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GEOMARKETING

GIS & Marketing, New Combination of Knowledge

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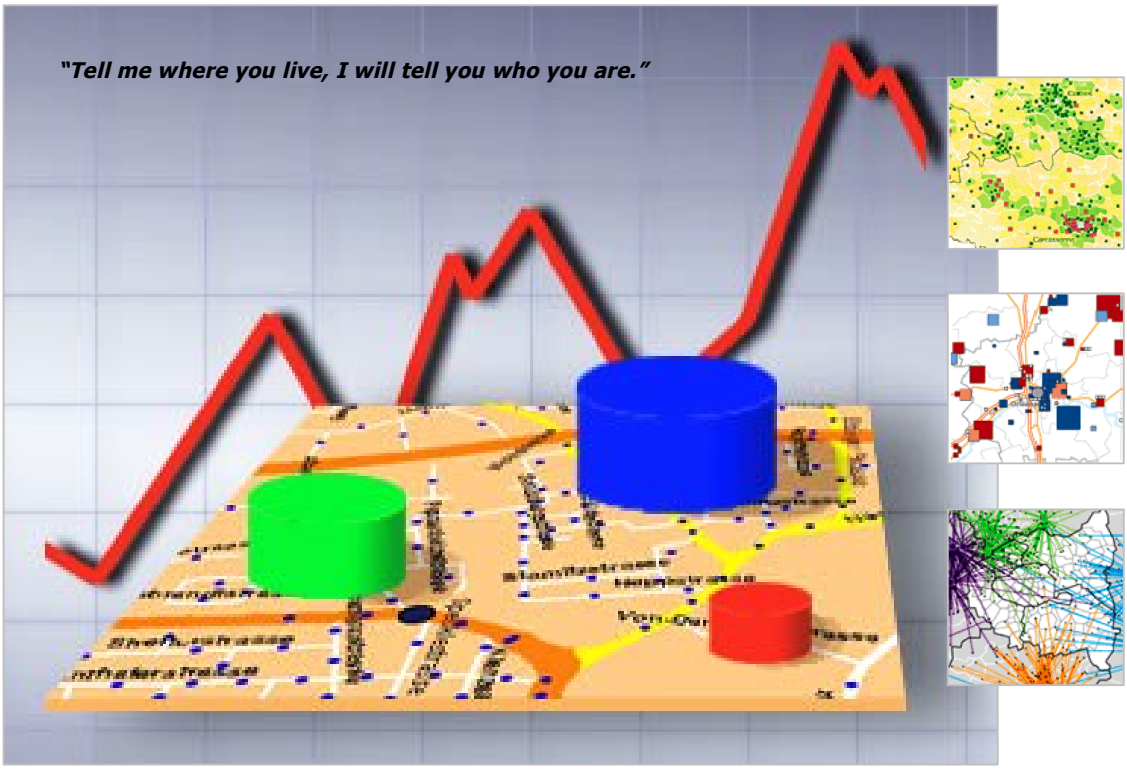

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Geomarketing

Marketing & GIS, New Combination of Knowledge

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Keywords
Geomarketing, Business-GIS, GIS, marketing, market information system, Geomarketing system, Geographical Information System

FOREWORD

In 2004/2005, I had a job at the Geomarketing department of a Dutch mobile telecommunications company, Orange Netherlands. Here I learned how to apply GIS in a marketing environment. This has really sparked my interest, which resulted in an idea for this thesis.

This report is in my opinion a good contribution to the science of Geomarketing and the application field of Geomarketing. I am convinced that this research is a good basis for a career where GIS plays an important role.

I would like to thank my supervisors from Wageningen University, Arnold Bregt and Willy ten Haaf, and the people in the organizations that supplied me with information as input for this research.

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ABSTRACT

Marketing and GIS are fundamental sciences of the present day. More than 80 percent of companies' data is spatial related. Business organizations today, now also focus on the key issue of "where", which is one of the prime rationales of GIS. Geomarketing is a combination of GIS and marketing, and can be defined as 'a tool based on GIS that broadens and strengthens marketing activities and supports management by doing analyses based on the combination of geographical data with company's internal and -external data. Dutch literature about Geomarketing is very limited in volume and it is unclear how Geomarketing is used in Dutch organizations. Geomarketing seems immature. Because of this lack of clarity, Geomarketing is studied in literature as well as in practice. This research started with an intensive literature study about Geomarketing. This literature study presents what Geomarketing exactly is, what is needed for it, how it is applied and how it supports decision-making. Literature study and practical experience in the field of Geomarketing were input for developing a Geomarketing maturity model to asses the degree of Geomarketing maturity and to determine how Geomarketing is used in Dutch organizations. The degree of maturity is determined by five 'keys', namely software, data, analyses, decision-making level and process structure, which are technical as well as managerial related. A questionnaire is developed, based on these five parameters too, as data generation method to acquire information of organizations. Forty well-known retail companies in The Netherlands are approached with a response of 75%; completely filled-in questionnaires are received from thirty companies. Six of these companies are not using Geomarketing, because of not seeing a surplus value to their existing information management. The maturity of Geomarketing of the twenty-four companies is quite mature. A majority shows an overall maturity of two on a scale of one to four, what in main principle means that Geomarketing itself is developed, but not managed or embedded in organizations. According to the model, plenty of growing possibilities for Geomarketing are present. Insurance companies are less mature and companies of sector 'other' are more mature. Integrating Geomarketing into management increases maturity and competition seems to have a positive influence on Geomarketing maturity as well. The Geomarketing Maturity Model needs a slight revision. Companies show a maturity equally as described in international literature.

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1. INTRODUCTION

1.1 Background

In today's highly competitive business environment, marketing is a customer-orientated operation that is essential for business success. The need for companies to coordinate on the needs of the customer becomes higher and higher. Marketing is also one of the fundamental sciences of the present day, especially because it makes use of its deductive character in the attempt to understand consumers and satisfy their needs. Beaumont and Inglis [1989] argue that marketing departments face real problems in fully understanding their markets and the potential customers for their products and services. Consumers have a very subjective behaviour whose analysis is not always linear. Geographic Information Systems [GIS] has enriched this analysis by using the capacity of referencing entities in a geographic manner [Costa 2004]. Knowing where existing and potentials markets are is crucial to any business. Business has traditionally focused on questions relating to 'what' [to produce], 'how' [materials & technology], and 'why' [strategy], neglecting the question of 'where' [to locate and find customers]. Business organizations today, now also focus on the key issue of "where", which is one of the prime rationales of GIS [Grimshaw 2000]. Most of the data inside organizations has a geographical location that is normally forgotten. Marketers observed this and began to use GIS tools to focalize their Marketing actions more efficient [Costa 2004].

The combination of GIS [desktop] with market relevant data, geospatial data, specific analysis methods and soft- and hardware with the purpose to develop marketing strategies and implementing market analysis is being seen as a 'Market-Information System' or as a 'Geomarketing System' [Nattenberg 2000]. Information systems are one possible means to decision-making [Scott-Morton 1967]. The provision of more information is generally regarded as reducing the uncertainty around making a decision [Grimshaw and Maier 1991].

Geomarketing is by far more than just a geographical representation of market relevant data. The application of Geomarketing has grown rapidly in the recent years and developed itself towards an application-oriented branch of modern economical geography. Business strategists are finding Geomarketing to be an ideal tool for identifying and expanding markets, and increasing profits [Zhao 2000].
Geomarketing is a well-known term, not only in geographical scientific literature; it is discussed in many neighbouring disciplines too. What Geomarketing exactly is, how it is being used, what its applications are and what it means for an organization; that is what this research is about.

1.2 Problem definition

Quite some foreign scientific literature can be found about the concept Geomarketing, but Dutch scientific literature about Geomarketing is very limited. It is unclear how Geomarketing is used in The Netherlands. Hernandez. et. al. [1999] says that the newly emerging GIS business sector is in an area where academic research is in its infancy. In particular, there has been minimal research into the adoption, use and development of GIS by retailers. Although GIS is a 'mature' technology, its use in retail is a relatively new phenomenon. The international literature speaks very broad about Geomarketing.

Different terms and definitions are used, and Geomarketing is being used in different fields of application. Geomarketing seems mature. The use of GIS in the mobile telecommunications sector is for example mainly described as an operational tool for managing the network and not described as a tool for marketing activities. Experience from a previous job in a Dutch mobile telecommunications company taught me how to apply GIS in a marketing environment. [Practical example I].

Practical example I
Marc Verschuren, Geomarketing Analyst at Orange Netherlands:
"Besides the 'know how' of using GIS, I experienced that many possibilities and capabilities were not being utilized. This means that a great potential was present in relation to the current use of Geomarketing. Tasks were executed that did not really belong to the application field of Geomarketing. These tasks were operational and technical related instead of analytical and marketing. The Geomarketing department at Orange Netherlands was for example mainly engaged, in rolling-out of the mobile network. This is more a technical matter than a marketing matter. When looking to the three main decision-making levels in the company, respectively operational, tactic and strategic, the Geomarketing department was mainly operating on operational level and not on a tactic and strategic level. Many parties within the company were also not familiar with Geomarketing, and did not know what the possibilities were and to which processes it could contribute".

Based on the practical example above, Geomarketing seems immature and not strongly incorporated in the company. A statement of Grimshaw [1989], "*People might have an understanding of the term geography and geographical data, but, to most business people the term 'geographical information system' is of little meaning*", may still be applicable.

Besides the mobile telecommunications sector, there are many other sectors, where it would be interesting to analyze how Geomarketing is used. Do these sectors and its companies use Geomarketing in the same way, with the same data, and is Geomarketing used as literature describes, or is it all the differently? Literature and other information sources show on the contrary that Geomarketing as a concept itself is highly developed. Looking to the practice, gives another picture. This lack of clarity raises questions, what makes it interesting to do research, find answers and contribute towards science and the real field of work. This research will lead to more clarity about this concept.

1.3 Hypothesis

Based on literature study and some practical experience the following hypothesis is stated:

"The maturity of Geomarketing strongly differs in the investigated sectors and its companies".

1.4 Research objectives

- Give insight into the concept Geomarketing, by studying literature
- Develop a 'Maturity Model' for Geomarketing
- Asses the degree of maturity of Geomarketing in several strong represented companies of the retail sectors in The Netherlands by using the Geomarketing Maturity Model

1.5 Research issues

- What is Geomarketing?
  - History and development of Geomarketing
  - Operational definitions
  - Where is Geomarketing being used?
  - Applications / Analyses

- How to develop a maturity model for Geomarketing?
  - Which existing maturity models are developed and used in science?
  - Which characteristics determine the maturity of Geomarketing?

- What is the degree of maturity of Geomarketing in the main retail sectors in The Netherlands?
  - Which internal- and external data is used?
  - What kind of software and applications are used?
  - How strong is the use of GIS incorporated in the company?

1.6 Methodology

This methodology of this research consists of three parts:
- Literature study
- Geomarketing Model
- Case study

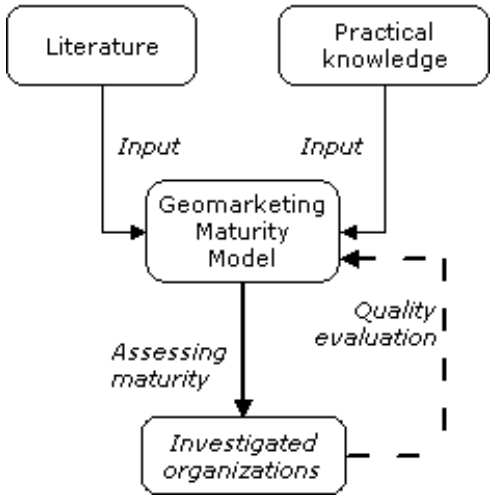

Figure 1.1: coarse outline of method

Literature study
The literature study consists out of three parts:
- Geomarketing and the use of GIS in marketing in general
- Geomarketing and the use of GIS in marketing specific in the main commercial sectors of The Netherlands
- Maturity and growth models

The literature retrieval is discussed with an Information specialist of Wageningen [ir. H. Fransen] and mainly for literature is searched outside the university. The main keywords that are used for searching are: 'Geomarketing', 'GIS', 'business GIS' and 'marketing', and

other synonyms of these keywords. All written literature is found in library 'De Haaff' from Wageningen University. Digital available literature is found via:

- Libraries of other universities [TU Eindhoven, TU Delft, VU Amsterdam],
- Specific internet literature databases ['GeoBase', 'ISI Web of Knowledge'],
- Search engines [Google, Scopus, Scirus, Science Direct]
- German scientific publisher [Zeitschrift für Wirtschaftsgeographie]
- German scientist [Olaf Nattenberg, WGI-Dienstleistungen, Dortmunt]

Geomarketing Maturity Model

The use of a model is a handle in this research. As Carnegie Mellon [2005] states: "*A maturity model can be used as a benchmark for assessing different organizations for equivalent comparison*". Therefore, a 'Geomarketing Maturity Model' is developed to asses the degree of maturity in several organizations and compare these companies equally. The model is based on knowledge from the retrieved literature and my own experience in the field of Geomarketing. It consists of a framework of several levels, which represent the degree of maturity of Geomarketing within an organization. The maturity is determined by 'determination keys', where each determination key consists of a set of characteristics. A questionnaire is developed, where the questions are based on the maturity levels and per determination key. These questionnaires will be implemented in several organizations. Finally, each question can be linked to the Geomarketing Maturity Model, to asses the organization on its Geomarketing maturity per determination key.

Case study

To investigate thoroughly the use of Geomarketing of a specific target population, a case study is therefore the best research strategy to use. It concerns a comparative case study, because several interrelated cases are compared [Verschuren & Doorewaard 1999]. This case study is characterised by a relative small number of research units [strategically chosen], more depth than breadth and a quite open qualitative observation on site with labour-intensive data generation. A labour-intensive data generating method is needed to realize the depth in this research. Therefore is chosen for the use of a questionnaire. To generalise the results and create a representative view about Geomarketing for all companies in the main Dutch commercial sectors, the target of research units is set on fifteen. This seems in my opinion a sufficient amount. Because most of the needed information is quite confidential and competition-sensitive, personal contact with the right person is necessary to get access to this information. Therefore, all organizations and their right persons are personally contacted by telephone. The General interview guide approach [McNamara 1999] is considered to ensure that the same general areas of information are collected from each interview and to allow a degree of freedom and adaptability in getting information from the respondent. These same general areas of information make benchmarking easier.

Target population

Geomarketing is a type of marketing and marketing is a process that is aimed at the consumer. This makes it logical to aim this research on a main sector where the consumer takes a central part in marketing. A main market sector that fits this description is the sector 'retail'. Retail can be described as "*Companies which deliver products and/or service to the consumer*". Therefore, this research is outlined by studying Geomarketing in companies in seven selected retail sectors, which forms the target population for this research. These companies have a high representation in the market and a high market share, and are familiar to the general public. From each sector, a minimum of three companies are approached, with a total target of fifteen. Table 1.1 gives an overview of these seven sectors, with for each sector two examples of companies.

The target group, employees of the approached companies, concerns people who are working with or execute Geomarketing analyses and/or managers who are responsible for these people.

Table 1.1: Overview of retail sectors and three example companies

Retail sector	Example companies
Mobile telecom	KPN, Orange
Supermarket	Albert Heijn, C1000
Bank	ABN AMRO, Fortis Bank
Insurance	Interpolis, Centraal Beheer Achmea
Utility	NUON, Essent
Oil & Gas	Shell, Texaco
Other retail	IKEA, McDonalds

The results of the literature study and the results of the comparative case study together form 'powerful knowledge' to answer the research questions, and make proper conclusions about the use of Geomarketing and the quality of the Geomarketing Maturity Model.

1.7 Report structure

The following two chapters, chapter two and three, present results of the literature study. Chapter two deals with the concept Geomarketing in general, where will be explained what Geomarketing exactly is, what is needed for it, and how it is applied and used. Chapter three presents practical examples of Geomarketing applications and –analyses of several retail sectors in The Netherlands. Chapter four discusses different maturity- and growth models and presents the Geomarketing Maturity Model that is developed and used in this research. Chapter five presents the results of the questionnaires and contains a discussion. Chapter six presents conclusions and future recommendations.

2. GEOMARKETING IN GENERAL

2.1 Geomarketing Development

Since the seventies, spatial techniques in Business became more important. The traditional marketing experienced through a new way of thinking, new inspirations in the up to then used analysis methods. An increasing number of very positive contributions in several scientific journals and other popular literature were observed. New catchphrases came up for this new technique like, 'Desktop-Mapping', 'Business-GIS', 'Market Information System', 'Micro Geographic Market Segmentation', in the course of which 'Geomarketing' mainly was being used as head concept. These catchphrases have implemented themselves from out of practice, outside and almost unnoticed from the geographical science. GIS and Desktop Mapping found an entrance for a variety of application fields within marketing. The combination of data and methodology of the marketing branch connected with cartographic presentation possibilities as well as analysis functions, established the GIS Domain [Frühling & Steingrube 1995].

Following on Frühling & Steingrube, Beaumont [1991] fixed the relevance of GIS in marketing as follows: "The intense competition and dynamics found in most markets will mean that GIS continue to be important tools for market analysis".
The change from a seller- to buyer's market, market saturation features, competition and globalization of the markets force enterprises and industries of all size to a spatially differentiated marketing and management strategy: 'think global - act local' [Fischer 2001].

Grimshaw [1992] stated that most of the 'current' applications of GIS by people in marketing functions of companies are to solve problems in the consumer market. Knowing where existing and potential markets are is crucial to any business. If you are trying to sell lawn mowers to people who live in high-rise flats, you are not going to be very successful.

In the English linguistic, the term "Geomarketing" is not used. Instead of this term, usually the designation "Business-GIS" is used. One can say that there is a difference between "Marketing" and "Business", what can be considered.
"Marketing" is limited to the customer-oriented activities, "Business" is more comprehensive and related to production-relevant aspects aligned [Schüssler 1997].
Fischer [2001] sees the concept Business-GIS not as a synonym for Geomarketing, but as two different concepts that are related to each other. He gives the following definitions:

Business-GIS: *'A computer-supported information system for Collection, Storage, Administration, Analysis, Visualization and Presentation of companies' internal and - external data with a geographical relation for the purpose of decision support'*.

It is an information system consisting of a mixture of a MIS and GIS.

Geomarketing: *'The use of Business-GIS tools for address focused marketing on the basis micro-geographically entities'*. Business-GIS is more or less an information system where Geomarketing is part of.

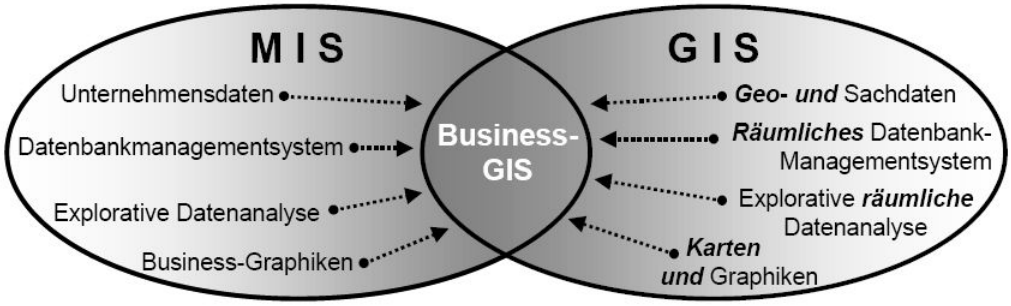

Figure 2.1: Business-GIS – An Information system between MIS and GIS [Fischer 2001]

2.2 Geomarketing Definition

"Tell me where you live, I will tell you who you are." This slogan may be a little bit simplest, but it resumes quite correctly the concept of Geomarketing [Bernard 2003].

Geomarketing is a junction of the two words, geography and market. Because it is not a [yet] known term, people can interpret this junction on another way, like a market where one can buy geo-data. To avoid indistinctness, the term Geomarketing is fully explained in this paragraph.

In the middle of the nineties the conception of 'place marketing' [Kotler et. al. 1994] was developed as a reaction on considerable changes in firm strategies and government policies caused by processes of globalization and regionalization. That was a principal moment for Geomarketing because it began to be placed and viewed in context of local and regional development. Local governments begin to view Geomarketing [marketing of regions and localities] as a tool for promotion of local and regional economic development in conditions of increasing geo-economic competition.
Another innovation in this sector is emerging of a new kind of business – production and distribution of geo-information technologies [GIS-technologies]. It may be viewed as a third dimension of Geomarketing – marketing of geographical knowledge and technologies.

As Nattenberg [2000] states: '*Geographical analysis in the sector marketing and sales is denoted with Geomarketing*'. Different definitions for the concept Geomarketing are found in literature:

- Frühling and Steingrube [1995, S.184], following on Kothe [1995, S.2] define Geomarketing as "ein bewußt auf bestimmte Standorte [standpunt] oder Raume unter kenntnis der standort- bwz. Raumspezifischen strukturen fokussiertes marketing."

- Krek [2000] says Geomarketing information is information that enables the user to take better and faster decisions about marketing and sales activities. The main sources of information are geographic-, demographic-, and statistic data.

- Geomarketing is the efficient dedication of GIS technology by answering a company's spatial related question for economical success. Normally used in Sales and Marketing *[Bill und Zeher 2001]*

- In general, the term 'Geomarketing' covers address- and location-based analysis of business marketing data utilizing geographic information systems [GIS] technology and spatial analysis techniques to support business management decisions [Fischer & Staufer-Steinrocher 2001].

- Kuchar [2002] says Geomarketing forms the connecting link between the geographical information system as a technical component and marketing as a business concept. The geographical information system is hereby used for the integration, visualization, procession and analysis of internal and external data with a spatial reference.

- Geomarketing is a marketing concept, which is expanded through consciously picking up the spatial relationships of all business aspects. The "Who" [customer] and the "What" [product] are complemented with the "Where". This extension is completed and supported through the integration of a geographical information system [Nitsche 1998].

- Geomarketing can be seen as a tool within marketing where it broadens and strengthens marketing activities. It encloses a complete series of analysis and applications, which can improve marketing activities by making use of spatial features of company's information combined with other data on a map [Geodan 2004].

Figure 2.2: Schematic overview of Geomarketing [gfk-macon.com]

Operational definition
None of above-mentioned definitions are complete. An operational definition is created from my practical experience with Geomarketing, combined with an average of the above mentioned definitions: *'A tool based on GIS, that broadens and strengthens marketing activities and supports management by doing analyses based on the combination of geographical data with company's internal and -external data'*.

2.3 Geomarketing Data

Research has shown that more than 80 percent of all information held by organizations can be geographically referenced. Greve & Plümer [2002] also state that 80 percent of all company processes have a direct or indirect spatial relation.
The power of GIS comes from the ability to link attribute data to spatial data [Grimshaw 1994]. All companies are collecting, editing en selling market relevant information. Because of the increasing competition, more detailed market information gets more

important that the amount of suppliers of information increased. This led to more using GIS-related technology. For many companies data is a corporate resource of tremendous value [Grimshaw 1994]. Practical example II emphasizes the tremendous value of data.

Practical example II
'Intratuin', a Dutch garden centre, makes use of the height dataset of The Netherlands in order to investigate new store locations. It is not interesting for 'Intratuin' to open a new store in an area with an overrepresentation of high-rise buildings.

No GIS exists without data/information. Geomarketing information is information that enables the user to take better and faster decisions about marketing and sales activities and plays an important role in Geomarketing. It can be delivered to the user in a different form, format and through different media. Geomarketing information is formed by Geomarketing data. Geomarketing data consists of internal company's data and external company's data, which are combined [Figure 2.3]. Internal data [amount of customers, rates of sale, customer's profiles, etc.] is collected and maintained by the company itself. External data, like statistics, demographics and topographic data come in a variety of formats and forms, as a collection of numbers, reports and maps, gathered by different institutions. Which information is relevant to use, differs per sector and branch.

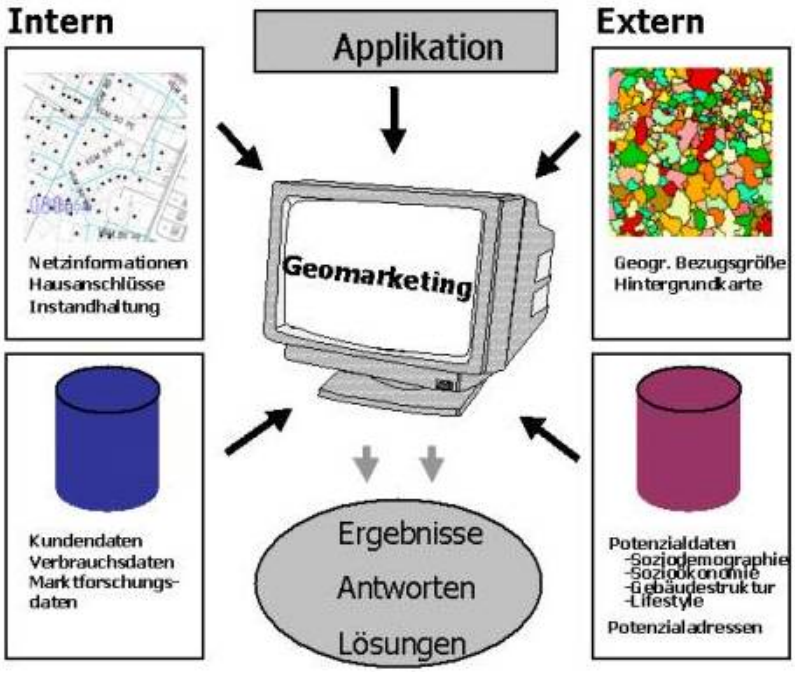

Figure 2.3: Schematic overview of Geomarketing data [König 2004]

For example, statistical and demographic data have a spatial dimension, which is usually given by the postal code or street name and house number. This data has to be geo-coded in order to link the attributes with geographic data.
The final integrators acquire, sort, filter and organize datasets, and offer them in advance defined analyses, which provides an answer to a particular user's question. An answer to the question can come in many different forms; as a selected dataset, a combination of datasets, a report, a map, etc. The majority of all enterprises and institutions assume that the straight combination of internal and external data is needed, in order to fulfil market analysis functions [Martin and Longley 1995]. According to Hess [2004], GIS provide value for marketing decision making through two mechanisms:

1. GIS provide a way to analyze internal or external marketing intelligence data in a format particularly suited to marketing decision making; and,
2. GIS provide the ability to integrate both internal and external marketing intelligence data to greatly improve the effectiveness of these marketing decisions.

Geomarketing is particularly based on the use of a desktop GIS [single PC], which provides the possibilities to transform various business data into useful and structured information [Kuchar 2002].
Geomarketing applications use a large amount of geographic and demographic data. Due to the extremely high costs for this data, Geomarketing is only feasible for large companies that can afford such data sets, or for companies offering specialized Geomarketing services to a number of clients [Wenzl 2000]. Software is relatively cheap, but data consumes a high percentage of the total price. A Geo-information product is not a standard economic good because of its cost structure, which has high fixed cost of producing the first copy of the Geo-information product and low marginal cost of producing each additional copy [Krek 2000]. Practical experience showed that costs of geographical data and software were important bottlenecks for the development of Geomarketing.

2.4 Marketing Mix

Many definitions for Marketing do exist, but a simple and old definition is: '*Marketing is the process to attract and to keep the customer'* [Levitt 1960].

Looking to the basis of marketing, a basic and well-known concept in theory is the 'Marketing Mix' or the 'four P's of marketing' [figure 2.4]. The main marketing management decisions can be classified in one of the following categories that form the marketing mix:

- Product
- Price
- Place
- Promotion

Figure 2.4: The 'marketing mix' or the 'four P's of marketing' [NetMBA.com]

The perfect mix of these four variables dictates the success of any organization in the market where it has involved [Costa 2004]. These are the variables that marketing managers can control in order to best satisfy customers in the target market [Beaumont 1991]. Costa [2004] states that there are many theories around adding new P's or any other letters related to other concepts, but the theory of the 4 P's is still actual and could be the basis for any successful marketing plan.

Nevertheless, Beaumont [1991] has a theory about adding a new P to the marketing mix. Additional on Costa, Beaumont suggests that these should be supplemented with a fifth P, that of data processing, which makes it possible to integrate GIS with the marketing mix. In my opinion, this extra 'P' is the Geographical Information System [inclusive geo-data] that is steering the marketing mix to come closer to the 'Target Market'. This highlights the central role GIS can play as a tool to integrate the various components of the marketing mix and make decisions within these four elements.

One can state that a geo-component is already present in the four P's, the component 'Place'. This is also true, but has another meaning than this fifth 'P'. The component place contains spatial features that are fundamental for a GIS, but is not a system, which is processing the marketing mix. Hess [2004] states that there is a geographic component to each element of the marketing mix.

Location is one of the main problems in Marketing. An incorrect decision of localization promotes a series of sequential errors in the marketing mix. This means that the 4 P's are deeply related and depend one on the other. If for example a store is opened in the wrong place, all others P's [price, product and promotion] will have to be reviewed [Costa 2004]. Practical example III emphasizes the importance of using spatial related analysis for location-determination.

Practical example III
Jeroen van Zuylen, market-planning analyst at BP Nederland
"The use of geo-information is an important tool in the decision-taking process of the closing and opening of new gas stations. "In the program MapInfo Professional different information is imported, like demographic data, postal code data, customer segmentation and an overview of all gas stations. By the combination of all the different data, one get a more structured and complete overview and missing links are coming above. It helps founding a decision. This information combined with the experience of our people, makes it possible to make a well-founded decision".

2.5 Application of Geomarketing

The applications of GIS are the tasks that organizations use the systems for [Grimshaw 1994]. As mentioned in chapter 2.2 about Geomarketing data, Geomarketing provides the possibilities to transform various business data into useful and structured information. As each spatial object in a GIS is described through attributes, individual regions can be filtered, analyzed and visualized by demographic, geographic and psychographic features [Kuchar 2002]. The application field of Geomarketing is divers; shop analysis, distribution planning, media planning, direct marketing etc.
The most common, and almost "classical", Geomarketing question/analysis is a penetration analysis - It is the amount of customers per area unit.
Some typical Geomarketing questions according to Anderson [2004] are:

- Where are my customers located? What are their characteristics [market segmentation, classification of residential areas]?
- Where are my competitors located?
- What is the potential turnover in a region for my product? What market share can I expect?
- Where should I locate my new branch? Should I expand an existing branch?
- How should I promote my product? Where and how should I advertise [direct mailing]?

Kuchar [2002] states that the two typical Geomarketing applications are:

- Penetration analyses
- Target-group analyses

Penetration analysis

It can be defined as 'The geographical evaluation of the market penetration'; the amount of customers per defined area [view market penetration in a spatial relationship]. The amount of inhabitants or the size of the household forms the potential indicator. The purpose of a penetration analysis is to identify the regions that are already sufficiently supplied with the products or services of an organization or to name those regions that still lack an adequate supply despite an existing demand.
Basis for a penetration analysis is a geo-coded member or customer database [organizational data with a spatial relationship]. The type of questions that can be asked, and the type of analysis that can be made, largely depend on information available in the database.

According to Kuchar [2002], three different forms of penetration analyses can be distinguished:

- Geographical market penetration shows where the organization is successful or is failing in the market [a typical question asked: "where are my opportunities and my threats"].
- Geo-demographic market penetration shows the relationship between relevant organizational reference numbers [i.e. sales, memberships] and the number of inhabitants in respect to households or a specific target group. The hereby-produced thematic map helps to illustrate the relationship between the member/customer and the demographic reference numbers.
- Target group penetration is used to view the organizational success not in relation to the total population, but to the absolute number of people in the target group for the product or service.

Target-group analysis

Areas with a high penetration can be classified and typified by socio-economical and/or socio-demographical aspects. This makes it possible to derive and define target groups.
These target groups describe micro-geographical areas where the properties of the population are similar comparably. When target groups are defined, similar areas in new markets can be transferred.

Meffert [1991] describes this concept as Micro-Geographical Market Segmentation, which is the division of the entire market into homogeneous groups/segments. Micro graphical segmentation is possible when groups show identical features in relation to their buying behaviour and have a characteristic spatial distribution.
König [2004] also defined types of Geomarketing analysis; some of them based on the typical Geomarketing applications stated by Kuchar.

Target group analysis

- Who are my customers?
- Where do my customers live?
- Where exist a high penetration, where a low one?
- Where are residential areas [Relevant amount of buildings]?

Potential analysis

- Where is my target-group located?
- Where is a high remainder-potential located?

- Where is an energy-intensive potential located?

Product analysis
- Where is which product used most intensively?
- Whose uses which product?

Sales area optimization
- Definition of a regional potential oriented sales-area structure?
- Where are my customers?
- How can I organize my distribution efficiently?

2.6 Decision-Making

Flexible data processing within Geomarketing makes it possible to make rapid reactions to constantly changing market situations from Micro up to the Macro level.
Decision-making is a part of every company and takes place at all levels. Geomarketing is because of this usable in all levels of an organization. Traditionally classification of applications has been on functional grounds, for example applications for forestry, environmental management, retail location etc. Applications here will be thought of in terms of the tasks. Applications of Geomarketing can be classified into a number of different areas. One could classify applications according to subject, for example location analysis, sales planning or product analysis, or according to industry such as car industry, banking, real estate etc. On the basis that the main purpose of an information system is to reduce the uncertainty surrounding a managerial decision, Geomarketing can also be classified into operational, tactical and strategic systems [Grimshaw 1994].
Figure 2.5 shows a framework for classifying Geomarketing applications, which was already developed by 'Anthony' in 1965 [Grimshaw 1994].

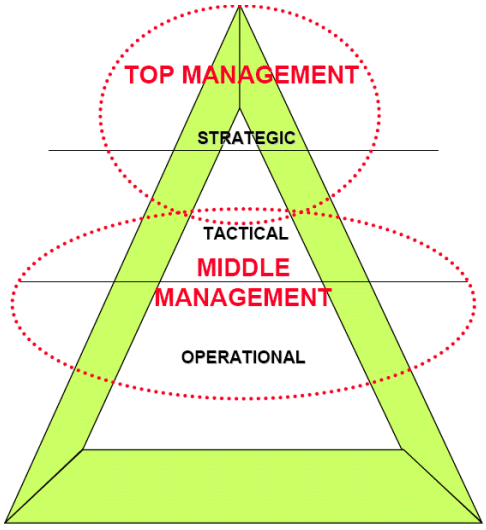

Figure 2.5: "la Piramide di Anthony" [Anthony 1965]

Operational
This level is responsible for day-to-day operations, finally fulfilling the organization's business goals. These involve making decisions about carrying out the specific tasks set forth by strategic planners and management. *Dataset selection of customer addresses of a specific target group [direct mail].*

Tactical
Decision-making activities of the middle management, which are concerned with how efficiently and effectively resources are utilized and how well operational units are performing. *Location analyses in order to determine a location for a new store*.

Strategic
Decision-making activities of high management, who is concerned with deciding on objectives, resources and policies of an organization; a broad overview of the 'business'. *Analysis in order to find out on which to focus segment*.

Following on Grimshaw, Ballou [1992] states that decision-making can also be divided into these three levels but depending on time. Strategic level considers time horizons of more than one year; operational level involves short-term decisions, often less than an hour or a day and tactical level falls in between those extremes.

According to Boudot [1999], the three main applications of Geomarketing are:
- Sales management
- Commercial management
- Leading the firm strategy

These three main applications are quite similar to the three levels of decision-making of Grimshaw and Ballou.

The increasing importance of Geomarketing to organizations is evidence that there is a movement from a dawn use of Geomarketing on operational level to a mature use of Geomarketing on strategic level [Grimshaw 1994].

2.7 Summary

This chapter gives an overview of the concept Geomarketing; what it is, what is needed, how it is used and how it supports on decision-making levels. It discusses Geomarketing from a technical- as well as from a management point of view. The development of Geomarketing went rapidly throughout the years. Nowadays more than 80 percent of companies' data is spatial related and the importance of Geomarketing for a company is proven. Standard Geomarketing analyses are extended to solve questions, which are more and more complex. The right combination of companies' internal- and external data is needed in order to get the best results of the executed Geomarketing analyses, which are used on an operational, tactical and strategic decision-making level. Presenting the 'marketing mix' seems a bit abnormal. The purpose is to view Geomarketing from a traditional marketing point of view, which is important because Geomarketing is a type of marketing. An objective of this research is to develop a maturity model for Geomarketing and use this model to asses the maturity of Geomarketing in several companies. Therefore, parameters are needed to build this model. Three important elements come forward in this chapter that form parameters for the maturity of Geomarketing: Analyses, Data and Decision-making level.

3. GEOMARKETING IN PRACTICE

3.1 Introduction

The past years the interest from the [business] market for applications with Geomarketing grew "tremendously". Just now the economy is "lower" than previous years, companies spend more attention on taking the right decision and therefore want to make use of Geomarketing [Geodan 2004].
It can be argued [with some important exceptions] that the use of GIS in business has moved from a secondary, technical role to a primary mainstream management role. With GIS products such as MapInfo and ESRI being incorporated into Microsoft Office, the functioning of GIS in business is impressive [Hernandez et. al 1999]. These statements must support the fact of the tremendous growth in the recent years and indicate the possibilities that are present with Geomarketing.
Organizations face two great challenges: increase sales and optimize their processes and resources. Costa [2004] suggests that the creativity and the innovation are the solutions for a highly competitive market, where the changes of products and services happen in an extremely quick form. According to Costa, Geomarketing does exactly fit on this.

By using different international sources of literature, like scientific journals, internet sites and commercial folders, the practical use of Geomarketing and it's meaning in several sectors of Retail are described. Striking is that most of the found and used literature is from outside The Netherlands and comes from Europe, America, and even India. These countries seem to have done many interesting things in science and in the application field of Geomarketing. Still, Dutch literature about Geomarketing is hard to find and also literature that is aimed specifically on practical examples of Geomarketing in retail. This supports the problem definition of this research, the fact that Geomarketing is immature in science.

The application field of Geomarketing is divers and nowadays used in many fields of application and sectors [Nattenberg 2000]. To get an idea of the practical use of Geomarketing, some practical examples of Geomarketing applications are given. These examples are from a random selection of sectors and some of these are elaborated in the next paragraphs.

Car Industry: Optimization of dealer network; Determination and visualization of buyer potentials; Dealer support

Banking- & Financial services [§3.2]: Analysis potential product groups; Branch and/or sales network planning; Micro marketing; Credit rating/scoring [possible credit risk]

Retail & Supermarkets [§3.4]
Planning/analysis potential store locations; Optimization media planning; Competition analysis, Weekly shop planning [products]; Monitoring and/or consultation of franchise partners; Assortment choice

Real estate
Evaluation of real estates property; Customer service [selection of objects]; Internal management of real estate; Co-ordination of maintenance and cleaning services.

Oil industry [§3.3]
Strategic planning for gas station nets

Cosmetic industry
Regional potential analysis; Definition of service areas; Selection of test markets

Mobile Telecommunications [§3.5]
Radio and data network planning; Infrastructure management; Demand analyses and finishing planning; Marketing, customer service; Call centre Support; Content management and location-based services

Tourism
Potential analyses in the Business-to-Business [B2B] and Business-to-Consumer [B2C] range; Planning of travel routes

Insurance companies [§3.2]
Evaluation of nature and ecological hazards; Determination of damage potentials from nature environment disasters; Rating in B2C and B2B.

Newspaper and magazine publishers
Subscriber acquisition; Planning of distribution areas; Route planning house-to-house delivery

3.2 Banks

Banks today, need to be market driven and market responsive. GIS is therefore a critical tool in today's banking environment, where there is increased competition, from existing and new banks, and other financial markets [URL 3]. Success in business depends on its approach to data management and customer relation management. By adding a spatial component to their databases, banks can gain enormous advantage in many ways on operational, tactical and strategic level. Banks manage a world of information about customers; Frühling & Steingrube [1995] state that these companies have a real 'treasure' of information among their customers. GIS plays an important role in various functional areas of banking in achieving the various business objectives of banks [Jafrullah et. al. 2003]. Some practical examples of these functional areas are discussed below.

Databases
Databases are structured based on their customers. These contain elements like personal information [address, age of the accountholder], information of accounts [balance, etc.] and data about the holder's contract [which products are used]. By geo-coding the customer database and overlay it with geographical data, it can be seen where customers come from and in which banks they do their service. By putting other internal data behind the customer data, like 'product use', 'account information' or 'balance stats', it is possible to determine customer share, turnover and profit per product or customer group for every store [Nattenberg 2000].

Branch Performance Monitoring
Potential customer zones can be drawn based on the spatial distribution of the customers. From here, service areas can be defined around the branch, measuring the market potential within that trade area, and identifying the nearby competitors. Banks can determine the products that are being purchased by particular socio demographic groups.

With that information, banks can determine other areas with similar influences to target specific advertising [Jafrullah et. al. 2003].

New bank location / ATM
Finding a new bank- or ATM [Automated Teller Machine] location for business expansion is a challenging task. With so much money on the line, management wants to feel sure with selecting the right location. GIS helps to understand how a potential new branch would perform based on the performance of an existing branch. Using GIS, banks can determine the maximum number of branches a market or region is capable of supporting. Based on the bank's criteria, analyses can consider competition, cannibalization, demographics and other information. It is also necessary to assess the performance of [new] branches/ATMs [Jafrullah et. al. 2003].

3.3 Utility

Since 1 July 2004, the energy & utility market in The Netherlands has been liberalized. Customers can now choose by which provider they want to buy their energy. The competition that comes forward from the liberalization has to lead to optimal performances of the utility market. The government expects that this release will lead to more innovation and creativity. The following text in this paragraph is based on Germany.

Before the liberalization, there was no need for utility companies to care actively for their customers. The market was divided and the tariffs were fixed. Every supplier had his own service area and had a monopoly position. Because of the liberalization, circumstances changed. The meaning of the customers began to play a more important role in marketing, which made the meaning of Geomarketing within the field of utilities grow. The tools of Geomarketing are nowadays supporting thee relevant processes of marketing and sales. Internal geographic data of the network and customer, combined with external information of the market and the potential customer, actively support the decision making of the marketing- and sales department [Nattenberg & König 2002]. The task range of the marketing- and sales department is extended with two important elements, namely *customer acquisition* and *customer relations* [figure 3.1].

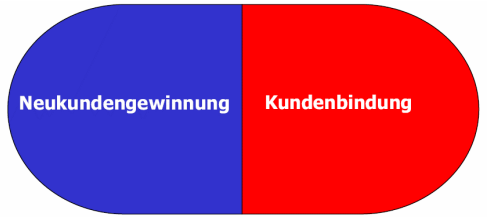

Figure 3.1: Extension of task range of the marketing and sales department of Utilities

Geo-information is important for Oil & Gas companies too, especially for opening new or closing existing gas stations. Different datasets are used, like demographic, postal codes, customer segmentation and an overview of all gas stations. Combining all different data gives a structured and complete overview and highlights missing links [Geodan 2004].

3.4 Supermarkets

The rising importance of customer relationship marketing in supermarkets makes micromarketing important too. It considers the heterogeneous market characteristics. The concept of micromarketing contents a differentiation strategy of the assortment, pricing, and selling-floor appearance at store level adjusted to the local market characteristics [Ziliani 2000].
Optimization service areas of chain stores as well as sales planning of products are the most important elements of the management in supermarkets. Linked directly with this, is the steering of an effective and well-targeted distribution of media and advertisement.

When you buy your groceries, it is likely that there will be asked for a home address. This is a well-known phenomena and it is not new anymore. It is from primary interest to know where customers live and which areas are the best for profiting. Take for example the "Albert Heijn Bonus kaart", which is a card where one can get discount on products. This card is registered on a home address of a customer. Not only 'Albert Heijn' has such a card, there a more supermarkets and other retail stores that have a 'shopping discount' card. Figures like what and when people are buying in the stores are registered at the counter. All this information can be linked to an address and can be visualized in a Geomarketing system where innumerable analyses are possible.

The market potential can be determined and analyzed, by studying the service areas and observing the competitors. For local store planning it is relevant to know how many potential customers live in a service area of a store and how high the expected buying power will be. Target groups can be determined and localized based on market segmentation and sold products. It is important to determine in which area it is efficient to use advertisement. Using a strong selection of postal codes, results in a well-targeted and effective advertisement, which is cost saving too.

3.5 Mobile Telecommunications

Mobile telecommunications is one of the most competitive sectors in the commercial market. This means that the need of keeping ahead on the others is very high.
In a deregulated telecommunications market, the need to cut costs, attract new customers, and remain ahead of the competition, are the business-driving forces. No longer are pieces of telecommunications equipment upgraded simply according to age, but investment is allocated first to those parts of the network that are likely to yield more customers. Whereas network planning, design, and maintenance used to be the main uses for GIS systems, nowadays having the means to visualize demographic data such as population, types of neighbourhood, average income, and customer preferences is as least as important.
As competition in the cellular marketplace increases, the trend towards planning networks for strategic advantage is likely to continue [Dair and Oldfield 1996]. The best way for telecommunications service providers to target new markets is for them to be able to compare information about their networks with data about present and potential subscribers [Practical example IV].

Practical example IV
Vodafone is using now its own graphical tool, Vodafone GIS, together with Tydac Technology's SPANS software, to combine network planning and marketing activities. For example, Vodafone staff overlay network information with population details to expose areas of high population with poor signal coverage that are likely to yield new customers [Fry 1999].

Larger telecommunications operators will increasingly be looking to gain strategic advantage by standardizing information throughout their organizations. Thus, marketing staff will be able to use the same data to map customer distribution as the engineers use to design networks.

3.6 Summary

Technological advancements and growth of the Internet have lowered geographic barriers and brought information to customers' fingertips. Changing lifestyles and technological sophistication have heightened customers' expectations and lowered their loyalty [Jafrullah et. al. 2003].

The amount of competitors is increasing; customers are increasing their requirements and markets gets more mature. These facts are supported by the statement of Jafrullah et. al. Nowadays the customer plays a central role in marketing. Companies want to get closer to the customer and keep ahead of their competitors. This is done by geographically tracking customers and overlay them with other information like product use, sales and socio-demographics. Analyses that are used in abundance are, customer-, market- and location analyses, which are all three aimed at customer-relation. Companies are constantly seeking ways to locate and acquire new customers, and keep existing customers. Geomarketing seems to be used in abundance and is developing. Following on Campo [2000] it seems that using geographic information in marketing has many [potential] applications. All practical examples are based on international literature. Therefore, it is not representative for the Dutch market. The case study will deliver the proof to what extend Geomarketing is present in Dutch retail organizations.

4. GEOMARKETING MATURITY MODEL

Before getting to the developed 'Geomarketing Maturity Model' [GMM] for this research, some other models will be discussed first. The following models that are discussed are related to growth and maturity in IT- as well as in the GIS sector. The idea and structure of both models form a secondary input for the development of the GMM.

4.1 Growth & Maturity Models

Stages of Growth Model

Gibson and Nolan [1974] found that organizations go through different stages as their spending on IT increases. They developed a model that is known in literature as 'stages of growth' [figure 4.1]. The idea of this model is simple; the level of spending on IT of any given business will go through stages [over time], from a beginning- to a mature stage.

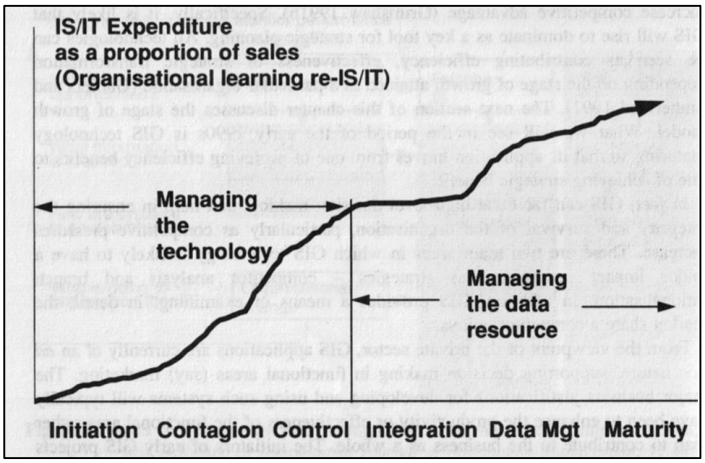

Figure 4.1: 'Stages of growth' [Gibson & Nolan 1974]

The idea is to use the model as a diagnostic tool that helps managers to understand where their organization currently is in terms of IT use. A major limitation of the model is that it provides a snapshot view that gives no insight into what changes over time might be expected.

Wiseman [1985] made an adaptation of this model and suggested three eras of IT. Grimshaw and Maier [1991] used the model of Wiseman to explain the use of GIS in marketing over time, and described the three eras as 'first-wave', 'second-wave' and 'third-wave GIS'. The 'first-wave' is known as data processing where the emphasis of information systems is on operational support. The 'second-wave' is characterised by a move towards integrating GIS into the corporate information systems of an organization, where in the third-wave the needs of the business drive the applications. There was little evidence to suggest that companies have gone beyond the 'second-wave' in their GIS applications in the nineties. Grimshaw [1994] stated it is worth considering how GIS might be used in the 'third-wave'. One of the central concerns of a paper by Grimshaw [1991] was considering the strategic applications of GIS. In that research, four methods of applying GIS were put forward. Two of these methods are related to Geomarketing:

1. Using GIS to identify and target customers as a first step towards linking with customers and/or suppliers through technologies like electronic data interchange.
2. Providing strategic decision makers with information that has come from geographical analysis of company and competitors' data.

It is interesting to discuss whether organizations are situated in the 'third-wave' or not and whether Grimshaw was right in his statement about the use of GIS in the 'third-wave'.

Galliers [1991] developed another model for information systems, named the "stages of growth" model. This model indicates six stages in information systems development and represents the growth in IT maturity in an organization. The model places companies in a given stage based on seven criteria; strategy, structure, systems, staff, style, skills and super-ordinate goals. However, Galliers' stages of growth model could not be applied to any of the companies surveyed [Wong, A. & Gregory 1997]. A more recent work of Doukidis et. al. [1996] showed that the model does not apply well to small companies. It seemed Galliers had large organizations in mind when he developed this model. The errors in Galliers' growth model led to discussions in literature. Brugha [1998] putted the model into a broader context and came up with a revised model.

Grimshaw [1993] came up with a modified and simplified 'stages of growth' model that fits the circumstances of GIS [table 4.1]. This model shows five stages and many organizations will travel through all stages sequentially. This model can be used to diagnose an organization. The main question in mind for using a 'stages of growth' model is, "Where are we now". To get a better understanding of this model, its source will be explained. Grimshaw's [1993] 'stages of growth' model originates from a study in the financial service sector in the UK. Analyses of a survey, followed by a detailed case study, showed five very distinctly different ways of introducing GIS into a building society. These five ways are shortly explained. The general thought of this growth model is clear; the use of GIS in business goes from a beginner stage to a mature stage.

Table 4.1: 'stages of growth' model [Grimshaw 1993]

Stage / ***Element***	**Opt out**	**Standalone**	**Linking**	**Opportunist**	**Corporate**
Strategy	Ad hoc	Audit	Top-down	Technology led	Integrated
Structure	Informal	Finance led	Centralised	Coalition	Cooperative
Systems	Operational	Duplication	Decision support	Strategic	Comprehensive
Staff	Non-technical	MIS manager	Business analysts	IS planners	IS Director
Style	What is GIS?	Do your own thing	Partnership	Run with it!	Team building
Skills	Scarce	Technical	Project mgt	Marketing	Innovative
Shared Values	Efficiency	Indeterminate	Effectiveness	Strategic	Transformation

'Opt-out stage': purchase GIS service from a data agency
Not many people in an organization are aware of GIS at all. Much of the energy goes into development of operational information systems. GIS analyses are boarded to external companies.

'Stand-alone stage'
An organization has found GIS to be useful for specific tasks, often executed on a single desktop. The applications must be fed with data from many sources. The stand-alone philosophy will typically result in data duplication and quick out-of-date data.

'Linking stage': in-house development
An organization uses GIS for a long time. The systems are centralised with well-developed management skills and are tailor-made to the particular requirements of the user. The strategy is being driven from the top.

'Opportunistic stage': strategic technology opportunity
Organizations see GIS as a strategic information system. The typical hardware platform is relatively small and cheap: A powerful PC with good graphics and GIS package.

'Corporate stage'
IT is used to transform the business. The strategy of the business and the strategy of the IT services are integrated

Capability Maturity Model [CMM]
The "Capability Maturity Model" [CCM] is an interesting model to discuss too. It is an internationally applied and well-known model, containing stages of maturity. It is a method for evaluating and measuring the maturity of the software development process of organizations on a scale of 1 to 5 [URL 1]. The model is also a help in increasing the maturity of processes [URL 2]. A research of Niessink et. al. [2005] suggests that its structure is generic enough to facilitate other areas besides software processes. This has already been shown by the development of other capability maturity models, such as the People CMM, the Systems Engineering CMM and IT Service CMM. The suggestion of Niessink et. al. supports making this models' structure also suitable for Geomarketing processes.

The IT Service Capability Maturity Model is developed by three Dutch organizations and three Dutch Universities. This model is a maturity growth model designed for providers of IT services like management of hardware and software, and software maintenance [Niessink 2003]. The model has two main goals and consists of five maturity levels:
- Determining the maturity of IT service providers
- Improving the IT service capability

1. Initial level
The IT service delivery process is characterized as ad hoc, and occasionally even chaotic. Few processes are defined, and success depends on individual effort and heroics.

2. Repeatable level
Basic service management processes are established. The necessary discipline is in place to repeat earlier successes on similar services with similar service levels.

3. Defined level
The IT service processes are documented, standardized, and integrated into standard service processes. All services are delivered using approved, tailored versions of the organization's standard service processes.

4. Managed level
Detailed measurements of the IT service delivery process and service quality are collected. Both the service processes and the delivered services are quantitatively understood and controlled.

5. Optimizing level
Continuous process improvement is enabled by quantitative feedback from the processes and from piloting innovative ideas and technologies.

Each maturity level describes a stage in the maturity of an IT service provider. All maturity levels [except for level one] contain a number of key process areas. To reach a certain maturity level, each of the key process areas of that level and lower levels has to be implemented by the IT service organization. A key process area is considered implemented if each of the goals of the key process area is reached. A key process area hence consists of goals and of activities, called key practices. An organization that implements all activities from a certain key process area is expected to reach the goals of that key process area. This model distinguishes five kinds of practices, called common features [Niessink 2003]. The structure of the IT service CMM is presented in figure 4.2.

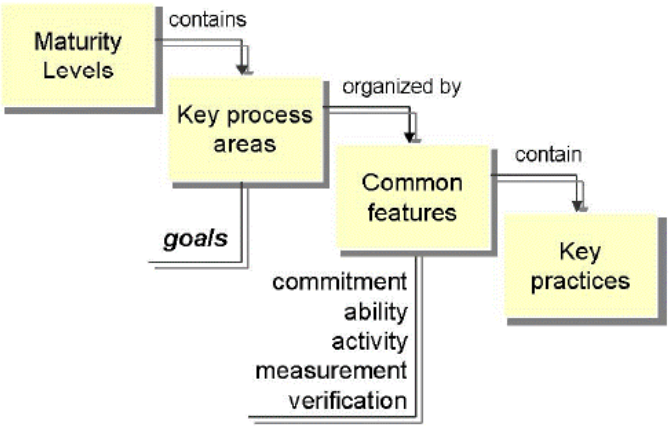

Figure 4.2: IT Service CMM structure [Niessink 2003]

Organizational aspects
GIS systems that need to operate on strategic level need to be born of the business strategy in order to be fully integrated with the other information resources of an organization. More information systems fail for organizational reasons than for technology reasons [Grimshaw 1988]. The implementation of information systems is part of a wider process involving the management. A change in management is required in order to make the implementation or development of an information system successful [Grimshaw 1994]. Therefore, it is important that, besides technological characteristics, organizational characteristics are taken into account in developing the GMM. Technique, resources and budget can be available for 100%, but when Geomarketing is not integrated in the main business strategy management, it will probably stay immature. This happened at a mobile telecommunications company; development from specialists was ready but management was not [Practical experience]. Some managerial aspects are adopted in the GMM, but many are left out in this research, otherwise the model gets too extensive and goes beyond the goals of this research.

4.2 Geomarketing Maturity Model [GMM]

The models discussed in paragraph 4.1 are interesting because of their structure and relation to IT technologies [Geomarketing is part of IT technologies], and form a secondary input for the development of the GMM. Niessink et. al [2005] showed that the structure of the CMM is applicable on Geomarketing processes. The primary inputs for the GMM are the results of literature study, discussed in chapter two and three, and practical experience. The GMM construction is based on the structure of the IT Service CMM. The GMM consist of five maturity levels with a mounting degree of maturity and complexity. Each maturity level contains five determination keys. Each determination key consists out

of a set of characteristics, which finally determine Geomarketing maturity. This structure is shown in figure 4.3. The GMM is not a growth model that describes the development of Geomarketing through five maturity levels. The model is a classification tool to indicate the degree of maturity of Geomarketing in an organization that uses Geomarketing. To reside on a certain maturity level, an organization needs to implement all of the key characteristics for that maturity level, and those of lower maturity levels.

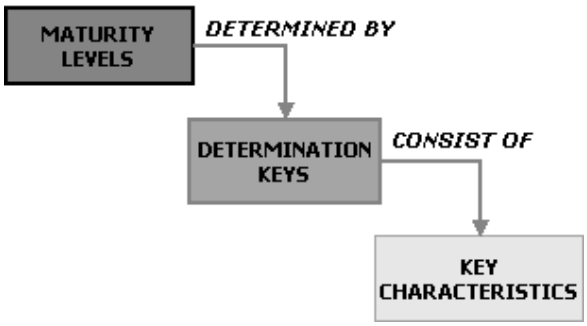

Figure 4.3: GMM overall structure [Verschuren 2006]

Determination Keys

According to literature and my experience, the degree of maturity and complexity of Geomarketing is mainly determined on five determination keys:

I. Software
II. Data
III. Analysis
IV. Decision-making level
V. Process structure

The reason for choosing 'Data', 'Analyses' and 'Decision-Making level' as determination key is founded in chapter two. The reason for using 'Software' is that Geomarketing is mainly a desktop-based tool. Geomarketing analyses are executed with software installed on desktops; software is therefore from great importance in using Geomarketing. 'Process structure' is an important element of the IT service CMM and is therefore implemented in the GMM.

I. Software

The GIS software packages that are used for analyses. Standard GIS package or more advances analyses software tools and building own applications.

II. Data

The type of data used in Geomarketing analysis. The combination of companies' internal- and external data with a mounting degree of rather simple- to more detailed and complex datasets.

III. Analysis

The types of Geomarketing analyses that are executed, which go from rather simple [viewing only] to complex ones.

IV. Decision-making level

The decision-making levels [operational, tactical, strategic] where the results of the Geomarketing analyses are used on [Discussed in §2.6].

V. Process structure
The structure of processes in which Geomarketing analyses are executed. These processes occur in a chaotic environment and on an ad-hoc basis where they are not documented; or the opposite, in a planned & structured way where they are well documented.

Figure 4.4 gives an overview of these five determination keys that go through the five maturity levels.

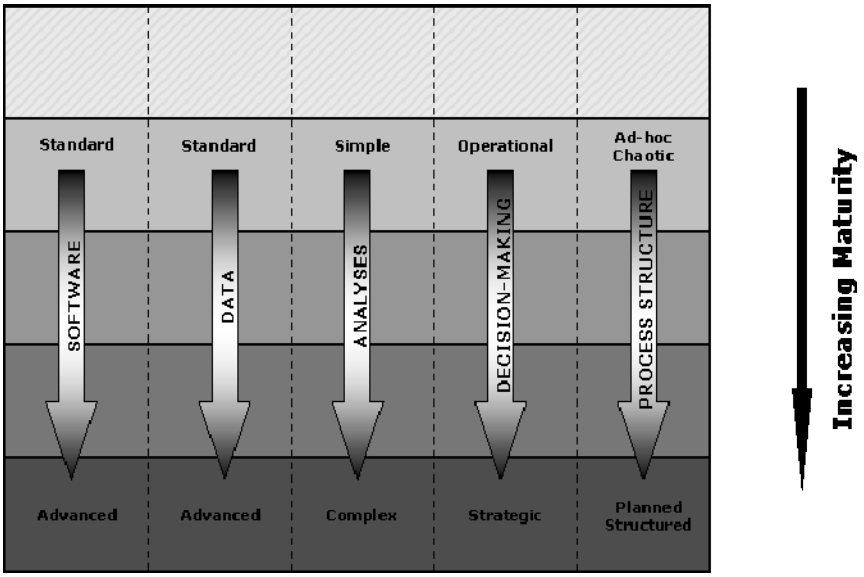

Figure 4.4: Determination keys and its key characteristic describing the maturity levels [Verschuren 2006]

Key I, II and III are to determine the maturity and complexity of Geomarketing on its technical aspects, key IV and V concern managerial aspects. All five determinations keys are considered as equivalent. An organization needs to develop all five the keys equally in order to increase maturity. This means that the overall Geomarketing maturity is determined by the weakest link.

Characteristics
The determination keys each consist of a set of characteristics. A complete overview of these characteristics per determination key and per maturity level is listed in Appendix II.
A minimum and maxim of these characteristics are shown in figure 4.4.

Maturity Levels
Management is the leading line in the GMM, like the names of the maturity levels are derived from it. The first level, 'Initial', is a stage where a company is not using GIS in her marketing environment, but has the intention to do. Four levels, namely, 'Defined', 'Developed', 'Managed' and 'Embedded', represent the different stages of maturity.

Level 1: 'Initial'
Geomarketing is <u>not</u> used at all in the organization, but the intention to use it, is present. Organizations are thinking about it and are in preparation to use it in the nearby future.

Level 2: 'Defined'
Only standard GIS software packages are used, like 'MapInfo' and 'ESRI'. Little data is used, mainly postal codes. No combinations of datasets are being made; only independent datasets are used and projected on a map. For example, *the postal codes of customers and competitors are geocoded and projected on a map with a topographic layer*. The data products and software licenses are often older than two years, because there is no high need to use strictly up-to-date material, and no update contract is present for them. Only

visualizations are made and simple Geomarketing analyses are executed. The main goal is getting an overview of the location of certain features. Questions that are answered mainly relate to *where*; for example: *'Where are my customers or competitors located?'* Geomarketing is a supporting tool and the results of these visualizations only contribute on Operation level. Processes are usually ad-hoc and chaotic, and are not documented. The organization usually does not provide a stable environment for Geomarketing.

Level 3: 'Developed'
Still, standard GIS software packages are used. Several internal- and/or external datasets are used independently and are linked to each other. In most cases, socio-demographic data is used in combination with postal code data; *Socio-demographic data [like gender, age, education] are linked to the customer database for profiling the customer*. The data products and software licenses are often older than two years and no update contract is present. The Geomarketing analyses are standardized and basic Geomarketing analyses are executed like 'Penetration analyses' and 'Target-group analyses'; for example *Postal codes of customers in combination with predefined areas [service area] in a topographic layer to determine the penetration*. Besides the location of certain features, like the customer, profiling these features is important too. Instead of *where*, the question *who* is important: *'Who are my customers / competitors?'* Geomarketing is still a supporting tool and forms mainly input for Operational decision-making. Processes are executed on an ad-hoc basis in a chaotic environment. Some processes are documented.

Level 4: 'Managed'
The standard GIS software package is often extended with some advanced GIS analyses tools like 'GeoMarktprofiel' or 'TargetPro'. These tools are specific designed for marketing related analyses, and seem more efficient and easier to manage than the standard package. Beside these software packages, applications are build to automate Geomarketing analyses. These applications, like 'MapBasic', are quite simple and often consist of additional scripts that are dependent on the existing software. Several internal- and/or external datasets are being used and linked to each other to make complex datasets. The data products and software licenses are often quite up-to-date and between one and two years old. Often an update contract for the products and licenses is present. The basic Geomarketing analyses are extended with ones that are more complex. All kind of classifications and profiling are made and executed, and detailed questions are asked like '*Where to locate a new store?' or 'Where to sell a new product?'* Often simple statistical methods, like correlation, are used in the analyses. Geomarketing is still a supporting tool and forms mainly input on Tactical decision-making level. Geomarketing processes are mainly planned & structured with most of the processes documented. The organization has a vision for Geomarketing, which is initiated by the middle management.

Level 5: 'Embedded'
Geomarketing is well developed and organizations are innovative. Besides the standard and advanced software packages, [advanced] Geomarketing applications are developed. These applications are not part of or dependent on the software packages, but are independent and self-running programs [standalone software]. These tailor-made applications are developed to answer specific questions, which cannot be as easily or efficient answered as by the existing software packages. The data use is equal as in the previous maturity level. All the data products and software licenses are fully up-to-date and an update/maintenance contract is present. Organizations are innovative in developing new kinds of Geomarketing analyses and methods. Often advanced statistical methods are used for analyzing. Geomarketing is not really a supporting tool any more, but a decision-making tool. Geomarketing is steering the main business strategy of the company and contributes on strategic decision-making level. All Geomarketing processes

are well characterized: planned, structured and documented. High management has a clear vision for Geomarketing. As Grimshaw [1994] states: 'Strategic applications of GIS are most likely to happen in organizations with a mature IT base'. This statement can be linked to the GMM. Strategic Geomarketing applications are an indicator for Geomarketing maturity.

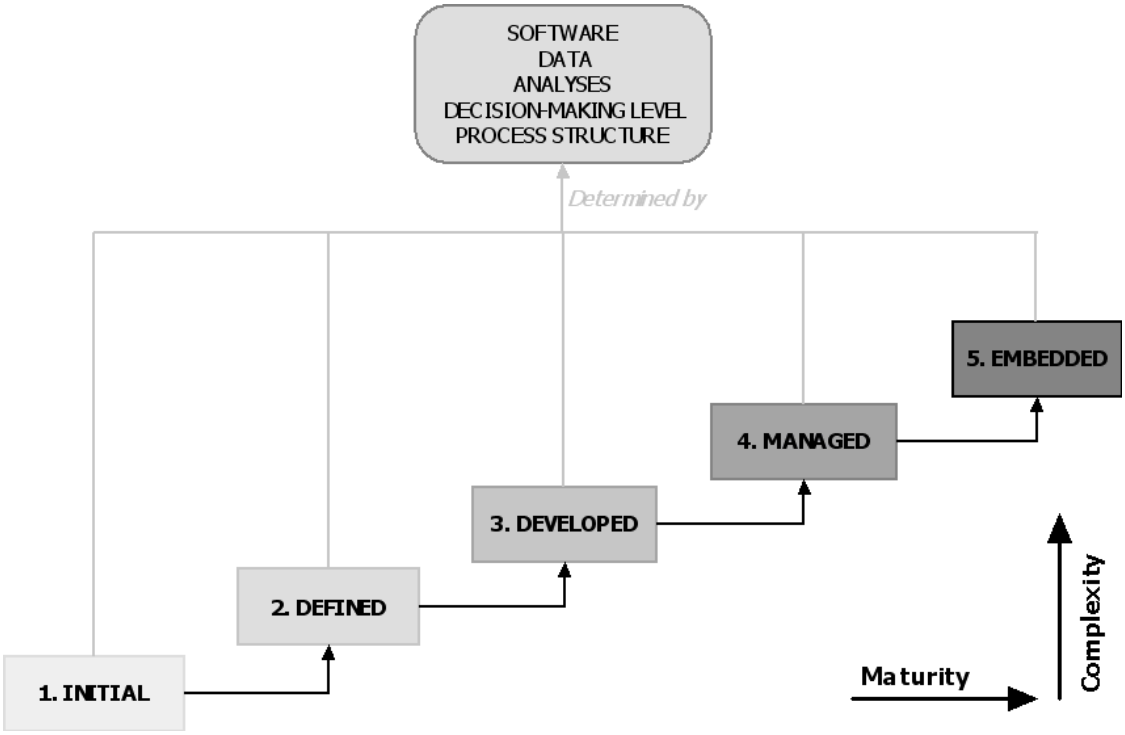

Figure 4.5: Geomarketing Maturity Model - GMM [Verschuren 2006]

4.3 Questionnaire

All data is generated by means of a questionnaire. The questions in the questionnaire are derived from the five determination keys describing the maturity levels. These determination keys are leading the questions in the questionnaire. See Appendix I for the questionnaire. The questions are divided in seven sections. The first section concerns starting questions to determine whether a company is using Geomarketing or not. The next five sections cover the five determination keys of the GMM, finally to determine in which maturity level the company can be placed. The last section concerns general and other questions for additional information in this research. To make filling-in the questionnaire easier and get maximal response, the questionnaire consists of yes/no questions and questions with predefined answers. There is one open questions used, because no predefined answers could be defined for this question. Sufficient space has been reserved for the respondent to give comment to each question. The questionnaire is designed to get maximal response and complete trustworthy answers. The questionnaire has been tested first to check how well it works.

5. RESULTS & DISCUSSION

5.1 Introduction

This chapter presents and discusses the results of the case study. The investigated and Geomarketing-using companies are assessed on their degree of maturity of Geomarketing. These results are presented and discussed in an overall picture and elaborated per determination key and its characteristics. The quality of the GMM is evaluated and discussed. Company names are not disclosed, with the exception of companies that gave permission to use their name. Because of this privacy issue, this research only discusses sector names.

Approached companies
For the case study, 40 companies are approached. In an intensive two weeks during survey, approximately 140 telephone calls were made and approximately 90 e-mails were sent. Completely filled-in questionnaires are obtained from 30 companies, which is 200% of the target that has been set. The other 10 companies did not participate in this case study due to reasons that include lack of limit, a strict company policy or no response. This means a response rate of 75%, what is considered as very good [Babbie 1973]. One should bear in mind that a lack of response bias is far more important than a high response rate.

All the respondents are personally contacted. Two questionnaires are filled-in on location in the form of a personal interview. Ten are filled-in during a phone call meeting and the rest [18] are independently filled-in by the respondent itself and handled by e-mail. No distinction is made between companies that have the expertise of Geomarketing in-house and companies that outsource their Geomarketing analysis to external bureaus.

Interpretation of the questionnaires
All answers of each question in the questionnaire can be linked to the characteristics of the GMM Table [Appendix II] in order to determine the maturity level where the organization is located in. The answers of the, for this research main and most determinative questions, are listed per company in a table in Appendix III. An organization is, per determination key, assigned to a maturity level where all the characteristics are present. The five determination keys together form the overall maturity, where the weakest link is determinative. This means that the key with the lowest maturity determines the overall maturity. The overall maturity and the maturity per determination key and are listed in table 5.1.

Non Geomarketing-users
Six companies do not use Geomarketing. These include two insurance companies, a utility company, an oil & gas company, a supermarket and a company of the sector 'other'. They all are familiar with Geomarketing. All these companies give a quite similar reason for not using Geomarketing. They see The Netherlands and their customers as one single market and do not see a surplus value in a regional approach or in using Geomarketing [Practical example V]. Some of them do use geographical features, which are built in the organizational database, but do not visualize any of these features.

Practical example V
Rob de Jong, Marketing Manager at NUON:
"We have a good marketing team and a good database, and I have never heard a person say that we need a GIS. Energy is homogeneous product and people in the northern part of The Netherlands do not use electricity in a different manner than people in the south. For a company which sells heterogeneous products, I can see the surplus value."

None of these six organizations are located in maturity level 1, 'Initial', what means they do not have the intention to use Geomarketing in the future.

5.2 Geomarketing-using companies

Overall Geomarketing Maturity

Twenty-four organizations do use Geomarketing and are assessed on their Geomarketing maturity. Figure 5.1 presents the distribution of all companies over the five maturity levels and table 5.1 gives a more detailed overview of the maturity and presents the:

- maturity levels per company and per determination key according to the GMM [row I,II,II,IV,V];
- overall maturity per company according to the GMM [row GMM];
- estimated maturity of the respondent [row Respondent].

The table is randomized so none of the companies is in any way recognizable.

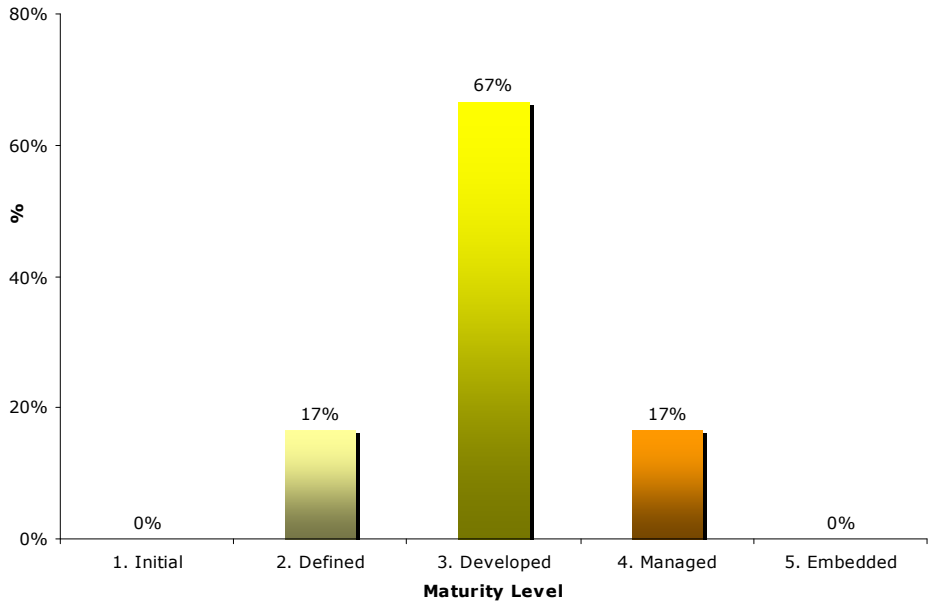

Figure 5.1: distribution of companies over the maturity levels

The first thing that can be noticed is that two-third [16] of the organizations is located in maturity level 3. In maturity level 2 as well as in maturity level 4, 17% [4] is located. None of the companies has the highest Geomarketing maturity. Three of the four companies located in maturity level 4, belong to the sector 'other'. Two of the four companies located in maturity level 2 belong to the sector 'insurance'.

Maturity respondent vs. maturity GMM

In a question [Appendix I, page 64] the respondent is asked to scale the overall maturity of Geomarketing in their company on a scale of 1 to 4. This number range [1-4] corresponds with the maturity levels [2-5] of the GMM [Maturity level 1 is not applicable]. The mark of the respondent has therefore been added up with 1 to correspond with the GMM. See row 'Respondent' of table 5.1 for the Geomarketing maturity scaled by the respondent. Almost half of the companies overestimate themselves and scale their Geomarketing maturity one level higher than the maturity according to the GMM.

Table 5.1: Detailed overview of Geomarketing maturity per company; Geomarketing maturity per determinative key [GMM], overall Geomarketing maturity [GMM] and Geomarketing maturity scaled by respondent.

	maturity determination keys					**overall maturity**	**maturity respondent**
	I	***II***	***III***	***IV***	***V***		
bank	4	4	3	4	3	**3**	3
bank	3	4	4	5	3	**3**	3
bank	4	5	4	5	4	**4**	3
oil & gas	3	4	3	3	5	**3**	4
oil & gas	3	4	4	4	3	**3**	3
insurance	4	4	4	4	3	**3**	4
insurance	3	5	4	3	4	**3**	3
insurance	3	5	4	4	2	**2**	3
insurance	4	5	4	4	2	**2**	3
mobile telecom	3	2	2	2	2	**2**	2
mobile telecom	3	3	3	4	4	**3**	3
mobile telecom	3	4	5	3	4	**3**	4
other	2	2	3	5	5	**2**	3
other	4	4	4	4	4	**4**	5
other	4	4	4	4	4	**4**	4
other	3	4	4	5	3	**3**	4
other	3	4	4	5	5	**3**	4
other	3	4	4	5	4	**3**	4
other	4	5	4	5	4	**4**	3
supermarkets	3	3	4	4	4	**3**	2
supermarkets	3	4	4	4	5	**3**	4
supermarkets	3	4	4	3	3	**3**	2
utility	4	4	4	4	3	**3**	3
utility	4	4	4	3	4	**3**	4

Maturity per Determination Key

Next, the results of the maturity per determination key are presented. Table 5.1 lists the maturity per company and per determination key. Figure 5.2 shows the distribution of companies over the five maturity levels per determination key. These five keys do not show an equal pattern [figure 5.2]. 'Software' shows a deviated pattern. A majority of the organizations are with respect to 'Software' located in maturity level 3 and to the other four keys, located in maturity level 4. The maturity per company differs between the five determination keys. In almost half of the companies [42%], the maturity differs two levels or more. For example, an organization is, with respect to 'Data', located in maturity level 2 and to 'Decision-making level', located in maturity level 5. There is no clear overall pattern to distinguish.

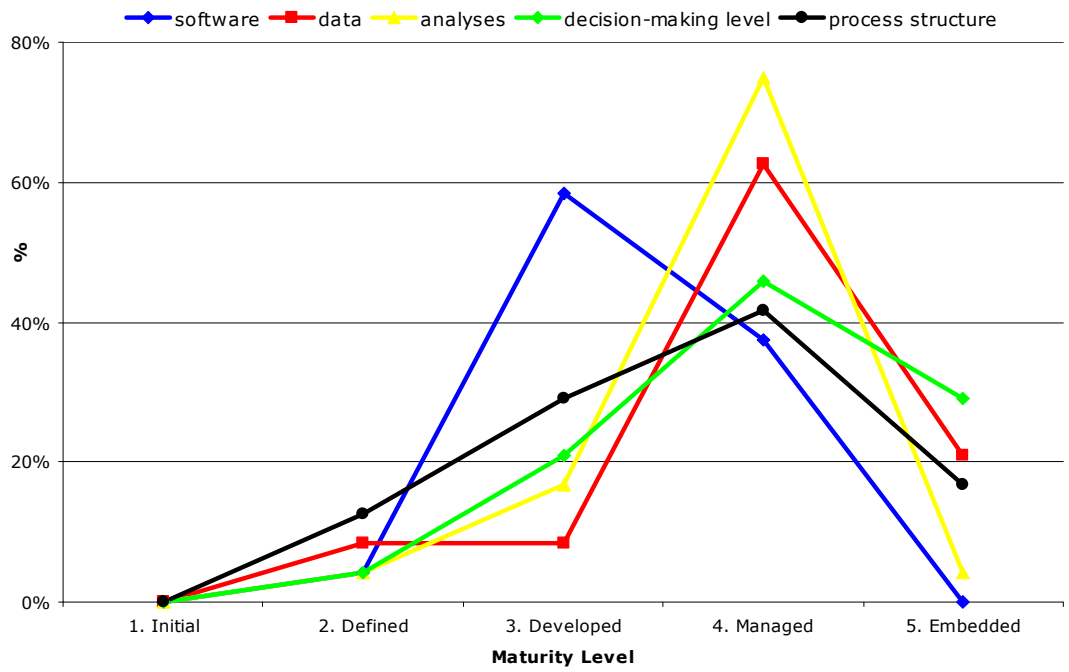

Figure 5.2: distribution of companies over the maturity levels per determination key

Figure 5.3 gives an overview of the average overall maturity per determination key. This can be derived from figure 5.2 too, but figure 5.3 emphasizes this better. Figure 5.3 shows that companies are most maturing in 'Data' and 'Decision-making level' and less mature in 'Software'.

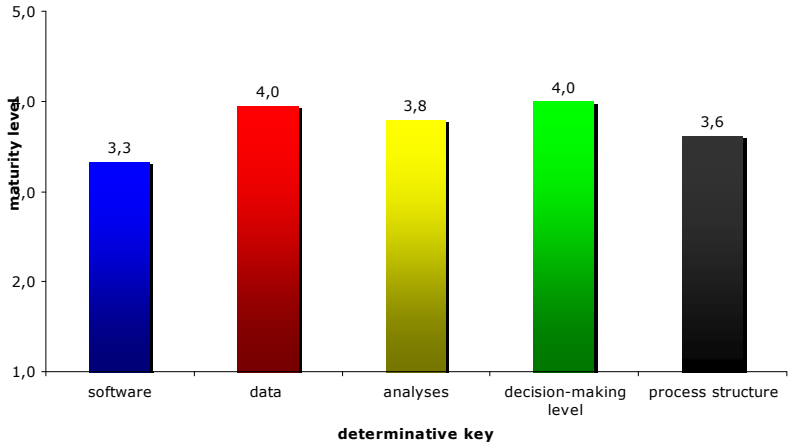

Figure 5.3: Average maturity per determination key

The determination keys are elaborated on their main characteristics. These main characteristics [answers of the questionnaire] are listed per company in Appendix III.

Software

This determination key shows a strong deviation to the left with the lowest amount of companies in maturity level 4 [figure 5.2]. No companies are located in maturity level 5 what means that organizations are not innovative and do not develop advanced Geomarketing applications. More than half of the companies are located in maturity level 3. In main principles, this means that that these companies are only using a standard package of software. To be precise, 75% of the companies are using a standard software package and 33% uses an advanced software package. This standard package mainly

consists of a 'MapInfo' product; MapInfo Professional and, as addition, MapBasic. Only two companies use an ESRI product. The advanced package is mainly GeoMarktprofiel. Two companies use TargetPro and SPSS Maps. Two companies are using a standard- as well as an advanced package. A quarter of the companies develop simple Geomarketing applications mainly based on the script-writing program MapBasic. In 79%, the software is up-to-date and in 79%, an update contract is present. 71% of the companies have both. Having a standard software package, which is up-to-date and wherefore an update contract is present, means for a company having characteristics of maturity level 3 and 5. Many organizations have characteristics of 'Software' from several maturity levels.

Data
This determination key shows a low point in maturity level 3 and a peak in maturity level 4. 'Data' has the highest percentage of companies in the two highest maturity levels; 83% of the companies are located in the two highest maturity levels, what means that these companies use several internal- and external datasets that are quite up-to-date [quite good package of data]. The only difference in data between maturity level 4 and 5 is the age. Remarkable is that three-quarter of the insurance companies are, with respect to 'Data', located in maturity level 5. In contrast to software, 50% of the companies have up-to-date data. In 96%, the data is younger than two years. 92% has an update-contract. All companies use data concerning their customers and postal code data. More than three-quarter uses socio-demographic- and market relevant data. Half of the companies do not use data of competitors and half does not use data concerning their products. Remarkable is that none of the Supermarkets do use datasets concerning their products. None of the companies of 'mobile-telecom' and 'oil & gas' are using market relevant data.

Analyses
This determination key has in contrast to the other four keys a high peak in maturity level 4 and a low point in maturity level 5. Only one company is, with respect to Analyses, located in maturity level 5. This company belongs to the sector 'mobile telecommunications' and develops its own Geomarketing analyses, related to network and modelling. Almost three-quarter [71%] of the companies are located in maturity level 4. This means executing complex analyses and classifications, use simple statistics, but no innovation in developing and executing new Geomarketing analyses. 88% executes basic- as well as advanced analyses. Most used analyses are target-group-, market segmentation-, branch- & location-, market-, and sales analyses. Almost half of the companies use statistics in their Geomarketing analyses, but these are mainly simple statistics like correlation.

Decision-making level
This determination key does not show such a strong peaks and low points over the maturity levels. Almost half [46%] of the companies are located in maturity level 4 and almost one-third [29%] in maturity level 5. This means that Geomarketing contributes in 46% of the companies mainly to tactical level and in 29% mainly to strategic level. Remarkable is that all companies, mainly contributing to strategic level, belong to the sector 'other' and 'banks' [see table 5.1]. Three companies contribute for the full 100% on only one decision-making level, respectively, operational, tactical and strategic. All the other companies have it distributed over the three decision-making levels with a peak in one of the decision-making level [Appendix III]. The three major questions where Geomarketing is used for:

- Where are my ... (customers, competitors, store)...located?
- Who are my … (customers, competitors)...?
- Where should I locate a new ... (product, store)...?

50% of the companies recognize Geomarketing only as a supporting tool and 17% as a decision-making tool [33% as both]. None of the companies that recognize Geomarketing as a decision-making tool is located in maturity level 2.

Process Structure
This key does not show strong peaks and low points over the maturity levels and has a quite high amount of companies in maturity level 2 and 3. In main principles, this means that Geomarketing processes are executed on ad-hoc basis in a chaotic environment and that not many processes are documented. 88% executes Geomarketing analyses on an ad-hoc basis and 71% has it planned & structured [56% both]. Two-third has documented its Geomarketing analyses/processes; half of it for 75% or more. 58% has a corporate vision for Geomarketing, 38% from out of middle management and 21% from out of high management. Bringing overall maturity in relation with 'having a company vision', shows that:

- all companies located in maturity level 4 do have a corporate vision
- three quarter of the companies located in maturity level 2 do not have a corporate vision

Outsourcing Geomarketing
Two companies, both from sector 'other', are outsourcing their Geomarketing analyses to an external bureau, which are specialized in doing geographical business analyses. One company is located in maturity level 3, the other in maturity level 4.

Development & Bottlenecks
Three questions in Part VI of the questionnaire are used to indicate if Geomarketing is in development and if organizations are facing bottlenecks in using Geomarketing. More than half of the companies [54%] indicate that Geomarketing is in development. The same amount indicates that Geomarketing is facing bottlenecks. The relation between these two facts is that 75% of the organizations that are facing bottlenecks are also in development. The main reasons that organizations give for facing bottlenecks are related to the organizational aspects, politics, money and resources. In all companies of the sectors 'utility' and 'supermarkets', Geomarketing is in development. All mobile telecom companies are facing bottlenecks. Two organizations give besides the mentioned reasons, a lack of familiarity as a reason. People in an organization have no idea of the existence and possible use of Geomarketing and are not familiar with it. In the following two practical examples [VI+VII], two respondents [KPN Mobile, ABN AMRO] give their opinion about the developments and bottlenecks of Geomarketing in their organization.
KPN Mobile has a low maturity in all determination keys; Practical example VII explains well why. ABN AMRO, facing bottlenecks too, is located in maturity level 4 or 5 according to all determination keys. These two companies are an exception; all other companies facing bottlenecks are located in maturity level 3.

Practical example VI
René Harder, functional manager at KPN Mobile:
"In the past, several times it has been tried to start up geographical marketing analyses to support the marketing department in actions and decisions, like customer analyses and network analyses. All these attempts failed because there is no knowledge at the marketing department about the use of geographics for marketing related processes. Also the IT department has no time and resources to make concepts and bring these to the attention. Software and data is available and ready to use".

Practical example VII
Bert Bickel, staff distribution general public at ABN AMRO:
"It is frustrating to see that the use of GIS in ABN AMRO is not a fully operating information system and is not at its capacity. Implementing a good GIS into ABN AMRO demands a great organizational change. The organization has to be organized toward its information systems. This needed change and of course money are the biggest bottlenecks that block the implementing of a GIS. I don't see a full working GIS in ABN AMRO in the coming four years".

Differences on sector level
To get a good overview of differences between companies, a summary is given of the most remarkable ones:

- 75% of the organizations with an overall maturity of maturity level 4 belong to the sector 'other';
- One organization [mobile telecom] is with respect to 'Analyses' located in maturity level 5; this company developed an own Geomarketing analysis, which is related modelling of network and customers;
- 75% of the insurance companies is with respect to 'Data' located in maturity level 5;
- None of the 'supermarkets' use datasets concerning their products;
- None of the 'mobile-telecom' and 'oil & gas' companies use market relevant data;
- All companies that contribute mainly to strategic level belong to the sector 'other' and 'banks';
- All companies of the sectors 'utility' and 'supermarkets', are in development with Geomarketing;
- All 'mobile telecom' companies are facing bottlenecks.

5.3 Discussion

Overall Geomarketing Maturity
The hypothesis of this research [page 10] can be supported as well as rejected, depending on the level of observation. Considering the overall maturity, the maturity differs, but not strong. The maturity per determination key shows quite some variation.

A majority of the companies are located in maturity level 3; none of the companies is located in maturity level 5. This means many growing possibilities for these organizations are present, what mainly comes down to a growth of two maturity levels of the GMM. On a geo-information congress in Germany, a market analyst stated that only 15% of the market of geo-information is being utilized [Esri Nederland 2002], what supports the fact above.

Sector 'insurance' and 'other' are the only two sectors showing a significant difference in overall maturity. It is a pity that the sector 'other' shows a significant difference in maturity, since this sector is more or less an indefinable group with consists of diverse organizations. The organizations from sector 'other' concern a fast-food company, a construction market and a huge department store. It is obvious they cannot be grouped. Subdividing the organizations of sector 'other' is not an option, due to a not sufficient amount of organizations. There is one exception; two companies could form the sector 'construction market'. These are added to the sector 'other' because the target was set on approaching a minimum of three companies per sector.

Six insurance companies were approached. Two are not using Geomarketing, two are located in maturity level 2 and the other two are located in maturity level 3. The overall

picture shows a quite immature 'insurance' sector in contrast to the other sectors. Considering the determination keys, insurance companies have a good package of data but handling processes and having a corporate vision is more or less a weakness.

In practical example V, 'Nuon' stated not seeing a surplus value in using Geomarketing, because energy is a homogeneous product and therefore equally used throughout The Netherlands. Other companies ['utility', 'oil & gas'], selling homogenous products, do use Geomarketing. This indicates that it could be useful for Nuon too. In my opinion, this is due to ignorance of the marketing manager of Nuon.

Maturity respondent vs. maturity GMM
The question about scaling the Geomarketing maturity on a scale of 1 to 4 is answered by the respondent with an average maturity. The overall Geomarketing maturity [GMM] is based on the weakest link and not on an average; so comparing the overall maturity [GMM] with the maturity of the respondent is not equivalent. Therefore, the maturity of the respondent is compared with the median of maturity of all determination keys. This gives an opposite view than described in the results; half of the companies is underestimating instead over overestimating, and scale their Geomarketing maturity one level lower than the maturity according to the GMM.

External bureaus
It sounds logical that companies outsourcing Geomarketing to an external bureau are more mature than other companies. These bureaus, specialized in geographical business analyses, often have advanced analysis tools and methods, and all kind of datasets [fully up-to-date] to execute complex analyses. This makes it plausible that the concerned company is located in a higher maturity level. Results do not show a significant relation in outsourcing and maturity.

Quality Geomarketing Maturity Model
The quality and usefulness of the model are important in this research too. The Geomarketing Maturity Model should be a good abstraction of reality, so it is representative for the maturity of Geomarketing in the Dutch market. The structure of the GMM is based on that of the CMM, what gives the model a stable and reliable basis.
The deviated pattern of the determination key 'Software' says something about [1] the quality of the model, or [2] the Geomarketing maturity of determination key 'Software'.
[1] The characteristics of 'Software' are not well distributed over the maturity levels, what makes a part of the model incorrect. This key needs a revision.
[2] Organizations are with respect to 'Software' less mature than in the other determination keys and need to develop their software.
Being mature in 'Software' does not require an organizational change or a great expenditure as in the other four keys. Organizations located in maturity level 4 [with respect to 'software'], do not have a particularly high overall maturity and are mainly located in maturity level 3. Considering both reasons, point 2 seems unlikely and makes it plausible that a part of the model is incorrect. 'Software' also gave some trouble with the maturity assessment of the questionnaire. A majority of the organizations had characteristics of two or three maturity levels, what made it difficult to unequivocal asses an organization into one maturity level. The lowest maturity level is chosen where most of the characteristics are represented. It is striking, 'Software' showed a remarkable pattern and gave trouble with the maturity assessment. Despite the possible error in the model, 'Software' is in only three companies [single] responsible for the weakest link and had thus no great influence on the overall Geomarketing maturity. In my opinion the characteristics of these 'Software' are not well structured and/or defined through the maturity levels, and need a slight revision. Some propositions for revisions can be found in

sub-paragraph 'Software' further in the text. It is likely, when both keys are revised, the overall maturity will shift slightly to the right of the GMM; more companies will be located in maturity level 3 and 4 instead of level 2 and 3. An advantage is that the filled-in questionnaires are still useful to asses companies again, based on a revised model. Implementing these questionnaires was a time consuming operation, what would not be necessary then.
In my opinion a perfect model does not exists. A model remains an abstraction of reality and cannot be 100% applicable in every situation. Revising the GMM, still gives situations where an organization cannot be unequivocal assessing into one maturity level.

'Software'
The borders of the characteristics have to be sharpened. According to the GMM, companies are located in maturity level 4, when having advanced software and developing simple applications. Many organizations have only standard software, but do develop simple applications and are thus located in maturity level 3. The distinction between standard and advanced has not been well scientifically founded in this research. The characteristics of maturity level 2 and 3 are equal. Further research should prove what the surplus value of using advanced software on Geomarketing maturity exactly is, and should clarify the definition of standard and advanced software.
Taking into account that most of the companies use a MapInfo product instead of ESRI, supports the thought that MapInfo is a real business GIS software package and that ESRI is not strong established on the business market.

'Data'
Many of the organizations have a good package of data. This determination key is also the most mature key of all. It is obvious that all companies use customer- and postal code data, since Geomarketing is a customer-oriented process and important features need a geographical position. Competitor data and data concerning companies' products seem less important to many companies. More important are socio-demographic- and market relevant data. In contrast to software, only half of the companies have up-to-date data instead. A possible explanation could be that data is far more expensive than software. Updating data every year costs an organization a lot of money.
'Supermarkets' have in contrast to the other sectors very much products in their assortment. This could be an explanation for not using data concerning products in Geomarketing analyses.
Almost all insurance companies are with respect to data located in maturity level 5. A possible explanation can be the coming of the new 'medical insurance system' in 2006. These companies want fully up-to-date data to target their [potential] customers as best as possible. Krek [2000] stated: "*information that is relevant to use, differs per sector and branch*". The above-mentioned difference in data use between the sectors fully supports this statement.

'Analyses'
The use of data reflects the type of analyses. Most of the analyses are based on the properties of the consumer. Three quarter of the companies is, with respect to 'Analyses', located in maturity level 4. Stopping organizations of being located in maturity level 5, is innovation; developing new kind of Geomarketing analyses. This seems almost a huge obstacle for all organizations, since only one company is located in maturity level 5. This company developed a Geomarketing analysis, related to modelling of the mobile network and customers. This type of analysis corresponds well with the tool developed by Vodafone, 'Vodafone GIS', which combines network planning and marketing activities [practical example IV, §3.5].

'Decision-making level'
This determination key has in contrast to the other determination keys the highest share of companies in maturity level 5. All these compnies belong to the sector 'other' and 'banks', what I cannot explain from out of practice or literature.
Located in maturity level 5 means mainly operating on strategic level, which is the highest organizational level where Geomarketing is used in. An organization that is fully using Geomarketing on strategic level is located in maturity level 5 too. Such companies should be more mature and be located in a higher maturity level. Possible, this key needs a revision, where maturity level 5 represents fully instead of mainly.

'Process structure'
Half of the companies have a company vision for Geomarketing. This means that in the other half of the companies, Geomarketing is more or less a loose 'appendix' and is not managed. Results show that all companies located in maturity level 4 ['Managed'] do have a company-vision for Geomarketing; almost all companies located in maturity level 2, do not have a company vision for Geomarketing. This proves the importance of a company vision for Geomarketing maturity.

Development & Bottlenecks
All organizations of the sectors 'utility' and 'supermarket' are in development with Geomarketing. Considering the news actualities, both sectors are facing today strong competition in the consumer market; the utility companies due to the liberalization of the energy market and the supermarkets due to the 'price war'. This possible explains the development of Geomarketing in these sectors.
A majority of the organizations facing bottlenecks are located in maturity level 3. This maturity level is typified as a level where Geomarketing is developed, but not managed. Striking is that all bottlenecks are management related, what indicates that Geomarketing is not managed. This makes it obvious these companies are located in maturity level 3. Solving these bottlenecks probably increases Geomarketing maturity.

Decision-making tool vs. supporting tool
In part VI of the questionnaire the question is asked: "As what kind of tool do you see Geomarketing?" The intention with this question was to get an answer on the present situation in the organization. The respondent probably interpreted as how he/she sees Geomarketing in an ideal or future situation. Because of this lack of clarity, it is wise to leave this question out of this research.

Literature
The Geomarketing applications and analyses, presented in chapter two, are based on German literature. All these example of Geomarketing applications and analyses are used and executed by the investigated companies. In chapter three an overview is given of the practical use of Geomarketing in several retail sectors. All practical examples are based on international literature. International Geomarketing literature describes a mature use of Geomarketing. Comparing this with the case studies, Dutch companies also show a quite mature use of Geomarketing. Dutch utility companies also deal with a liberalized market and mobile telecommunications companies are mainly engaged in analyses, which are network and marketing related. It is still remarkable that there is a quite mature use of Geomarketing in The Netherlands, but Dutch literature about Geomarketing is scarce.

GIS applications in the 'third wave' [Grimshaw 1993]
Grimshaw considered how GIS might be used in the 'third wave' [chapter 4] and putted two Geomarketing related ways of strategic applications forward; [1] using GIS to identify and target customers, and [2] providing strategic decision-makers with information

coming from geographical analyses with companies and competitors data. Both points are applicable on the present use of Geomarketing. Grimshaw was right in predicting how GIS is applied in the 'third-wave'. This also indicates a tremendous growth in the field of Geomarketing since 1993.

Use of this research

One complete overview of Geomarketing is not found in literature and almost no Dutch scientific literature is found about Geomarketing. As far as I know, this is the first time a [maturity] model is developed for Geomarketing. In my opinion, this report is a contribution for gaining insight in the definition of Geomarketing in general and the present use of Geomarketing in The Netherlands. Hernandez [1999] supports my opinion: "academic research into the use of GIS in business by retailer is in its infancy".

This report is an interesting piece of literature for people, who are interested or whose work is related to the field of Geomarketing. It can be used to update their knowledge about Geomarketing and use it as a measurement-tool on how mature their use of Geomarketing is. It can function as a practical framework from where, for example a marketing manager, can ask the question: *'Where are we now with Geomarketing?'*

6. CONCLUSIONS & RECOMMENDATIONS

6.1 Conclusions

Geomarketing in general

- The results are representative for all 'bigger' and well-known retail companies in The Netherlands.
- Geomarketing applications made a tremendous growth in the last ten years.
- Geomarketing is a household word for many Dutch organizations.

Maturity of Geomarketing

- For a majority of the organizations, the use of Geomarketing is quite mature and quite developed; it can be marked with a 2 on a scale of 1 to 4; Geomarketing is developed, but not well managed and embedded in organizations.
- No great significant differences in Geomarketing maturity between the investigated sectors are present.
- Insurance companies seem most immature and can be scaled with a 1.
- Organizations of the sector 'other' seem most mature and can be marked with a 3.
- The Geomarketing maturity shows quit some variation per determination key.
- Half of the Geomarketing-users underestimate the maturity of Geomarketing in their organization.
- Integrating Geomarketing better into the management [company vision] increases the overall Geomarketing maturity.
- Geomarketing maturity and development seem influenced by competition in the market.
- Outsourcing Geomarketing analyses to an external bureau does not increase the overall Geomarketing maturity.
- Dutch Geomarketing maturity is equal as the international use of Geomarketing.
- Plenty of growing possibilities in Geomarketing maturity are present for organizations to reach the top of Geomarketing maturity.

Geomarketing Maturity Model

- The Geomarketing Maturity Model is a useful tool to scale the maturity of Geomarketing in a bigger company.
- The determination key 'Software' needs to be revised to increase the models' quality.

Overall and average characterization for Geomarketing

Geomarketing is a tool which is based on the standard software MapInfo or advanced tool GeoMarktprofiel, and an extensive set of internal- [customer, competitor, product, sales] as well as external data [topographic, socio-demographic, lifestyle], which are up-to-date. Advanced analyses are executed, like customer-, sales-, product- and location analyses, which are automated by the use of scripts. Geomarketing is mainly supporting the company in its tactical decision-making; processes are planned, structured & documented, and Geomarketing is steered from out of a corporate vision of management.

6.2 Recommendations

This research did not conscious focus on the smaller companies. It is interesting to do further research in how smaller companies on the Dutch market use Geomarketing and compare these results with the investigated companies in this research.

The GMM gives a starting point for a following researcher to refine or even re-design a second one. The model is now built up of five determinations keys. These five keys are in my opinion the main five elements that are determinative for the use of Geomarketing. It is advisable to find out if determination keys need to be changed or new ones should be added.

The CMM is a tool for evaluating and measuring the maturity of software development processes of organizations and a help in increasing the maturity of processes. The GMM is only an assessments tool in the sense that it is used for assessing Geomarketing maturity and not for helping in further developing Geomarketing maturity. It is interesting to study how and to adapt the GMM into a growth model that helps organization in further developing Geomarketing. An organisation can then ask itself: 'Where are we', 'where do we want to go' and 'what do we need to do'.

It would be interesting to know for how many years an organization is using Geomarketing and connect this with the Geomarketing maturity. Such a question is not asked in the current questionnaire. It is advisable to include this question in a next version of the questionnaire.

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APPENDIX I QUESTIONNAIRE

MATURITY GEOMARKETING - *Questionnaire*

Marc Verschuren

February 2006

Please answer all questions. Questions can be answered by marking one of the possible answers. Please add comments to all of the questions to explain and motivate your answer.
Please mark the right answers and use the grey marked fields to add text.

Participant information

Date	
Company	
Name	
Department	
Function	
Telephone	
Email	

STARING QUESTIONS

1. Is GIS [Geomarketing] used in the marketing department of your company? Yes/No
☐ Yes
☐ No
Comment

1.1 If Yes, for how many years now?
☐ 0-1
☐ 1-5
☐ >5, namely ……
Comment

2. Is your company going to use Geomarketing in the future? Yes/No
☐ Yes
☐ No
Comment

2.1 If Yes, within a year?
☐ Yes
☐ No
Comment

I. SOFTWARE

1. Which GIS software is used?
☐ MapInfo Professional
☐ MapInfo MapBasic
☐ ArcView [ESRI]
☐ ArcGIS [ESRI]
☐ GeoMarktprofiel
☐ Mappoint
☐ MicroVision
☐ TargetPro
☐ other →
Comment

2. Are [specific] applications developed for executing Geomarketing analyses?
☐ Yes
☐ No
Comment

2.1 If yes, what kind of Geomarketing applications?
☐ scripts [Visual Basic / MapBasic] incorporated in the standard software [dependant]
☐ independent applications [full programs]
☐ other →
Comment

3. When is the last time the software is updated?
☐ <1 year
☐ 1-2 year
☐ >2 years
Comment

4. Is there an update contract for the software?
☐ Yes
☐ No
Comment

II. DATA

1. Which types of company internal datasets are used for Geomarketing?
☐ customer
☐ competitor
☐ sales
☐ product [use]
☐ Other →
Comment

2. Which types of company external datasets are used for Geomarketing?
☐ postal code
☐ administrative areas
☐ topographic dataset
☐ [socio]-demographic
☐ market relevant data, like lifestyle, trends etc.
☐ Other →
provider
☐ Geodan
☐ 'Experian' data
☐ 'Acxiom'/'Claritas
☐ CBS
☐ WegenerDM
☐ Other →
Comment

3. How old is ±75% of all the data?
☐ <1 year
☐ 1-2 year
☐ >2 years
Comment

4. Is there an update contract for the data?
☐ Yes
☐ No
Comment

5. Does Geomarketing have a direct link to the organizational database[s]?
☐ Yes
☐ No
Comment

III. ANALYSES

1. Are datasets visualized [on a topographic map]?
☐ Yes
☐ No
Comment

2. Are different datasets laid on top of each other [more than one geographical layer in one view]?
☐ Yes
☐ No
Comment

3. What kind of Geomarketing analyses are executed?
☐ penetration analyses [amount of features of a dataset per area unit]
☐ target-group analyses
☐ customer analyses [profiling & classifying]
☐ market analyses
☐ market segmentation
☐ branch- & location analyses
☐ service analyses
☐ product analyses
☐ sales analyses
☐ spatial point pattern analyses
☐ Other →
Comment

4. Are statistical methods used in the Geomarketing analyses?
☐ Yes
☐ No
Comment

4.1 If Yes, what kind of statistical methods?
☐ correlation
☐ spatial point pattern
☐ Other →
Comment

5. Are new Geomarketing analyses [methods] developed and/or build?
☐ Yes
☐ No
Comment

5.1 If Yes, what kind of Geomarketing analyses?
Comment

IV. DECISION-MAKING LEVEL

1. To what kind of main questions gives Geomarketing an answer?
☐ Where are my ..[customers, competitors, store]..located?
☐ Who are my.. [customers, competitors..?
☐ Where should I locate a new ..[product, store]..?
☐ On which type of customer do I have to point my marketing?
☐ Who should I select for a direct mail [target marketing]?
☐ Other →
Comment

2. On which time span of decision-making is Geomarketing supporting?
☐ less than 1 day
☐ between 1 day and one year
☐ more than one year
Comment

3. Are the results of Geomarketing used for daily decision-making [Operational]?
☐ Yes
☐ No
Comment

4. Are the results of Geomarketing used for making decisions on middle management [Tactical level]?
☐ Yes
☐ No
Comment

5. Are the results of Geomarketing used for making decisions on high management/board [Strategic level]?
☐ Yes
☐ No
Comment

6. Geomarketing can support decision-making on three levels, namely Operational, Tactical and Strategic. How would you divide 100 percent over the three decision-making levels on which Geomarketing is supporting?

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Operational:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tactical :	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Strategic:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Comment

V. PROCESS STRUCTURE

1. Are Geomarketing processes/analyses executed on an ad-hoc basis?
☐ Yes
☐ No
Comment

2. Are Geomarketing processes executed on a regular / recurrent basis?
☐ Yes
☐ No
Comment

3. Are Geomarketing processes/analyses planned and structured?
☐ Yes
☐ No
Comment

4. Are Geomarketing processes documented?
☐ Yes
☐ No
Comment

4.1 If yes, what percentage is documented?
☐ < 25%
☐ 25-75%
☐ > 75%
Comment

5. Is there a vision for Geomarketing within the company?
☐ Yes
☐ No
Comment

5.1 If Yes, from out where does this vision come?
☐ Middle management
☐ High management
☐ Other →
Comment

VI. Other Questions

1. As what kind of tool do you see Geomarketing?
☐ supporting tool
☐ decision-making tool
☐ Other →
Comment

2. Is Geomarketing in development?
☐ Yes
☐ No
Comment

3. Are obstacles/bottlenecks present within the use of Geomarketing?
☐ Yes
☐ No
Comment

3.1 If Yes, to what aspect[s] are these bottlenecks related?
☐ political
☐ money
☐ resource[s] [shortage]
☐ Other →
Comment

4. How would you scale the maturity of Geomarketing within your company from immature to mature on a scale of 1 to 4?
☐1 ☐2 ☐3 ☐4
Comment

APPENDIX II GEOMARKETING MATURITY MODEL TABLE

	SOFTWARE	DATA	ANALYSES	DECISION-MAKING LEVEL	PROCESS STRUCTURE
maturity level 1 'INITIAL'	- no software use	- no data use	- no visualisations & geomarketing analyses	- no supporting in decision-making	- no processes
maturity level 2 'DEFINED'	- standard software package - software not up-to-date, > 2 yrs	- little datasets used - only postal code data - data not up-to-date, > 2 yrs	- simple geomarketing analyses - viewing & overlay of datasets - only location is important	- supporting tool - fully [100%] on operational level	- ad-hoc / chaotic - no processes documented
maturity level 3 'DEVELOPED'	- standard software package - software not up-to-date, > 2 yrs	- few datasets used - postal code data & socio-demographic data - data not up-to-date, > 2 yrs	- basic geomarketing analyses, customer profiling/classification - more than location is important	- supporting tool - mainly [>50%] on operational level	- ad-hoc / chaotic - some processes documented
maturity level 4 'MANAGED'	- advanced software package - simple geomarketing applications developed & build - software *quite* up-to-date, 1-2 yrs & update contract	- several internal/external datasets used - data *quite* up-to-date, 1-2 yrs & update contract	- complex analyses, classifications & profiling - simple statistical methods used	- supporting tool - mainly [>50%] on tactical level	- planned / structured - most processes documented - geomarketing vision from out of middle management
maturity level 5 'EMBEDDED'	- advanced software package - advanced geomarketing applications developed & build - software up-to-date, < 1 yr & update contract	- several internal/external datasets used - data up-to-date, < 1 yr & update contract	- complex analyses, classifications & profiling - innovation→ new analyses (methods) developed & executed - advanced statistical methods used	- decision-making tool - mainly [>50%] on strategic level	- planned / structured - all processes documented - geomarketing vision from out of high management

APPENDIX III OVERVIEW ANSWERS QUESTIONNAIRE – CHARACTERICS

Sector	I-A	I-B	I-C	I-D	I-E	II-A	II-B	II-C	II-D	II-E	II-F	II-G	II-H	II-I	III-A	III-B	III-C	III-D	IV-A	IV-B	IV-C	V-A	V-B	V-C	V-D	V-E	V-F
bank	no	yes	no	yes	yes	yes	no	yes	yes	yes	yes	yes	no	yes	yes	no	no	no	0%	80%	20%	yes	no	yes	1	no	-
bank	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	0%	30%	70%	yes	yes	yes	2	yes	1
bank	yes	no	no	no	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	10%	40%	50%	yes	no	yes	1	no	-
oil & gas	yes	no	yes	no	no	yes	yes	yes	yes	yes	yes	No	no	yes	yes	no	no	no	80%	10%	10%	yes	yes	no	-	yes	2
oil & gas	yes	no	no	yes	yes	yes	yes	yes	no	yes	yes	No	yes	yes	yes	yes	no	no	20%	60%	20%	yes	yes	no	-	no	-
insurance	no	yes	no	yes	yes	yes	no	yes	no	yes	yes	yes	no	yes	yes	yes	yes	no	20%	60%	20%	yes	yes	yes	3	no	-
insurance	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	60%	30%	10%	yes	yes	yes	2	yes	1
insurance	yes	yes	no	yes	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	0%	100%	0%	yes	no	no	-	no	-
insurance	no	yes	no	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	0%	80%	20%	yes	no	no	-	no	-
mobile telecom	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	yes	yes	yes	yes	yes	60%	30%	10%	yes	no	yes	2	yes	1
mobile telecom	yes	no	yes	yes	no	yes	no	no	yes	yes	yes	no	no	yes	yes	yes	no	no	40%	50%	10%	yes	yes	yes	2	yes	1
mobile telecom	yes	no	no	no	no	yes	no	no	no	yes	yes	no	yes	yes	no	no	no	no	100%	0%	0%	yes	no	no	-	no	-
other	yes	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	no	no	0%	50%	50%	yes	yes	no	-	yes	2
other	yes	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	no	no	10%	80%	10%	yes	yes	yes	3	yes	1
other	yes	no	no	yes	yes	yes	yes	yes	no	yes	yes	yes	no	yes	yes	yes	no	no	10%	20%	70%	yes	no	yes	2	no	-
other	yes	no	no	yes	yes	yes	no	yes	no	yes	no	no	no	no	yes	yes	no	no	0%	40%	60%	yes	yes	yes	3	yes	2
other	yes	no	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	no	yes	yes	yes	yes	no	10%	40%	50%	yes	yes	no	-	yes	1
other	yes	no	no	yes	yes	yes	no	yes	no	yes	yes	no	yes	yes	no	yes	no	no	0%	0%	100%	no	yes	yes	3	yes	2
other	no	yes	no	yes	yes	yes	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	no	10%	30%	60%	yes	yes	no	-	yes	1
supermarkets	yes	no	yes	yes	yes	yes	yes	yes	no	yes	no	no	no	yes	yes	yes	no	no	0%	70%	30%	no	yes	yes	3	yes	1
supermarkets	yes	no	no	yes	yes	yes	no	no	no	yes	yes	yes	yes	no	yes	yes	yes	no	30%	50%	20%	yes	yes	yes	3	yes	2
supermarkets	yes	no	no	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	no	no	50%	30%	20%	yes	yes	yes	1	no	-
utility	no	yes	no	yes	yes	yes	no	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	no	10%	60%	30%	yes	yes	yes	1	no	-
utility	no	yes	no	yes	yes	yes	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	no	70%	20%	10%	no	yes	yes	3	yes	1

A development
B bottlenecks
I-A standard software package
I-B advanced software package
I-C application development
I-E update contract
I-F software up-to-date, <1yr
II-A customer data
II-B competitor data
II-C sales data
II-D product data
II-E postal code data
II-F socio-demographic data
II-G market relevant data
II-H data up-to-date, <1yr
II-I update contract
III-A basic analyses
III-B advanced analyses
III-C statistics
III-D simple stat. [1] / advanced stat. [2]
III-E innovative - new Geom. Analyses
IV-A % operational
IV-B % tactical
IV-C % strategic
V-A ad-hoc processes
V-B planned & structured
V-C documented
V-D % documented <25%[1], 25-50%[2], >75%[3]
V-E vision from out management
V-F middle management[1] / high management[2]