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How to Attract the Right Economic Activities in a Certain Spatial Environment?

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1 ABSTRACT

During the past few years, our research has examined and described the spatial patterns and organisation of economic activities. In order to link these findings to policy, we introduced the concepts of demand and supply segments, and applied them on the scale of an area or a certain spatial environment.

Considering the business needs of companies on a certain location, we identified 16 demand parameters of companies, that are spatially relevant on the scale of an area: the size of good flows, the alternative freight transport, the nearness to the market,… Literature, interviews and observations offer supporting evidence for the parameters. We linked them to 24 other parameters that reflect the characteristics of the area where a company is located. These include amongst others mobility, level of foot fall, the presence of green infrastructure, other companies (or mix of companies), density, parking possibilities,… The combination of this information with our typology of economic area's (Giaretta, Pennincx, De Mulder, Zaman, 2019) resulted into 24 main segments, that show the relation between demand of companies and supply of spatial characteristics on the scale of an area. The segments are ideally grouped according to the characteristics, and in this sense they differ from typology of economic areas, that is based on the observed location preferences of companies.

This way of grouping into segments generates new questions, that enable us to spatially differentiate economic environments, and to make decisions regarding the location of economic activities. We aim at getting concrete answers to three main questions:

(1) Is my company located in the right place? Does this area spatially deliver what my company needs?

(2) Does the area deliver the right services, that the companies in this area need?

(3) If we want to transform an area, which area characteristics do we need to change in order to attract the wanted companies?

We subdivide these three main questions into sub questions.

The first question considers the demand side and uses the micro-economic considerations, made by a company, in order to choice a certain segment. Several questions succeed each other and deal with the demand of companies regarding the effects of agglomeration, economic and environmental spatial use, freight transport, price per square meter,…

The second question can lead to the segment that is the closest to the actual situation, based on the typology of economic areas. Indeed, there is usually a gap between the actual situation and the best fitting segment. Using the typology and the segments on an actual situation uncovers information about visibility, land price value, good flows, land use plan.

The third and last question deals with areas that are in a process of transformation. After finding out the desirable segment, it is possible to evaluate which companies belong to this segment, which need to adapt or to disappear. In addition, the transition in terms of services that the area delivers (which is implied when transforming from one segment to another), can be determined.

Keywords: upgrading areas, future of mixed use areas, urban economy, economic space, segmentation

2 INTRODUCTION

During the first decade of the 21st century, spatial planning for economic space was focussing on two questions: (1) What are the characteristics of a preferred location of companies that are looking for a place to start or that are in the process of leaving their current location? and (2) How much space (new developped businessparks) is needed to accommodate the growth of the economy in Flanders? The first question was adressed in the 'strategic plan for regional economy' (SPRE) (Cabus et al, 2004) and was based on a

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questionnaire filled out by more than 5.500 companies in Flanders. In the context of desindustrialisation and suburbanisation, with an oversupply of cheap available green field development for offices and light industry, company owners where asked to stated their preferences for a future location. These are 'stated preferences'. However, when combined with a dominant view of modernist planning, the way the questions were asked implied a social set of values that can be best described as a 'constructed preference'. The second question was answered by making forecasts based on macroeconomic data such as the current number of employees per hectare per sector, trend analysis of workforce growth in these sectors, investment,… In order to decide whether these parameters were good for these forecast purposes, a sensitivity analysis was done (Jacobs et al, 2003). Without much surprise, the results had a big variance, and the Flemish Government decided that, in order to be on the safe side (and not limiting economic growth), they would go for the moderate scenario, while providing extension possibilities towards the high demand scenario.

By 2012 first signs appeared that the public was no longer happy with the ever expanding businessparks that popped up everywhere in the countryside (Pisman et al. 2018, p 73)

In 2014, the government agency Flanders Innovation and Entrepreneurship (VLAIO) presented a research (Idea consult, 2014) where they tried to recalculate the need for additional industrial land and the net land take. In this project they had to find a way to measure whether a company really needed to occupy industrial land, or if it could also thrive in a mixed urban context.

Soon after this project, we started the research project called 'segmentation of economic locations', (van Dinteren, 2015) where we aimed to reframe the questions, both from the perspective of a business owner and of a local spatial/economic policy maker. The central position is that economy is everywhere, and that we (as spatial planners) do not fully understand how this functions. We asked ourselves how this understanding can be improved, for audiences such as the businesses, workers, and the public in general. In order to graps how economy functions, we have to know where specific activities take place, in what circumstances, and also try to understand what were implicit business related decisions that a company made in different phases of its history.

We complemented the stated preference from SPRE, with an observed choice of companies by mapping all activities present in different areas in Flanders and Brussels. From 2016 until 2019, we mapped almost 45.000 individual economic units in a 375 km² territory. We interpret the observed choice as a 'revealed preference' (Varian (2005), Samuelson (1938, 1948)) for micro economic site location choices of individual companies. As discussed in Huybrechts et al (2019), companies not only make a location choice when they first settle in a specific space: the law of minimizing costs obliges them to make a recurring evaluation of the location cost. The cost of moving a company is high and doing so has many uncertainties, which result in the statement that companies do not change location unless absolutely necessary.

We therefore assume that the best way of understanding location choice is to look at existing complex environments or economic ecotopes. This concept means that we focus on economic activities that are located on one or more parcels, taking into account their business models, and that we look into the area surrounding the economic activities. These economic area's have certain (spatial) characteristics that can be seen as economic ecotopes.

As discussed by Giaretta et al (2018, 2019), the revealed preference from the comprehensive mapping of economic activities had to be transformed into 'types' or economic ecotopes? An iterative inductive method was used to define the 16 economic types. For some small areas we produced a first proposal. This proposal was used by a group of people involved in spatial planning, urbanism, economics and real estate development. All of them have a good understanding of the field and have an in depth knowledge of that specific territory. The users discussed the nature of the types, the specific subdivision and how to use it in spatial and economic transformation of the territory. From these discussions, a new set of rules was derived for a new version of the types. This was done in different areas in and around Brussels and in Flemish cities, Kortrijk, Roeselare and Herentals.

3 FROM ECONOMIC ECOTOPES TO MARKET SEGMENTS

In 2018, we proposed a first version of the economic types (Giaretta et al, 2018), that we later used in discussions about transformation of areas, area specific development en regional economic planning. By november 2019 we applied an improved version of the method for the complete mapped area of 37.558ha in

Flanders and Brussels (Fig), allowing a more in depth study of the implicit parameters of each ecotope. The extend of the mapping (almost 45.000 economic units) resulted in the definition of 3.300 areas in 16 types (update of the 2018 version), ordered into 'continous', 'close', 'discontinous' and 'solitary' categories, and into several mixes of activities. From this mapping of units we were able to deduce a 'fingerprint' of each type (Fig 1).

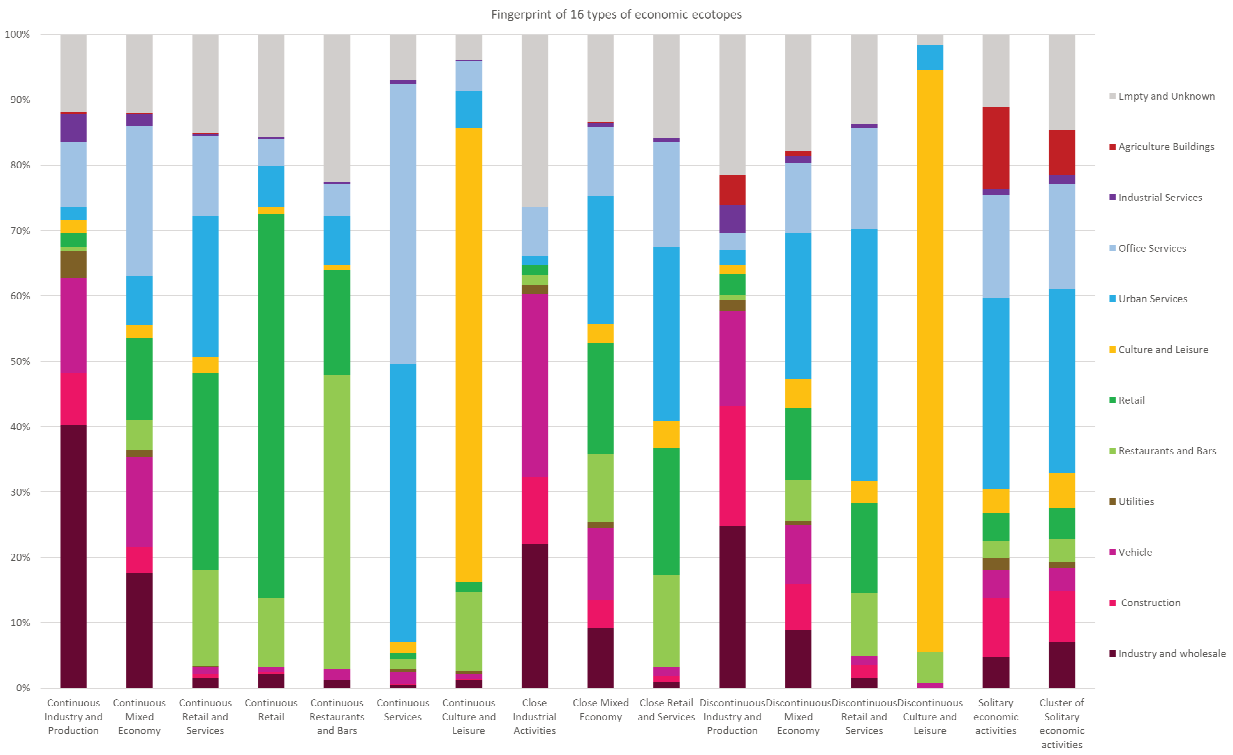

Fig. 1: Characteristic presence of different economic activities in each type or economic ecotope, based on the amount of units of the different economic activities.

As discussed in previous papers, it is expected that some types have a very similar composition because the main difference is not the type of activities but the distance between the economic activities in that type of ecotope. This is most striking between 'Continuous Culture and Leisure' and 'Discontinuous Culture and Leisure', and off course both types with solitary economic activities. In general, one can say that every economic activity can be present in every economic ecotope. So we can also use the data to calculate the probability that a company active in a specific sector will locate itself in any of the 16 types. Figure 2 shows this for a manufacturing company. As you would expect, a manufacturing company will most likely locate itself in a 'Continuous Industry and Production' type. However, the huge variety of manufacture and the different scales of these companies, make that the second observed choice is 'Discontinuous Mixed Economy'. Not all producing companies need the infrastructure provided in an industrial zone, nor do they have the necessary size and scale to be eligible for such sites. These graphs give a first glimpse of how individual companies might behave.

While site location choice is a discrete choice, the constant proces whether to stay in the same location or move to a new one, has more in common with a spatial planning 'Wicked Problem' (Rittel, 1972) than with a rationalisation of consumer choice. For wicked problems, no explicit basis exists for the termination of a problem solving activity; any time a solution is proposed, it can be developed still further (Rowe, 1987). This means that location choice is a recurrent problem. The interviews conducted by Huybrechts et al. (2019) with companies that remained in their original site, clearly show this proces. Every new event, acquisitions, hostile take over, new investment, environmental disputes with neighbours,… can suddenly revive the wicked problem of questioning the location of the firm. Changes in the value chain, e.g. outsourcing of material stock and logistics, can also influence the optimal location of a company.

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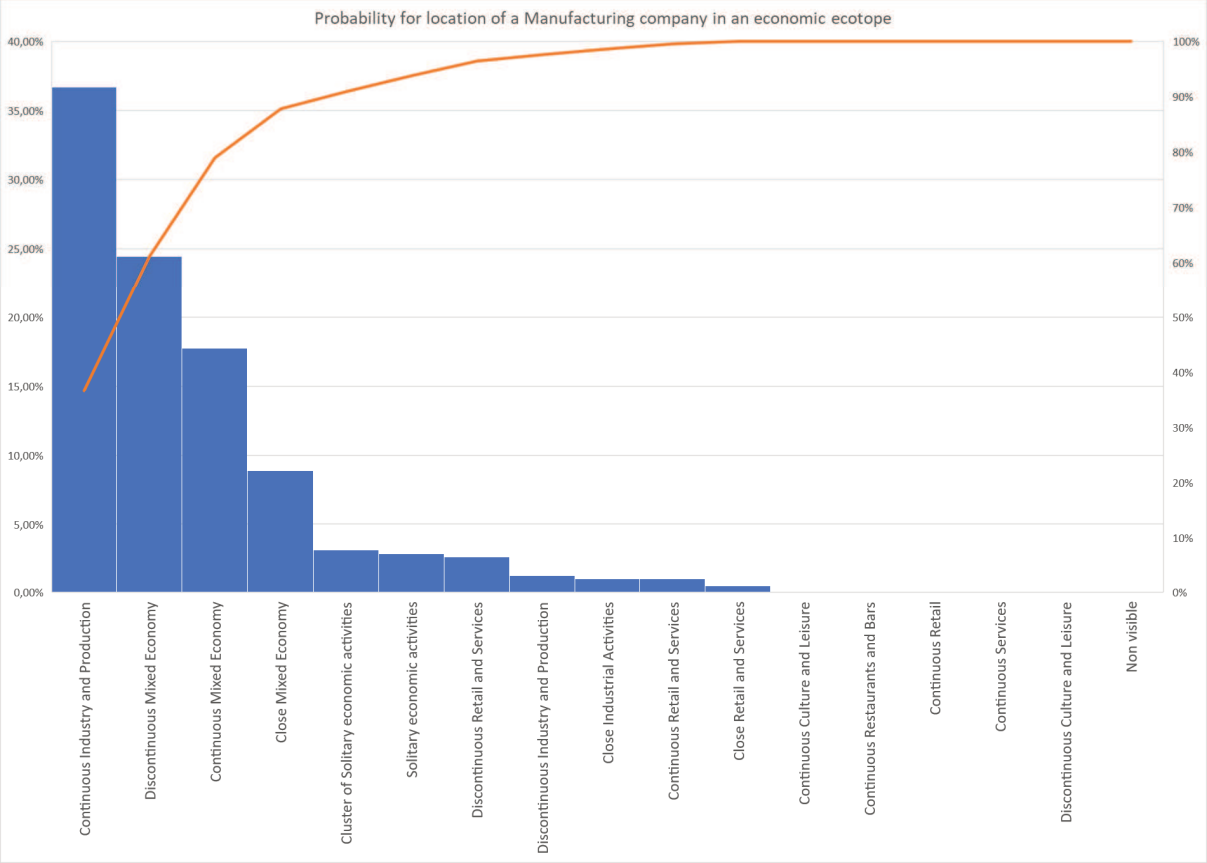

Fig. 2: probability of location of a manufacturing company in a Type of economic ecotope.

Different interdependent parameters play a role in the location decision making proces. In order to understand which parameters are relevant in making this discrete choice (demand side) we listed the parameters in site location that are differentiated territorially and are relevant on the scale of the economic ecotopes.

Starting with Alfred Weber's 'Theory on the location of Industries' (Weber, 1929), combined with industry and retail sales annual reports (JLL, 2019), and discussions with local stakeholders in the area of Buda in Brussels, we selected 16 relevant parameters for the demand side, and 26 for the product stratification (DeLisle, 2019).[1] The first stable version was tested for the Buda area in a workshop (29 August 2019), and later with the Province of Flemish Brabant (15 October 2019). Based on the comments and reviews, an adjustment was made to the proposed market segmentation. To keep a direct link with the economic ecotopes, we decided to slightly adjust the method, so types of ecotopes are either grouped or subdivided, but not spread around in different market segments.

A confrontation between the ecotope types and the territorial demand and product stratification parameters brings forward these findings:

[1] Territorial relevant parameters for the demand side and for the product stratification:
Demand: (D01) mix of activities in the area, (D02) size of units, (D03) cost of space, (D04) operational cost (environmental restrictions), (D05) population density in the area, (D06) population in the wider region, (D07) proximity to public services, (D08) image of the area, (D09) footfall, (D10) visibility from cars, (D11) number of cars passing, (D12) accessibility by public transport, (D13) accessibility by alternative goods transport, (D14) number of deliveries per week, (D15) type of goods vehicles, (D16) parking needs;
Product stratification: (P01) type of economic ecotope, (P02) proximity to economic activities, (P03) size of units, (P04) land use plan, (P05) combination with housing, (P06) environmental restrictions, (P07) external risk and hazard allowance, (P08) Floor Area Ratio, (P09) population density, (P10) average rent, (P11) land price, (P12) safe walking and cycling, (P13) large sidewalk, (P14) public transport service level, (P15) altenative goods transport infrastructure, (P16) direct access from the road, (P17) accessibility restrictions, (P18) parking availability, (P19) organization of loading and unloading, (P20) busy walking route between attraction points, (P21) footfall, (P22) visibility from a car, (P23) number of cars passing, (P24) availability of green spaces, (P25) public accessible green areas in the wider surroundings, (P26) collective water management.

(A) When the distance between economic activities increases, the potential relationship (Tobler, 1970) deminishes. Slight differences in distance between economic units are not distinctive when seen from the demand side. Three categories of proximity remain relevant: Continuous, Close (combining Close and Discontinuous), and Solitary.

(B) Where the mix of economic activities provides positive agglomeration effects and shared infrastructure in the Continuous economic ecotopes, this is no longer the case when economic activities are dispersed. The dominant presence of other activities (housing, farmland, forest,…) is more important for site location choice than the observed differences in mix of economic activities. The analytical subdivision of 'Close' and 'Discontinuous' types based on economic activity mix is not distinctive.

(C) The demand side parameters that are most relevant on this territorial scale are (1) footfall, (2) visibility from a main road, (3) potential clients in the area (= density), (4) shared infrastructure, and (5) organisation of loading and unloading. These parameters also explain the price of the accomodation. Areas will be subdivided in different segments where these parameters are considered important.

(D) The product stratification approach adds the (1) built form, (2) floor area ratio, (3) indoor/outdoor activities, (4) environmental restrictions and the (5) combination with housing as important parameters. As for the demand side, market segments will be subdivided accordingly.

Table 1 shows the resulting relation between the types and market segments. Not all parameters are equally relevant, and most are linked to one another. This is also reflected in the description of the market segments. The Type 'Continuous Industry and Production' exists both with and without a strong presence of housing. For the market segments, we propose a clear split between 'Urban Industry and Production', which includes substantial amounts of housing, and has a high Floor Area Ratio, and the other market segments, where there is no or very limited housing included in the area. When analyzing existing areas, an economic ecotope 'Continuous Industry and Production', that also contains a large proportion of housing, is associated with the 'Urban Industry and Production' market segment. Similarly, the 'Modern Industry and Production' segment refers to the absence of outdoor activities and storage, and 'Logistics and Wholesale' implies a very good freight transport accessibility and a dominance of Wholesale, Transport and Storage activities.

Type of economic ecotope	**Market Segment**
Continuous Industry and Production	Urban Industry and Production
	Industry and Production along a Main Road
	Modern Industry and Production
	Standard Industry and Production
	Logistics and Wholesale
Continuous Mixed Economy	Mixed Economic Activities along a Main Road
	Standard Mixed Economic Activities
Continuous Retail and Services	Retail and Services High Street
	Retail and Services Area
Continuous Retail	Shopping Street
	Shopping Mall
	Car Based Retail
Continuous Restaurants and Bars	Restaurants and Bars
Continuous Services	Office Services
	Urban and Public Services
Continuous Culture and Leisure	Culture
	Sports and Leisure
Close Industrial Activities; Close Mixed Economy; Close Retail and Services; Discontinuous Industry and Production; Discontinuous Mixed Economy; Discontinuous Retail and Services; Discontinuous Culture and Leisure	Close Economic Activities along a Main Road
	Close Economic Activities in Urban Areas
	Close Economic Activities in Low Density Areas
Solitary economic activities; Cluster of Solitary economic activities	Solitary Economic Activities in Built Areas
	Solitary Economic Activities in Agricultural Areas
	Solitary Economic Activities in Green Areas
	Areas without visible economic activities

Table 1: relationship between 16 types of economic ecotopes and 24 market segments

As in every attempt to propose market segments, this does not erase the differences between the individual locations or products within a segment. Within a an economic ecotope, different plot sizes, building properties,… will be available while other characteristics will be common for the entire ecotope. For specific economic activities (e.g. huge environmental impact, need for very large space,…) more in depth market research will be necessary to find a suitable location.

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4 CASE: MARKET SEGMENTS IN BUDA (FLANDERS, NORTH OF BRUSSELS)

Buda (central in Figure 3) is a historic industrial cluster south of Vilvoorde. This area is located in Flanders, but strides the border between the Brussels Capital Region and Flanders. This administrative divide however is invisible on the field. The development of the area started from the 1920s and resulted into different economic ecotopes of industrial type, around major transportation axes that link Brussels to Antwerp. In the Types map (Figure 3) we see how the industrial and mixed activities developed around the Canal Brussels-Scheldt and the railway Brussels-Antwerp. This patchwork of continuous industrial ecotopes highlights the perception problems this old industrial zone faces. Due to the historic soil pollution and strategic location close to Brussels and the Orbital Motorway (left to right in the middle of the orthophoto), there is real estate speculation in Buda, as many ambitious transformation proposals are currently discussed.

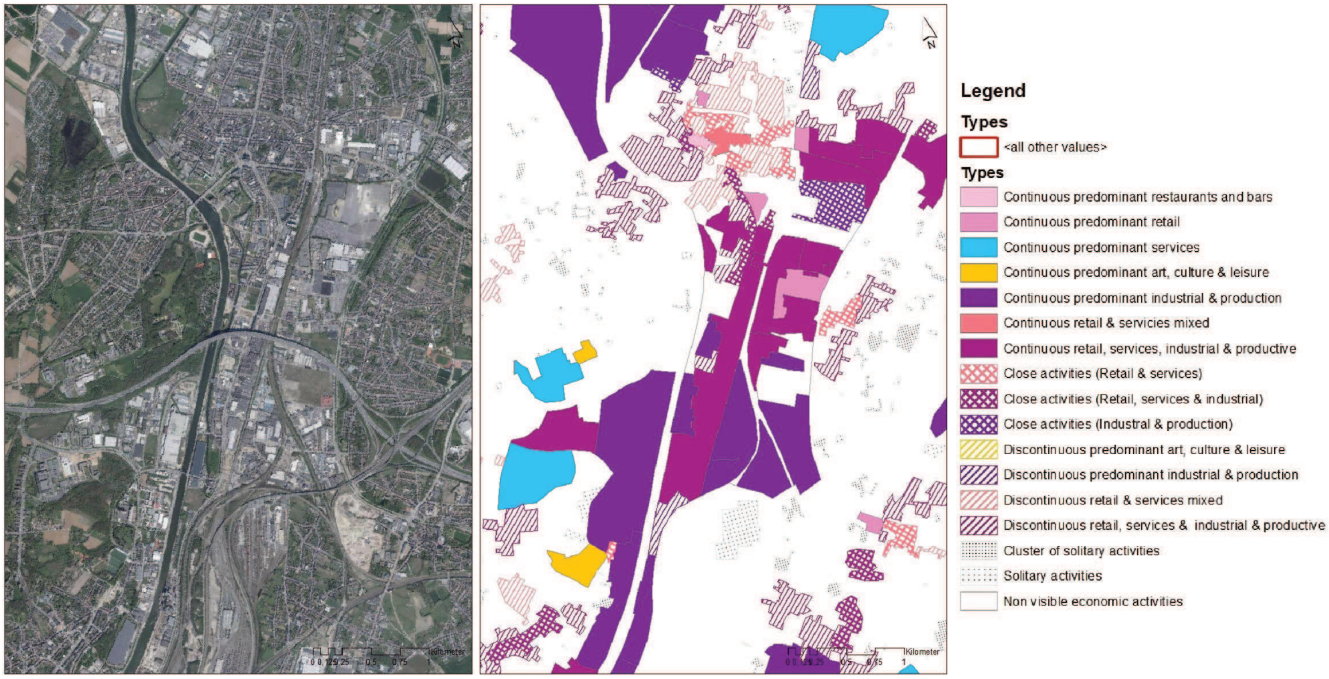

Fig. 3: Buda situation: orthophoto (left), Types of economic ecotopes in Buda (Central) and Type Legend (right)

Taking the step from types to segments in the Buda case, we attribute the most likely market segment to the existing areas. As both the set of demand parameters and of the product stratification are for a large part based on stated preferences of companies and policy makers, this does not necessarily correspond to a reality on the field. Everyone wants safe walking and cycling, but in real life this is not provided everywhere, especially not in industrial estates. As shown above in Table 1, the Segments map (Fig. 4) gives less detailed information for the non-continuous economic fabric, but highlights relevant site location factors such as visibility and accessibility. The Segments located along a main road or a high street are defined using local knowledge, additional data (such as population density) and network analysis. The morphological characteristics of areas surrounding solitary activities were used to create three different segments that focus on the interaction with either housing, agriculture or green areas.

In the following part of the paper we will show how this map of market segments can guide companies and policy makers to fully understand their decision making power. First, we will look through the eyes of a company that wants to move. Second, we will show how the segments can only be used to their full potential if all required services are provided, and last, we will demonstrate how market segments can contribute to the transformation of existing areas.

5 MINIMIZING COSTS BY CHOOSING THE RIGHT SEGMENT… AND A GOOD LOCATION

As shown in Figures 1 and 2, companies active in a specific type of activity could find a good location in almost any marked segment. Minimizing the cost of location depends on other factors than the trade or industry of a company. The 9 variables that describe the demand side of each market segment, can be used to help site location choice. As mentioned earlier, these variables are highly interdependent, meaning you only need to make a clear choice on three or four parameters to get a suggested type of ecotope. Furthermore, a

company may attach more importance to certain parameters than to others. We constructed several decision trees from the demand side.

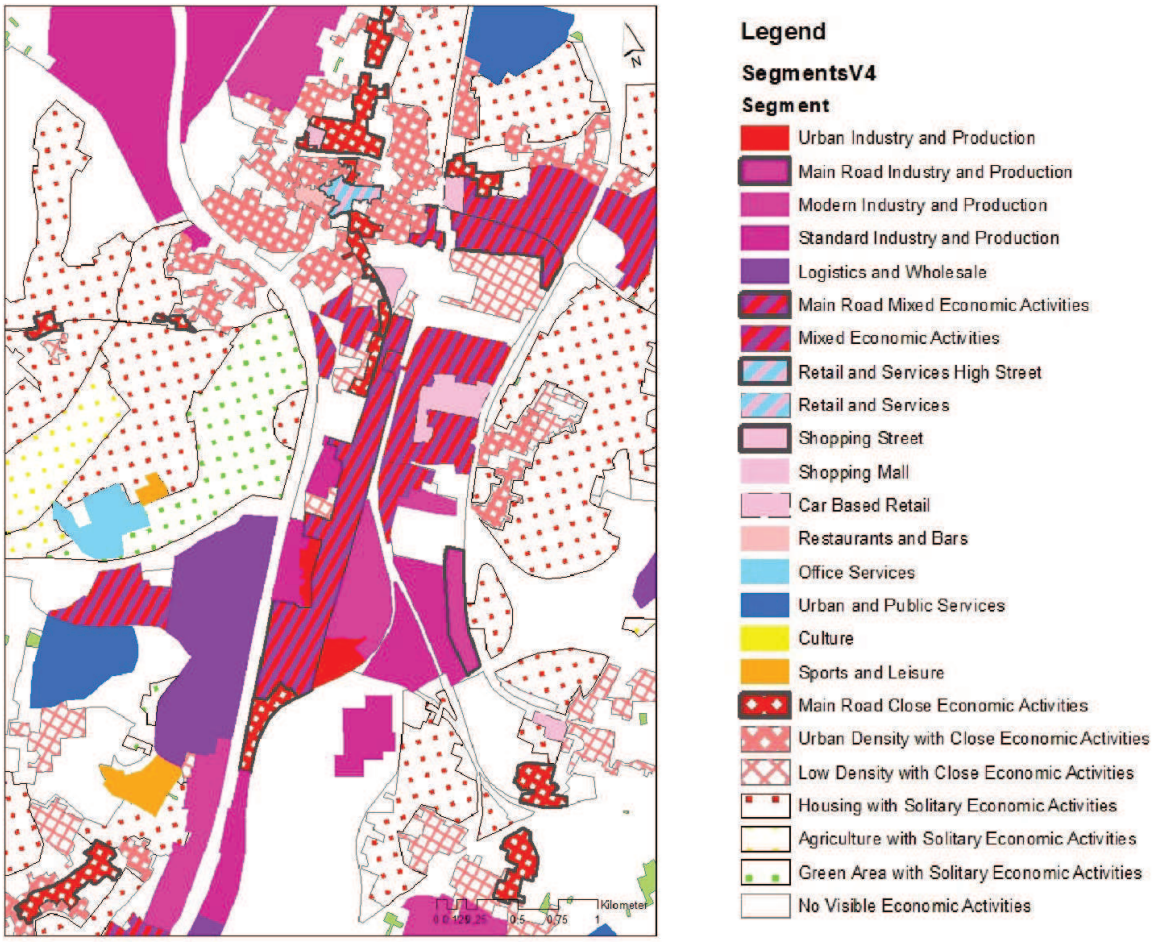

Fig. 4: Market Segments in Buda (Cross Border Brussels-Flanders)

In Fig. 5 you find a decision tree where the first question relates to rent price. This can easily be changed in a land purchase value (€/m² land) or building purchase value (€/m² floor). When we consider a furniture manufacturing company, it can use the decision tree depending on its specific activity characteristics. If it produces furniture on an industrial scale, the rent price, frequency of deliveries (1-5/day) and the indoor character would lead it to the 'Modern Industry and Production' segment. If is a highly specialised company that produces bespoke furniture and sells mainly through people seeing their products in their shop window, they may find it important to be visible on a high street and end up in the 'Retail and Services High Street' segment.

As the different parameters have a high interdependance, the scheme in Figure 5 is not the only way of getting to a suggestion for a market segment.

As mentioned above, the importance of certain parameters can vary according to the type of activity. That means that other decision trees will be developed, e.g. starting with the environmental impact of the activity, or with the characteristics of the area. An individual company can choose which cascade of questions seems more appropriate for its specific situation, or even use different decision trees in parallel in order to understand the nature of their 'Wicked Problem'.

6 OPTIMIZING THE COLLECTIVE BENEFITS /WELFARE MAXIMIZATION (VARIAN) BY PROVIDING THE RIGHT SERVICES

In the Buda case, we mentioned that the attribution of the 'most likely' Market Segment to an existing economic ecotope does not imply that all the requirements from the demand side are necessarily met. Most areas only approximate the 9 demand parameters and 26 product stratification characteristics.

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The market segments (Fig. 4) suggest that you could have similar loading and unloading conditions in the same segments (e.g. Modern Industry and Production). However, the current situation (Fig. 6) shows that there is no clear relationship between the most likely market segments and the actual organisation on the field. For policy makers this is a good opportunity to improve these areas according to market segment. This can lead to communicate to existing and new companies what behaviour is expected from them and what services (e.g. space for loading and unloading, public space, other activities in the neighbourhood,…) the local government will deliver to accommodate the economic activities. In this way, governments are taking steps to welfare maximization by providing the right services.

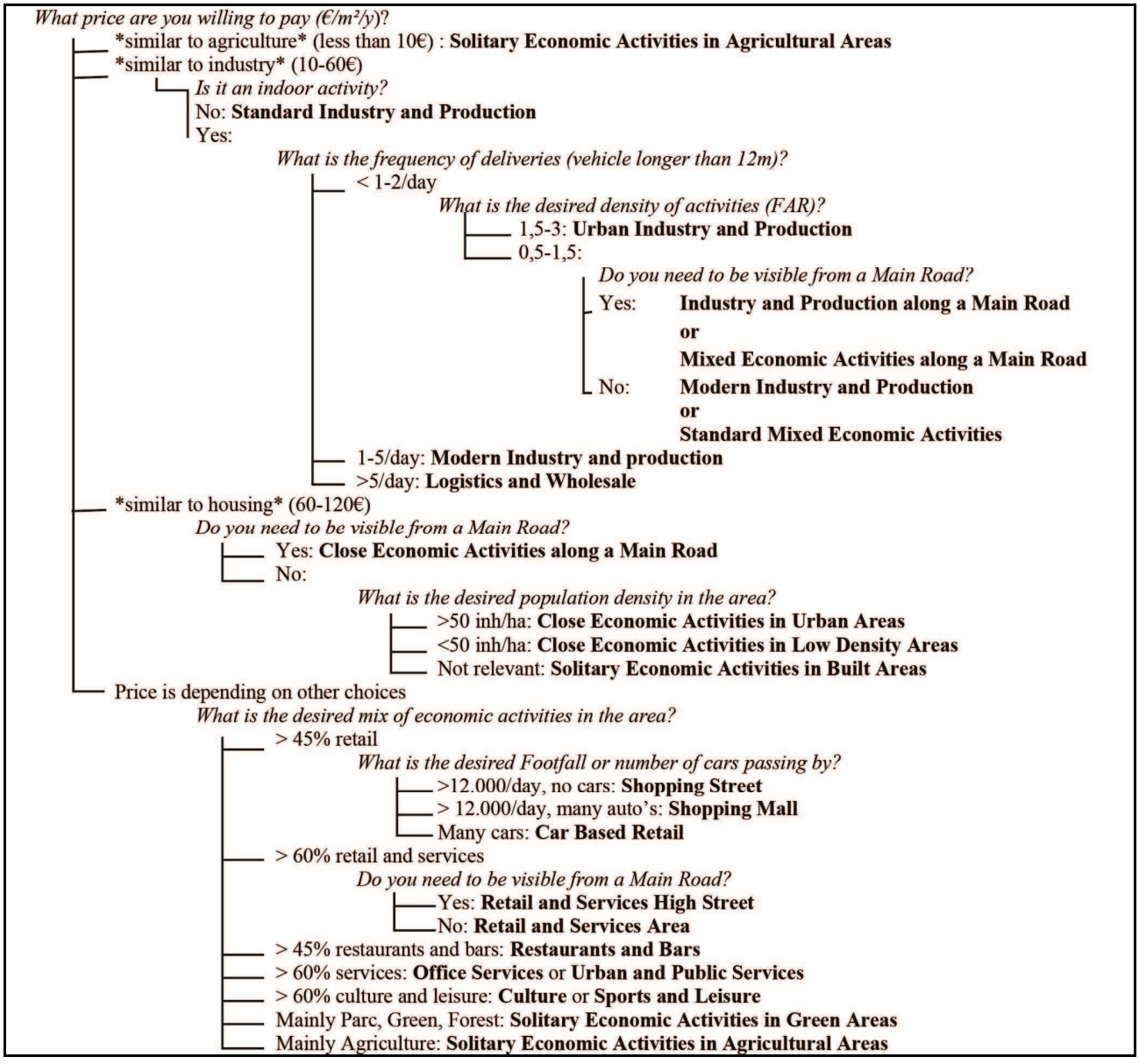

Fig. 5: Example of decision tree for site location choice between market segments

7 TRANSITIONS AND TRANSFORMATIONS

For policy makers, the creation of market segments based on an analysis of the current situation, is not sufficient. Especially in areas that are in a process of transformation at a high rate, such as Buda, the main objective is to redevelop large parts and therefore to change the existing segment into another segment. This will result in attracting new investments that are in line with the redevelopment goals, while existing companies will have to adapt to the new context or move to another location. For this purpose we will develop a different set of decision trees, with the 26 product stratifications parameters as a starting point. These trees guide policy makers through different main questions in order to get to a specific market segment. As a result, policy makers will get a clear idea about the most likely behouviour of companies in

this segment. Next to this, the trees will help them to get a clear understanding of what public services they have to provide.

Fig. 6: Current organisation of Loading and Unloading in Buda.

8 CONCLUSION

In this paper, we gave a brief overview of the spatial economic research we carried out and commisioned over the last 5 years. We started from the assumption that a new approach was needed to give economic planning an appropriate position within a spatial planning policy framework, in order to restrain green field development. The change from an urban expansion paradigm to a transformation of built up space paradigm necessitates a good understanding of the current economic functioning. By mapping economic activities on the field, and conducting many interviews and site visits, we got a good idea of territorial and spatial important parameters. The view point of micro economics and site location choice models gave crucial information. Thanks to this, we were able to move from an analytical tool to a decision support scheme for individual companies. In a final step we aim to transform the findings and maps into a policy making support tool, both for maximizing welfare and for the transformation of existing areas.

To get to a stable and fully developed spatial planning tool, more experiments and tests on the field are needed. We aim at combiing this with the elaboration of a separate set of decision trees.

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