Geomarketing

A case study:

The use of GIS for the development of a marketing strategy

for the Vrije Universiteit of Amsterdam

Rosan van Wilgenburg,

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Abstract

Geomarketing involves the use if Geographical Information Systems (GIS) for the realization of strategic objectives of organizations based on the fact that the market differs from one place to the other. Many different kind of geography related variables influence (part of) a marketing strategy. This paper presents an investigation into the definition of geomarketing. The concept of the marketing mix is used as a framework to gain more insight in geomarketing activities.

An extensive case study serves as an example of how location based factors influence the marketing strategy of the Vrije Universiteit Amsterdam (VU). The subject of the case study is the location of the schools that the students originate from and the locations of the schools that are potentially large providers of students. GIS is used as a marketing research tool to develop a marketing strategy for the VU in order to promote the university more efficiently among potential students.
The Netherlands

Index

Disclaimer

The results presented in this paper are based on my own research at the faculty of Earth and Life Sciences at the Vrije Universiteit Amsterdam.

This paper is never used before for obtaining a degree at an institute.

Signed,

Rosan van Wilgenburg,
Amsterdam, 11 may 2005

1 Geomarketing

1.1 Introduction

The earliest Geographical Information Systems (GIS) were used extensively within governmental organizations and for environmental management in North America and Europe. The last three decades GIS has increasingly been adopted in commercial organizations for business analysis, decision-making and problem solving activities, especially those concerned with operations, strategic marketing and site selection, and strategic business planning [9].

In 1991 the business geographic software market became the third largest market for GIS products, behind utilities and government [11]. A survey in three countries, the Netherlands, the United Kingdom and Canada, suggests that GIS is buoyant in the retail market and that further growth and diffusion of the technology can be predicted in the coming years [5].

Not only there was a rapid growth in GIS in business environments, there also was a shift from 'technology push' to 'demand pull' in GIS in the business world. In GIS this shift took place even faster than in business computing in general [10]. Another trend that is taking place is the movefrom standalone desktop GIS applications to integrated companywide systems: GIS data and functionality can be approached and integrated over the Internet (webmapping).

Not only on the software side major developments take place, also the availability of data is largely expanding. Ninety percent of company and client details contain location-based components [7]. This can be an address, a place name, a district name etc. This data can be mapped,connecting geographical information (customer addresses, service areas or logistic channels) with internal and external data (consumer purchasing, competitor locations, turnover, zoning plans or demography) potentially leading to valuable information.

Awareness that GIS represents a technology that can provide decision-makers with a range of operational, tactic and strategic decisions combined with an increase in data and software available caused the development of what is called "Geomarketing" [8], [6]. This paper presents an investigation into the definition of geomarketing. The concept of the marketing mix is used as a framework to describe the relation between GIS and geomarketing.

An extensive case study serves as an example of how geomarketing is used in practice. The subject of the case study is the location of schools that students originate from, but also the location of schools that

are potentially large providers of students. The result of this research will be used to develop a marketing strategy for the Vrije Universiteit Amsterdam (VU) to market the VU more efficiently.

1.2 Definitions

GIS is being adopted at different levels in the organizations. In this paragraph GIS will be defined and the objectives of organizations, in terms of marketing, will shortly be described in order to combine these to define geomarketing.

1.2.1 GIS

The G in GIS contains a critical element, that of "Geography". This is the element that distinguishes GIS from other information systems [4]. There is a lot of debate on the classification of GIS. A GIS can range from a very simple mapping system to a complex spatial decision support system. The basic functionality a system needs in order to be classified as a GIS is the ability to overlay information and to integrate such information via location, coupled with spatial search [5]. More complex systems are able to analyse and model data in order to do predictions. Different disciplines emphasise different aspects of a GIS. For example, cartographers stress the importance of high-quality mapping capabilities, while computer and information scientists have developed various system architectures and algorithms to handle spatial data (a database perspective). A definition of GIS that captures most of the prevailing descriptions is:

GIS are computer-based systems that are used to manage, analyse and present geographical related data [5].

1.2.2 Marketing

Marketing is a broad concept that basically describes all activities of marketers that lead tofulfill the marketing-objectives of an organization. A well-known framework of marketing instruments for describing an organization's marketing policy is known as the 'four Ps': Product, Price, Place (distribution/site selection) and Promotion (communication). These four P's of marketing are also known as *the marketing mix* and were initially identified by McCarthy 40 years ago. Other researchers – especially in the field of services marketing – increase the mix to the 'five Ps', to include People. Others increase the mix to 'Seven Ps' to include Physical evidence (such as uniforms) and Processes (i.e. the whole customer experience e.g. service offered around a product). The theory above leads to the following definition of marketing:

Marketing is the –in market perspective- development, pricing, promotion and distribution of products (services and ideas), in order to strategically establish a reputation, to encourage transactions and to

create sustainable relations, by which organizations and interested parties can realize their objectives (adapted from [13]).

1.2.3 Geomarketing

There are quite some synonyms for the term geomarketing, for instance: business GIS, marketing GIS, geobusiness and business geography. Combining the definitions of GIS and marketing from the previous paragraphs leads to the following definition of geomarketing:

Geomarketing involves the use of computer-based systems to manage, analyse and present geographical related data for the- in market perspective- development, pricing, promotion and distribution of products (services and ideas), in order to strategically establish a reputation, to encourage transactions and to create sustainable relations, by which organizations and interested parties can realizes their objectives.

The basic principal on which geomarketing is based, is the fact that the market differs from one place to the other. A shorter and easier, but less descriptive, definition for geomarketing is therefore:

Geomarketing involves the use of GIS for the realization of strategic objectives of organizations based on the fact that the market differs from one place to the other.

1.3 Geomarketing activities related to the marketing mix

Market segmentation is the division of the market in homogeneous groups of people or organisations that react similar in terms of the marketing mix. Based on this segmentation target groups can be defined. The geographical spread of these target groups asks for a certain strategy. Not only consumer types differ form place to place, but also workforce, facilities, infrastructure and the proximity to other companies (competitors, clients and suppliers).

These geographical differences directly influence the site selection and distribution of products and services, but also significantly influence other marketing related fields, like sales strategy, pricing and media planning.

Each P in the marketing mix has, to a smaller or bigger extent, a relation to location. In the next section useful GIS activities will be described for each P in order to give more insight in geomarketing activities.

1.3.1 Product

The success of product introductions depends, among other things, on the type of consumer that is being targeted in a marketing campaign. The target groups of certain products and services will have a distinct geographical spread pattern. For instance, it is of no use to sell baby goods in an area with predominately elderly people.

Another example is the introduction of a new product. The target group of a new product will in first instance consist of innovators. The first users of mobile telephones with camera are most likely young people with sufficient financial resources and an interest in new techniques. These variables can be used to perform a selection on a socio-demographic database. The results will most likely show distinct geographical spread patterns, as different types of people are not spread homogenous over the country.

Media and distribution planning can be based on the outcome.
The retail sector will profit form an efficient allocation of product categories within a store according to local differences. The performance of different stores will improve byassortment strategies based on local needs to gain advantage over local competitors. [1]

1.3.2 Price

There are price differences in products and services within at various geographical scales: The price of a beer is higher at the city centre in Amsterdam than in a local pub in the countryside. Likewise, computer components are cheaper in the eastern part of the Netherlands (which is close to Germany where these products are cheaper) than in the Randstad.

Price differences can be caused by differences in production or distribution costs, but also by the perception of the product value on the local market, competition (a monopoly in general means higher prices) or political and juridical differences. Variables that influence production costs can be the differences in labour costs and availability of resources. Again, all these differences can be analysed and shown on a map to set a regional pricing policy.

1.3.3 Promotion

When a target group and the geographical spread pattern of the group (catchment area) are defined, the map with the location of the target group can be overlaid with a map that shows the service areas of different communication media. In this way an efficient media selection can be done especially when the characteristics of the audience of that particular medium are considered.

A nodal region reflects the influence of a city on the surrounding area. Interactions (trade, communication) define nodal regions. The Netherlands consists of 80 nodal regions.

Local media (newspaper, television and radio) often cover the complete nodal region. Product introductions can be based on nodal regions, as local media will target the whole area at once.

Sales(-support) is closely related to the P of promotion in the marketing mix. The kind of sales strategy depends on the nature of the product, distribution channels, distance to prospects, frequency of visits, etc. Products can be sold directly from the producer to the consumer, but also through an intermediate party (the retail sector). The customer can come to the seller, or the sales people can visit prospective customers. The influence of the nature of the product on the size of the sales area can best be illustrated when comparing convenience goods with specialty goods. People are prepared to travel further to purchase new furniture (specialty good) than to purchase a packet of biscuits (convenience good). The definition of sales areas depends on many, mainly geographical, variables

1.3.4   Place

The P of Place in the marketing mix will be (by definition) the marketing activity that benefits most from GIS. Distribution planning and site selection and optimisation are typical geomarketing activities.

Site selection involves the selection of a location on where to open or purchase an office, shop, service point, restaurant, etc. Also related processes, such as where to close a store or where to extent the product line (micro marketing), have a strong geographical component. Variables that might influence site selection and product scope are: accessibility, market segmentation, local workforce, facilities, infrastructure and the proximity to other companies (competitors, clients in a b2b environment and companies for the supply of products and services), political and juridical factors, etc. Again, these variables can be used to develop a geographical model for site selection.

The choice of a distribution channel depends on the size of the sales area, accessibility, consumer type, the frequency with which a product is being bought, costs of logistics, distance to customer, the importance of sales support, supply and demand, the logistical approach of a company (just-in-time or total costs approach) etc. Most of these variables have a strong geographical relation and lend themselves perfectly for geographical modeling. Strongly related to distribution channel is site selection of warehouses. The optimal location and the size of a warehouse depends for a large extend on geographical factors.

For network planning, in the telecom and utility sector, GIS is being used frequently to determine the rollout of the network, based on location of customers, digging costs and juridical factors. Network registration is not considered a geomarketing activity, as GIS is not used for the development of a strategy.

2   Case study

This case study will serve as an example to illustrate what geomarketing involves and how it can be put into practise. The subject of the case study is the use of GIS for the development of a marketing strategy for the VU that matches the business objective: to attract as many students as possible. We first look into the mission statement of the Vrije Universiteit (VU) and the business objectives that follow this statement.

First part consists of a literature study to investigate the main reasons for a student to choose for a certain university in general. Based on this literature research hypotheses are put forward to further investigate the case of the VU. With the available data the hypotheses are being tested.

2.1   Vrije Universiteit of Amsterdam

The Vrije Universiteit of Amsterdam (VU) is, together with the University of Amsterdam (UVA) located in Amsterdam. With 16.407 registered students the VU is the fifth biggest (8.8% market share) university of the 13 universities in the Netherlands (source: Department of Educational Statistics of the VU, 2004).

The mission statement of the VU is:
The VU is a broad and general university where research and education are being practised in mutual coherence. As a "general and special" university, the VU represents a leading- and directing role in the practice of science and academically education and forming.

One of the business objectives that might follow this statement is:
*The VU wants to attract as many students as poss*ible.

The derived marketing objective will be *the development of a marketing strategy to attract more students.* The VU especially aims to enlarge the intake of bachelor students from the VWO (the education system that prepares for academic education).

2.2   University selection by students

The Ministry of Education, Culture and Research has conducted a broad research in 2000 among Dutch first year students [12]. One of the topics was about the university selection process, where ten alternative factors that might determine the choice for a certain university were presented. The students were asked to encircle the alternatives that played a role in their decision process. Per alternative it was calculated for which percentage the alternative contributed to the selection process of the students. Table

1 indicates that travel distance is by far the most determinative factor, followed by the reputation of the university. This is even more pronounced for students who study economics and who study nature sciences. Easy access to housing, like travel distances an other location-related factor, has little influence.

The results are shown for all students together and for students studying economics and nature sciences separately. The reason that students who study economics are added to the table is that the VU has a high proportion of the first year students who do study economics. Due to the fact that most universities teach economics (see table 4), the factor that a major is only offered at a particular university can be excluded in the analyses.

Nature sciences is added because earth sciences is part of nature sciences. Earth science is one of the smaller majors offered at the VU and taught at five different universities in the Netherlands (see table 5).

	Total	Economics	Nature
Travel distance	50	54	63
Reputation university	36	46	31
Education method university	29	29	31
Major only on that university	29	7	25
Reputation subject and university	23	39	19
Appealing information	21	15	19
Facilities	12	15	6
Accompanying of university	7	7	13
Easy housing	5	7	0
Other	20	20	25

Table 1: Motives for choice of university for first year student in %.

Source: studentenmonitor 2000

The first year students were also asked to do the same with different activities that influenced their choice of university. The following table shows the importance of the different activities in the selection of universities for first year students.

	Total	Economics	Nature
Information day/ exchange programme	60	59	80
Information packages	51	43	55
Information from friends	34	31	20
Student counsellor	24	20	35
Parents	23	15	15
Magazines	18	13	20
Brochures	14	22	35
Study information nights/ student fairs	12	16	25
Internet	10	4	5
CD-ROM	2	3	0

Table 2: Activities that influenced the choice of university for first year student in %.

Source: studentenmonitor 2000

An information day or an exchange programme is the most influential activity, especially for nature sciences, followed by information packages.

2.3 Hypothesis

Based on the information above the following hypothesis is developed.

Location-related factors that influence the decision of new students to enter the VU are:

- Distance from parents to universities that teach the major of interest (place and product)

- Differences in university promotion activities per region (promotion)

- Difference in reputation of the VU and the University of Amsterdam (UvA) (promotion)

The latter aspect of the hypothesis is not explored due to lack of data. Also the fourth P of the marketing mix (Price) is not considered in this research because the cost of the university fee is the same all over the country and are therefore not expected to be influential. The costs of living differs slightly from one region to the other, but since the research above proved that access to housing has little influence in the choice for university, this factor is not being considered.

Two assumption are made:

1. A service area of a high school is similar to a nodal region. A nodal region reflects the influence of a city on the surrounding area and is defined by interactions (trade, communication).

2. Travel time is equally spread over the country; the infrastructure has no influence. This assumption is made because no accurate data is available on travel time with public transport.

To test the hypothesis the following research questions will be explored.

- What is the current situation?
    - Which geographical regions represent the current first year students, who come straight from a VWO school? Where are these schools located?
    - Which geographical regions represent current first year students, who study economics or earth sciences and who come straight from a VWO school?
    - What is the market share of the VU in different regions of the Netherlands and what is the market share of the UVA.
    - In which regions of the Netherlands does the VU under perform?

- What are the service areas per university when nearest distance is taken as the determining factor?
    - How many potential students are located in the service area of the VU?
    - How many potential economics students are located in the service area of theVUwhen only universities that teach economics are considered?
    - What will the service area and the student potential be of the VU whenWindesheim, a satalite location of the VU, will be added offering all courses?

- What is the current marketing policy of the VU?
    - Where are the schools that join a special programme with the VU located?
    - How are these schools selected?

By combining the answers to these geographical questions amarketing strategy to attract more students can be developed.

2.4 Data

The following data is available for the analyses:

- A table with all first year students of the VU in 2003, containing the following relevant information:
    - postal code preparatory school student,
    - students preparatory training (HBO/VWO/foreign country),

- major/faculty
- bachelor/masters

The postal code is used for geo-referencing. Geo-referencing is the process of attaching x- and y-co-ordinates to a table in order to be able to visualise the data on a map and to perform geographical analyses. The postal code of the school is used, rather than that of their home address. The reason for this is that students often provided the address of the student housing that they moved to, rather than their parent's address. An other reason is that the home addresses are not relevant for a marketing strategy as marketing is more likely to be done at level of nodal regions or direct at schools.

The field in the table that shows the students preparatory training will be used to differentiate between students who come straight from a VWO school and students who come from other universities or academies. Students who come straight from the VWO are more likely to live with their parents at the moment they choose a university, while students who come from other universities and educational institutions are more likely to already life in Amsterdam.

Source is the department of Educational Statistics at the VU.

- A table with all VWO schools for the years 2001-2002, 2002-2003 and 2003-2004.
  The table contains:
    - postal code of the school,
    - the number of students who went straight to university after graduation,
    - the number of students who joined the VU,

- A table derived from the Internet with schools that join a programme that aims to narrow the cap between de VWO and VU (the aansluitprogramma) for the VU

Similar information about other universities is not freely available. But adjusted graphs based on the similar data are taken from research posters to make a comparison possible. The research is conducted by the GIS-centre FMG of the University of Amsterdam in 1999.

Different maps are used:
- Four position postal codes for the geo-referencing.
- Nodal regions in the Netherlands.
- Locations of the Dutch Universities.
- Municipalities.

2.5 Current situation

In 2003 there were 16.407 registered students at the VU. Tables 3 and 4 show respectively the intake of full time bachelor students who study economics and earth sciences in the Netherlands per university in 2003.

University	Major	Students	Market share
Technical Universuty Delft	Technical earth sciences	24	13,80%
University Utrecht	Earth sciences	85	48,90%
University of Amsterdam	Earth sciences	8	4,60%
VU	Earth sciences	27	15,50%
Wageningen University	Soil, Water and Atmosphere	30	17,20%
Grand Total		**174**	**100,00%**

Table 3: intake of full time bachelor students earth sciences in the Netherlands per university in 2003.

*Source: Department of Educational Statistics of the VU*

University	Major	Students	Market share
Erasmus University Rotterdam	Economics		0%
	Economics & Business economics	423	19%
Catholic University Tilburg	Economics	41	2%
Rijks University Groningen	General Economics	47	2%
	Economics	15	1%
	Economics and Management	187	9%
	International Economics and Business	184	8%
University Maastricht	Economics	4	0%
University Utrecht	Economics	143	7%
University of Amsterdam	Economics		0%
	Economics and business sciences	339	16%
University of Tilburg	General Economics	56	3%
	Businesseconomics	298	14%
	Economics	237	11%
	International Economics and Finance	33	2%
VU	Economics	167	8%
Grand Total		**2174**	**100%**

Table 4: intake of full time Bachelor students Earth Sciences in the Netherlands per university in 2003.*Source:*

Bureau Educational Statistics of the VU

The following maps are based on student statistics of the VU of intake 2003 and show first year bachelor students, who came directly from the VWO are selected. The figures used for the maps differ from the statistics above because the numbers above include also the students who came from other universities and majors and therefor not straight from the VWO.

The postal codes of the schools are used for geo-referencing. The school locations are aggregated to nodal regions, because schools are expected to serve the whole nodal region. The amount of students per nodal region is shown. The first map shows all first year bachelor students, who came directly from the VWO (1742), the second shows only students who study economics (109 students) and the third shows the students who study earth sciences (24 students).
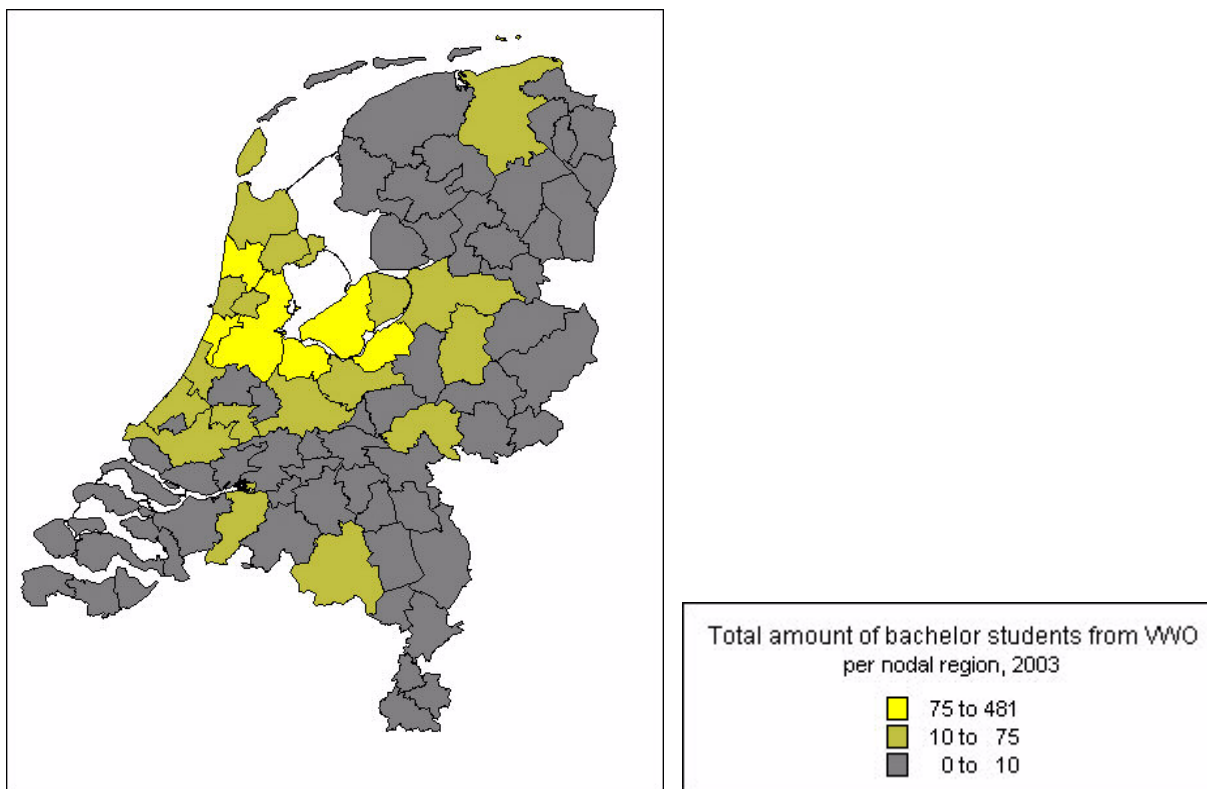
Map 1: All first year bachelor students at the VU coming straight from the VWO per nodal region, based on school addresses, 2003
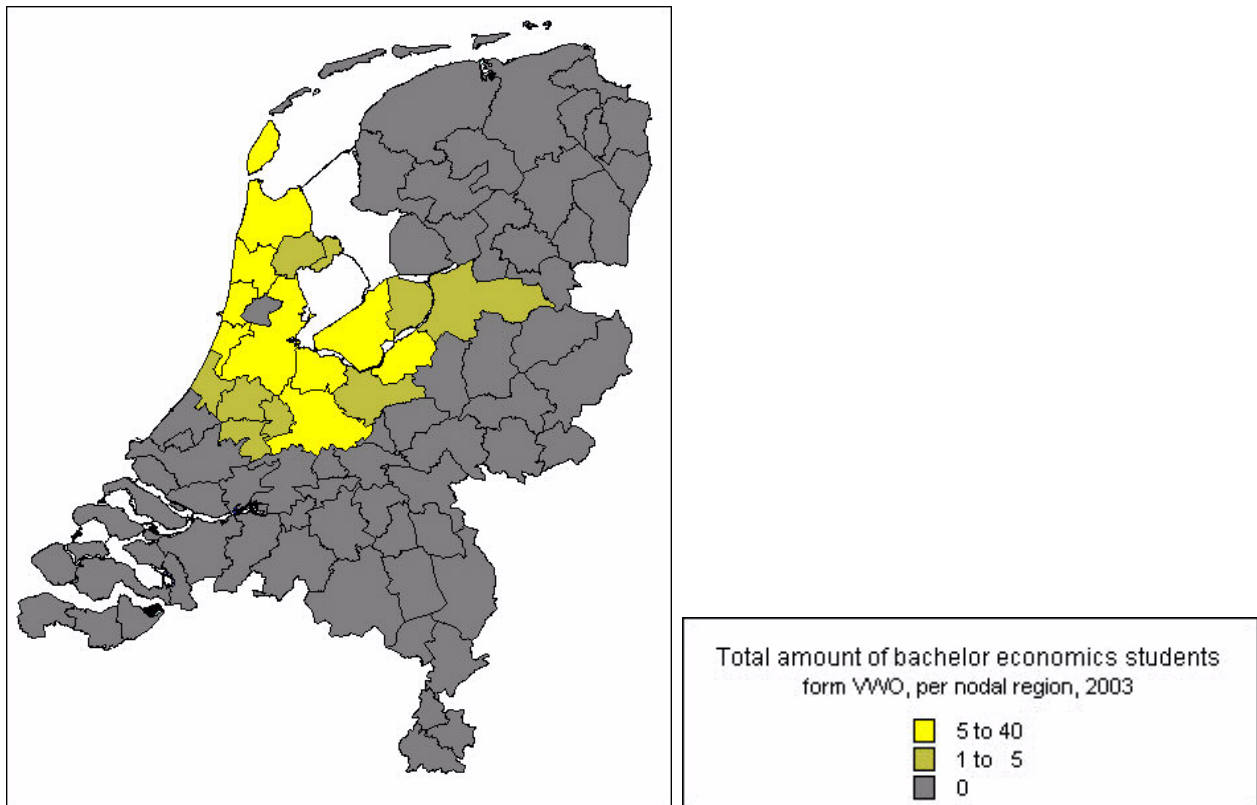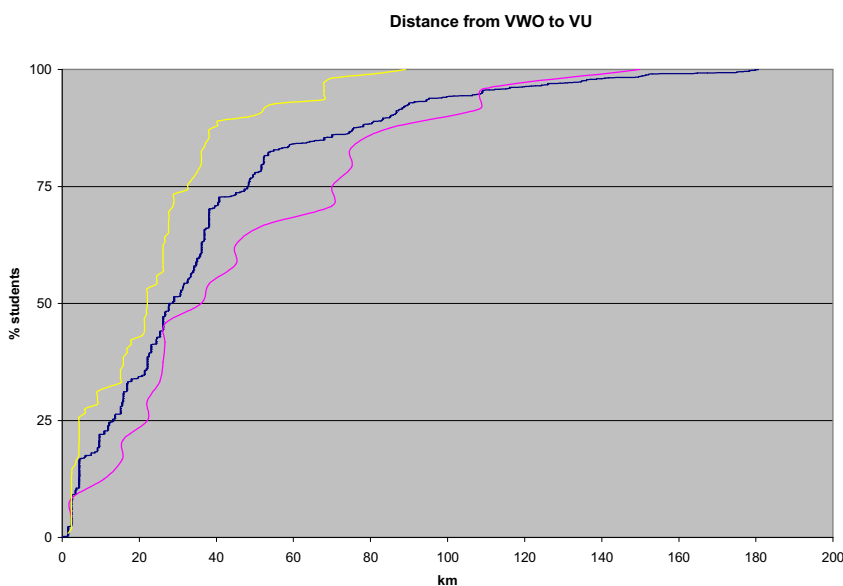
Map 2: First year bachelor students (economics) at the VU coming straight form the VWO per nodal region, based on school addresses, 2003
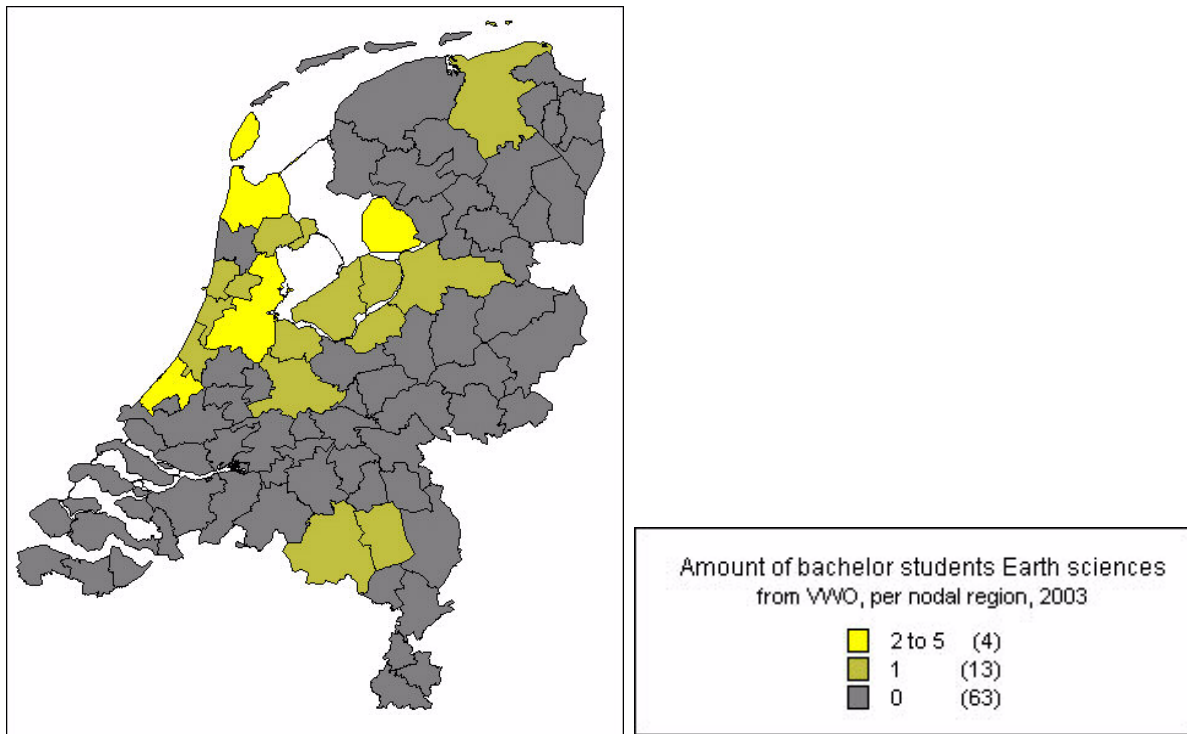
Map 3: First year bachelor students (earth sciences) at the VU coming straight form the VWO per nodal region, based on school addresses, 2003 . Between brackets is the number of occurrences.

The maps show a very distinct spatial pattern. Especially the students who study economics originate from schools in the province of North Holland. Notice that there are no students who study economics in the grey coloured nodal regions. The student from the most remote school comes fromZwolle, less than 100 kilometres away. There are only 24 first year bachelor students in earth sciences that come straight from the VWO. The map shows that they originate from nodal regions that are in some cases relatively far away from Amsterdam.

Graph 1 shows the percentage students against the distance between school and VU, as a crow flies (straight line, not following infrastructure), for all students and for students who study economics and

Distance from VWO to VU

earth sciences.

Graph 1: Distance division of first year bachelor students (all, economics and earth sciences) from VWO, distance between the VU and high school addresses, 2003

As is expected from previous maps, there is a strong relation between distance and amount of students: the larger the distance, the lesser students the VU attracts. This relation is called distance decay. This relation is the strongest for students who study economics. For students earth sciences this relation is the weakest. Given the data available we can only speculate what the reason for the weak relationship for students who study earth sciences is. Possibly it is due to the fact that the choice of universities to study earth sciences is less. These universities are all concentrated in the western part of Holland. For students who originate from other parts of Holland, the difference in distance is perhaps so small that they let the reputation of the university prevail.

Earth sciences is being taught at five universities, but they all offer different subjects within earth sciences (see table 3). For example, the University of Amsterdam does not provides a major in geology

19

and the University of Delft has a more technological focus. For that reason the assumption that students will let their choice for a certain university to study earth sciences depend on distance is to general, as they are very likely to base their choice on the subjects offered within earth sciences and/or the reputation of the university.

Looking at nature sciences, when considering earth sciences, in table 1 is obviously not accurate enough to do any estimations: nature sciences include too many different majors. The fact that 63% of the students who study nature science consider distance as the most determinative aspect in their choice for a certain university is contradicted by the fact that the relation with of the students who study earth science at the VU is not as strong as for other subjects.
On the other hand that the population of the students studying earth sciences is only 24 andtherefor not reliable enough to draw general conclusions.

The following graph shows the same figures but than for the UVA in 1999.
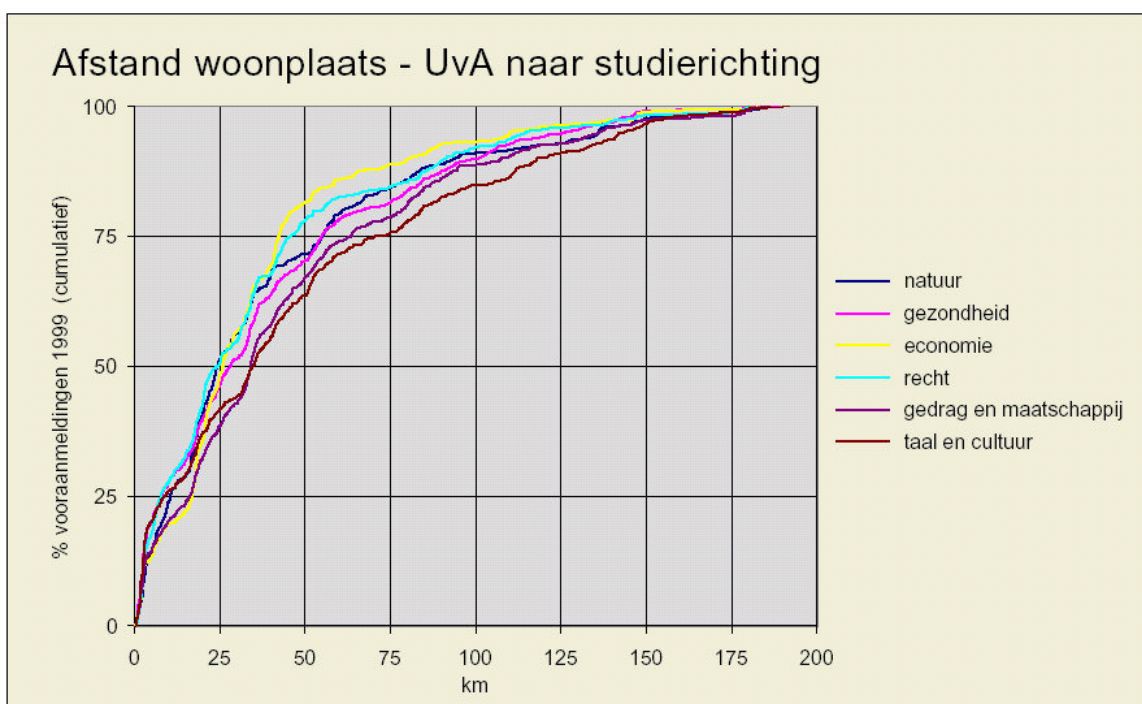
Graph 3: Distance division of the pre-enrolments of students in 1999, distance between the University of Amsterdam and the place of pre-enrolment. *Source: GIS-centre FMG of the University of Amsterdam, 1999*

The graph of the UVA is roughly the same as the graph of the VU, except from the fact that students who study economics come from further distances. There were 419 pre-enrolments for economics. Nothing is known about their pre-education.
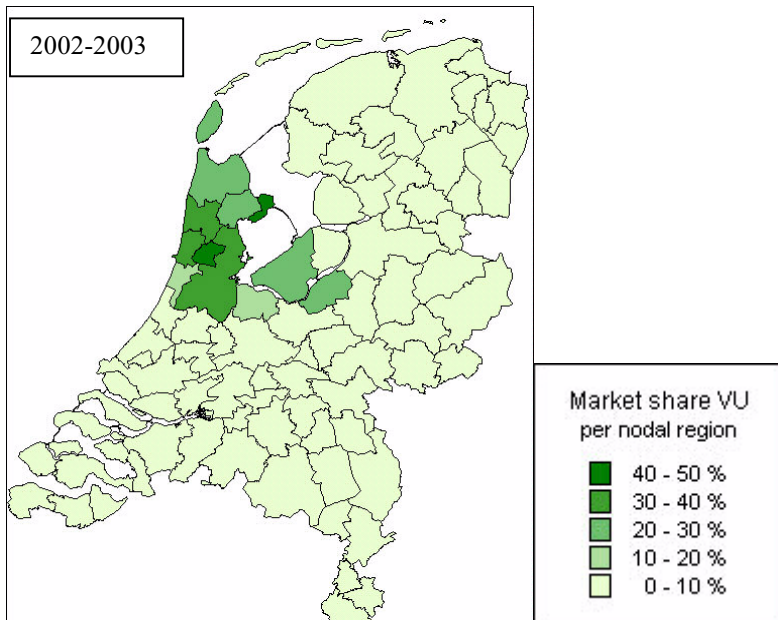
2.6   Market share

When looking at market share (percentage of students who choose for the VU, out of all students that go to a university) per VWO per nodal region a similar spread pattern can be distinguished as looking at absolute numbers of students. There is again an emphasis on the provinces of North Holland and Flevoland. Maps 4 to 6 show that the market share per nodal region differs from year to year. Nodal region Enkhuizen, for example, had a market share of respectively 15, 30 and 47% from 2000-2001 till 2002-2003.
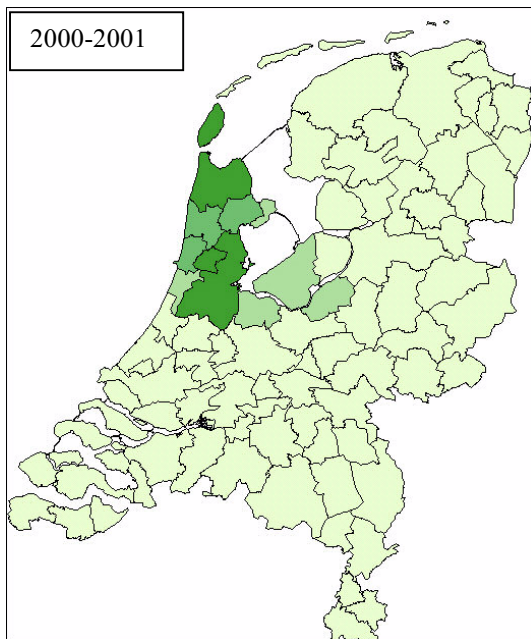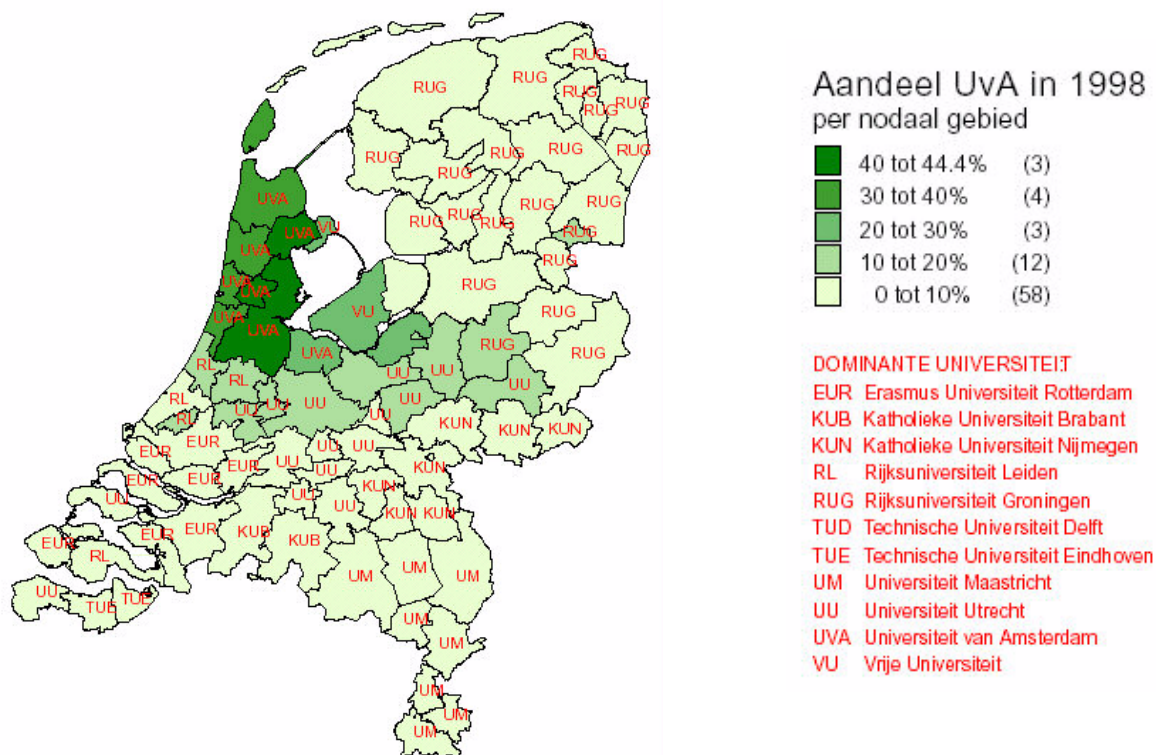
Map 4
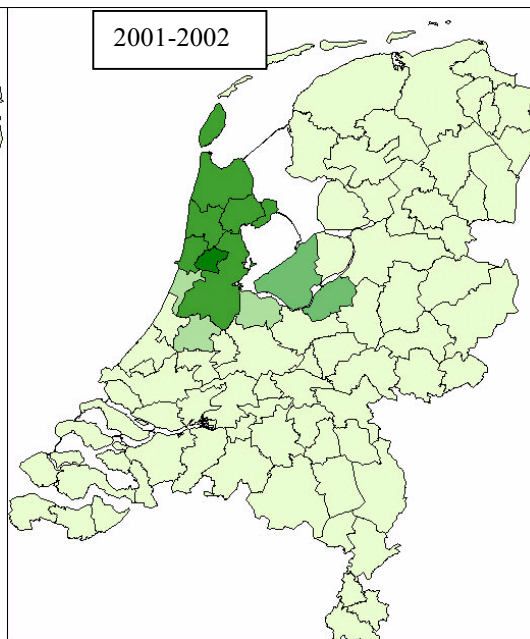
Map 5

Map 6

Map 4-6: Market share of the VU (percentage of students who choose for the VU, out of all students that go to a university) per VWO per nodal region, 2001-2002, 2002-2003 and 2003-2004 *Source: IOWO, 2004*

Map 7 is a map based on the similar data in the year 1998, produced by the UVA to show market share of the UVA.

Map 7: Market share of pre-enrolment of students at the University of Amsterdam and dominating university per nodal region, 1998. *Source: A research conducted by the GIS-centre FMG of the University of Amsterdam in 1999.*

Map 7 cannot be compared with map 4-6 without mentioning that the figures are from different years. As we have seen in map 4 to 6 differences in market share for different years exist. In 1998 there was no division yet between bachelor and masters students. There is a difference in the total amount of first year students between the VU and the UVA. In 2003 the VU had 15.776 and the UVA had 22.045 registered student in total (Source: department of educational statistics VU). The difference in total amount of students is currently around 30%. This difference is also noticeable in market share.

In general a spread pattern of nodal regions in which a certain university dominates can be distinguished around the location of a university. Looking at the region, which is covered by the two universities in Amsterdam, it is clear that the UVA dominated in 1998 in eight nodal regions, including Amsterdam. The VU dominated in two nodal regions, Enkhuizen and Harderwijk, on the edge of the expected service area of Amsterdam.

There are no figures available to show differences between marketshare for different majors.

2.7   Nearest distance regions

The hypothesis that students choose a university based on the distance between home address and university would lead to a distinct pattern of service areas per university, providing that all universities offer the same majors and all students choose the nearest university. The following analyses are based on a scenario that assumes that students only use distance as deterring factor and that other universities do not have satellite locations.

Based on the distance between the centroid of a four-position zip code and the centre of the city in which the university is based, service areas per university city are created by combining the postal codes into regions (see map 8). Per service area all high school students who joined a university after the VWO in the year 2002 are summarised. Following this scenario 1038 students (half of the 2077 students in the Amsterdam service area, as Amsterdam has two universities) will start at the VU, presuming the VU and the UVA offer all majors. Notice the big area in the Middle North East of the country on map 8 where there is currently no university. Zwolle is situated in the middle of this area.

At the moment the VU is in the process of merging with Windesheim, an institute of vocational education based in Zwolle. Map 9 shows the division of the service areas in case Zwolle is added as a university city.
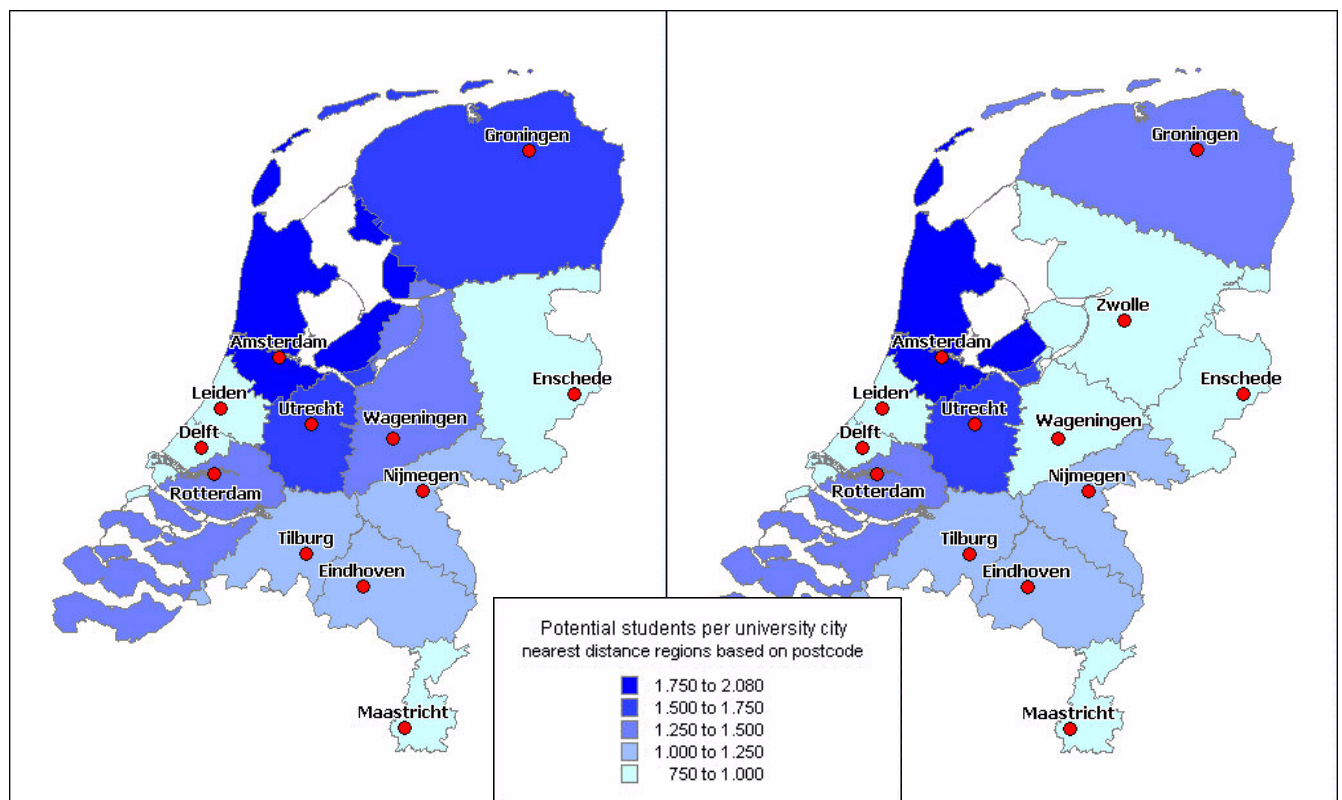
Map 8, service areas based on distance   **Map 9, service areas based on distance**
between post code and university city.   **between post cod and university, incl Zwolle**

23

Suppose Windesheim would be a mature satellite of the VU offering all subjects, the service area, and therefor the potential amount of students entering the VU, would be much higher. The amount of students would be 1010 + 995 = 2005 students. The VU will have the highest amount of students following that scenario. In the following table the first column is related to map 8 and the second column to map 9.
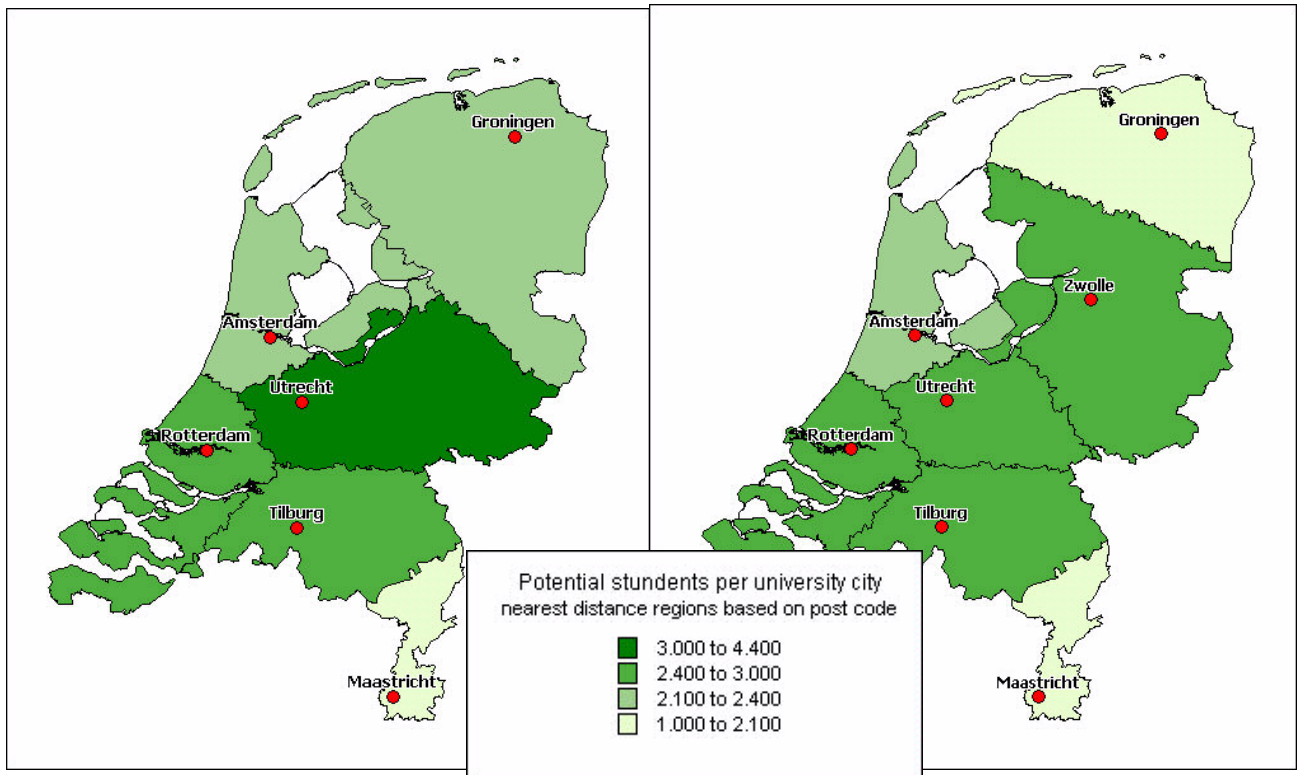
University city	Potential first year Students per service area	Potential first year Students per service area in case Zwolle is added
Amsterdam	**2077**	**2021**
Delft	789	789
Eindhoven	1249	1149
Anschede	996	776
Groningen	1533	1267
Leiden	996	996
Maastricht	782	782
Nijmegen	1015	1015
Rotterdam	1398	1398
Tilburg	1189	1189
Utrecht	1722	1722
Wageningen	1409	996
Zwolle	-	**995**

Table 5: Hypothetical amount of first year bachelor students coming from the VWO, per service area of different university cities.

But because not all universities offer the same subjects the above situation is very hypothetical. A more realistic view on the influence of distance on university selection will be provided without the assumption that all universities offer similar majors. Therefor we look at the location of different majors, rather than at all universities. As can be seen in table 1 the influence of distance in students motivation is even higher for economic students (54% versus 50%) than for all students. Map 2 and graph 1 proved this statement.

For that reason the universities with an economics faculty are selected and again service regions are created and updated with potential students studying economics. 17% of all high school students

entering university are considered potential students as 17% of all first year students in 2000 studied economics [3]. Nothing is known about the regional spread of future economics students, so it is assumed they are spread equally over the country. The same routine is executed withZwolle added presuming that Windesheim would have a fully operating economy faculty. The following maps and table show the result. The University of Utrecht will loose part of its potential students to the VU.

Map 10, service areas for economic faculties based   on distance from university.

Map 11, service areas for economic faculties based on distance from university, incl Zwolle

Table 6 shows the amount of potential first year students who study economics per service area of cities with a university with an economics faculty. The second column shows the real figures for 2003, the third column is related to map 10 and the last column is related to map 11.

University city	First year economics Students at the Free University from VWO, 2003	Potential first year economics students per service area	Potential first year economics Students per service area in case Zwolle is added
Amsterdam	84	384	362
Groningen		368	215
Maastricht		184	184
Rotterdam	2	502	502
Tilburg		421	421
Utrecht	23	717	482
Zwolle		-	410

Table 6: True and hypothetical amount of first year bachelor students (economics) coming from the VWO, per service area of different university cities.

Without Windesheim Utrecht serves by far the most potential economics students (717). AddingZwolle as a satellite of the VU will cause a major shift in the geographic division of service areas. In that case the VU will take the lead with (0.5*362) + 410 = 591 students.

This routine is not repeated for students who study earth sciences based on the fact that table 3 and map 3 show that the relation between distance and choice for a certain university is not as strong as it is for students who study economics.

2.8 Marketing policy of the VU

The marketing policy to attract new students at the VU consists at the moment of the following activities (in random order):

- Advertisement in national newspapers and magazines.
- Information days.
- Posters at bus stops in Amsterdam, Haarlem and other nearby cities. This policy is not going to be continued due to low effectiveness.
- Posters and information packages at schools.
- Aansluitprogramma, see next paragraph.

The effects of different campaigns are barely measured. Students who choose for the VU are sometimes being interviewed, but the motives of the ones that didn't choose for the VU are unknown.

2.8.1 Aansluitprogramma VWO-VU

The Aansluitprogramma VWO-WO is a programme that aims to narrow the gap between de VWO and Universities. Goals are:

- a better connection between the curriculum of the first year of the university to the educational system of the VWO and
- assisting students in making the choice for right major and university.

The programme is carried out, among other things, by exchange programmes, guest lectures, information exchange, etc. The Aansluitprogramma VWO-WO is carried out individually by all universities.

Table 2 showed that the activities that influenced a students choice for a certain university was in the first place an information day or exchange programme (61%) and in second place an information package (51%). The aansluitprogramma is therefor likely to have a large influence on a student's decision.

The Aansluitprogramma VWO-VU is the programme that is carried out by the VU in co-operation with 38 schools that teach on VWO level.

The initial selection of the schools to join the aansluitprogramma was based on the following considerations:

1. Is the school in the vicinity of the VU?
2. Does the VU has any ties the school all ready?
3. Is the school a big supplier of students?

The selected schools were initially being approached to join the programme. Since that time schools joined and left the programme for unknown reasons. Schools sometimes ask the VU if they can join the programme. With these schools possibilities are discussed. Due to lack of time of the programme coordinator at the VYU there is currently no policy to approach schools proactive, although there are plans to extend the programme to areas were there is low coverage at the moment like Haarlem, Flevoland and Zwolle.

The VU made an agreement with the University of Amsterdam to share information and not to get involved in each other's schools, unless a school approaches one of the universities on their own initiative. There is an overlap in the schools of both universities. The universities don't consider this as a

problem, on the contrary, they think it is positive that future students visit both universities. One of the goals is that students make a choice that suits them best, and not just to recruit as many students as possible.

The following map shows the spread of the schools that join de programme, mapped against total amount of bachelor students who come form the VWO per nodal region.
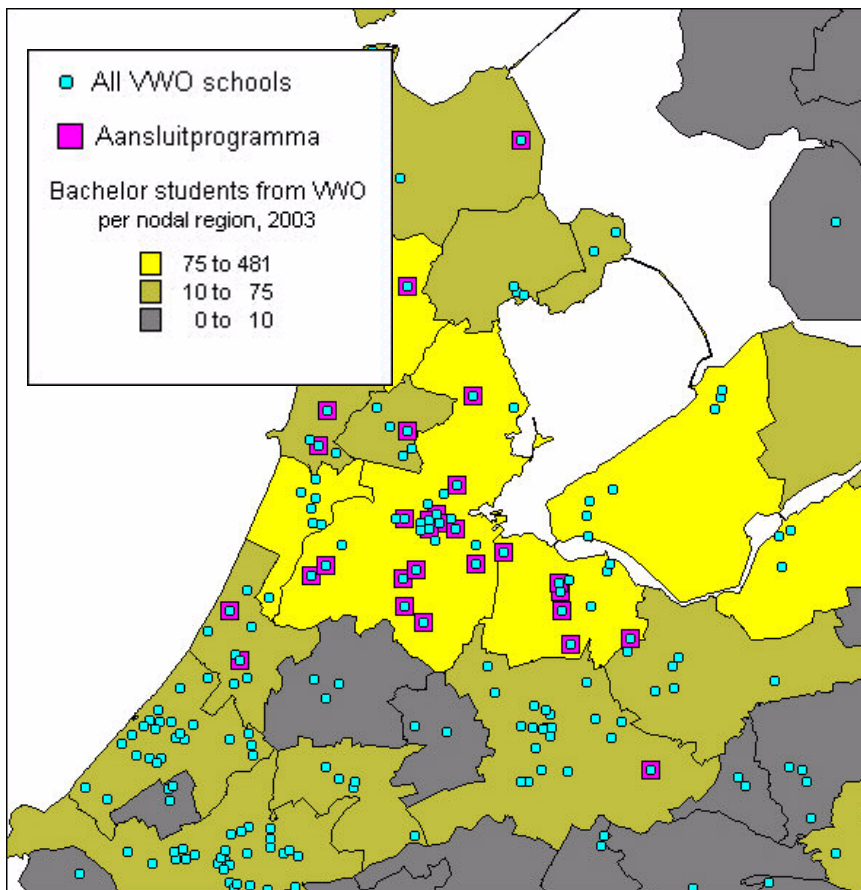
Map 12: Schools joining the Aansluitprogramma VWO-VU in 2004, compared with all VWO schools and total amount of first year bachelor students per nodal region from the VWO in 2003.

Due to the policy of the VU all schools are in the vicinity. The farthest school is inWieringerwerf, approximately 55 km north of Amsterdam. When comparing the location of the schools joining the aansluitprogramma on national level with the nodal regions where most students come from, a relation exists: the schools are relatively often in nodal regions that many students originate from.

In next tables and map the schools that join the aansluitprogramma are compared with market share at school level. Table 7 shows the VWO schools that are the top 10 suppliers for the VU in absolute numbers for the year 2002-2003 and the schools that are part of theaansluitprogramma.

VWO school name	Location	No students	No students to	Market share	Aansluit programma
Keizer Karel College	AMSTELVEEN	28	52	54	yes
Alkwin Kollege	UITHOORN	27	51	53	yes
Jac P Thijsse College	CASTRICUM	26	70	37	yes
O V C	ALMERE	25	52	48	
RK SGM St	ZAANDAM	24	29	83	yes
Trinitas College	HEERHUGOWA	23	53	44	yes
H Wesselink College	AMSTELVEEN	22	47	47	yes
Calandlyceum	AMSTERDAM	20	28	72	
Atheneum Coll Hageveld	HEEMSTEDE	17	54	31	
SGM v Vwo Havo Mavo	AMSTERDAM	17	25	68	

Table 7: VWO schools that are the top 10 suppliers in absolute numbers for the year 2002-2003 and whether these schools are part of the aansluitprogramma (Source IOWO)

Table 8 shows the same but than a top 10 sorted per percentage of students who went to the VU out of all students who went to a university (relative numbers).

VWO school name	Location	No students	No students to	Market share	Aansluit programma
Islam SGM Ibn	ROTTERDAM	2	2	100	
Meerstroom	UTRECHT	1	1	100	
Esprit Scholengroep	AMSTERDAM	5	6	83	yes
RK SGM St	ZAANDAM	24	29	83	yes
Joodse SGM	AMSTERDAM	8	10	80	
Calandlyceum	AMSTERDAM	20	28	71	
SGM v Vwo Havo	AMSTERDAM	17	25	68	
Leonardo	LEIDEN	2	3	67	
Regionale Sgm	ENKHUIZEN	12	20	60	
Het Baken	ALMERE	13	22	59	

Table 8: VWO schools that are the top 10 suppliers in relative numbers for the year 2002-2003 and whether these schools are part of the aansluitprogramma (Source IOWO)

Table 8 shows that a school with relatively few students who join a university easily have a very high market share.

Map 13 shows the locations of the absolute and relative top 10 schools and the location of the schools joining the aansluitprogramma.
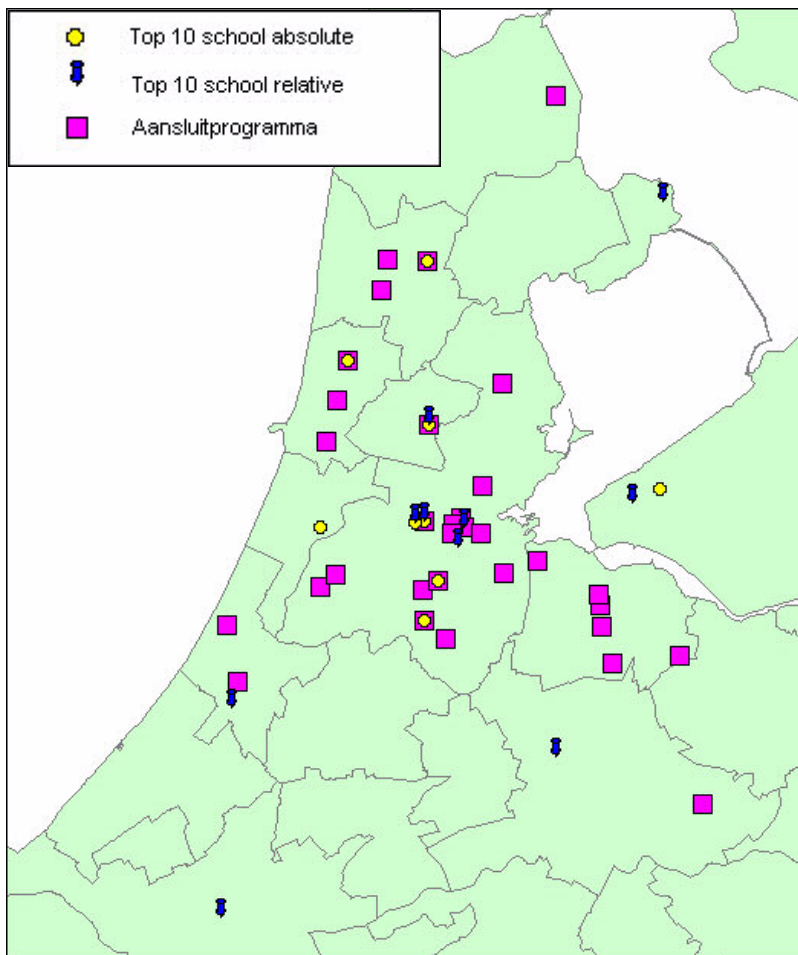
Map 13: VWO schools that are the top 10 suppliers in absolute and relative numbers for the year 2002-2003 and whether these schools are part of the aansluitprogramma (Source IOWO)

On average 7.0% of all students who went straight from the VWO to a university in 2002 went to the VU, while 30.4% of the schools that join the Aansluitprogramma VWO-WO entered the VU (the market share is not known of two schools). There are schools that are big providers of VU students in absolute or relative numbers, that are located in the vicinity of Amsterdam that are not part of the aansluitprogramma, for example the Calandlyceum.

When the programme would be used solely for recruiting students another selecting policy could be more favourable, namely selecting those schools that are potentially big suppliers. These are schools with a big amount of students who go to a university, but not the VU and that are that are located in the nearest distance region of the VU.

Map 14 shows schools with more than 25 students who went to a university in 2002-2003, but who did not go to the VU, within the nearest distance region of Amsterdam.
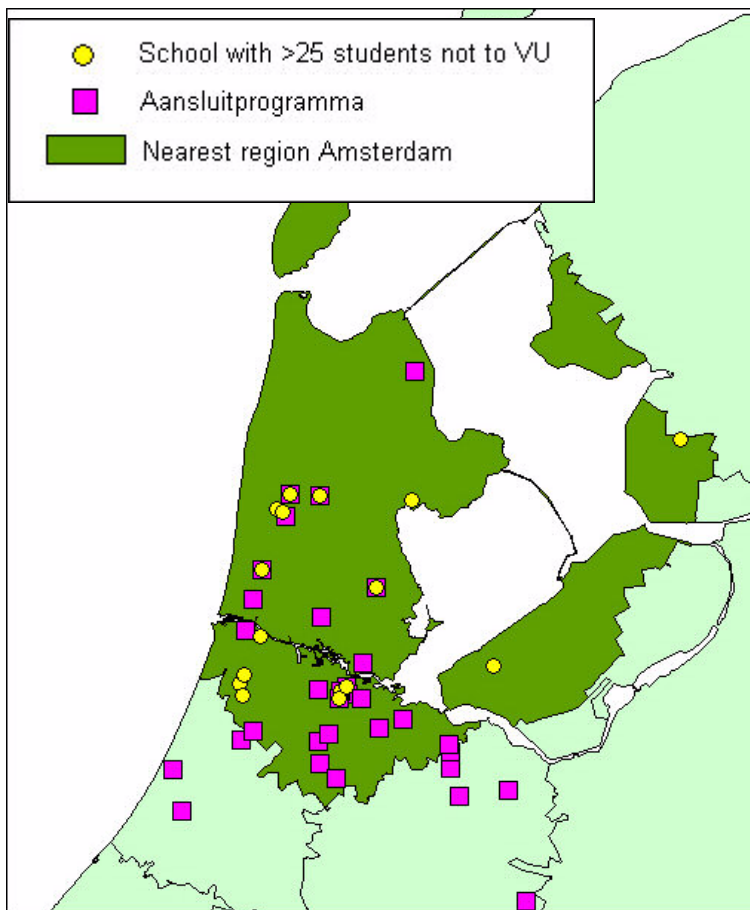
Map 14: VWO schools with > 25 students who went to a university in 2002-2003, but who did not go to the VU, within the nearest distance region of Amsterdam.

Table 9 gives an overview of the selected schools in map 14 and indicates if they all ready join the aansluitprogramma.

VWO school name	Location	No students	No students to	Difference	Aansluit programma
Trinitas College	HEERHUGOWAARD	23	53	30	Yes
Purmerendse S.g. loc. Jan	PURMEREND	8	42	34	Yes
Willem Blaeu Opb SGM	ALKMAAR	10	41	31	
RK SGM Tabor	HOORN NH	11	42	31	
RK SGM Sancta Maria	HAARLEM	5	35	30	
Chr. S.G. Jan Arentz	ALKMAAR	12	42	30	Yes
Atheneum Coll Hageveld	HEEMSTEDE	17	54	37	
St. Nicolaas Lyceum	AMSTERDAM	9	38	29	Yes
Montessori SGM	AMSTERDAM	5	38	33	
Murmellius Gymn	ALKMAAR	12	57	45	
Zuyderzee College	EMMELOORD	0	32	32	
Gymnasium Felisenum	VELSEN-ZUID	12	44	32	
Jac. P. Thijsse College	CASTRICUM	26	70	44	Yes
Stedelijk Gymnasium	HAARLEM	1	39	38	
Barlaeus Gymnasium	AMSTERDAM	2	29	27	Yes
Vossius Gymnasium	AMSTERDAM	11	39	28	
O V C	ALMERE	25	52	27	

Table 9: VWO schools with > 25 students who went to a university in 2002-2003, but who did not go to the VU, within the nearest distance region of Amsterdam.

Not all schools meeting the set criteria join the aansluitprogramma yet.

Based on these figures and the description of the selection process, it can not be stated whether the programme has an amplifying effect. It is not clear wether schools are big providers because they join the aansluitprogrmme or the other way round.

3 Conclusion

The Ps from the marketing mix, except for Price, form a useful checklist for developing ageomarketing strategy for organizations in general. In this paper, the case of a universities marketing strategy is analysed.

There is a strong relation between travel time to the VU and the place that students originate from (The P of place in the marketing mix). The strength of this relation differs somewhat per major. One reason for this is the fact that not every major is offered at every university (product). Another reason is probably the difference in reputation of universities and the difference in rate of specialization in some majors between universities.

The strong influence of travel time also makes the UVA the biggest competitor for potential students. Therefore difference in reputation between the VU and the UVA and the specific majors they offer are the most determinative factors for students to decide for one of these two universities. Further research is necessary to establish differences in reputation. Based upon the results a place-dependent promotion strategy (promotion) can be developed.

The strong emphasis on distance as determinant factor serves as proof that adding Windesheim as a satellite of the VU offering the full range of majors would have a positive impact for the VU with regard to the number of new students per year.

Maps suggest a geographical relation between regions/schools where students originate from and promotion activities (aansluitprogramma). Care should be taken with these kind of seemingly relations; mapping schools joining the aansluitprogramma against regions with high market share suggest a casual effect.

The hypothesis that location related factors influence the decision for new students to enter the VU is proven correct and can be used for the development of a marketing strategy. The case study shows that geomarketing is a powerful tool to visualise the current situation and potential developments over time, to analyse the market, to calculate "what if" scenarios (what if Windesheim is added?) and to plan "should be" scenarios (list of schools that should be added).

A recommendation for future research would be not to use Euclidean distance in the analysis. Instead, travel time over the (public) transport network should be used. This will enhance the analysis, specifically in the more rural areas.

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