-Hertogenbosch (Municipal archives 's-Hertogenbosch)
UvT = Bibliotheek Universiteit van Tilburg (+library code) (Tilburg University Library)

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Appendices

Townid	Town	Quarter of the Bailiwick	Hearth-counts (number of hearths) 1374	1438	1464	1472	1480	1496	1526	market	fair	in km² area
1	's-Hertogenbosch	's-Hertogenbosch	3647	2883	2335	2351	2930	3456	3643	1328	x	47.65
2	Mierlo and Opthout	Peelland	152	236	226	220	225	211	239		x	17.86
3	Lierop	Peelland	91	116	125	98	100	120	108			21.57
4	Budel	Peelland	0	245	0	0	0	0	0	1534	x	58.21
5	Bakel	Peelland	70	194	215	207	103	157	204			65.98
6	Liempde	Peelland	35	123	137	137	102	128	142			18.96
7	Asten	Peelland	150	265	261	271	267	250	281		x	71.38
8	Helmond	Peelland	153	280	333	282	327	275	394	1376	x	46.80
9	Sint-Oedenrode	Peelland	252	467	446	436	372	364	416	1403	x	64.95
10	Someren	Peelland	238	287	373	250	316	261	338			81.43
11	Soerendonck and Maarheeze	Peelland	45	192	209	182	166	132	209			19.93
12	Geldrop	Peelland	25	109	99	99	106	116	135	xxxx	x	13.19
13	Nuenen, Gerwen, Nederwetten and Tongelre	Peelland	171	346	353	353	346	327	385		x	34.11
14	Son and Breugel	Peelland	121	290	328	325	386	255	286		x	26.49
15	Aarlebeek and Rixtel	Peelland	190	162	286	289	180	234	327		x	29.71
16	Deurne and Vlierden	Peelland	98	316	413	286	327	299	316			118.37
17	Erp	Peelland	234	234	267	207	200	209	254			35.76
18	Stiphout	Peelland	50	74	86	67	65	69	89			7.76
19	Veghel	Peelland	153	273	282	245	240	214	278			42.10
20	Lieshout	Peelland	70	145	132	134	133	132	148			25.55
21	Schijndel	Peelland	193	263	284	280	241	248	287			41.65
22	Oirschot	Kempenland	375	659	728	703	640	591	774	xxxx	x	59.39
33	Bladel	Kempenland	55	186	207	202	242	158	171			33.15
34	Reusel	Kempenland	72	118	129	136	105	105	125			31.06
35	Lommel	Kempenland	100	244	291	298	246	250	256	1422	x	102.37
45	Zonderwijk and Veldhoven	Kempenland	55	107	118	109	104	102	111			31.92
46	Blaarthem below Oerle	Kempenland	0	23	26	30	31	29	40			0.37
47	Woensel	Kempenland	60	153	161	161	140	135	194			26.83
49	Vught and Cromvoirt	Oisterwijk	328	252	239	259	252	237	309			34.46
50	Sint-Michielsgestel and Gemonde	Oisterwijk	100	175	170	170	136	177	218			20.58
51	Loon op Zand	Oisterwijk	84	127	143	143	91	85	221			50.72
52	Helvoirt	Oisterwijk	104	114	111	101	107	96	116			23.57
53	Esch	Oisterwijk	70	48	48	49	45	41	60			4.07
54	Waalwijk	Oisterwijk	140	118	137	124	113	121	146	1516	x	22.56
55	Moergestel	Oisterwijk	139	193	161	161	151	155	172			27.51
56	Boxtel	Oisterwijk	300	330	349	349	316	340	417		x	45.06
57	Drunen	Oisterwijk	129	145	153	147	138	94	165			33.16
58	Gansoijen	Oisterwijk	3	54	39	0	5	4	2			1.00
60	Kessel	Maasland	137	48	39	41	25	39	43			3.30
61	Maren	Maasland	133	71	68	61	35	60	81			1.40
63	Berlicum	Maasland	173	200	184	136	118	86	168			23.73
64	Oisterwijk, Haaren, Belveren, Udenhout, Berkel, Enschot and Heukelom	Oisterwijk	309	684	682	660	694	763	973	1399	x	45.31
65	Hooge and Lage Mierde and Hulsel	Oisterwijk	158	201	205	209	214	179	219			46.72
66	Hilvarenbeek, Diessen, Riel and Westelbeers	Oisterwijk	482	724	716	740	650	625	747	<1400	x	96.48
67	Oss	Maasland	497	361	321	199	229	243	374	1399	x	31.08
70	Alem	Maasland	85	56	46	37	37	25	54			2.69
71	Berghem and Duren	Maasland	89	122	136	103	124	106	136			11.43
72	Geffen	Maasland	136	163	128	131	124	162	170			13.17
75	Empel and Meerwijk	Maasland	128	73	65	64	53	51	85			8.00
76	Heeze and Leende	Peelland	586	415	429	429	531	535	748			105.12
77	Nuland and Rosmalen	Maasland	246	276	261	272	286	132	288			45.67
78	Oostel- and Middelbeers	Kempenland	80	110	118	118	111	112	119			38.36
79	Gestel, Strijp and Stratum	Kempenland	87	162	185	180	176	168	258			49.96
80	Tilburg and Goirle	Oisterwijk	385	542	520	396	426	379	618			161.39
81	Eersel Duizel and Steensel	Kempenland	90	275	325	306	288	259	259	Eersel 1544	x	35.61
82	Hoogeloon, Hapert and Casteren	Kempenland	46	187	208	205	189	184	195			39.65
83	Vessem, Knegsel and Wintelre	Kempenland	80	159	174	173	193	159	156			44.24
84	Aalst and Waalre	Kempenland	74	141	164	164	154	142	167			22.71
85	Heeswijk-Dinther, Nistelrode and Heesch	Maasland	422	562	566	431	389	325	554			90.38
86	Bergeijk, Westerhoven and Riethoven	Kempenland	96	440	508	503	407	443	479	Bergeijk 1468	x	101.79
87	Veldhoven, Zonderwijk, Oerle en Meerveldhoven	Kempenland	147	239	254	246	217	191	207	Oerle 1551	x	31.92
88	Eindhoven and Zeelst	Kempenland	245	294	306	277	272	234	295	Eindhoven 1232	x	38.88
89	Valkenswaard en Dommelen	Kempenland	79	158	187	170	187	163	168		x	56.44
90	Lith en Lithoijen	Maasland	233	239	75	52	50	40	97			54.11

Townid	Town		1374	1438	1464	1472	1480	1496	1526	market	fair	area
		Peelland	3077	5032	5284	4797	4733	4536	5584	4	9	946.88
		Maasland	2279	2171	1889	1527	1470	1269	2050	1	1	284.96
		Kempenland	1741	3655	4089	3981	3702	3425	3974	6	7	744.65
		Oisterwijk	2731	3707	3673	3508	3338	3296	4383	3	4	612.59
		's-Hertogenbosch	3647	2883	2335	2351	2930	3456	3643	1	1	47.65
		Total Bailiwick	13475	17448	17270	16164	16173	15982	19634	15	22	2636.73
		Total Bailiwick without 's-Hertogenbosch	9828	14565	14935	13813	13243	12526	15991	14	21	2589.08

[44] Krom and Sassen (1884) 41-42 original Gem. Arch Helmond
[45] Frenken (1975) 83 Helmond had four fairs from 1592 and they were moved to a Saturday since there were to many fairs on a Tuesday. They became the Saturday before the middle of lent, the Saturday after St. John the Baptist, the Saturday after St Gillis and the Saturday after St. Catherine.

Fairs

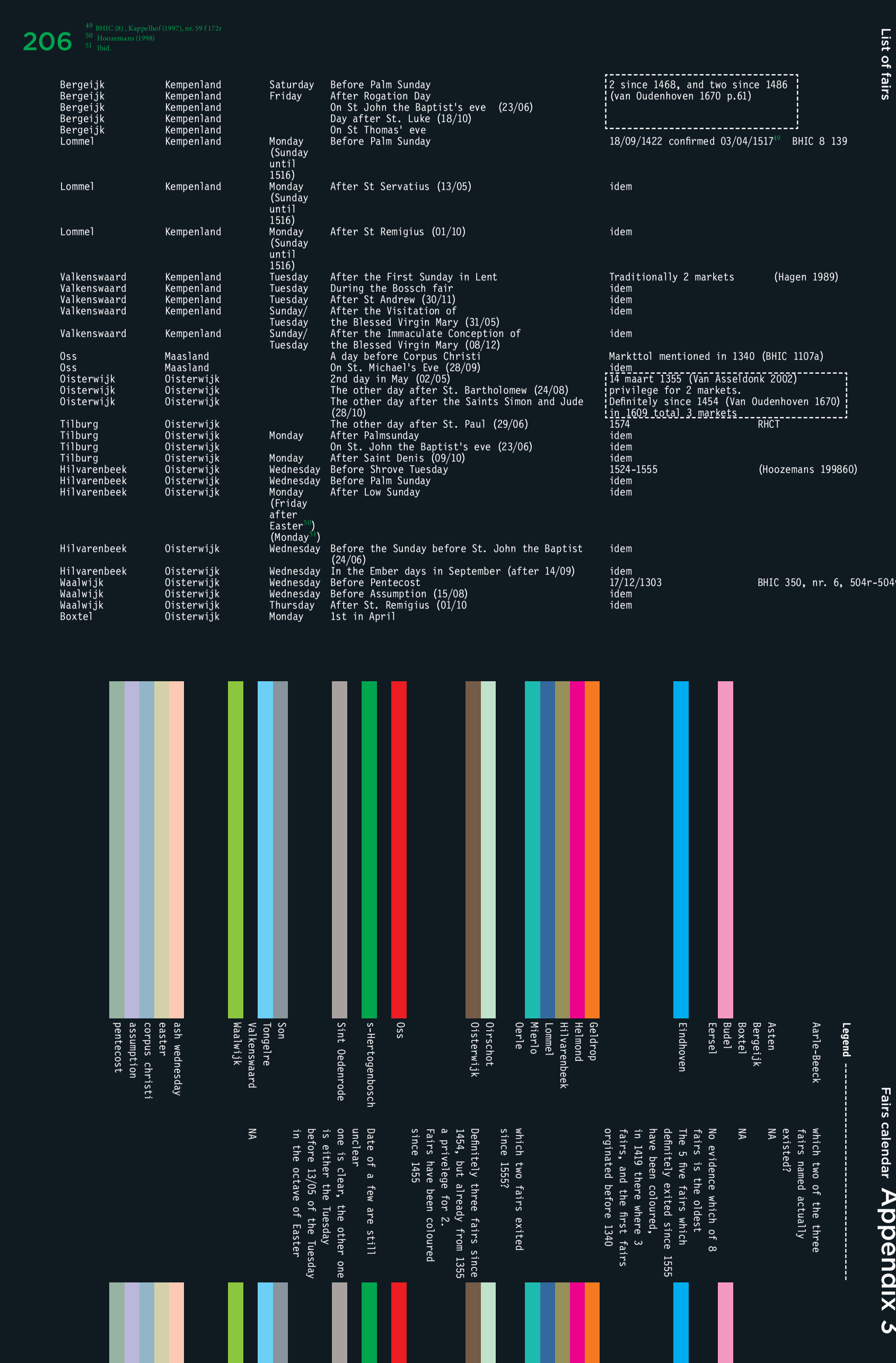
Town	Quarter	Day	Religious Feast	Since	Evidence
's-Hertogenbosch	's-Hertogenbosch		St. John's Fair : 3 days before St. John the Baptist's eve(20/06) until 3 days after the nativity of St. John the Baptist (27/06)		(Jacobs 1986)
's-Hertogenbosch	's-Hertogenbosch		Our Lady Fair : 8 days before the procession until 8 days after the procession (on the first Sunday after 24 June and from 1515 on the first Sunday after 2 July)		(Jacobs 1986)
's-Hertogenbosch	's-Hertogenbosch		Bartholomew Fair : From St. Bartholomew's eve (23/08) until St Giles' eve (31/08)	1403	SAH 3881, Sassen 291: Brussel 1403 sept 25
's-Hertogenbosch	's-Hertogenbosch		Cattle-fair : A day after St. Luke (19/10) until St. Severijn (22/10) but from 1465 a day after St. Severijn (23/10) until All Saints (01/11)	Before 1465	SAH 3882, Sassen 513: Brugge 1463/4 jan 2
's-Hertogenbosch	's-Hertogenbosch		St. Nicolas Fair : 3 days before St. Nicolas' eve (2/12) until 3 days after St. Nicolas (9/12).		(Jacobs 1986)
's-Hertogenbosch	's-Hertogenbosch		Zuij-markt : Saturday before the 3rd Sunday in Lent until the Saturday before the 4th Sunday in Lent (freedom). The fair was held on the Monday, Tuesday and Wednesday before Mid-Lent Sunday.	1403	SAH 3881, Sassen 291: Brussel 1403 sept 25
's-Hertogenbosch	's-Hertogenbosch	Tuesday & Wednesday	Lean Cattle Fair : Saturday before Palm Sunday until Holy Saturday	July 1540	SAH 3884, Sassen 790: Brussel 1540 juli
Helmond[44]	Peelland	Sunday	Before Mid-Lent Sunday	23/12/1376[45]	
Helmond[46]	Peelland	Tuesday	In the Pentecost days	idem	
Helmond[47]	Peelland	Sunday	Before St. Denis (9/10)	idem	
Sint Oedenrode	Peelland	Tuesday	Before St. Servatius (13/05)	1232 (van Oudenhoven 1670)	
Sint Oedenrode	Peelland	Tuesday	After St. Remigius (01/10)	of 1341 (van Asseldonk)	BHIC 7633-87
Aerle-Beeck	Peelland	Tuesday	After Mid-Lent Sunday		(Mastboom 1935)
Aerle-Beeck	Peelland	Tuesday	2nd after the Bossch fair 1e		
Aerle-Beeck	Peelland	Tuesday	After the Sunday after Visitation of the Blessed Virgin Mary (31/05)		
Son	Peelland	Thursday	After Mid-Lent Sunday	1355-1406	Confirmation on 19/10/1553
Son	Peelland	Tuesday	After the Sunday after Assumption (15/08)	idem	of charter issued by
Son	Peelland	Tuesday	After the Sunday after Saints Simon and Jude (28/10)	idem	Johanna[48]
Tongelre	Peelland	Thursday	Before Pentecost	Before 1340 (van Asseldonk)	
Tongelre	Peelland	Tuesday	Before St Denis (9/10)	idem	
Tongelre	Peelland	Tuesday	After St. Lucien (13/12)	idem	
Mierlo	Peelland	Tuesday	2nd Tuesday in Lent		(Mastboom 1935)
Mierlo	Peelland	Tuesday	After St. Catherine (25/11)		
Asten	Peelland	Tuesday	Before St. Matthias(24/02)		
Asten	Peelland	Tuesday	Before St. Servatius (13/05)		
Geldrop	Peelland	Tuesday	Before presentation of the Lord (02/02)	1371	(Van Oudenhoven 1670, 31)
Geldrop	Peelland	Tuesday	After the 3rd Sunday after Easter	idem	
Geldrop	Peelland	Tuesday	Before St. John the Baptist (24/06)	idem	
Geldrop	Peelland	Tuesday	Before St Remigius (01/10)	idem	
Gemert	Peelland	Monday	Before St. Mark (25/04)		
Gemert	Peelland	Monday	Before St. Matthew (21/09)		
Budel	Peelland	Monday	After St. Servatius (13/05)	1534	RHCE A-258 1-a-1-15 C-007
Budel	Peelland	Monday	After the Visitation of the Blessed Virgin Mary (31/05)	idem	
Budel	Peelland	Monday	After St Remigius (01/10)	idem	
Budel	Peelland	Monday	After St. Catherine (25/11)	idem	
Eindhoven	Kempenland	Tuesday	After Epiphany (06/01)	<1555	Before 1340 ARAB ARK 45038 91v (Melssen 199499 & 116) Before 1376 (Melssen 1994116) note 549 In 1419 3 fairs confirmed In 1541 5 fairs confirmed In 1554-1563 5 fairs confirmed (Mastboom 1935) In 1614 7 fairs confirmed In 1670 10 fairs confirmed (Van Oudenhoven 1670)
Eindhoven	Kempenland	Tuesday	Before Shrove Tuesday	1563-1614	
Eindhoven	Kempenland	Tuesday	Before Palm Sunday	<1555	
Eindhoven	Kempenland	Tuesday	Before the Rogation days	1670	
Eindhoven	Kempenland	Tuesday	Before Corpus Christi	<1555	
Eindhoven	Kempenland	Tuesday	Before Bossch fair	1670	
Eindhoven	Kempenland	Tuesday	After St. Jacobs Day (25/07)	<1555	
Eindhoven	Kempenland	Tuesday	Before 1st Sunday in September	1670	
Eindhoven	Kempenland	Tuesday	After St Giles (01/09)	<1555	
Eindhoven	Kempenland	Tuesday	After St Remigius (01/10)	1563-1614	
Eindhoven	Kempenland	Tuesday	Before St Martendag (11 t/m 16 nov)	1670	
Oirschot	Kempenland	Tuesday	St. Anthony's Fair: After St. Anthony (17/01)	<1340	ARAB ARK 45038 91v (Lijten 1991, 191)
Oirschot	Kempenland	Monday & Tuesday	New Fair: After Low Sunday	20/08/1524	
Oirschot	Kempenland		May Fair: First day after St Servatius (13/05) (in1811 moved to the Tuesday after St. Servatius (13/05))		
Oirschot	Kempenland		All Saints Fair: First day after All Saints (01/11) (in 1811 moved to a day after Sint Huijbrechtsdag (03/11))		
Oerle	Kempenland	Monday	After Sint Paul (29/06)	On 16 June 1551 patent for 2 markets (ARAB 139) 7 markets in 1670	
Oerle	Kempenland	Wednesday	After Mid-Lent Sunday		
Oerle	Kempenland	Wednesday	Na Sint Servatius (13/05)		
Oerle	Kempenland	Wednesday	After St. John the Baptist (24/06)		
Oerle	Kempenland	Monday	After the Sunday after Assumption (15/08)		
Oerle	Kempenland	Wednesday	After St. Matthijs (24/02)		
Oerle	Kempenland	Wednesday	After St. Catherine (25/11)		
Eersel	Kempenland	Wednesday	After Epiphany (06/01)	Before 1316 (Van Asseldonk 2002) 1387 or 1424 (Van Oudenhoven 1670) Markt- tol mentioned in 1316 & 1340 (BHIC 1107a) (Van Asseldonk 2002) but also BHIC 9 87 fol 54 3 markets in 1531 (BHIC 1107b) 4 markets in 1554 (Mast- (Mastboom 1935) 8 in 1670	
Eersel	Kempenland	Wednesday	Before Mid-lent Sunday		4
Eersel	Kempenland	Tuesday	After the 2nd Sunday after Easter		1
Eersel	Kempenland	Wednesday	After Corpus Christi		
Eersel	Kempenland	Wednesday	After the Sunday after St Peter and Paul (29/06)		
Eersel	Kempenland	Tuesday	Before Assumption (15/08)		2
Eersel	Kempenland	Wednesday	After St Remigius (01/10)		
Eersel	Kempenland	Tuesday	After the Sunday after Martinmass (11/11)		3

[46] Krom and Sassen (1884) 41-42 original Gem. Arch Helmond
[47] Ibid. original Gem. Arch Helmond
[48] Kappelhof (1997) 75 nr. 246 f 177v/ f 157v/ f 19v

[49] BHIC (8) , Kappelhof (1997), nr. 59 f 172r
[50] Hoozemans (1998)
[51] Ibid.

Bergeijk	Kempenland	Saturday	Before Palm Sunday	2 since 1468, and two since 1486	
Bergeijk	Kempenland	Friday	After Rogation Day	(van Oudenhoven 1670 p.61)	
Bergeijk	Kempenland		On St John the Baptist's eve (23/06)		
Bergeijk	Kempenland		Day after St. Luke (18/10)		
Bergeijk	Kempenland		On St Thomas' eve		
Lommel	Kempenland	Monday (Sunday until 1516)	Before Palm Sunday	18/09/1422 confirmed 03/04/1517[49]	BHIC 8 139
Lommel	Kempenland	Monday (Sunday until 1516)	After St Servatius (13/05)	idem	
Lommel	Kempenland	Monday (Sunday until 1516)	After St Remigius (01/10)	idem	
Valkenswaard	Kempenland	Tuesday	After the First Sunday in Lent	Traditionally 2 markets	(Hagen 1989)
Valkenswaard	Kempenland	Tuesday	During the Bossch fair	idem	
Valkenswaard	Kempenland	Tuesday	After St Andrew (30/11)	idem	
Valkenswaard	Kempenland	Sunday/ Tuesday	After the Visitation of the Blessed Virgin Mary (31/05)	idem	
Valkenswaard	Kempenland	Sunday/ Tuesday	After the Immaculate Conception of the Blessed Virgin Mary (08/12)	idem	
Oss	Maasland		A day before Corpus Christi	Markttol mentioned in 1340 (BHIC 1107a)	
Oss	Maasland		On St. Michael's Eve (28/09)	idem	
Oisterwijk	Oisterwijk		2nd day in May (02/05)	14 maart 1355 (Van Asseldonk 2002)	
Oisterwijk	Oisterwijk		The other day after St. Bartholomew (24/08)	privilege for 2 markets.	
Oisterwijk	Oisterwijk		The other day after the Saints Simon and Jude (28/10)	Definitely since 1454 (Van Oudenhoven 1670) in 1609 total 3 markets	
Tilburg	Oisterwijk		The other day after St. Paul (29/06)	1574	RHCT
Tilburg	Oisterwijk	Monday	After Palmsunday	idem	
Tilburg	Oisterwijk		On St. John the Baptist's eve (23/06)	idem	
Tilburg	Oisterwijk	Monday	After Saint Denis (09/10)	idem	
Hilvarenbeek	Oisterwijk	Wednesday	Before Shrove Tuesday	1524-1555	(Hoozemans 199860)
Hilvarenbeek	Oisterwijk	Wednesday	Before Palm Sunday	idem	
Hilvarenbeek	Oisterwijk	Monday (Friday after Easter[50]) (Monday[51])	After Low Sunday	idem	
Hilvarenbeek	Oisterwijk	Wednesday	Before the Sunday before St. John the Baptist (24/06)	idem	
Hilvarenbeek	Oisterwijk	Wednesday	In the Ember days in September (after 14/09)	idem	
Waalwijk	Oisterwijk	Wednesday	Before Pentecost	17/12/1303	BHIC 350, nr. 6, 504r-504v
Waalwijk	Oisterwijk	Wednesday	Before Assumption (15/08)	idem	
Waalwijk	Oisterwijk	Thursday	After St. Remigius (01/10	idem	
Boxtel	Oisterwijk	Monday	1st in April		

Fairs calendar Appendix 3



1255 C

JANUARY

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FEBRUARY

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MARCH

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APRIL

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AUGUST

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Fairs calendar

1305 C

JANUARY

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DECEMBER

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Fairs calendar

1405 D

JANUARY

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FEBRUARY

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MARCH

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APRIL

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MAY

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JUNE

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JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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1455 E

JANUARY

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FEBRUARY

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MARCH

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APRIL

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JUNE

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JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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1505 E

JANUARY

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FEBRUARY

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MARCH

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APRIL

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MAY

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JUNE

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JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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1555 F

JANUARY

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FEBRUARY

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MARCH

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APRIL

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MAY

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JUNE

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JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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Markets

Town	Quarter	Day	Since	Evidence
Helmond[52]	Peelland	Tuesday, since 23/08/1538 on Saturday[53]	23/12/1376	(Frenken 197579; Van Asseldonk 2002276)
Sint Oedenrode	Peelland	Wednesday	1403	(Van Oudenhoven 167018)
Eindhoven	Kempenland	Tuesday	1232	(Van Oudenhoven 167051; Melssen 199499; Van Asseldonk 2002276)
Oirschot	Kempenland	Saturday	14/10/1399	27
Oss	Maasland	Tuesday	1355 (Asseldonk 276)	(BHIC 7362nr 1)
Oisterwijk	Oisterwijk	Wednesday	15/10/1516	37 (1670 p. 69)
Waalwijk	Oisterwijk	Friday	1328 (Asseldonk 276) / 1327 (Oudenhoven 1670 p35)	(Kappelhof 1997mr. 54 f 137r)
's-Hertogenbosch		Thursday (when it is a holiday the Wednesday before since 1515)		
Bergeijk	Kempenland	Saturday	1468	(Van Oudenhoven 167061)
Eersel	Kempenland	Wednesday	1387/1424 (Van Oudenhoven 1670)	15/10/1544 (Rijken 1930; Kappelhof 199750)
Geldrop	Peelland	Friday		(Van Oudenhoven 167031)
Lommel	Kempenland	Monday	18/09/1422 confirmed on 03/04/1517	(Kappelhof 199719 mr. 59 f 172r)
Oerle	Kempenland	Monday	1551 (van Oudenhoven)	
Tilburg	Oisterwijk	Saturday		(Hoozemans 199860)
Hilvarenbeek	Oisterwijk	Friday	1400 first mentioned	
Gemert	Peelland		1588	RHCE A-258 1-a-1-15 C-007
Budel	Peelland	Thursday	18 January 1534	

52 Krom and Sassen (1884) 41-42. Van Asseldonk (2002) 276

53 Frenken (1975) 82 To many markets on Tuesday, and none of the settlements in the Bailiwick had a Saturday market. The market was held on a Friday if the Saturday was a holiday from 10/03/1544. Before that date in that occasion the market was not held at all

Profession	Beroep	Professional group	HISCO 1	HISCO 2	Map	1502	1505	1511	1547	1552
alderman	schepen	Alderman	2	20	Other Occupations					8
almoner	busmeester	Almoner	3	31	Other Occupations					2
apothecary	medecijn	Apothecary	0	6	Other Occupations		1	1		
apple salesman	appelkoper	Apple salesman	4	42	Sales Workers	4	2	2	2	
bag maker	tassenmaker	Bag maker	8	80	Leather-workers					1
bailiff	groenroede	Bailiff	2	20	Other Occupations					3
bailiff	meier	Bailiff	2	20	Other Occupations					
bailiff	roededrager	Bailiff	2	20	Other Occupations					
baker	bakker	Baker	7	77	Food & Beverages processors and Catering workers	43	38	48	32	65
baker's servant	bakkersknecht	Baker	7	77	Food & Beverages processors and Catering workers					1
ball maker	balmaker	Ball maker	8	80	Leather-workers	2	4	1	1	
barber	barbier	Barber	5	57	Other Occupations	16	10	14	12	22
bargee	schipper	Bargee	9	98	Transporters	7	5	5	4	10
bargee	schuitvaarder	Bargee	9	98	Transporters					2
barrow-man	kruiwagenkruier	Barrow-man	9	98	Transporters					10
basketman	mandenmaker	Basketman	9	94	Other Producers	4	5	3		3
basketman's servant	mandenmakersknecht	Basketman	9	94	Other Producers					1
beadsman	bidster	Beadsman	1	14	Other Occupations			1		1
bed maker	bedmaker	Bed maker	7	79	Textile workers					1
beguine	begijn	Beguine	1	14	Other Occupations			34		
bell-founder	belmaker	Bell-founder	7	72	Metalworkers					1
bell-founder	klokgieter	Bell-founder	7	72	Metalworkers	1	1	2	2	2
biretta maker	bonnetmaker	Biretta maker	7	79	Textile workers					6
blacksmith	smid	Blacksmith	8	83	Metalworkers	10	13	18	10	59
blacksmith & knifemaker	smid & mesmaker	Blacksmith	8	83	Metalworkers					1
blacksmith & scythe maker	smid & zeismaker	Blacksmith	8	83	Metalworkers					
blacksmith's servant	smidsknecht	Blacksmith	8	83	Metalworkers					
bleacher	bleeker	Bleacher	7	75	Textile workers	1		3	2	6
blue dyer	blauwverver	Dyer	7	75	Textile workers				1	3
bodger	stoeldraaier/wrijter	Bodger	8	81	Woodworkers	1			1	3
bonnet maker	mutsenmaker	Bonnet maker	7	79	Textile workers	6	5	11		
book salesman	boekverkoper	Book salesman	4	42	Sales Workers					1
bookbinder	boekbinder	Bookbinder	9	92	Other Producers	3	2	2	1	1
bootmaker	laarsmaker, mr	Bootmaker	8	80	Leather-workers			1	1	1
bowyer	boogmaker	Bowyer	9	94	Other Producers	4	2	3	8	8
brandy distiller	brandewijnbrouwer	Brandy distiller	7	77	Food & Beverages processors and Catering workers					
brewer	brouwer	Brewer	7	77	Food & Beverages processors and Catering workers	3	2	1	6	18
brewer's servant	brouwersknecht	Brewer	7	77	Food & Beverages processors and Catering workers					1
bricklayer	metselaar	Bricklayer	9	95	Construction workers	12	13	6	11	38
bricklayer's servant	metselaarsknecht	Bricklayer	9	95	Construction workers					3
brickmaker	steenbakker	Brickmaker	8	89	Other Producers	1		1		
building yard master	loodsmeester	Building yard master	2	22	Other Occupations	1	1	1	1	1
butcher	beenhouwer	Butcher	7	77	Food & Beverages processors and Catering workers	6	1	6	3	
butcher	keelbreker	Butcher	7	77	Food & Beverages processors and Catering workers	2		1		
butcher	vleeshouwer	Butcher	7	77	Food & Beverages processors and Catering workers					33
Butcher	voorslager	Butcher	7	77	Food & Beverages processors and Catering workers			1		5
butcher	slager	Butcher	7	77	Food & Beverages processors and Catering workers					
buyer	afnemer	Buyer	4	42	Sales Workers					3
cabinetmaker	schrijnwerker	Cabinetmaker	8	81	Woodworkers	20	21	29	15	36
cabinetmaker's servant	schrijnwerkersknecht	Cabinetmaker	8	81	Woodworkers					1
caner	rietmaker	Caner	9	94	Other Producers	2	2	1		1
cannon founder	busmaker	Cannon founder	7	72	Metalworkers				2	8

Profession	Beroep	Professional group	HISCO 1	HISCO 2	Map	1502	1505	1511	1547	1552
canon	kanunik	Canon	1	14	Other Occupations					1
canon	kapittelheer	Canon	1	14	Other Occupations					1
captain	kapitein	Captain	5	58	Other Occupations					
carder	kammer	Carder	7	75	Textile workers			1		
cardmaker	kaardemaker	Card Maker	8	83	Metalworkers					2
caretaker	concierge	Caretaker	5	55	Other Occupations					2
carilloneur	beiaardier	Carilloneur	1	17	Other Occupations					1
carpenter	timmerman	Carpenter	9	95	Construction workers	24	18	28	14	37
carpenter's servant	timmerknecht	Carpenter	9	95	Construction workers					6
carrot merchant	wortelverkoopster	Carrot merchant	4	42	Sales Workers					
carter	karman	Carter	9	98	Transporters					2
carter	sleper	Carter	9	98	Transporters			1		
carter	voerman, karreman	Carter	9	98	Transporters	1		2		
cartwright	wagenmaker	Cartwright	8	81	Woodworkers					
carver	beeldsnijder	Carver	8	81	Woodworkers	2	4	4	2	4
carver	houtsnijder	Carver	8	81	Woodworkers					1
cattle dealer	rundkoper	Cattle dealer	4	42	Sales Workers					
cattle feeder	rundvoederer	Cattle feeder	6	62	Agricultural Occupations					1
chair maker	zetelmaker	Chair maker	8	81	Woodworkers					
chamois corveser	zeemschoenmaker	Chamois corviser	7	76	Leather-workers	3		1	2	
chamois merchant	zeemkoper	Chamois merchant	4	42	Sales Workers					1
chandler	kaarsmaker	Chandler	7	74	Other Producers	2	4		3	4
cheese monger	kaaskoper	Cheesemonger	4	42	Sales Workers					5
chimney sweep	schoorsteenveger	Chimney sweep	5	55	Other Occupations	1		1		
chirurgeon	chirurgijn	Chirurgeon	0	6	Other Occupations	1		4		
church master	kerkmeester	Church master	5	55	Other Occupations	1				
clerk	klerk	Clerk	3	30	Other Occupations	2		1		8
clock maker	uurwerkmaker	Clock maker	8	84	Metalworkers					1
clogger	plattijnmaker	Clogger	8	81	Woodworkers	1	1	2		2
cloth cutter	gewandsnijder	Cloth cutter	7	79	Textile workers					5
cloth cutter	snijder	Cloth cutter	7	79	Textile workers	68	58	74	31	104
cloth cutter & messenger	snijder & bode	Cloth cutter	7	79	Textile workers					
cloth cutter's servant	snijdersknecht	Cloth cutter	7	79	Textile workers					1
cloth merchant	kleerkoper	Cloth merchant	4	42	Sales Workers			1		
cloth preparer	lakenbereider	Cloth preparer	7	75	Textile workers					1
cobbler	lapper	Cobbler	8	80	Leather-workers	12	6	13	5	4
cobbler	schoenlapper	Cobbler	8	80	Leather-workers	1	2		6	5
cofferer	kistmaker	Cofferer	8	81	Woodworkers				1	1
commander	commandeur	Commander	5	58	Other Occupations					
cook	kok	Cook	5	53	Food & Beverages processors and Catering workers	4	4	5		
cooper	kuiper	Cooper	8	81	Woodworkers	25	25	28	17	37
cooper & cabinetmaker	kuiper & schrijnwerker	Cooper	8	81	Woodworkers					1
coppersmith	koperslager, mr	Coppersmith	8	87	Metalworkers					
cordwainer	schoenmaker	Cordwainer	8	80	Leather-workers	9	8	19	6	45
councillor	raadsheer	Councillor	1	12	Other Occupations					34
crane maker	kraanmaker	Crane maker	9	97	Transporters	1				1
crane master	kraanmeester	Crane master	9	97	Transporters					
crane puller	kraantrekker	Crane puller	9	97	Transporters	1	1			1
crane servant	kraanknecht	Crane servant	9	97	Transporters					
cripple	kreupel	Cripple	na	na	na					
crooked-hat maker	schevenhoedemaker	Crooked-hat maker	7	79	Textile workers			4		8
crown maker	kroonmaker	Crown maker	9	94	Other Producers			1		
cutler	mesmaker	Cutler	8	83	Metalworkers	25	20	37	13	56
cutler	mesverkoper	Cutler	8	83	Metalworkers					1
cutler's servant	mesmakersknecht	Cutler	8	83	Metalworkers					9

Profession	Beroep	Professional group	HISCO 1	HISCO 2	Map	1502	1505	1511	1547	1552
dish merchant	schotelkoper	Dish merchant	4	42	Sales Workers		1			
dish turner	schoteldraaier	Dish turner	8	81	Woodworkers					
ditcher	graftmaker	Ditcher	9	99	Other Occupations	2	1	4	4	2
doctor	doctor, mr	Doctor	0	6	Other Occupations	1		1		1
doll maker	poppenmaakster	Doll maker	9	94	Other Producers					
draper	drapenier	Draper	4	42	Sales Workers					6
draper	lakenkoper	Draper	4	42	Sales Workers		1	3		36
draper	lijnwadenier	Draper	4	42	Sales Workers					5
draper & dry shaver	lakenkoper & droogscheerder	Draper	4	42	Sales Workers					1
drummer	tromslager	Drummer	1	17	Other Occupations				2	4
dry shaver	droogscheerder	Dry shaver	7	75	Textile workers	5	3	6	1	17
dyer	verver	Dyer	7	75	Textile workers	8	4	11	8	15
dyer (finisher)	afverver	Dyer	7	75	Textile workers					1
dyer's servant	verversknecht	Dyer	7	75	Textile workers					2
embroiderer	borduurstikker	Embroiderer	7	79	Textile workers	1	2	3		2
executioner	scherprechter	Executioner	9	99	Other Occupations					
faille maker	faillemaker	Faille maker	7	75	Textile workers					1
falconer	valkenier	Falconer	6	64	Agricultural Occupations					
farmer	huisman	Farmer	6	61	Agricultural Occupations					
farrier	hoefsmid	Farrier	8	83	Metalworkers	2	2	1	2	2
farrier	hoefslager	Farrier	8	83	Metalworkers					
fat grocer	vetwarier	Fat grocer	4	42	Sales Workers				1	8
fat grocer & horn maker	vetwarier & horenmaker	Fat grocer	4	42	Sales Workers					1
feeder	voederer	Feeder	6	62	Agricultural Occupations			1		
fencer	schermer	Fencer	na	na	na					1
fish merchant	viskoper	Fish merchant	4	42	Sales Workers	1	4	1		12
fish merchant's servant	viskopersknecht	Fish merchant	4	42	Sales Workers					
fisherman	visser	Fisherman	6	64	Agricultural Occupations	1	1	3	1	2
flax dresser	hekelerster	Flax dresser	7	75	Textile workers	2		2	1	3
flax merchant	vlaskoper	Flax merchant	4	42	Sales Workers					
flax merchant	vlasman	Flax merchant	4	42	Sales Workers					
fletcher	pijlmaker	Fletcher	9	94	Other Producers			1		
flute-player	pijper	Flute-player	1	17	Other Occupations	2	1	1		4
foreman	voorman	Foreman	2	22	Other Occupations					3
fower	slijkveger	Fower	5	59	Other Occupations	2	1	1		3
fowler	vogelaar	Fowler	6	64	Agricultural Occupations					
friar	broeder	Friar	1	14	Other Occupations					1
fripperer	oudkleerkoper	Fripperer	4	42	Sales Workers				2	5
fuller	volder	Fuller	7	75	Textile workers	4	1	8		3
furrier	bontwerker	Furrier	7	79	Textile workers	4	3	6	2	16
furrier's servant	bontwerkersknecht	Furrier	7	79	Textile workers					1
gardener	hovenier	Gardener	6	62	Agricultural Occupations					
gentleman	heer	Gentleman.	na	na	na					29
girdler	gordelmaker	Girdler	8	80	Leather-workers			1		
glass-blower	gelaesman	Glass-blower	8	89	Other Producers	1				
glass-blower	glasmaker	Glass-blower	8	89	Other Producers	8	5	7	7	14
glover	handschoenmaker	Glover	7	79	Textile workers	3	5	3		1
glue maker	lijmzieder	Glue maker	7	74	Other Producers					1
goldsmith	goudsmid	Goldsmith	8	88	Metalworkers	11	10	9	6	16
grain & fish merchant	korenkoper & viskoper	Grain merchant	4	42	Sales Workers					1
grain measurer	korenmeter	Grain measurer	3	39	Other Occupations	1				
grain merchant	korenkoper	Grain merchant	4	42	Sales Workers	3	2	2		20
grain merchant's servant	korenkopersknecht	Grain merchant	4	42	Sales Workers					
grazier	ossenweider	Grazier	6	61	Agricultural Occupations					3

Profession	Beroep	Professional group	HISCO 1	HISCO 2	Map	1502	1505	1511	1547	1552
grinder	slijper	Grinder	7	72	Metalworkers	1		1		
grindstone whetter	wetter	Grindstone whetter	7	72	Metalworkers	1				3
grindstone whetter	slijpsteenwetter	Grindstone whetter	7	72	Metalworkers					
grocer	crudener	Grocer	4	42	Sales Workers	1				
gruit maker	gruiter	Gruit maker	7	77	Food & Beverages processors and Catering workers	1				
hairwasher	haarwasser	Hairwasher	5	57	Other Occupations					1
hairweaver	haarwever	Hairweaver	7	75	Textile workers					
handmaiden	maagd	Handmaiden	5	54	Other Occupations			3	2	1
hatter	hoedenmaker	Hatter	7	79	Textile workers	7	4	4	3	4
hay maker	hooimaker	Hay maker	6	62	Agricultural Occupations	4	5			2
hen salesman	hoenderkoper	Hen salesman	4	42	Sales Workers					
herald	choer (roeper)	Herald	1	17	Other Occupations				2	
herald	roeper	Herald	1	17	Other Occupations			1		
hodman	opperman	Hodman	9	99	Other Occupations	2	1		1	5
hook maker	haakmaker	Hook maker	8	83	Metalworkers	1	1	2	2	4
hops brewer	hopbrouwer	Hops brewer	7	77	Food & Beverages processors and Catering workers	1	1	1		
hops merchant	hoppenkoper	Hops merchant	4	42	Sales Workers					
horn maker	horenmaker	Horn maker	8	84	Metalworkers	2	3	1		
horse collar maker	gareelmaker	Horse collar maker	8	81	Woodworkers	2	1	1	3	3
horse collar maker	hammeker	Horse collar maker	8	81	Woodworkers	2	3			
horse-dealer	paardenkoper	Horse-dealer	4	42	Sales Workers					1
horseman	ruiter	Horseman	na	na	na					
hospital master	gasthuismeester	Hospital master	5	55	Other Occupations			1		1
innkeeper	herbergier	Innkeeper	5	51	Food & Beverages processors and Catering workers					10
innkeeper	kastelein	Innkeeper	5	51	Food & Beverages processors and Catering workers					
ironmonger	ijzerman	Ironmonger	4	42	Sales Workers					1
ironmonger	ijzerverkoper	Ironmonger	4	42	Sales Workers					3
judge	mr vd schepengericht	Judge	1	12	Other Occupations					
jug founder's servant	kangietersknecht	Latouner, jug founder, pewterer	7	72	Metalworkers					1
junk dealer	uitdraagster	Junk dealer	4	42	Sales Workers					1
knacker	harnasmaker	Knacker	8	83	Metalworkers	3	3	3		
knife grinder	schaarslijper	Knife grinder	8	83	Metalworkers				1	2
knife-stabber	messteker	Knife-stabber	na	na	na					1
labourer	arbeider	Labourer	9	99	Other Occupations	1		4	1	3
labourer	werkman (stad)	Labourer	9	99	Other Occupations	1				1
lacer	nestelmaker	Lacer	7	75	Textile workers	1	1	4	1	9
landlord	waard	Publican	5	51	Food & Beverages processors and Catering workers					1
lantern maker	lantaarnmaker	Lantern maker	8	83	Metalworkers			1	3	2
last maker	leestmaker	Last maker	8	80	Leather-workers	1		1		
latouner, jug founder, pewterer	geelgieter, kangieter, tingieter	Latouner, jug founder,	7	72	Metalworkers	10	6	6	2	15
Latten shaver	lathoenschaver	Latten shaver	7	72	Metalworkers					
lawyer	advocaat	Lawyer	1	12	Other Occupations					1
leg maker	schachtmaker	Leg maker	8	80	Leather-workers			1		
Lime measurer	kalkmeter	Lime measurer	3	39	Other Occupations					1
linen merchant & cutter	lijnwadenier & snijder	Linen merchant	4	42	Sales Workers					1
linen-draper	linnenlakenkoopman	Linen-draper	4	42	Sales Workers					1
linen-draper	linnenlakenkoper	Linen-draper	4	42	Sales Workers					10
linen-preparer	linnenlakenbereider	Linen-preparer	7	75	Textile workers					
linen-sewer	linnennaaister	Linen-sewer	7	79	Textile workers					
linen-weaver	linnenwever	Linen-weaver	7	75	Textile workers	22	9	17		6
locksmith	slotenmaker	Locksmith	8	83	Metalworkers	10	11	9	1	9
lombard	lombard	Lombard	3	33	Other Occupations				1	1
master	mr	Master	na	na	na					32

Profession	Beroep	Professional group	HISCO 1	HISCO 2	Map	1502	1505	1511	1547	1552
master singer	basconter, mr	Singer	1	17	Other Occupations					1
mate	maat	Mate	na	na	na					1
mayor	burgemeester	Mayor	2	20	Other Occupations					
mead brewer	meeblander	Mead brewer	7	77	Food & Beverages processors and Catering workers	2	1	1	1	2
measurer	meter	Measurer	3	39	Other Occupations	2		2		
messenger	bode	Messenger	3	37	Other Occupations	1	3	8	3	7
midwife	vroedvrouw	Midwife	0	6	Other Occupations	2		2		1
miller	maalder	Miller	7	77	Food & Beverages processors and Catering workers	7	5	7	5	8
miller	molenaar	Miller	7	77	Food & Beverages processors and Catering workers	2	9	7	5	41
miller & oil-crusher	molenaar & olieslager	Miller	7	77	Food & Beverages processors and Catering workers	2				5
miller's servant	molenaarsknecht	Miller	7	77	Food & Beverages processors and Catering workers					1
millwright	molenmaker	Millwright	8	84	Metalworkers			1	2	2
minstrel	speelman	Minstrel	1	17	Other Occupations				1	2
money changer	wisselaar	Money changer	3	33	Other Occupations			2		
moquette maker	trijpmaker	Moquette maker	7	75	Textile workers	1		3		1
municipal messenger	ingebieder	Municipal messenger	3	37	Other Occupations					2
nailor	nagelmaker	Nailor	8	83	Metalworkers	1	2			
notary	notaris, mr	Notary	1	12	Other Occupations					3
nurse	verpleegster	Nurse	0	6	Other Occupations	3		6		1
oil-crusher	olieslager	Oil-crusher	7	77	Food & Beverages processors and Catering workers	7	5	8	7	16
oil-crusher's servant	olieslagersknecht	Oil-crusher	7	77	Food & Beverages processors and Catering workers					2
organ maker	orgelmaker	Organ builder	9	94	Other Producers		1		1	2
painter	schilder	Painter	9	93	Other Producers		1		3	7
pastry baker	koekenbakker	Pastrycook	5	53	Food & Beverages processors and Catering workers					1
pastrycook	pasteibakker	Pastrycook	5	53	Food & Beverages processors and Catering workers		1		2	1
paviour	stratenmaker	Paviour	9	95	Construction workers	2			1	2
pearl barley miller	gorter	Pearl barley miller	7	77	Food & Beverages processors and Catering workers	1				
peat carrier	turfdrager	Peat carrier	9	98	Transporters					1
pedlar	kramer	Pedlar	4	42	Sales Workers	19	19	23	11	58
pedlar & fat grocer	kramer & vetwarier	Pedlar	4	42	Sales Workers					1
pedlar's servant	kramersknecht	Pedlar	4	42	Sales Workers					
pensionary	pensionaris	Pensionary	na	na	na					
person of independent means	rentenier	Person of independent means	na	na	na					1
pharmacist	apotheker	Pharmacist	0	6	Other Occupations					4
pin merchant	speldenkramer	Pin merchant	4	42	Sales Workers					
plane maker	schaafmaker	Plane maker	8	83	Metalworkers					
plumber	loodgieter	Plumber	8	87	Metalworkers					1
police officer	korte stok	Police officer	5	58	Other Occupations					2
pork butcher	varkenslager	Pork butcher	7	77	Food & Beverages processors and Catering workers					
porter	kruier	Porter	9	98	Transporters	9	7	11	5	
porter	portier	Porter	9	98	Transporters	1				4
porter	sluiter	Porter	9	98	Transporters	1				5
potter	pottenbakker	Potter	9	98	Transporters			1	1	5
pox master	pokmeester, mr	Pox master	0	6	Other Occupations					1
priest	pastor	Priest	1	14	Other Occupations					1
priest	priester	Priest	1	14	Other Occupations				4	18
printer	drukker	Printer	9	92	Other Producers					1
publican	biertapper	Publican	5	51	Food & Beverages processors and Catering workers			2	1	7
publican	tapper	Publican	5	51	Food & Beverages processors and Catering workers					
pulpit maker	preekstoelmaker	Pulpit maker	81	81	Woodworkers					
pynner	speldenmaker	Pynner	8	84	Metalworkers	14	7	34	11	97
pynner's servant	speldenmakersknecht	Pynner	8	84	Metalworkers					2
rector	rector, mr	Rector	na	na	na					
registrar	griffier	Registrar	3	39	Other Occupations					1
regular priest	pater	Priest	1	14	Other Occupations					

Profession	Beroep	Professional group	HISCO 1	HISCO 2	Map	1502	1505	1511	1547	1552
ribbon weaver	lintwever	Ribbon weaver	7	75	Textile workers					
rifleman's servant	schutknecht	Riffleman's servant	5	58	Other Occupations	1				
rope maker	zeeldraaier	Roper	7	75	Textile workers	1		3	2	8
roper	leertouwer	Roper	7	75	Textile workers	1		1	3	2
roper	touwer	Roper	7	75	Textile workers	4		2		2
roper	zeelmaker	Roper	7	75	Textile workers					
rosary turner	vijftigdraaier	Rosary turner	7	75	Textile workers					3
sack carrier	zakdrager	Sack carrier	9	98	Transporters	8	9	6	8	7
sadler	zadelmaker	Sadler	9	98	Transporters	4	2	4	1	3
salt merchant	zoutkoper	Salt merchant	4	42	Sales Workers					
salt merchant	zoutverkoper	Salt merchant	4	42	Sales Workers					
sand carrier	zandloper	Sand carrier	4	42	Sales Workers	1				
sand merchant	zandkoper	Sand merchant	9	98	Transporters			1		
sawyer	houtzager	Sawyer	8	81	Woodworkers	14	14	21	4	11
scale maker	schaalmaker	Scale maker	8	83	Metalworkers	4	1	2	7	6
schoolmaster	schoolmeester	Schoolmaster	1	13	Other Occupations	1	3	1	1	7
scissorsmith	schaarmaker	Scissorsmith	8	83	Metalworkers		1	1		
scrubber	schrobber	Scrubber	5	55	Other Occupations					
scythe maker	zeismaker	Scythe maker	8	83	Metalworkers	1		2	2	6
seamstress	naaister	Seamstress	7	79	Textile workers	3	2	5		
secretary	secretaris	Secretary	3	30	Other Occupations	1	1	1		5
sergeant	wachtmeester	Sergeant	5	58	Other Occupations					
servant	knecht	Servant	na	na	na		1			8
shaft maker	schaftmaker	Shaft maker	9	94	Other Producers					1
shalloon weaver	sergewever	Shalloon weaver	7	75	Textile workers	1		2	1	
shalloon weaver	zartswever	Shalloon weaver	7	75	Textile workers					1
shammymaker	zeemtouwer	Shammymaker	7	76	Leather-workers					3
sheath maker	schedemaker	Sheath maker	9	94	Other Producers					9
sheriff	schout	Sheriff	2	20	Other Occupations					1
sheriff's servant	schoutsdienaar	Sheriff	2	20	Other Occupations					1
sherman	scheerder	Sherman	6	64	Agricultural Occupations	5	3	4		
shipwright	pleitmaker	Shipwright	9	95	Construction workers	1				
silkweaver	pellewever	Silk weaver	7	75	Textile workers				1	4
silversmith	zilversmid	Silversmith	8	88	Metalworkers					
singer	cantor	Singer	1	17	Other Occupations					1
singer	zanger	Singer	1	17	Other Occupations					3
skin merchant	velkoper	Skin merchant	4	42	Sales Workers					1
skinner	velblotter	Skinner	7	76	Leather-workers			4		11
slater	leidekker	Slater	9	95	Construction workers	7	5	6	12	15
soap boiler	zeepzieder	Soap boiler	7	74	Other Producers	1		2		10
soldier	soldaat	Soldier	5	58	Other Occupations					
sole maker	zoolmaker	Sole maker	8	80	Leather-workers					
sollicitor	pleitenaar	Sollicitor	1	12	Other Occupations	1	2	2		
sollicitor	procureur	Sollicitor	1	12	Other Occupations					
spectacles maker	brilmaker	Spectacles maker	8	84	Metalworkers					
spinster	spinster	Spinster	7	75	Textile workers					
spurrier	spoormaker	Spurrier	8	83	Metalworkers	1			2	2
stadtholder	stadhouder	Stadtholder	2	20	Other Occupations					
starcher	stijfster	Starcher	7	75	Textile workers					
steward	rentmeester	Steward	2	21	Other Occupations				1	6
stonecutter	steensnijder	Stonecutter	8	82	Construction workers					
stonemason	steenhouwer	Stonemason	9	95	Construction workers	4	4	6	3	5
sword cutler	harnasveger	Swordcutler	8	83	Metalworkers				2	
swordcutler	zwaardveger	Swordcutler	8	83	Metalworkers				1	1
swordcutter	lemmersmid	Swordcutler	8	83	Metalworkers			2		1

Profession	Beroep	Professional group	HISCO 1	HISCO 2	Map	1502	1505	1511	1547	1552
tailor	kleermaker	tailor	7	79	Textile workers					3
tailor & pedlar	kleermaker & kramer	tailor	7	79	Textile workers					1
tanner	looier	Tanner	7	76	Leather-workers					48
tanner	pelser	Tanner	7	76	Leather-workers	1		1		
tanner	leermaker	Tanner	7	76	Leather-workers					
tanner & cattle merchant	looier & veekoper	Tanner	7	76	Leather-workers					1
tanner & corveser	looier & schoenmaker	Tanner	7	76	Leather-workers					3
tapestry-weaver	legwerker	Tapestry-weaver	7	75	Textile workers				2	2
teeth-puller	tandtrekker	Teeth-puller	0	6	Other Occupations					
thatcher	strodekker	Thatcher	9	95	Construction workers		1			
tinker	ketelbuter	Tinker	8	87	Metalworkers					1
tinker	keteler	Tinker	8	87	Metalworkers	11	12	8	12	21
toll-collector	tollenaar	Toll-collector	3	31	Other Occupations					
trumpetter	trompetter	Trumpetter	1	17	Other Occupations					
turner	draaier	Turner	8	81	Woodworkers					1
verger	koster	Verger	5	55	Other Occupations	1	3	3	5	9
vintner	wijnkoper	Vintner	4	42	Sales Workers					1
vintner	wijnverkoper	Vintner	4	42	Sales Workers					
washer	westersen	Washer	7	75	Textile workers				3	
watchmaker	horlogemaker	Watchmaker	8	84	Metalworkers					
weaver	wever	Weaver	7	75	Textile workers	14	10	39	8	52
weaver's servant	weversknecht	Weaver	7	75	Textile workers					1
wheelwright	rademaker	Wheelwright	8	81	Woodworkers	5	5	5	3	10
wine-barrel carrier	wijnschroeder	Wine-barrel carrier	9	98	Transporters		1			
wine-merchant	wijnhandelaar	Wine-merchant	4	42	Sales Workers			1		1
wine-taverner	wijntapper	Wine-taverner	5	51	Food & Beverages processors and Catering workers					1
wine-taverner	wijntavenier	Wine-taverner	5	51	Food & Beverages processors and Catering workers					14
wood-cleaver	houtklover	Wood-cleaver	7	73	Woodworkers	2	2	5	2	1
woolen cloth salesman	wollakenverkoper	Woolen cloth salesman	4	42	Sales Workers					
wool-weaver	wolwever	Wool-weaver	7	75	Textile workers			1		3
writer	schrijver	Writer	1	15	Other Occupations			2		6

HISCO 1

0 Professional, technical and related workers
1 Professional, technical and related workers
2 Administrative and managerial workers
3 Clerical and Related workers
4 Sales workers
5 Service workers
6 Agricultural, animal husbandry and forestry workers
7 Production and Related workers, transport equipment operators and labourers
8 Production and Related workers, transport equipment operators and labourers
9 Production and Related workers, transport equipment operators and labourers
NA NA

HISCO 2

6 Medical, dental, veterinary and related workers
12 Jurists
13 Teachers
14 Workers in religion
15 Authors, journalists and related writers
17 Composers and performing artists
20 Legislative officials and government administrators
21 Managers
22 Supervisors, foremen and inspectors
31 Government executive officials
33 Bookkeepers, cashiers and related workers
37 Mail distribution clerks
39 Clerical and related workers not elsewhere classified
42 Buyers
51 Working proprietors (catering, lodging and leisure services)
53 Cooks, Waiters, Bartenders and related workers
54 Maids and related housekeeping service workers not elsewhere classified
55 Building caretakers, charworkers, cleaners and related workers
57 Hairdressers, barbers, beauticians and related workers
58 Protective service workers
59 Service workers not elsewhere classified
61 Farmers
62 Agricultural and animal husbandry workers
64 Fisherman, hunters and related workers
72 Metal processors
73 Wood preparation workers and paper makers
74 Chemical processors and related workers
75 Spinners, weavers, knitters, dyers and related workers
76 Tanners, fellmongers and pelt dressers
77 Food and beverage processors
79 Tailors, dressmakers, sewers, upholsterers and related workers
80 Shoemakers and leather goods makers
81 Cabinetmakers and related woodworkers
82 Stone cutters and carvers
83 Blacksmiths, toolmakers and machine-tool operators
84 Machinery fitters, machine assemblers and precision-Instrument makers
87 Plumbers, welders, sheet-metal, and structural metal pr
88 Jewellers and precious metal workers
89 Glass Formers, potters and related workers
92 Printers and related workers
93 Painters
94 Production and related workers not elsewhere classified
95 Bricklayers, carpenters and other construction workers
97 Material Handling and related equipment operators, dockers and freight handlers
98 Transport equipment operators
99 Workers not elswhere classified
NA NA

"What
is
past
is
prologue"

(Shakespeare: The Tempest)

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