



A framework for an e-marketplace facilitator for home care services matching.

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**The development of a framework for an e-marketplace facilitator for trading home care services
matching demand with supply.**

Thesis for the completion of the master Business Administration at the
School of Management and Governance, University of Twente.

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Management summary

The healthcare industry in the Netherlands is rapidly changing. There is a strong increasing demand of healthcare products and services. At the same time, there is a decreasing availability of healthcare personnel. The home care sector is becoming more and more important due to these same demographic changes. The home care sector has to deal with an accessibility threat and a changing position of the home care consumer, namely consumer empowerment. Information and Communication Technologies (ICT) is seen as a solution to keep the accessibility of home care affordable and still remain of a high quality level. ICT can also provide people with dignity and well-being through self facilitation of care. The electronic marketplace refers to the emerging market economy where producers, intermediaries and consumers interact electronically or digitally in some way and uses information systems to support at least some of the different transaction phases electronically [Luxem (2000)].

Focus Cura needs insight in the necessary steps it must take to act as an e-marketplace facilitator. It wants to support in the match between demand and supply of home care services electronically. In other words, it wants to support in the home care suppliers' selection process for consumers of home care services as on online advisor. The emphasis in this thesis thus lies in the information phase. For this research the "Framework for Electronic Knowledge Markets" developed by Müller (2005) is used. The reason for this choice is its applicability. This thesis proposes a framework for home care services trading. The contributions of the thesis are shown here in detail:

An analysis of the home care services market

The environment and characteristics of the home care services market and their changes and effects are analyzed.

Development of an e-marketplace framework for home care services

A framework for an electronic marketplace for home care services is proposed. The framework described the market elements that need to be determined by the market operator. The elements of the framework consist of the following: the market strategy, the home care trading process, the matching of home care demand with supply and the IT infrastructure. The framework also describes market elements that are a result of the determined market elements: the behavior of the market participants and the market outcome. The evaluation measure is the last item of the framework.

Development of a matching tool

A special focus lies on matching home care demand with supply in the form of a matching tool that is in turn part of the e-marketplace framework. To promote and ensure the usability of the tool, qualitative empirical data was gathered with home care consumers. The contents of the suppliers' selection matching tool and its final design are given.

Acknowledgements

Before you lies the result of my graduation assignment: “. *A framework for an e-marketplace facilitator for home care services matching.*” The thesis is available for Focus Cura B.V., the University of Twente and others who are interested in this research topic. Finishing this graduation assignment automatically means the end of my time as a student at the university of Twente. This would not have been possible without the support of some important people.

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Last but not least, I want to thank my family and friends for their support during my period as a student. Special thanks go to Ewout Janssen en Roel Wessels for helping me with several topics. I hope that this thesis will provide enough guidance when implementing an e-marketplace for home care services.

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Introduction

The healthcare industry in the Netherlands is rapidly changing. These changes are necessary to withstand rising bottlenecks; a strong increasing demand of healthcare products and services, decreasing availability of healthcare personnel, issues that occur due to improvements of the quality of healthcare, the accessibility threat, the changing position of the patient (patient empowerment), the adaptation of healthcare organisations to a ‘care-chain’ supply of healthcare and so on. The home care sector especially, is one of the first sectors which will have to deal with radical changes due to the extensive growing demand of home care services and decreasing availability of personnel in this sector.

Information and Communication Technologies (ICT) can be a solution to keep the accessibility of home care affordable and still remain of a high quality level. ICT can also provide people with dignity and well-being through self facilitation of care. ICT in healthcare, like the Internet, are an enabler to this change. Focus Cura is in search of a framework in order to get insight in the necessary steps to take, to support in the match between demand and supply of home care services as an electronic marketplace facilitator. In other words, it wants to support in the home care suppliers’ selection process for consumers of home care services as an online advisor.

In chapter one of this paper, the research outline is defined and explained. The project domain, objective of the research and methodology used in order to gain the necessary theoretical information and data for the construction of both the framework of the e-marketplace and the home care suppliers’ selection tool are described. Chapter two describes a review on the e-marketplace framework for knowledge sharing developed by R. Müller (2005). Chapter three describes the translation of this framework, into one suitable for home care services. All elements needed to construct such a framework will be dealt with. Chapter four presents the contents of the suppliers’ selection matching tool and all its elements. It concludes with the services, the criteria, and the method on which the tool will be based on. It will present the tool, the methodology of how the tool is programmed and tested and the test and evaluation results generated by end-users. The final developed tool and its requirements are presented in chapter five, as are the conclusion of the thesis, benefits, shortcomings and recommendations for further research.

1 Research design

1.1 Introduction

In this chapter the layout of the research is presented. The objective of the research is to develop a framework for an e-marketplace for home care services. This research design is based on the work of Verschuren and Doorewaard (2000). In paragraph 1.2 the basis of the research layout is given. Verschuren en Doorewaard split the design of a research in two design activities. The first is the conceptual design, which is explored in more detail in paragraph 1.3. The second is the technical design which is given in paragraph 1.4.

1.2 Research design in overview

During the conceptual design, the objective is to determine what, why and how much is to be explored. To begin a quick scan of the global research domain is conducted. Hereafter the formulation of the research objective is made. Once the research domain is globally set, a research model can be given. This model is used to see more clearly how to reach the research objective. This part concludes with the design process.

After the conceptual design is treated, one is able to proceed with the technical design of the research. A justification is given on how the research questions will be answered in order to achieve the research goal. In other words, the methodology in order to get the research material is presented. The next step to take is the research strategy, which encompasses the decisions on how to approach the object of the research. The end of this phase and consequently the research design consists of the research planning. It shows how this research design is broken up in different steps and chronologically presented in a Gantt chart, to be found in the appendix (section D). To gain a full picture of chapter one, a schematic model of the research design and its place in the chapter is shown on the next page (figure 1).

1.3 Conceptual design

In this paragraph the conceptual design that forms the basis for this assignment is discussed. The conceptual design fulfils several functions within the assignment. The most important function is the targeting function, which is in turn related to the effective implementation of the assignment. Moreover the conceptual design fulfils a motivating and evaluating function. In this paragraph the project domain, the relevance of the assignment, the research objective, the research model and the research questions are presented. A list with abbreviations can be found in appendix B. For definitions of concepts which are used in this research, one can turn to appendix C.

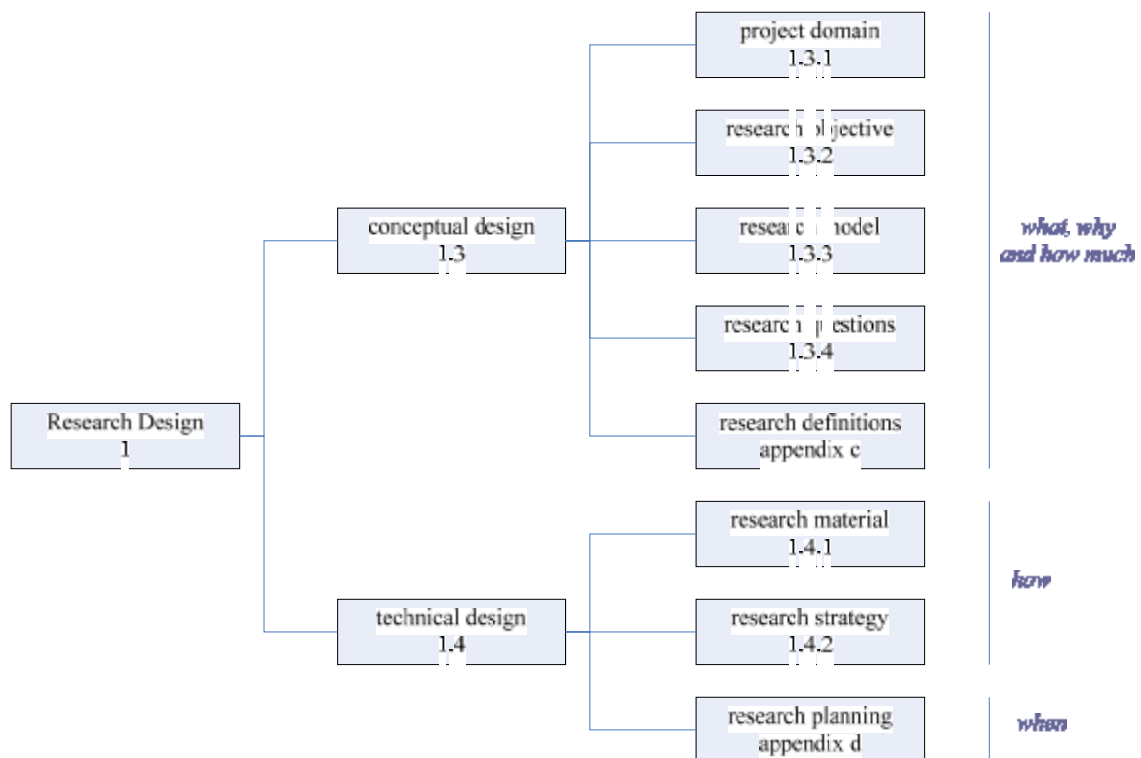


Figure 1 Designing a research according to Verschuren & Doorewaard (2000)

1.3.1 Project domain

The project domain forms the area within which the research lies. This research area has been narrowed down in order to establish a useful, univocal and informational objective, within a feasible time. First a description is given of the company for which this assignment is carried out. Then a perspective of healthcare ICT trends and the reason for the assignment itself.

Focus Cura

Focus Cura provides expertise and practical guidance and is committed to successfully develop innovative healthcare projects. To cover both theoretical and practical aspects with regard to technology in healthcare, Focus Cura has two separate divisions: consultancy and project guidance (Focus Cura Healthcare Innovation) and practical implementation support (Focus Cura Installation Technique). The divisions provide both joined as independent projects. This assignment lies within the profile and the objective of Focus Cura, which is to close the gap between healthcare and technology. Besides the usual activities, Focus Cura continuously explores new possibilities and opportunities for meeting demand in healthcare innovations.

ICT trends in the healthcare sector

The ageing of societies essentially results from falling fertility rates and increased life expectancy. An additional impact stems from the so-called baby-boom, which has led to large differences in the size of age groups. For over half a century, it has been observed that the cost of demand for healthcare tends to increase more than proportionally to the per capita income. Demand is determined by standard of living and level of education. This has three main consequences [SCADPlus: The future of healthcare and care for the elderly (2001)]:

- patients are better educated and are able to adopt healthier lifestyles and a prevention-based attitude which in the long run makes it possible to avoid the need for costly care. This is why healthcare systems are focusing increasingly on education and prevention;
- patients expect ever better quality and efficiency from healthcare systems. The spread of information technologies provides patients access to more information on services available and allows them to make an increasingly well-informed choice;
- healthcare consumers feel that they need to be considered as partners and players in healthcare systems, not only by health professionals but also by the public authorities. They also expect greater transparency on the performance and quality of care services.

These last two consequences (efficiency and transparency in performance) and the subject e-procurement, or buying by means of or using web technology, gain more and more attention within the healthcare sector. The dentist sector in Germany for example has become more competitive as of this autumn. Dentists, by means of Internet, are able to bid on treatment requests of patients [Zibb: Tandartzorg per opbod komt er aan (2007)]. The auction site is an initiative of the German Internet company Medikompass from Munich. This site works roughly the same as other sales by auction on the Internet. The patient places a request for a certain treatment. Dentists can then place an offer. According to Seeberg from Medikompass, patients can save money and therefore health insurers as well. Some treatments were carried out with savings up to 30%. After the treatment, patients can assess their experiences with the dentist concerned, by filling in an assessment form on the Internet site. This way other candidate patients get a good picture of the quality of the service delivered.

In the Netherlands, early forms of healthcare auction sites exist as well. Since two years an auction site called Zorgveiling.nl trades maternal care on the Internet. Healthcare insurers Achmea and Menzis auction maternal care through an auction process. The healthcare insurer places the healthcare demand of their clients on the site. Healthcare organisations can then place an offer to supply the service. When the auction period ends the organisation with the best offer can contact the client for delivery of the service. In a case study from the Dutch Healthcare Authority NZa, one of the findings in their paper [Rapport Zorgveiling (2006)], was that the trade of maternal care by auction has a positive effect: it offers opportunities to allocate care against fair market prices and it makes the demand and supply of maternal care transparent for all participants.

Reason for and relevance of the assignment

Tronto (1993) distinguishes four different phases or dimensions for healthcare: caring for, looking after, caring and receiving care. The four associated values are: attention, responsibility, competencies and admissibility. These values form the core of care as a practice. Care can only be received when it is offered. Several (government) -agencies, companies and institutes recognize that supplying healthcare becomes more and more expensive whilst the demand grows rapidly. The foundation for future scenario's of healthcare (STG: Stichting Toekomstscenario's Gezondheidszorg) gives its long-term vision on an integral and area orientated supply of healthcare services. This subject is covered in their article *Welzijn en waardigheid voor langdurige zorggebruikers Op weg naar 2020* (2002). The main issue discussed in the article is that patients do not only wish more freedom in their choice of, control over, and quality of healthcare services. They also want to have more input in and responsibility over care and other service providers.

Furthermore, institutes that provide healthcare services should help customers in realising their demand for care and ensure them that they are able to participate in social life. Healthcare should therefore be organized in the same area where it is needed. What do people, who will be depending on long-term healthcare demand and how will they want this demand to be met? This issue will include an integrated and complete solution. The conclusion of STG is that people will want to remain in their own homes and be able to take matter in their own hands. When assistance is needed they wish to choose and organise the service needed themselves. Research also shows that people will want to appeal to the support of others when buying healthcare services. Family members, friends or other acquaintances will be consulted. The supply of healthcare services must as such be organised so that the four values of the aid process – attention, responsibility, competence and reciprocal admissibility – are met as well as possible. Focus Cura considers these trends as a lead to the following statement:

In order to react to the changes in the healthcare sector, opportunities on trading healthcare services by means of the internet must be seized to ensure reciprocal admissibility .

Focus Cura is continuously searching for new opportunities to fill gaps between technology and healthcare. The use of the Internet to trade healthcare services is rising. Focus Cura is looking for ways to successfully support the e-procurement process for healthcare services as an e-marketplace facilitator.

The electronic marketplace refers to the emerging market economy where producers, intermediaries and consumers interact electronically or digitally in some way and uses information systems to support at least some of the different transaction phases electronically [Luxem (2000)].

The healthcare services Focus Cura wants to support, are services that are part of the home care or domestic care sector. Focus Cura wants to facilitate the home care trading process by matching demand with supply as an independent third party and thus act as an online advisor. This demands certain preparation and knowledge.

1.3.3 Research objective

The previous paragraph makes clear that Focus Cura wants insight in how to facilitate in the trading process of home care services when one wants to match home care services demand with supply. Hence, this thesis is a design assignment with the objective to create a framework which can be used by Focus Cura and provide them with the necessary information to successfully commercialise this process. Therefore the objective of this research is:

The development of a framework for an e-marketplace facilitator for home care services matching demand and supply.

The framework will function as a kind of blueprint. It will provide Focus Cura the necessary elements needed to get a complete picture of the process and sector. This will help them in their process in matching home care consumers with home care providers and thus act as a home care services online advisor.

1.3.3 Research model

In this paragraph the research model is visualized. The model includes the steps which must be taken in order to reach the research objective.

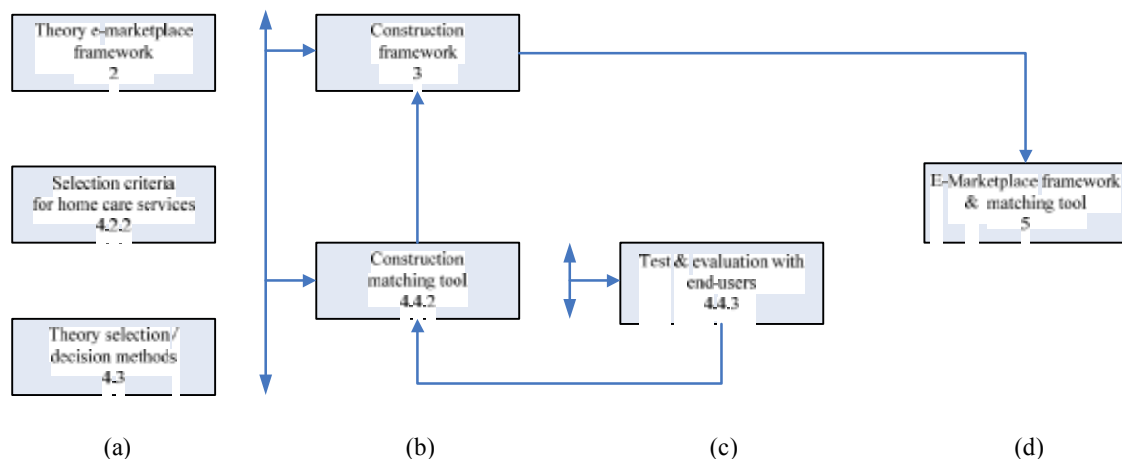


Figure 2 Research Model for the e-marketplace framework

Verbalization of the research model:

(a) A study in the field of e-marketplaces and selection methods forms the basis for this research. A study concerning health and home care services, selection criteria for home care services will also be conducted at this stage. A useful e-marketplace framework must be identified. (b) The issues discovered in phase (a) are used to construct and amend the e-marketplace framework for home care services found in the previous section. The matching tool which is part of the e-marketplace framework must be constructed as well and must be presented to end-users of home care services. (c) Testing and evaluating the usability of the matching tool with care consumers must lead to the amendment of the matching tool so that this will lead to (d) the finalization of an e-marketplace framework for home care services.

1.3.4 Research questions

The answer on the questions presented in this paragraph must lead to the necessary knowledge to eventually reach the objective of the research. The research questions are defined by a number of sub questions and are primarily based on answering issues related to the e-marketplace framework. Questions 2 and 3 are merely content questions of the first question. Question 4 is crucial to understand the necessary elements for matching home care consumers with suppliers.

- 1) What e-marketplace framework can Focus Cura use for trading home care services?
 - a) How does the e-marketplace frameworks for knowledge sharing look like and in how far is it applicable for trading home care services.
 - b) What other complementing e-marketplace frameworks are available according to literature?
 - c) What aspects can be identified to construct the e-marketplace framework so that is suitable for trading home care services as an online advisor?
- 2) What are the characteristics and environmental aspects of the home care services sector?
 - a) What are the environmental aspects of the home care services sector?
 - b) What are the legislation aspects on home care service sector?
 - c) What are the characteristics of the supply side of home care service sector?
 - d) What are the characteristics of the demand side of the home care service sector?
- 3) What does the home care services trading process looks like?
 - a) What aspects contribute to the home care services trading process?
 - b) What transactions can be identified when looking at home care services sector?
 - c) In which part of the transaction phases will Focus Cura support in?
- 4) How can Focus Cura match home care consumers with home care providers?
 - a) What kind of services exists in the home care sector?
 - b) On what grounds or criteria are choices made for selecting a home care services provider?
 - c) What kinds of suppliers' selection or decision methods are available according to literature?
 - d) How can a matching tool for suppliers' selection be developed with these methods?
 - e) How should the tool be programmed so that the usability is assured?

In order to answer these questions, a research methodology is needed to ensure that appropriate procedures are followed. The research methodology is described in the technical design part in next paragraph.

1.4 Technical design

The technical design (or methodology) describes which steps will be taken in order to conduct the research for the conceptual design effectively and to reach the research objective. In this chapter the research material and the research strategy that is used are presented.

1.4.1 Research material

In this paragraph the research material used to answer the research questions is presented. The material needed to answer most of the research questions can be conducted and found through desk research. The material consists of literature research and secondary research and involves data that already exist either from internal sources, publications of governmental and non-governmental institutions, free access data on the Internet, professional newspapers and magazines, in annual company reports and commercial databases to name but a few. By carrying out the desk research, background knowledge to the subject will be gained as well as useful leads. Desk research will be conducted on several issues in order to answer many research questions, concerning

- e-marketplace frameworks;
- the environment and characteristics of the home care services sector;
- the home care services trading process;
- the matching of home care consumers with suppliers.

For the environment, characteristics and the trading process of the home care services sector, information is gathered through websites from governmental agencies like the Social Cultural Planning Bureau, the National Institute of Public Health and the Environment, the Gateway of the European Union, and the Statistics Netherlands. For the trading process, information is also gathered at home care institutions and the central institution for home care determination (CIZ).

A number of different sources will be used in order to find relevant literature that contributes to the e-marketplace framework and selection/decision methods for the matching tool. Indexes of university libraries and other relevant internet sources will be consulted for this topic. Examples of these are: Library of the University of Twente, Science Direct, Picarta, and World's Libraries Connected. For this research, the framework will be based on the one developed by R. Müller (2005) which is intended for knowledge sharing. The justification for this lies in the applicability of the framework which is discussed in the second chapter. The construction of the framework will be realised by translating this existing e-marketplace framework into one that is applicable for home care services. This will be conducted mainly through desk research on characteristical differences that are part of the home care services sector.

For the mathematical computation of the suppliers' selection tool, which will be part of the framework, Multicriteria Decision Analysis Methods (MCDA) will be used. Familiarization on this topic was gotten in the course *Methoden en Technieken voor Ontwerpen en Beslissen* at the University of Twente. The reason for using MCDA methods for the suppliers' selection matching tool is that the MCDA discipline is aimed at supporting

decision makers who are faced with making numerous and conflicting evaluations. MCDA aims at highlighting these conflicts and deriving a way to come to a compromise in a transparent process. So besides the familiarization of the topic, its transparency in the decision-making process is an advantage for the usability function of the tool. For the design of the tool itself, the principles discussed in: Don't make me think. A common sense approach to web usability [Krug (2006)] will be used. One must keep in mind that the users group for the matching tool is not as familiar with web use as is the younger part of society.

1.4.2 Research strategy

In general it is recommended to activate existing knowledge first [van Berkel (2000)]. This can be done by considering the information in study books, readers and articles which were used in study courses and projects. The most important material which is used for the matching tool exists of the reader *Methoden en Technieken voor Ontwerpen en Beslissen* (MTOB) and related articles used in this course. The research strategy is whole of coherent decisions that are made concerning the way in which the assignment is conducted. This is related to the gathering of research material and the processing of this material to answers the research questions. According to Verschuren & Doorewaard (2000), the research strategy is based on three core decisions, presented below:

1. Breadth versus depth

The chosen strategy for this assignment is twofold. This is the consequence of the objective of the research. The framework for an e-marketplace for home care services will be based on the framework discussed in "Knowledge Sharing and Trading on Electronic Marketplaces" [Müller (2005)]. By choosing a broad strategy for the framework, all relevant issues which contribute to a successful commercialisation of the e-marketplace concept can be incorporated into the framework. For the construction of the matching tool qualitative research is needed. A depth analysis approach is appropriate for qualitative research [Verschuren & Doorewaard (2000)]. This way a detailed and complete picture into the usefulness and usability of the home care services selection tool may be gotten. To be able to search systematically, selection criteria are defined in advance of the search. Examples of these are:

- The source for the electronic marketplaces must not be older than 5 years because of the strong recent developments on this subject;
- The source for the material on electronic marketplaces must contain suitable aspects which may contribute to an e-marketplace framework for home care services;
- The source for the MCDA methods to create the suppliers' selection matching tool must not be older than 20 years because of the same period of experience with this subject;
- The source for the material on MCDA methods has to contain information about construction variables used for the preferential structures and to address decision-aiding activities, or the information has to elaborate a project in which MCDA methods were used.

The goal is to identify useful MCDA methods which can be used as input for the mathematical computation part of the matching tool. There should be enough different and complementing aspects in the different methods. The results of this phase can be found in chapter four where a summary of the preferred methods and a short

description is given. The search for material for the e-marketplace framework must contribute to the amendment of the one for designed for knowledge sharing.

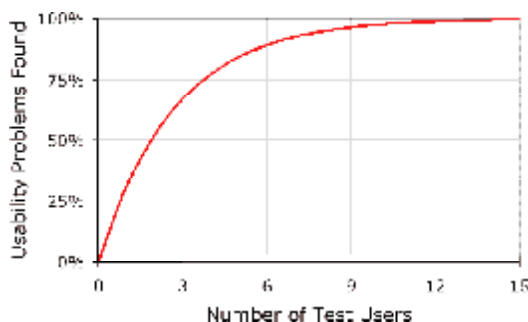
2. A quantified versus qualified approach

This research uses a qualified approach. The objective is to match home care demand with home care supply by means of a matching tool posted on a screen to screen application. This way the tool functions as an online advisory for home care selection by assessing qualitative criteria. The design of this tool will be done on the basis of a few steps. The first step is to identify on which criteria a care provider is selected. MCDA methods must be investigated in order to search for appropriate methods for a home care suppliers' selection tool. In order to find an appropriate method, the trading process must be defined.

During the design and programming of the matching tool, it can be presented to end-users. By testing and evaluating the matching tool with end-users, qualitative data on usability can be gathered which can be used to amend and finalize the tool. In other words, the tool must be based on users' experience. The programmed tool will be posted on an existing web-based program used by Focus Cura called PAL4 (www.pal4.nl). PAL4 which stands for Personal Assistant 4 Life, is a web-based portal designed for the elderly. At the moment it is still in development. The objective of the portal is to create a supportive screen to screen device for the elderly in order to help them live their life more independently and help them on all sorts of subjects for the frail elderly. By using this application, the suppliers' selection tool can be tested by a population that is already participating in other development projects and is part of the target market

3. Empirical versus desk research

Within this task the emphasis lies mainly on desk research. Desk research is conducted to get insight in existing e-marketplace frameworks and the aspects on which the framework is to be constructed on. Differences between traded commodities and/or services on existing frameworks and the home care services must be discovered in order to make a translation for a framework for home care services. For the construction of the matching tool desk research must take place in order to get leads on the content and usability of the tool. For validation of the tool, empirical research must take place by testing and evaluating it with end-users. Usability testing has been



around for a long time, and the basic idea is pretty simple:

If you want to know whether a web application is easy enough to use, watch some people while they try to use it and note where they run into trouble. Then fix it, and test it again [Krug (2006)]. Six test users will be consulted on the usability of the application. By testing aloud 85% of usability problems will be discovered. Finding the design errors will result in further amendment and finalisation of the matching tool and promote its usability.

2 Literature review on e-marketplace frameworks

Due to the fact that the suppliers' selection tool is part of the e-marketplace framework, the design of the framework needs attention prior to the design of the matching tool. In this chapter a literature review is presented on the e-marketplace framework on which the framework for home care services will be based on. Literature on e-marketplace frameworks is scarce. Nonetheless there are e-marketplace models which have proven to be successful like the "Generic Trading Model for e-Marketplaces" [Yinsheng, L et all. (2006)]. This model depicts a service oriented framework in order to address the issues associated with the development of e-marketplaces. Specifically, it introduces a generic trading model oriented to e-marketplaces so as to overcome the inadequacy of existing models and to facilitate the development of a computational trading process. However, most models are centered around a topic, i.e. trading and auctioning and thus not very applicable for this subject due to the regulated market of the home care services. For this research the "Framework for Electronic Knowledge Markets" developed by Müller (2005) is used. The reason for this is its applicability and all aspects that contribute to an e-marketplace framework are incorporated and do not just focus around one aspect or topic. First an introduction is given in paragraph 2.1. The basis of the framework from Müller and its different elements will be elaborated in paragraph 2.2.

2.1 Introduction

In economics, a market is a social structure developed to facilitate the exchange of rights, services or product ownership [Marshall (1961)]. In traditional markets a market price is derived through the interaction of demand and supply. In electronic markets, unlike the traditional market in which the meeting place is a physical location, the meeting place is a virtual space on an electronic network [Malone, Yates, & Benjamin (1987)], an interorganisational information system that allows the participating buyers and sellers to exchange information about prices and product offerings [Bakos (1991), Brandtweiner & Scharl (1999)], "an e-application" [Hoque (2000)], or an internet-based e-commerce platform [Brooks & Cantrell (2000)] that matches multiple buyers and suppliers in transactions. E-marketplaces provide an electronic method to facilitate transactions between buyers and sellers that potentially provide support for all of the steps in the entire order fulfillment process. An electronic market uses information systems to support at least some of the different transaction phases electronically [Luxem (2000)].

However, Skjøtt-Larsen et al. (2003) suggest that most e-marketplaces do not support all transaction phases (i.e. information, negotiation, settlement, and after sales). This implies that the market engineer needs to decide which phase(s) it wants to support in. The market engineer is the one who manages these decisions by means of structured and systematic procedures. Market engineering is the discipline of making markets work [Weinhardt et al. (2003)].

2.2 E-marketplace framework for knowledge sharing

This brings rise to the question to which transaction phase(s) a market engineer wants to support in. However, there are other elements on which a market engineer is able to decide on as well. A distinction can be made between elements that are determined by the market engineer and those that cannot be determined or even influenced by the market engineer. In figure 3 a presentation is given to the basis of the framework. The framework consists of several layers. Some layers are a given fact and therefore cannot be influenced or changed by the market engineer. Other layers can be (in)directly changed or determined by the market engineer [Müller (2005)].

The basis for an analysis of an electronic market is the environment. This environment consists of the economic, social and cultural environment. Other important aspects of the basis for the analysis are the characteristics of the services traded. These layers cannot be changed by the market engineer (visualised as hexagons in figure 3) and are the input factors for the next elements. The next three layers consists of market elements that are to be determined by the market engineer. According to the framework the first thing a market engineer should do is determine the marketplace strategy.

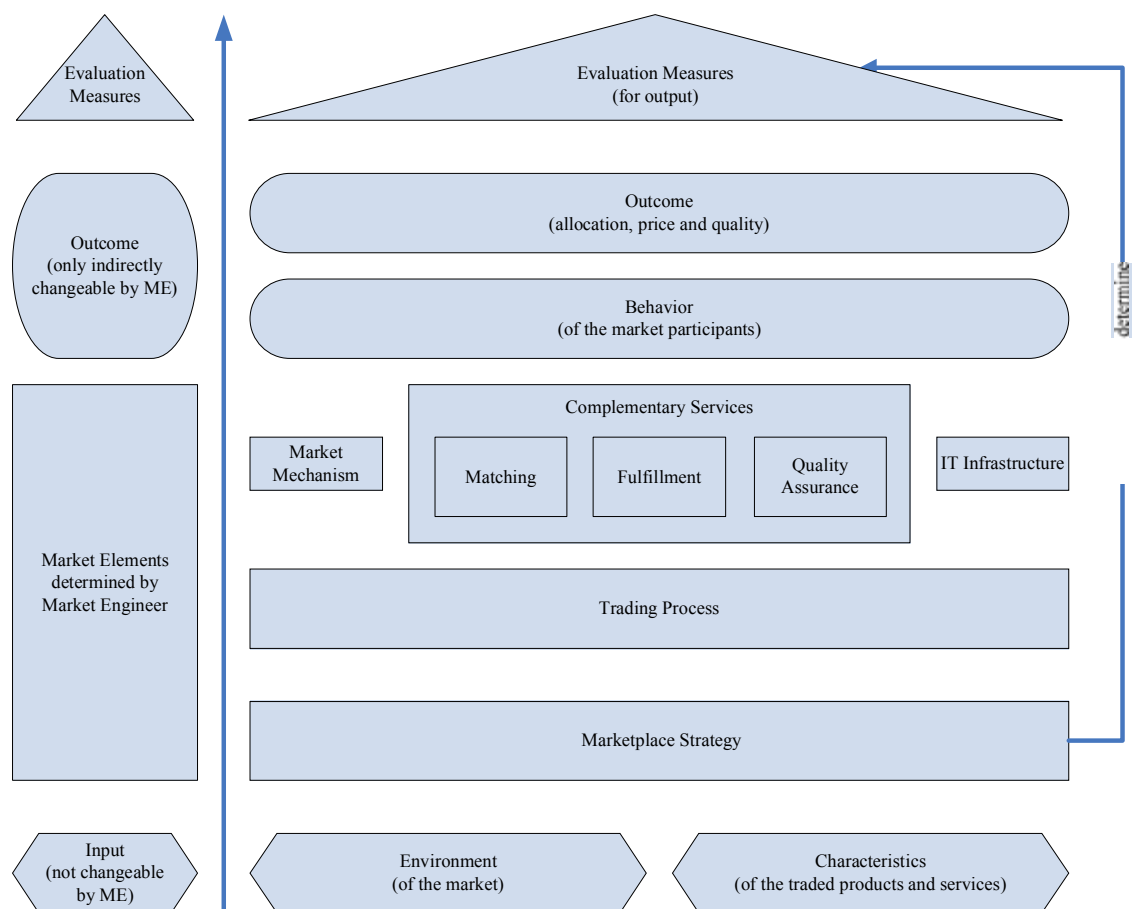


Figure 3 A framework for electronic knowledge markets [Müller (2005)]

The marketplace strategy takes into account the environment and the characteristics and is the foundation for all elements that are under direct control of the market engineer (visualised as rectangles in figure 3). The trading process defines the sequential order of the tasks and activities of the marketplace and is the second element on which the market engineer has to decide on. According to the framework, there are three other elements. These elements will differ from the e-marketplace framework for home care services, as will become clear in the next chapter.

The market mechanism

The bidding process can be seen as a market mechanism in the knowledge trading process. For the input of the process, it entails the bids of the players. The decision who gets the items and what price they have to pay can be seen as the output of the process. The market mechanism determines who gets access to which assets for which price. However, this will not hold for the trading of home care services due to the fact that this is part of a regulated market (see paragraph 3.2).

The IT infrastructure

The IT infrastructure is the collection of devices or IT assets used for data transport, i.e. internal networks, telephone lines, software, etc. The market must be well integrated into the daily work. To achieve this level of integration, IT architecture must be used in order to easily integrate this into other programs like office applications or portals.

The complementary services

The complementary services may differ according to which market the market engineer wants to operate in and to which services it wants to support. The services may exist of matching suppliers with buyers. It may concern the fulfillment of the transfer or concern the assurance of the quality of the traded commodity or service, etc.

Outcome and evaluation measures

The market engineer decisions influence the behaviour of the market participants, i.e. the participation decision. The behaviour is not under the direct control of the market engineer and can only be influenced indirectly (visualised as ovals in figure 3). The behaviour then determines the overall market outcome, i.e. revenue, prices, and allocation. The outcome can be evaluated by different measures, depending on the goal of the marketplace owner or regulator [Müller (2005)]. As already stated the framework is developed for knowledge sharing and trading. Trading knowledge assets is not equivalent to the trading of home care services. The home care services market is a regulated market. Because of the fact that the input layer of the framework is different, it is important to investigate the other layers that are built upon the input layers and check for the applicability of the following ones. By analyzing the different layers and amending them, one is able to make a translation to a framework that is suitable for a home care services e-marketplace. Chapter 3 elaborates on this matter.

3 Translation of framework for home care services

This chapter presents a translation of the framework to one that is suitable and intended for the trade of home care services. All aspects that are of importance to the framework will be elaborated. Paragraph 3.1 presents the environment of the health and home care services sector. Paragraph 3.2 treats the characteristics of the services traded. When the input is available, the appropriate marketplace strategy can be determined (paragraph 3.3). Paragraph 3.4 discusses the trading process. Due to the duration of the research and the content of the master degree program, the IT infrastructure that is needed for the e-marketplace will not be incorporated in this research. As described in the first chapter, one of the objectives is to create an online advisory in the form of a suppliers' selection matching tool. In other words, the provision of a complementary service by matching home care buyers with home care suppliers. This can be addressed in the complementary service part of the framework. Due to the significance of this topic in this research, it is treated separately and hence presented in chapter 4.

3.1 Environment of the home care services sector

In the Netherlands, the supply of domestic care is in hands of care and nursing institutions and institutions that provide home care services. The healthcare sector is undergoing tremendous and far-reaching change. This change can be explained by defining and examining components of the external organisational environment. This includes all elements that exist outside the boundary of a healthcare organisation and have the potential to affect the organisation. The description is based on the different environmental aspects of organisations as distinguished by Daft (1994). The reason for this choice is that Daft has developed a method by describing the more traditional organisations and not specifically ones for healthcare.

The innovation tendencies in the healthcare sector have been activated mainly by economic aspects. Analyzing domestic healthcare organisations and the market as a traditional one, makes it easier to comprehend the full picture. Both aspects, internal and external to the organisational boundaries, will be described by the potential affects they have on healthcare organisations. The general environment is some sort of layer that is widely dispersed and affects organisations indirectly. It includes social, demographic, economic, and technological factors that influence all organisations. The general environment is characterised by the ongoing change of the environment by the market and has indirect influence on organisations.

3.1.1 The sociocultural dimension

The social cultural dimension of the general environment represents the demographic characteristics as well as the norms, customs, and values of the general population. Important sociocultural characteristics in respect to the home care sector are the population density and the population age of home care consumers. Today's demographic profiles are the foundation of tomorrow's workforce and consumers.

Sociocultural aspects

Health is universally regarded as a basic necessity. The World Health Organisation defines health as a state of complete physical, mental and social well-being. The Netherlands have a domestic healthcare history for approximately 125 years. During this period, domestic care has been continuously developing and as we speak many organisational changes are taking place. In total 184 000 people work in the domestic care sector and are part of the domestic care branch and thus responsible for providing care to more than 2 million home care consumers. The care service and aid vary from simple domestic work to very specialised care: preventive care for baby's and youngsters, nursing and care of chronic patients and disabled, elder care and intensive and terminal guidance. Elder care can be thought of as an umbrella of care and services for the frail elderly. These include a broad range of services like meal distribution and socialization activities, personal care, light housekeeping chores, residential facilities, and adult day care. In the Netherlands the level of healthcare is high. The average life expectancy, which is 76.3 years for men and 81.1 years for women, is an indication of this. However, not all these years are spent in good health. Men spend an average of 14 and women an average of 20 years of their lives in less than good health [Dutch Ministry of Health, Welfare and Sport, n.d.]. A large proportion of the budget for healthcare goes to common illnesses that require lengthy and intensive treatment.

Norms and values

In general the Dutch government is responsible for healthcare of all its citizens. The Dutch health policy legislation provides obligatory insurance payments in order to finance large numbers of Dutch healthcare institutions. Healthcare is provided by a wide range of institutions and professionals. The key concerns are affordability, quality and accessibility. Quality of care is regulated by a number of laws. Patient and consumer organisations also contribute to the quality of care and ensure that patients have a say. They can for instance call insurance companies to account on the purchase of good quality care. Hospitals, homes for the elderly and other care providers are responsible for setting up and monitoring their own quality systems. The Healthcare Inspectorate supervises the quality of care on behalf of the Dutch government.

Home care is mainly financed by means of the Exceptional Medical Expenses Act (AWBZ). This means that all citizens in the Netherlands can appeal to home care, regardless of race, place of residence or age (for an explanation of AWBZ see paragraph 3.1.4). In order to acquire home care one must turn to the CIZ. This organisation determines the sort and amount of care granted in hours per week. On the basis of this calculation the home care institutions deliver the service. Recently the new national insurance law has done its entrance and so has the law for social support called the WMO. These two laws influence the ways in which healthcare is financed. Some services will be financed by the AWBZ and some by the WMO and therefore are carried out by the municipalities and no longer by the home care institutions.

3.1.2 Demographic aspects

The Netherlands is a highly decentralised country, with 12 provinces and 646 municipalities. Each province has its own representative body, the Provincial State, whose members are directly entitled to issue ordinances concerning the welfare of the provinces and to raise taxes. Each municipality forms a corporation with its own interests and rights subject to the general law, and is governed by a municipal council directly elected for four years which has the right to issue laws concerning municipal welfare and to levy certain taxes. These decentralised levels of government are responsible for most of the organisation of the healthcare system. Dutch municipalities have a statutory duty of care to the elderly and the disabled, which means they must provide services like transport, wheelchairs and special facilities. Patients can now apply to a special municipal agency for care services or a personal budget with which to purchase the care themselves. This has led to greater flexibility and a more demand-driven approach among care providers.

Table 1 Population prognoses ≥ 65 until 2050 Source data: Social Cultural Planning Office

Long-term population prognoses, 2006-2050 for age category ≥ 65 (in thousands)													
Period	2008	2009	2010	2011	2012	2017	2022	2027	2032	2037	2042	2047	2050
Amount	2409	2461	2520	2569	2680	3079	3412	3751	4056	4253	4197	4058	3964

All countries are experiencing a strong demographic ageing situation. Although the Netherlands belongs to one of the youngest countries of Europe (EU15), there is great reason for vigilance because the tempo of ageing is one of the highest in Europe [De Vries (2006)]. The number of persons aged 65 and over, relative to the working age population is set to double between 2010 and 2030 [OECD (2002)]. This will reduce economic growth and increase resource transfers to the elderly, placing pressure on the retirement income and healthcare insurance systems. The Netherlands is better prepared than most other OECD countries to meet these pressures as it has a large, funded occupational pension system. This reduces fiscal pressures from population ageing, although they remain substantial. Pre-funding these budget pressures, enhancing productivity growth, prolonging working lives and containing the increase in transfers to the retired population can reduce the economic costs of this demographic shock.

As can be seen in figure 4 the prognoses of the population growth are rising for all age categories. These categories account for practically all consumption of home care services. This results in an increasing demand for healthcare and home care services in absolute sense. The amount of chronic patients is increasing as well so that the demand for care is reinforced even more (Van Wijk, Roszek and Kallewaard, 2001). The total number of people with a chronic disorder (approximately 20% of the Dutch population) is responsible for approx. 80% of the care consumption in the Netherlands. Both percentages will increase. The increase of the number of chronically ill patients is only partly due to population ageing. Advanced technology is a second important factor as several diseases become chronic (e.g. cancer). The treatment of chronic patients will lie mainly in the hands of home care services.

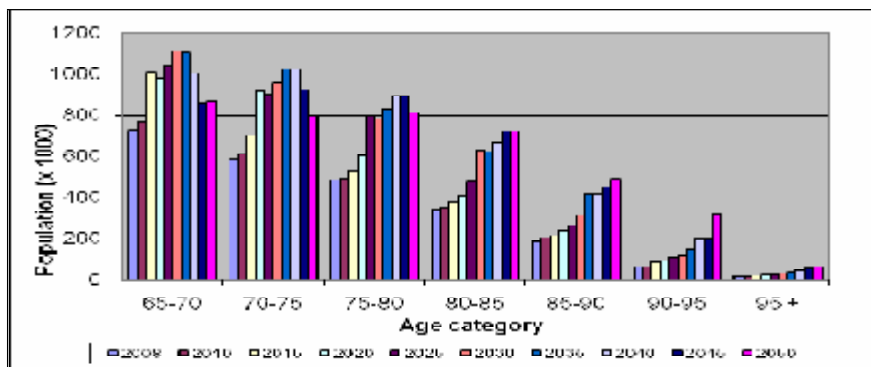


Figure 4 Population prognoses > 65 until 2050 Source data: Social Cultural Planning Office

Beside purely demographic factors that increase the demand for healthcare, new kinds of healthcare services arise as well. Approximately 50% of the increase comes from the changing composition of the population. Moreover, due to innovative technological advancements and changing conceptions of patients themselves, this effect is even reinforced [De Vries (2006)]. Innovation and changes in the home care services must be examined in respect of these developments. On the labour market a reversed tendency can be seen. The amount of people that constitute the workforce (20-64 years) remains stable or shows a slight decrease. An important conclusion is that not only will there be pressure on the healthcare but on the home care in general as well. An increase of the workload forces home care institutions to supply more hours of care services. This can be realised by hiring more staff or working more effectively and more efficiently with the current staff. It appears that this is an important driver for innovation in the home care sector [De Vries (2006)].

3.1.3 Legal/political aspects

The Netherlands' first social legislation dates from 1800. It was a very minor law setting down rules for employing young people and women, but it was the first in what would become one of the most extensive, generous bodies of social legislation in the world [the Netherlands & the Embassy, n.d.]. Recently, however, in the light of demographic ageing, the social system has been overhauled with the aim to activate more of the population. In other words, to stimulate participation. A number of recent political developments that have influenced the functioning of home care organisations can be identified. These developments originate from the fact that governmental institutions recognize the increasing pressure on healthcare and see the need to change healthcare policies.

Recent years have seen a shift towards care in the community for the elderly and the disabled. The focus is no longer on the illness but the person with the illness, who wishes to lead as independently as possible. Care previously confined to institutions can now be provided at home, if the patient wishes. Key issues concerning the structuring and market approach of healthcare are decentralisation, scale reduction and liberalisation. Institutions should, according to the government, profile themselves on the basis of quality, treatment methods, service and/or accessibility. This can be realised through better insight in the quality of the current products and services offered.

Secondly, one sees that the concept of Corporate Social Responsibility (CSR) in the healthcare sector is being more and more permitted and encouraged/stimulated by the government. This trend has been effected by freedom of negotiations and Diagnosis and Treatment Combinations (DTC) in hospitals. In 2006, this is applied by means of transmural DTC's; e.g. diabetes. Healthcare consumers are in this way expected to purchase their own healthcare service from insurers, who have negotiated the provision of healthcare with care providers. In the home care sector this development is less visible but the prediction is that the rising market approach will result in more demand for care providers and healthcare professionals in the home care sector.

Thirdly, the government and care institutions realise more and more that intramural care is relatively expensive compared to home care. In the past two decades there has been a lot of attention towards the limitation of duration of hospital stay and extramuralisation. Extramuralisation and socialisation have been the policy issues that underlie the current reforms in the Netherlands. Extramuralisation refers to the shift from care provided in institutions to care provided at the client's home. These concepts are the result of awareness in healthcare policy and automation developments of medical devices through new technologies and improved medical procedures. It is probable that this tendency will continue to increase these coming years. Because of this a shift takes place from care in hospitals to nursing homes and even domestic homes and therefore to home care. This shift will put pressure on nursing homes and home care organisations to cope with a larger number of patients and with heavier demand for home care. This last phenomenon is accompanied by a large shift in the healthcare sector. Large and bureaucratic organisations like the care and nursing homes are decomposed under pressure of governmental bodies by means of (financial) separation of living and healthcare or extramuralised. The eldercare are thus in many cases changing gradually towards the direction of integral care supply which fall under the common denominator well-being, care and living. All kinds of healthcare that fall under the terms well-being, care and living, must then be provided in the form of home care and other additional services. This will also result in a broadening of the products and services that home care institutions provide.

3.1.4 Economical aspects

In 2005, the Netherlands spent 46 billion Euros on healthcare. Despite government efforts to keep care affordable, healthcare is the fastest growing item in the national budget, due to demographic ageing. Because of the post-war baby boom and a birth rate that continued to rise until about 1970, roughly four million residents of the Netherlands will be over 65 years of age in 2030. That is almost a quarter of the population. Currently, people over 65 make up about 17% of the population. As the number of seniors grows, so too will the pressure on healthcare services. For this reason, cost control is currently a key issue in the Netherlands. The government is trying to introduce incentives into the healthcare system to increase efficiency. People, too, are being given more responsibility.

The system

The Dutch social security system is based on social insurances and supplementary income support provisions. The two categories of social insurance – employee and national insurances – are paid for jointly by employees and employers. Employees in the Netherlands are automatically insured under several acts of parliament. In this context, an employee is defined as someone who works for an employer and has an employment contract.

National insurances

Everyone who lives in or is in paid employment in the Netherlands falls under the Healthcare Insurance Act (ZVW). This act forms the basis of the medical insurance system in the Netherlands. Since January 2006 there is a single healthcare insurance for everyone. The composition of the basic insurance package is laid down by law. Everyone is free to take out insurance with the company of their choice. Insurance companies are obliged by law to accept everyone, regardless of age or health, and may not charge higher premiums for people who are ill or old. The AWBZ is an example of national insurance.

Financing mechanisms

Healthcare financing in the Netherlands is predominantly organized on the basis of social health insurance. Furthermore, there are contributions from general government revenue and, fairly limited, from direct payments. The system consists of three compartments, as illustrated in table 2. The 2006 healthcare reforms mainly affected the second compartment.

The first compartment of the Dutch financing scheme refers to the Exceptional Medical Expenses Act (AWBZ). It is a population-wide, mandatory health insurance scheme covering exceptional medical expenses (long-term care and high-cost treatment). Contributions to the fund are income-related salary deductions (with a maximum ceiling) deducted from the taxable income of employees or social security beneficiaries by the employer or the responsible institution. In 2004, the contribution was 10.25% of taxable income; in 2006, this increased to 12.55%. The AWBZ also receives a grant from general government revenue and co-payments from consumers for nursing home costs depending on a person's financial position. The fund is managed by the Healthcare Insurance Board (CVZ)

The second compartment has been reformed and is further discussed in the following section. The third compartment represents voluntary, supplementary health insurance. It refers to healthcare services that are regarded as less necessary. Almost all sickness funds offer the possibility of voluntary supplementary health insurance to their members. Since January 2006, consumers can buy additional health insurance from another insurer than the basic benefit package. Insurers may apply risk selection in this compartment only.

Before January 2006, the Dutch home care was financed from the General Exceptional Medical Expenses Act (AWBZ). One could claim assistance under the AWBZ to provide additional home care. To obtain this benefit you had to be reassessed on a regular basis by the Needs Assessment Centre (CIZ). In addition to the home care services, one could employ someone for additional services and pay the salary from the personal budget.

Table 2 Healthcare insurance reforms

Before reforms	After reforms
<p>Supplement health insurance (voluntary) <i>Third compartment</i></p>	<p>Supplement health insurance (voluntary) <i>Third compartment</i></p>
<p>Sickness funds Private health Insurance (compulsory under a certain income) (mostly voluntary) <i>Second compartment</i> <i>Second compartment</i></p>	<p>Social Health Insurance (compulsory for the entire population) <i>Second compartment</i></p>
<p>National health insurance for exceptional medical expenses (compulsory for the entire population) <i>First compartment</i></p>	<p>National health insurance for exceptional medical expenses (compulsory for the entire population) <i>First compartment</i></p>

Since 1 January 2006, there has been a single healthcare insurance system in the Netherlands. Everyone living in the Netherlands or paying income tax here is required to take out compulsory healthcare insurance. Although the basic package is fixed by law, people are free to choose their insurer. Insurers have a duty to accept everyone for the basic package and older or chronically ill people may not be charged higher premiums for the basic coverage. The new system should lead to more efficient and client-centered healthcare services.

As from 1 January 2007 not all domestic care is part of the AWBZ. Some are part of the WMO. Since 1995 there exists a personal budget (PGB) in order to purchase care. With this budget a person that needs home care can purchase the necessary service. The PGB is financed from the AWBZ and everyone who has the right to home care has can apply for a PGB. At this moment about 80,000 people use of the PGB regulation with which they can buy the care. This is about 10% of total home care consumption. The remaining group makes use of the regular care, where insurers can make arrangements with home care organisations and where the patient/client is free of organisational involvement. In conclusion the main healthcare developments consist of the following:

- Patient and consumer organisations will contribute to the quality of care and ensure that patients have a say.
- An increase in workload as a result of an increase in chronic disease and a stable workforce, forces home care institutions to supply more hours of care services by working more effectively and more efficiently with the same amount of staff.
- Key issues concerning the structuring and market approach of healthcare are decentralisation, scale reducing and liberalisation.
- Healthcare institutions should, according to the government, profile themselves on the basis of quality, treatment methods, service and/or accessibility.

- Healthcare consumers are expected to purchase their own healthcare service at healthcare insurers who have negotiated the provision of healthcare with care providers.
- The government is trying to introduce incentives into the healthcare system to increase efficiency. People are being given more responsibility.

The environmental aspects of the home care services sector may be seen as opportunities for supporting the home care services trading process. Now that the main environmental aspects have been identified, one can move to the characteristics of the traded commodity, i.e. home care service. This is the second hexagon in the model and cannot be changed or influenced by the market engineer.

3.2 Characteristics of the home care services sector

This paragraph describes the characteristics of the home care services sector. The most distinctive characteristic one must acknowledge is the fact that in the Netherlands, the healthcare sector is a regulated market. The provision of healthcare goods and services is regulated by several government appointed bodies. The regulations cover the terms and conditions of supplying the goods and services and in particular the price allowed to be charged. In 3.2.1 the services are presented. Paragraph 3.2.2 presents the structure of how the application for the services is attained.

3.2.1 Services

The home care services for which one can apply are of different kinds. These services are provided in the context of care management. WMO care exists of services for the disabled and domestic care services which were formally provided by the AWBZ. The purpose of the WMO is: 'participation'. The government wants to assure that citizens are able to live at home independently and remain participants of society. Therefore the WMO must provide services and products that help this category of care consumers.

- **Domestic care**

Domestic care differs from attendant care. Domestic care is aimed at the range of duties that enable a household to function normally. It is also known as ADLs (Activities of Daily Living) and includes — cooking, cleaning, washing, ironing, shopping, gardening, household maintenance, brushing and meal preparation. In the home care sector this kind of care is part of the WMO and under direction/supervision of representatives of the municipal council. In nurse and caring homes, domestic care is integrated in the total provision of care of the nursing home and is part of the AWBZ. For care that is only part of the AWBZ a distinction can be made in six different kinds of care services.

- **Attendant care**

Attendant care are those activities where your needs are met in your own home, which may include assisting you with — eating, dressing, bathing, shaving, personal hygiene, lifting/transferring, taking of medication and other 'home health aide assistance for personal care' activities. Attendant care workers can also assist with personal management tasks such as: writing and mailing letters, paying

bills, making phone calls and shopping. They may also assist you with attending community activities and social or recreational events, with transport and other duties as required.

- **Supportive guidance**

Supportive guidance aims at the promotion and support of self-facilitation of care. Examples are structuring daily activities and exercising skills in order to improve all functions of daily living.

- **Nursing**

Nursing focuses on the recovery or prevention of a disorder or handicap. Health problems are diagnosed and operations are expertly carried out. Examples are medication administration, oxygen provision, wound care, physical control, analysing aid needs, mobility support, etc. Palliative care is also part of the nursing services and is any form of medical care or treatment that concentrates on reducing the severity of the disease symptoms, rather than providing a cure. The goal is to prevent and relieve suffering and to improve quality of life for people facing serious, complex illness.

- **Active guidance**

Active guidance entails the support of care consumers in coping with (the effects of) disorders, disabilities or handicaps. The treatment is partly given in an institution and partly at home. Examples are: intervention in behaviour, exercises, revalidation and improving social capabilities. The Behaviour Intervention Service (BIS) is a specialist service for people with ageing disability. People provide services or care for people with intellectual disability who have challenging or offending behaviour.

- **Treatment services**

Treatment services are services aimed at intervening medical complaints and are therefore focused on curative issues. Treatment is always provided by a medical-specialist or paramedical-specialist and is performed by a healthcare institution. Healthcare workers provide clinical services to patients under the supervision of a physician. This term generally encompasses nurses, therapists, technicians, and other ancillary personnel involved in medical care but is frequently applied specifically to highly trained persons who share direct responsibility for patients' care with a physician.

- **Admission**

If it is impossible to continue living at home independently (due to dementia or other very serious physical restrictions) a protected or therapeutic environment such as nursing home is provided. The care consumer can stay in an institution during day and night. There is permanent supervision, supportive activities to improve daily well-being issues, as well as domestic care, meal service, etc.

In order to receive a home care service one must apply for the necessary service. As stated before paragraph 3.1.3 en 3.1.4 the home care services sector is a regulated sector. The application for home care service and its structure is regulated by law.

3.2.2 Structure of application

In order to receive care one must apply for care. As already stated the two regulation domains are the WMO and the AWBZ. A consultation and assessment are available upon request. For the WMO domestic support at home is attained through an indication assessment interview conducted by a municipal council employee. For AWBZ care this is done through an intake assessment interview at CIZ. This visit helps to understand the client's wants and needs, and to answer any questions the client or family may have. The consultation includes an assessment of the social and physical environment. An individualized care plan is developed at the start of care and is continually reviewed to ensure that the needs of the client and the family are being met. The services are available for short intervals, longer stays or round-the-clock live-in care. The begin of the application process for home care starts with an application form. As an example, a part of the application form is shown below:

WHAT KIND OF CARE DO YOU NEED?		
<input type="checkbox"/> Attendant care	<input type="checkbox"/> Active guidance	
<input type="checkbox"/> Supportive guidance	<input type="checkbox"/> Treatment	
<input type="checkbox"/> Nursing	<input type="checkbox"/> Admission (see below)	
When you choose to stay, how many days per week do you wish to stay?		
<input type="checkbox"/> 1 day <input type="checkbox"/> 2 days <input type="checkbox"/> 3 days <input type="checkbox"/> 4 days <input type="checkbox"/> 5 days <input type="checkbox"/> 6 days <input type="checkbox"/> 7 days		
Possible explanation:		
How long is your estimate on the duration of the care needed?	<input type="checkbox"/> Less than 3 months	<input type="checkbox"/> Between 3 and 6 months
	<input type="checkbox"/> Between 6 months and a year	<input type="checkbox"/> Longer than a year
	<input type="checkbox"/> Undefined period (=for always)	<input type="checkbox"/> Unknown
Has the care provision already been started?	<input type="checkbox"/> No, desired start date:	<input type="checkbox"/> Yes on:

As is clear from the application form, one is able to apply for different forms of care service. The next step is to indicate the desired way of how the care is received, i.e. care in kind or a PGB. In the first case the organisation regulates the supply of care and care employees together and in consultation with the care consumer. With the PGB, the care consumer can make use of an agreed amount of monetary resource and is free to spend it like he or she wishes to. This way the care consumer determines where the service is purchased and who provides it. However, the care consumer must administratively justify how the budget was spent.

Now that the environment and the characteristics of the home care services sector are identified, the market engineer is able to determine the next elements or layers of the framework, beginning with the marketplace strategy.

3.3 Marketplace strategy

In the market engineering approach, the marketplace strategy defines the business model for the market. [Weinhardt et al. (2003)] This element of the framework describes the target groups for the marketplace and the financial model in which the market engineer is intending to make money and recoup expenses. Besides these topics, strategies to ensure a critical mass of participants and trades are necessary as well. The business model must satisfy both the home care provider and home care consumer and generate enough revenue to run the market.

The e-business model for this research is the marketplace model or “trading community” (many-to-many). Four distinct e-marketplace models have emerged [Cap Gemini Ernst & Young (2002)]. The models are separated on the basis of ownership role and value proposition scope. In this situation we may speak of an Independent Model. The Neutral Independent Marketplace has the highest value when buyers and sellers are highly fragmented, and commoditised, and standardised products are involved, as is the case in the home care services sector.

3.3.1 Target group

An organisation generally creates value for a specific customer segment. The definition of the market scope [Hamel (2000); Afuah & Tucci (2001)] captures the essence of where the firm does and does not compete – which customers, which geographical areas, and what service segments. In this case the potential customers are home care consumers and home care providers. However, the focus in this assignment for the strategy lies with the consumers as will become clear in chapter 4.

3.3.2 Financial model

The financial model deals with the question of how the market covers its costs and yields a profit. There are different revenue opportunities for an electronic marketplace. In “Supplier Adoption: Getting Ready for e-Business” Cap Gemini Ernst and Young have identified the characteristics of the different e-business models. For the independent marketplace the business model and thus revenue may be realised by

- Participation Fees. A participation fee may be charged for access to the market.
- Transaction Fees. These are fees that may be charged per transaction. The fee could be a fixed amount per transaction or it could be a fraction of the sales value or a combination.
- Membership Fees.
- Advertising.

Focus Cura wants a transaction-based business model, in which the company collects revenue by taking a fee on its customers' transactions. The justification for this is that home care organisations will save money by cutting costs on acquisition and the supply of information which is provided by the matching tool.

3.3.3 Critical Mass

A potential seller profits from a market with a higher number of potential buyers. Vice versa, a potential buyer is interested in as many potential sellers as possible [Müller (2005)]. Web sites, e-marketplaces a.o. feature a network effect [Economides (1996)]. The value of the marketplace to a new user is proportional to the number of other users in the market. In other words, the utility of the market for the participants is a function of the number of the participants. As will become clear in paragraph 4.2.2 the choice for a home care provider is based upon quality aspects only and not on price. The theory is that as the number of users and therefore quality assessment editors grows, the quality of information on the e-marketplace improves, encouraging more users to turn to it as a source of information; some of the new users in turn become editors, continuing the process and encouraging care providers to become more competitive and improve their services. However, to make the decision to participate in a market, based on the utility of the market, there may exist a critical mass of participants that has to be reached to have a sustainable situation [Müller (2005)]. Because the significant factor for the success of the markets is the number of participants, the market strategy must be crafted in order to gain these participants.

Micro-segmentation

In order to assure a sufficient amount of market participants, a strategy is needed. Micro-segmentation is a strategy applied in marketing to narrow and refine a market into smaller segments on the basis of common characteristics — age, beliefs, residence, medical needs, quality preferences. Micro-segmentation is critical to focused direct marketing messages aimed at niche customer segments and will be further explored in the suppliers' selection tool section in chapter four.

Customer relationship

Besides a critical mass and the micro-segmented way in attaining this amount, one must also retain its customers. According to Dubosson-Torbay (2001), the importance of customer relationship potential is often forgotten in other business model approaches. Most are mainly focused on products, value creation processes and exchange patterns between different actors. However, other e-marketplace frameworks show that ICT offers a whole new range of opportunities to exploit customer relationships. This may be done by getting a feel for the customer's desires, serving the customer and developing an enduring relationship with the customer. Getting a feel for the customer and especially for customer relationship management (CRM). Hamel (2000) calls this the positive feedback effect. This aspect will be dealt later in the assessment part of the suppliers' selection matching tool for the assessment part is in turn the input data needed in order to update the matching tool.

Based on the business model the market operator has to decide on the other market framework elements. These are discussed in the corresponding sections. How the market operator wants to form the home care services trading process will be discussed in the next paragraph. The way in which the additional value to the market participants is assured by matching the right expert to the advice seeker will be discussed in chapter 4.

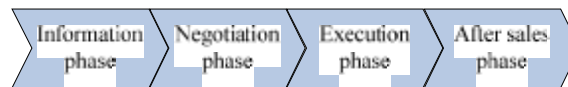
3.4 Home care services trading process

The second element on which the market engineer has to decide on is the trading process. In this paragraph, a presentation is given of the different transaction phases in the home care market trading process as are the transaction costs that occur during the trading process. One objective of an electronic marketplace is to reduce these transaction costs by automating them.

“A transaction occurs when a good or service is transferred across a technologically separable interface. One stage of activity terminates and another one begins” [Williamson (1985)]. Several transaction phases can be identified when it comes to interaction process of a market. The interaction process of a market is defined by exchange. Transaction costs are the costs of specifying and enforcing the contracts that underlie exchange. The costs of transaction costs can be clustered into costs which occur in the information phase, in the negotiation phase, in the settlement and in the after sales phase. As will be described further on, Focus Cura wishes to provide support in the first and last phase of the trading process.

3.4.1 The phases

In the framework developed by Müller (2005) the transaction phases can be divided into four separate ones:



For this research the same four transaction phases are used and so are their characteristics. In order to get a clear picture of the position of Focus Cura in the transaction process, the model developed by Gebauer (1999) is used. The outline of the model was developed in order to improve the conceptual design of web-based information systems to support business-to-business transactions. This part of the framework delineates the different phases of commercial transaction processes and is suitable to indicate the various transaction flows of the home care trading process.

Information Phase

During the information phase, suppliers and buyers attempt to get information about market participants and about services being traded. The quality of the service is what is under investigation. In an electronic marketplace the home care provider can tender their services, so that buyers can search for the right service provider. The right service provider can depend on many factors as described in paragraph 3.2.1 and 4.2. Transaction costs occur during this phase because of the search for the right trading partner. The information phase will consist of eventually matching services and will be discussed in chapter 4.

Negotiation phase

During the negotiation phase the settlement of the transaction conditions between the sellers and the buyers take place. This phase ends with a legally-binding contract. In normal e-marketplaces the method for negotiation can be defined through several market mechanisms. The use of a market mechanism does not imply a free market per se. When it comes to the healthcare market in the Netherlands for which the prices of the healthcare services are fixed and determined by the government, market mechanisms cannot lower the transaction costs of the negotiation phase. The regulations may cover the terms and conditions of supplying the goods and services. The negotiation phase is not part of the process in which Focus Cura wants to be involved in and remains under the supervision of the healthcare provider. In this phase the time of service delivery must be agreed upon.

Settlement phase

In the execution phase, the contract is fulfilled and the services are exchanged. The home care service is transferred in this phase. The home care provider will give the service to the home care consumer. This, too, is not part of the involvement of Focus Cura and remains under the supervision of the healthcare provider.

After sales phase

During the after sales phase all activities after the settlement phase take place, i.e. payment of the goods or services and their assessment. Focus Cura only wishes to take part and facilitate in the assessment part of the after sales phase. This means it wants to be an e-marketplace facilitator that works with a reputation system. The service buyer rates the service provider in this phase. An example of this is an email sent to a care consumer in which the quality of the care service is rated on all sorts of criteria (see paragraph 4.2.2). This way the risk that the service provided does not have the quality expected can be reduced and the same quality assurance may be gained by others. Furthermore, the transaction fee that will be charged per transaction must be collected in this phase. It can be concluded that the involvement of Focus Cura in this process is in the beginning and at the end of the spectrum of the trading process. To get a clear picture of this situation, the transaction phases and their characteristics, a scheme is shown on the next page.

Figure 5 presents the different phases of the home care trading process and again the role Focus Cura wants to adopt.

Role Focus Cura = _____

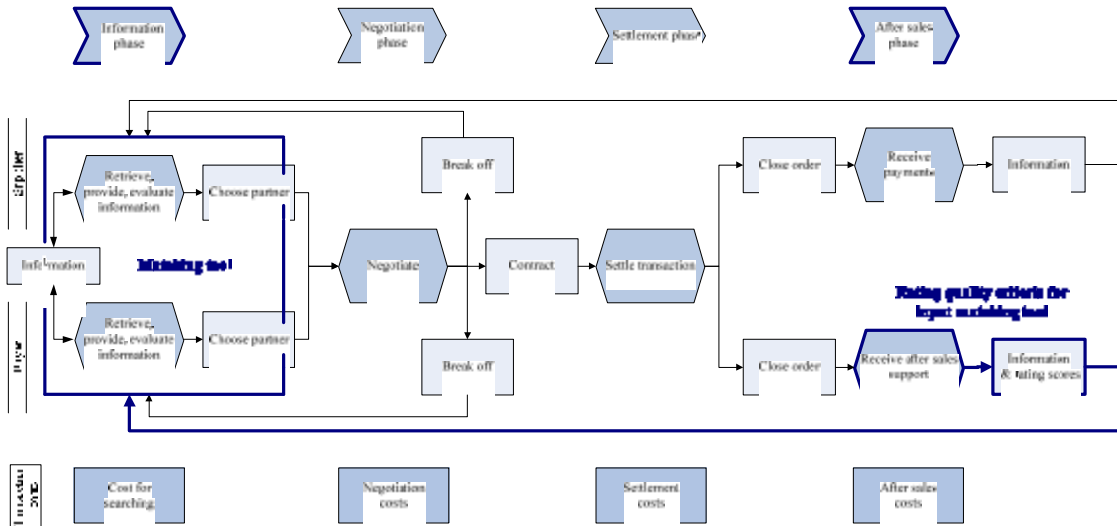
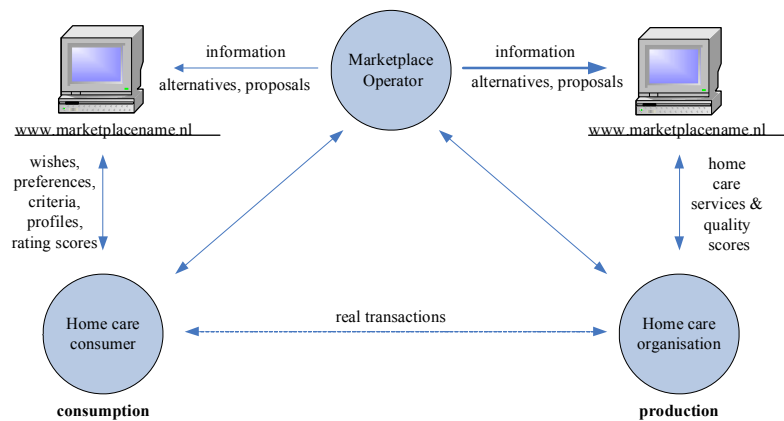


Figure 5 The four transaction phases and their characteristics adopted from Gebauer (1996)

Figure 6 Real and virtual transactions



information & after sales phase is done by virtual contact through the e-marketplace facilitator
negotiation & settlement phase is done by real contact through the market participants

Transactions during the information phase are virtual. The information is provided by the suppliers' selection matching tool. The after sales phase concerns an assessment of the home care organisation and service provider. Chapter 4 elaborates on these issues. The real transactions exist of the provided home care services and other tasks that are not provided by the market operator, i.e. payments etc. Now

that all elements for trading home care services are identified and it is clear to what trading process phases Focus Cura wants to facilitate, the amendment of the e-marketplace framework is the next step to take.

3.5 E-marketplace framework for home care services matching

For an e-marketplace framework for home care services, the framework for knowledge trading is very suitable based on desk research. However, some layers must be adjusted. It's mainly the middle part of the framework that needs amendments. The reason for this is the input of the framework. The environmental and characteristic differences of trading knowledge assets compared to trading home care services results in a different situation and thus makes this change necessary. The complementary services (shaded a darker blue) exists of the suppliers' selection matching tool. Two activities will be executed in this part of the framework. Both the matching of the home care supplier with the home care buyer is part of this element as is the assessment of the home care provider by the home care consumer once the service is delivered. Rating score data, then, function again as input for the matching tool. When the complementary services are determined the market engineer is able to take the next step. The market engineer has to provide the necessary IT infrastructure. After the completion of the IT infrastructure, all elements on which the market engineer is able to decide on are completed.

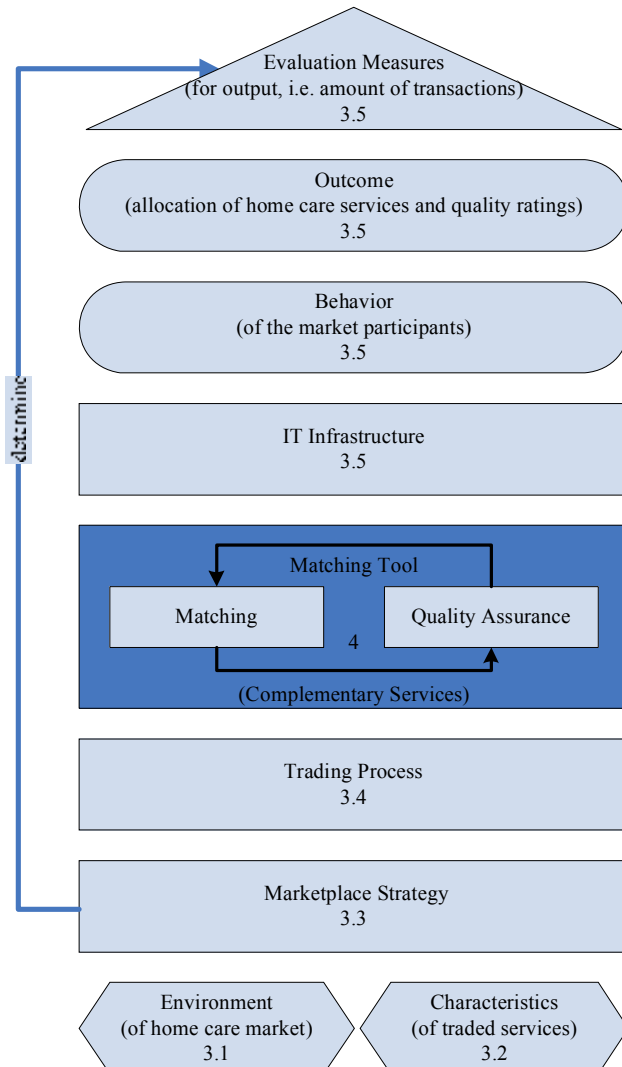


Figure 7 Framework for home care services trading

The rest of the framework follows the same layers as the original. The content however, differs on a few aspects. The outcome layer concerns only the allocation of home care services and the updated quality scores. The evaluation measures will exist of the amount of transactions. The reason for this is the financial model which is based on transaction fees. Now that the different layers or framework elements are identified, the start can be made with the creation of the complementary services element of the framework: the suppliers' selection matching tool.

4 Creating the supplier selection matching tool

4.1 Introduction

In order to create the suppliers' selection tool, research must be conducted in order to get the necessary elements. First of all, one must determine on what basis home care services are chosen. Besides of course the choice for the service itself, other criteria for the selection of a home care provider exist as well. Due to the fact that the home care sector is a regulated one, there is no price difference. Therefore to compete and distinguish oneself from others, home care organisations must compete on the basis of quality criteria.

4.2 Quality of home care services

Quality criteria of home care services can be described by dividing the criteria in two separate sorts, namely obligatory ones and voluntary ones. First of all, a home care provider must be qualified to provide the service. This is done by compliance of a quality certificate, described in paragraph 4.2.1. Furthermore quality determination is also based on users experience ratings. Paragraph 4.2.2 discusses this issue.

4.2.1 Quality certifications

Care organisations must offer good quality. For this matter a law has been established called the Law for Healthcare Institutions' Quality. This law states that all care institutions must provide responsible and justifiable care, therefore care of good quality. When organisations are aware how they score on quality criteria, they will be able to improve their quality. In order for healthcare institutions to deliver quality it must be clear on what the definition of quality is. There are several certifications for quality assessment. These certificates indicate what quality implies and how quality is measured.

HKZ certificate

HKZ-certificate (the foundation for Harmonisation of Quality Assessment in the Healthcare Sector) is a quality certification for institutions of care and wellness. Care institutions must offer quality for the complete care process. This concerns the indication and initial intake interview with patients, the quality of care attribution and evaluation of the provided service. Care institutions must pay attention to:

- the monitoring of professional acting;
- the communication of the care process;
- the recording of activities and care processes.

A care institution must regulate all supporting processes well. Supporting processes are not directly concerned with care provision, but are processes which are needed for an organisation to regulate care attribution well. It concerns for example — organisation policy, staff, housing and research issues. The norms of the HKZ certificate are in compliance with the international standard for quality management systems ISO 9001:2000.

HKZ certificate 1 and 2

HKZ-certificate 1 and 2 differ somewhat from the HKZ certificate. Organisations are able to attain the HKZ certificate in phases, hence certificate 1 and 2.

ISO

ISO 9000 is a family of standards for quality management systems. ISO 9000 is maintained by ISO, the International Organisation for Standardization and is administered by accreditation and certification bodies. Some of the requirements in ISO 9001 (which is one of the standards in the ISO 9000 family) includes:

- a set of procedures that cover all key processes in the home care sector;
- monitoring processes to ensure they are effective;
- keeping adequate records;
- checking output for defects, with appropriate corrective action where necessary;
- reviewing individual processes regularly and the quality system itself for effectiveness; and
- facilitating continual improvement.

A company or organisation that has been audited independently and certified to be in conformance with ISO 9001 may publicly state that it is "ISO 9001 certified" or "ISO 9001 registered." Certification to an ISO 9000 standard does not guarantee the compliance (and therefore the quality) of end products and services; rather, it certifies that consistent business processes are being applied. This is the only implementation for which third-party auditors may grant certification. It should be noted that certification is not described as one of the 'needs' of an organisation as a driver for using ISO 9001 but does recognise that it can be used for such a purpose.

MIK-V

ActiZ, the branch organisation for eldercare, developed its own quality system for nursing homes MIK-V (Model Inter Kwaliteitssysteem voor Verpleeghuizen). Care for patients must meet all kinds of conditions:

- the care service must be of good quality;
- it must be coordinated around the need of the patient;
- the service must be effective, efficient and client focused.

To be able to provide this, the organisations' processes must be well regulated and reliable. The processes describe several activities that must be carried out to provide good care. If a nursing home meets the conditions, the organisation gets MIK-V certification.

Perspekt certificate

Perspekt is a certification for nursing homes. Perspekt assesses organisations on the basis of recognised quality norms and delivers a certificate of good performance. Organisations can get a bronze, silver or golden certificate. Perspekt has developed the certificate by collaborating with care insurers and consumers' organisations. The quality system is named PREZO (Prestatiemodel Zorg).

Besides mandatory certificates, there are other criteria on which the quality of home care services is assessed. These quality criteria are discussed in the next session.

4.2.2 Quality criteria

Consumers have a central position in healthcare. Evidently, consumer experiences and satisfaction are important measures of quality of care. In recent years the interest in measuring actual experiences of care consumers has increased, as shown in the growing number of benchmark studies. The information obtained enables care providers to improve their services and supports consumers in making an informed choice of care provider [Delnoij et al. (2005)].

The NIVEL is an institute for health services research and contributes to the body of scientific knowledge about the provision and use of healthcare services. For this purpose NIVEL carries out research activities on the national and international level on the entanglement between:

- the need for health (health status, life style, social environment, norms and attitudes);
- the supply of healthcare (volume, capacity, organisational structure, quality and efficacy);
- healthcare policy (legislation, regulations, financing and insurance).

On behalf of the governmental body RIVM (The National Institute for Public Health and the Environment), the NIVEL defined several indicators of consumer judgments on healthcare based on consumer experiences: how do care consumers judge the care provided? The criteria on which home care organisations are assessed are divided in two users' experience rating domains — experience with the home care organisation and experience with the home care provider.

Organisation	Home care provision
Experience with home care organisation	Experience with home care provider
Scheduling and delivery	Professional expertise
Telephone accessibility	Treatment
Information supply	Patient centeredness
Care program, appointments and consultation	Communication
Flexibility	Support
Attention to safety	Attention for respite care
Reliability	Reliability

In principle, two parties are directly involved in the care giving process, that is the care giver (the healthcare provider) and the care receiver (the patient). In this context, the notion of 'demand-oriented care' is relevant: "the joint effort of patients and care providers that results in patients getting the help they wish and expect to get and that meets professional standards" [van der Kraan (2001)]. Demand orientation is a multifaceted concept. In this context, demand orientation is assessed by determining patient/client judgments of care received and people's trust in healthcare. In other words, the score on patient centeredness. This is just one example on how care providers are rated.

All these criteria will be used as criteria on which home care consumers can base their choice. Besides these quality criteria there are other criteria on which a home care organisation is chosen. The organisation must be in approximation of the residence of the care consumer, i.e. in the same municipality. Gender and age or generational difference will result in different preferences [Noble, et al. (2002)]. One can imagine that the elderly wish a more formal approach, whilst youngsters like an informal one. Preferences may differ greatly depending on the type of care needed. However, in all cases one will eventually choose a home care organisation and therefore structure the decision-making process.

4.3 MCDA methods

Multi-Criteria Decision Analysis (MCDA) or Multi Criteria Decision Making (MCDM), is a discipline aimed at supporting decision makers who are faced with making numerous and conflicting evaluations. MCDA aims at highlighting these conflicts and deriving a way to come to a compromise in a transparent process. When a MCDA problem is described, a decision matrix is used. A decision matrix allows decision makers to structure and then solve their problem by:

1. *specifying* and *prioritizing* their needs with a list of criteria; then
2. *evaluating*, *rating*, and *comparing* the different solutions; and
3. *selecting* the best matching solution.

If in a MCDA problem, there are M alternative options and each needs to be assessed on N criteria, then the decision matrix for the problem has M rows and N columns or M X N elements, as shown in the following table. Each element, such as X_{ij} , is either a single numerical value or a single grade, representing the performance of Alternative i on Criterion j.

	Criterion 1	Criterion 2	...	Criterion N
Alternative 1	X_{11}	X_{12}	...	X_{1N}
Alternative 2	X_{21}	X_{22}	...	X_{2N}
...	X_{ij} Good	...
Alternative M	X_{M1}	X_{M2}	...	X_{MN}

For example, if Alternative i is "Service Provider i", Criterion j is "Expertise" assessed by five grades {Excellent, Good, Average, Below Average, Poor}, and "Service Provider i" is assessed to be "Good" on "Expertise", then X_{ij} = "Good".

There are two types of MCDM methods. One is compensatory and the other is non-compensatory [Hwang and Yoon, 1981]. Non-compensatory methods do not permit tradeoffs between attributes. An unfavourable value in one attribute cannot be offset by a favourable value in other attributes. Each attribute must stand on its own. Hence comparisons are made on an attribute-by-attribute basis. The MCDM methods in this category are credited for their simplicity. For the suppliers' selection tool both compensatory as non-compensatory methods are needed.

4.3.1 Non-compensatory methods

Non-compensatory methods are needed to see for example whether certain home care services are offered by an organisation in the first place or not. The region where the home care organisation is situated and the home care consumers' residence must comply. For selection criteria as these following methods are suitable.

- Conjunctive constraint method [Hwang and Yoon (1981)]: By setting up a minimum standard for each attribute, the alternative selection or evaluation process is simplified to compare each attribute against its standard. If the standard reflects the decision maker's expectations, the obtained solutions are satisfying solutions.
- Disjunctive constraint method [Hwang and Yoon (1981)]: This method evaluates an alternative on its best attribute regardless of all other attributes.

Conjunctive and disjunctive decision models divide an initial set of suppliers into acceptable and non acceptable suppliers. These techniques can have their application domains in which they are reasonable. In order to see whether an organisation offers a certain home care service and does this in the right area (residential area), disjunctive constraint methods are very suitable. Conjunctive constraints measures can be used in order to determine if a home care provider has a quality certificate(s). However, these models are not particularly useful for making a good choice between a few acceptable suppliers and therefore not very useful for general decision making [Luitzen de Boer, 1998] as is needed when selecting home care suppliers based on quality criteria.

The actual procedures for finding a solution vary greatly depending on the structure of the underlying decision problem. In this thesis, methods are examined with respect to their suitability for finding a solution to a matching problem for a home care services market. For this reason, methods that do allow comparison among several suitable home care suppliers will be discussed in the next paragraph in greater detail.

4.3.2 Compensatory Methods

Compensatory methods permit tradeoffs between attributes. Compensatory in this context means that a lower value in one criterion can be compensated for by a higher value in another criterion, meaning that values can therefore be combined across different criteria. With regard to comparing various supplier profiles for a home care market, compensatory methods are especially useful. A slight decline in one attribute (say customer focus) is acceptable if it is compensated by some enhancement in one or more other attributes (say communication). Compensatory methods can be classified into scoring methods and concordance methods. This last category of methods generates a preference ranking which best satisfies a given concordance measure. Example of these are ELECTRE (ELimination Et Choix Traduisant la REalité) [Roy (1974)] and PROMETHEE (Preference Ranking Organisation METHod for Enrichment Evaluations) by [Brans et al. (1986)]. However, due to the choices at hand they are less suitable as the scoring methods for obvious reasons discussed hereafter.

4.3.3 Scoring Methods

The scoring method selects or evaluates an alternative according to its score (or utility). This score is then used to express the decision maker's preference. It transforms attribute values into a common preference scale. This way comparison between different attributes becomes possible. A very popular method in this category is the Simple Additive Weighting method. This method calculates the overall score of an alternative as the weighted sum of the attribute scores.

4.3.4 Simple Additive Weighting

Simple Additive Weighting (SAW) which is also known as weighted linear combination or scoring method is a simple and most often used multi-attribute decision technique [Malczewski (1997), Janssen (1992), Eastman (1993)]. SAW method is the simplest and widely-used multi-attribute decision technique for aggregating several criteria [Hwang and Yoon (1981)]. It uses the additive form for the aggregation of different criteria outcomes, which assumes the independence of the criterion preference. In other words it is based on the weighted average. An evaluation score is calculated for each alternative by multiplying the scaled value given to the alternative of that attribute with the weights of relative importance directly assigned by decision maker followed by summing up the products for all criteria. The simple additive weighting method evaluates each alternative, X_i , by the following formula:

$$X_i = \sum W_j * X_{ij}$$

Where x_{ij} is the score of the i th alternative with respect to the j th attribute, w_j is the normalized weight. Once values for all alternatives have been aggregated, the alternative with the highest (or lowest) value is then selected as the comparatively optimal solution. The purpose of this chapter is to present a multi-criteria decision making model for home care suppliers' selection. In this chapter, fourteen quality criteria are discussed that form the basis for selecting the home care organisation. However, before the application of the method, the home care providers restricted by rules or physical constraints are excluded from the investigated suppliers during the data preparation stage. The exclusion of certain unsuitable providers is done by the disjunctive methods.

Due to the fact that the rating scores of the quality criteria are of a uniform scale it is possible to use the SAW method in order to compare attributes. This process is used to consolidate decision-makers' assessments about criteria weightings. Finally, an empirical study for identifying the home care suppliers' selection matching tool is conducted to demonstrate the computational process and test the users' friendliness, usability function and effectiveness of the matching tool proposed by this thesis.

4.4 Matching tool

4.4.1 Introduction

A research conducted at the University of Twente on web-usability shows that governmental websites are mostly far too complicated. Only 62% of the people succeed in renewing their drivers license online. Only 25% is able to appeal to a municipal directive [Van Dijk, J. & Van Deursen, A. (2008)]. According to Van Dijk this is the result of the extensiveness of the websites. The website are not designed in the same fashion as users use them. The design of the application in this thesis must be done in a fashion that elders understand how to use it easily.

4.4.2 Design application

The interface of the matching tool will be constructed on the principles discussed in Don't make me think. A common sense approach to web usability [Krug (2006)]. The essence of the book is that web-experience is solely about usability. Especially for the elderly this is an important aspect. If something is hard to use, they will not use it as much. As the title already states, the first law of usability is that when designing a web based application like the matching tool, one must not let the user think. In other words when home care consumers are looking at the tool it must be self-evident, self-explanatory, obvious. As already stated, the tool must function as a home care service online advisor. The goal is to receive an unbiased list of recommendations based on users' individual preferences. No ads, no selling, no registration. It may be seen as jumpstarting consumers' purchasing process. Users should be able to "get it" – what it is and how to use it – without expending any effort thinking about it. Three facts are discussed when it comes to web usage. First of all, people do not read pages. They scan (or skim) them, looking for words or phrases that catch our eye. They do not make optimal choices. They satisfice. Users do not figure out how things work. They muddle through. Faced with the fact that users are whizzing by, there are five important things one can do to make sure users see – and understand – as much of the matching tool as possible:

- create a clear visual hierarchy on each page;
- take advantage of conventions;
- break pages up into clearly defined areas;
- make it obvious what is clickable;
- minimize noise.

In order to program the tool there will be made of several programming techniques: Cascading Style Sheets (CSS) is a style sheet language used to describe the presentation of a document written in a markup language. Its most common application is to style web pages written in HTML. CSS is used to help readers of web pages to define colours, fonts, layout, and other aspects of document presentation. It is designed primarily to enable the separation of document content (written in HTML or a similar markup language) from document presentation (written in CSS). The algorithm that will be programmed is graphically presented on the next page. The computational model is shown on page 37.

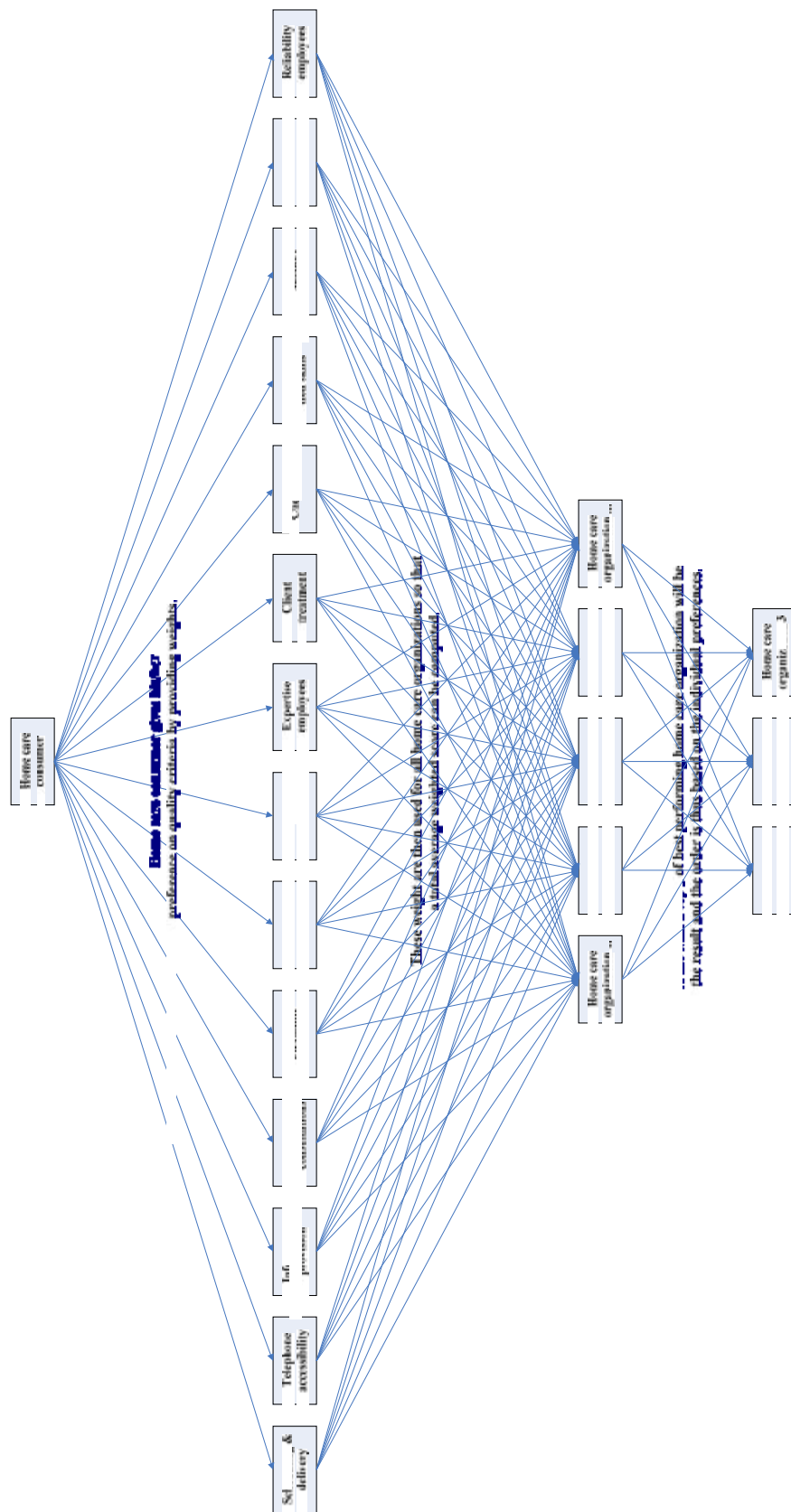


Figure 8 Visualised model for SAW algorithm

Matrix 1														Matrix 3					
Home care organization 1	Criteria													Total Average weighted score A11					
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13						
Home care organization 2	v ₁₁	v ₁₂	v ₁₃	v ₁₄	v ₁₅	v ₁₆	v ₁₇	v ₁₈	v ₁₉	v ₁₁₀	v ₁₁₁	v ₁₁₂	v ₁₁₃	2w ₁					
...	v ₂₁	v ₂₂	v ₂₃	v ₂₄	v ₂₅	v ₂₆	v ₂₇	v ₂₈	v ₂₉	v ₂₁₀	v ₂₁₁	v ₂₁₂	v ₂₁₃		2w ₂				
...	v ₃₁	v ₃₂	v ₃₃	v ₃₄	v ₃₅	v ₃₆	v ₃₇	v ₃₈	v ₃₉	v ₃₁₀	v ₃₁₁	v ₃₁₂	v ₃₁₃			2w ₃			
Home care organization n	v _{n1}	v _{n2}	v _{n3}	v _{n4}	v _{n5}	v _{n6}	v _{n7}	v _{n8}	v _{n9}	v _{n10}	v _{n11}	v _{n12}	v _{n13}				2w ₄		
Quality criteria for the home care organization														Quality criteria for the home care employees					
The rows represent the individual home care organizations, The columns represent the quality criteria, The first seven represent the score of the second organization on the sixths criterion, The next: represent quality criteria for the home care organizations, The second matrix are the weights assigned by the individual home care consumer, The third matrix gives the total average weighted score for each individual home care organization,																			
Matrix 1														Matrix 3					
The rows represent the individual home care organizations, The columns represent the quality criteria, The first seven represent the score of the second organization on the sixths criterion, The next: represent quality criteria for the home care organizations, The second matrix are the weights assigned by the individual home care consumer, The third matrix gives the total average weighted score for each individual home care organization,																			

Figure 9 Computational matrix SAW algorithm

4.4.3 Test results and design iterations

As stated in the introduction, the final design of the web application is presented in chapter 5. This paragraph shows the test results from earlier designs. The tests were conducted at users' home. No explanations as how to use the application were given beforehand. They were only given the task to use it and think out loud. Besides documenting users' difficulties in using the application and other comments on paper, they were recorded as well. This must eventually lead in detecting design errors and promote the usability of the application.

First a static design was made in order to get some indication of how the application should look like and what elements are needed to incorporate. Colleagues were asked their opinion on the contents and the layout. After completing this preliminary phase the design was made dynamic. This means that a database with functionary quality scores was added. With the dynamic design, came the mathematical algorithm in order to investigate if the computational method worked. Due to the fact that some participants are using their web application with a normal computer and some with a touch screen device, the choice was made to develop two separate versions for the matching tool. The part that is programmed differently, concerns the individual preferences weights on the quality criteria. The purpose of developing two different versions is to see whether there exists a preference for one of the two versions depending on the used device. A remark that has to be made is that only qualitative results were generated for usability purposes.



Screenshot 1 Choice for version

First test results

The first tests were conducted with two participants. One with a touch screen and one with a normal computer. Due to the fact that both users had practically the same difficulties using the application, the test results and comments are combined and listed below. Problems occurred almost directly.

- For entering the home care consumers' zip code a pulldown menu is used. The use of this item was not as clear as presumed. There was no familiarity with such form. The main comment was that explanation on how to use the pulldown menu was missing.
- When preference weights are asked in order to score the quality criteria, it was not clear that the preferences are to be given by keeping in mind the care service selected on the previous screen.
- Due to the length of the list with quality criteria not all criteria could be seen directly. The list exceeded the page range. This caused trouble with the ones that exceeded the page.
- Furthermore, not all criteria were understood as intended and some were skipped altogether.
- The use of a slider to score the quality criteria was not obvious. There was no familiarity with sliders.

The first tests indicated that more explanation is needed on how to use the application. The first rule described by Kruger (2005): people do not read pages, did not seem to apply for the first participants. During the tests it became obvious that they did not scan (or skim) web pages, looking for words or phrases. They did not satisfice. They seemed to have the need to figure out how things work exactly before making any choices. Moreover, both users had a preference for the button version. They found it more logically and easier to use even though the slider version was tested before the button version was shown. There was simply more familiarity with buttons than with sliders.

Iterations made in the second design

To amend the application and resolve the design errors of the first design, explanation was added to several pages. Major changes are illustrated with screenshots as can be seen below.



Screenshot 2 Entering zip code first design

Screenshot 3 Entering zip code second design

To overcome the problem with the pulldown menu for the zip code, text was added with instructions how to select the numbers. To solve the page range problem, similar adjustments were made. In the second design the user is told that they could scroll down in order to get the next quality criteria for the home care organisation. Formulation is chosen carefully. The users did not know the term “scroll down”. Instead the phrase “use the bar on the right of your screen to see the bottom of the screen” was added. Furthermore, a checkbox next to the buttons in the second design indicates that a weight has been given. Same adjustments were made to the slider design.



Thuiszorg Adviseur

Voorkeur aangeven

Geef hier aan welke criteria voor u van belang zijn. U mag meerdere criteria even belangrijk vinden. Het is ook mogelijk om voorkeur aan te geven voor de thuiszorgorganisatie op basis van de voorkeuren die u aan de criteria geeft.

1 = Niet belangrijk, 2 = Minder belangrijk, 3 = Neutraal, 4 = Belangrijk, 5 = Zeer belangrijk

Stelling	Niet belangrijk	Zeer belangrijk			
Planning en levering	1	2	3	4	5
Telefonisch bereik	1	2	3	4	5
Informatie	1	2	3	4	5
Zorgplan, afspraken en overleg	1	2	3	4	5
Flexibiliteit	1	2	3	4	5
Aandacht voor veiligheid	1	2	3	4	5
Betrouwbaarheid organisatie	1	2	3	4	5

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Screenshot 4 Entering preference weights first design (buttons)



Thuiszorg Adviseur

Voorkeur aangeven

Geef hier aan welke criteria voor u van belang zijn. U mag meerdere criteria even belangrijk vinden. Het is ook mogelijk om voorkeur aan te geven voor de thuiszorgorganisatie op basis van de voorkeuren die u aan de criteria geeft.

1 = Niet belangrijk, 2 = Minder belangrijk, 3 = Neutraal, 4 = Belangrijk, 5 = Zeer belangrijk

	1	2	3	4	5
Planning en levering	1	2	3	4	5
Telefonische bereikbaarheid	1	2	3	4	5
Informatie omtrent organisatie	1	2	3	4	5
Zorgplan, afspraken en overleg	1	2	3	4	5
Flexibiliteit bij het plannen van zorg	1	2	3	4	5
Aandacht voor veiligheid in huis	1	2	3	4	5
Betrouwbaarheid organisatie	1	2	3	4	5

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Screenshot 5 Entering preference weights second design (buttons)

Second test results

For the second round of tests, again two users were consulted. The second design has significantly more text than the first one due to the additional explanation. Although now it was clear what was asked, there were reading difficulties; problems with word identification and comprehension. The sentences were found to long and too complicated. The first participant had a Master in Dutch language and literature and still published a district booklet for elders in the neighbourhood. The comments she gets from elders was in turn an advice for me: make sentences as short and as simple as possible. Although it was eventually clear how to use the sliders to enter the preference weights, there were some troubles. A remark that was made was that there was no digit next to the indicators of the sliders. The bar above the quality criteria gave some confusion. The term “not important” was situated above the first two buttons and the term “most important” above the last two. This way it seemed as if button 1 and 2 both indicated not important (4 and 5 most important). Therefore the bar was removed altogether.

Iterations that were made in the third design

The amendments in the second design has led to more explanation and thus text. The third design has simplified the instructions. Shorter sentences were used and some words were replaced by others simpler ones.



Screenshot 6 Start page second design



Screenshot 7 Start page third design

Entering the zip code was given as an option. As stated before some home care services are locally organized. In the third design the care consumer is advised to enter the zip code.



Screenshot 8 Entering zip code second design



Screenshot 9 Entering zip code third design

Here numbers of importance are added.

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Voorkeur aangeven

Geef hier aan welke criteria voor u van belang zijn op een schaal van 1 tot 5. Het resultaat wordt gebruikt om de afbeelding te selecteren op de volgende pagina.

U mag meerdere criteria even belangrijk vinden. De criteria gaan over de voorkeuren van de afbeelding zelf.

Klik hier om te zien hoe het systeem werkt in de pagina naar het volgende scherm.

Als u klaar bent, klik op de laatste criteria dan komt u op het scherm "volgende pagina" kijken en het resultaat.

1 = Niet belangrijk, 2 = Minder belangrijk, 3 = Neutraal, 4 = Belangrijk, 5 = Zeer belangrijk

Planning en levering: 1 2 3 4 5

Telefonische bereikbaarheid: 1 2 3 4 5

Informatie antwoord organisatie: 1 2 3 4 5

Zorgplan, afspraken en overleg: 1 2 3 4 5

Flexibiliteit bij het plannen van zorg: 1 2 3 4 5

Aandacht voor veiligheid in huis: 1 2 3 4 5

Betrouwbaarheid organisatie: 1 2 3 4 5

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voorgaande pagina volgende pagina

Screenshot 10 Entering preference weights second design

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Voorkeur aangeven

Geef hier aan welke criteria voor u van belang zijn op een schaal van 1 tot 5. Het resultaat wordt gebruikt om de afbeelding te selecteren op de volgende pagina.

U mag meerdere criteria even belangrijk vinden. De criteria gaan over de voorkeuren van de afbeelding zelf.

Klik hier om te zien hoe het systeem werkt in de pagina naar het volgende scherm.

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1 = Niet belangrijk, 2 = Minder belangrijk, 3 = Neutraal, 4 = Belangrijk, 5 = Zeer belangrijk

Planning en levering: 1 2 3 4 5

Telefonische bereikbaarheid: 1 2 3 4 5

Informatie antwoord organisatie: 1 2 3 4 5

Zorgplan, afspraken en overleg: 1 2 3 4 5

Flexibiliteit bij het plannen van zorg: 1 2 3 4 5

Aandacht voor veiligheid in huis: 1 2 3 4 5

Betrouwbaarheid organisatie: 1 2 3 4 5

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voorgaande pagina volgende pagina

Screenshot 11 Entering preference weights third design

Third test result

During the third tests, the participants had no real comments. The task was found easy to perform. Some minor changes were suggested. For the sliders it concerned the place of the slider. In the final design the users are told that the slider has a default weight. The slider is put automatically in the middle and thus on neutral. The instructions given in order to go to the next page in the previous designs was situated with the rest of the instructions. It was found clearer if this would be placed near the button "next page" as is in the final design (see paragraph 5.1).

4.4.4 Conclusion

This chapter describes the matching tool. The tool is the content of the complementary service layer of the framework (see paragraph 3.5). The tool was founded on quality criteria which is the only aspect by which home care organisations are distinguishable. In order to support care consumers, that are faced with making numerous and conflicting evaluations on the quality criteria, a Multi Criteria Decision Making method is used. The chosen method is the Simple Additive Weighting method. A visualised (see page 36) and computational (see page 37) model for the SAW algorithm is given as well. Programming the application made it possible to test it with care consumers. The test results and amended designs show that elders do need more explanation when using such a web based tool. However, all participants did think it was a useful and helpful application, if one could make contact with the preferred home care organisation at the end of the tool.

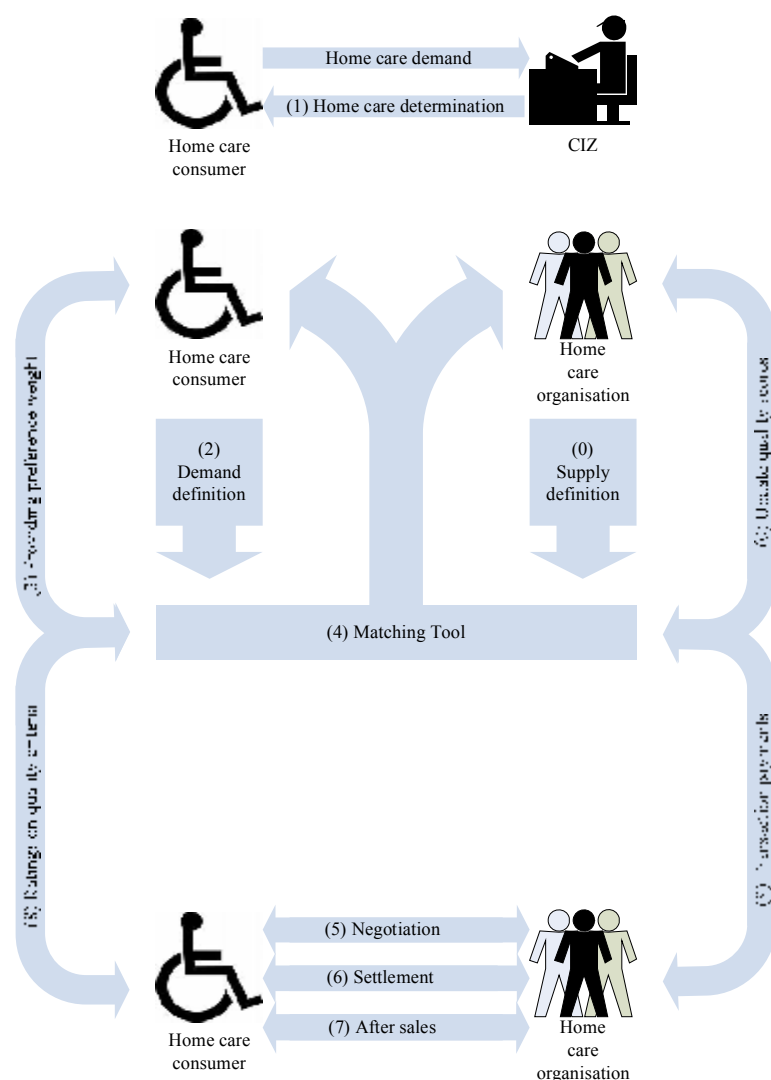
5 Conclusion and discussion

In this chapter, the process of the trading of home care services is shown. A summary of the contributions and benefits of this work is given, as are the shortcomings and therefore suggestions for possible future work and recommendations.

5.1 Contributions

This thesis proposes a framework for an e-marketplace facilitator for home care services. The purpose of the framework is to help market operators who want to facilitate in the home care services trading process electronically. The emphasis for this thesis lies in the matching of home care consumers with home care suppliers based on quality aspects of the suppliers.

Home care services trading process in a market for home care suppliers advice



The home care trading process in an electronic home care services market for suppliers advice begins by determining (1) how much and what kind of care is needed.

The home care consumer can then define (2) his or her care demand on the marketplace. By providing preference weights (3) appropriate home care organisations may be found. Once this has been done, the matching tool finds (4) suitable home care organisations.

The negotiations (5) and settlements (6) are part of the next phase and are determined by the most suitable home care organisation and home care consumer. Appointments must be made to deliver the service.

When the service is delivered the after sales phase (7) starts. The market operator will then contact the home care consumer so that the home care organisations can be evaluated by the home care consumer on the service delivered. This can be done by asking the consumer to fill out a rating form with the same quality criteria. These score must then be added (8) to the database of the matching tool and a feedback is given to the home care supplier (0). Payments of the agreed transaction fee follows (9) In order to make the online advisory work, it is important to incorporate all available information of home care organisations (0). This is the first step the market operator needs to take. As stated before a potential seller profits from a market with a higher number of potential buyers and a potential buyer is interested in as many potential sellers as possible. In order to assure a sufficient amount of market participants, the necessary information must be collected. Quality scores of the organizations are available and must be incorporated in the matching tool database. The type of home care services an organization offers must be incorporated as well. Organisations must be approached and convinced to participate and join the matching tool. This may be done by convincing them on the time and expenses they can save during the information phase.

The matching tool

The programmed algorithm to match has proven to work. Amending the tool has led to an application that is understandable for the target market. Design errors and usability problems that occurred during usability testing have been removed. After testing the matching tool with users of the target market interesting results were gathered. The final design of the web application is presented below. The left side of the pages show the design most preferred by the test participants. For the parts where weights are asked for the quality criteria, the slider design is shown on the right side of the page.


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Uk hangt af van meerdere factoren, zoals het type zorg, voor aan te geven wat voor u van belang is, kunt u advies krijgen over welke zorginstelling het beste bij u past.

Klik op de 'Begin' knop om het adviesprogramma te starten.



Begin

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Uw Locatie

Aangezien u wilt weten waar u uw zorg wilt krijgen, wordt u verzocht uw postcode in te vullen. Sommige thuiszorginstellingen zijn niet bereikbaar op bepaalde plaatsen. Indien u niet zeker bent, kunt u het adres van uw huidige woonplaats invullen. U kunt de lijst van plaatsen door op de pijl rechts van het veld te klikken om de lijst te laten scrollen.

Postcode: (toets de postcode)

Aangeboden zorg

Kies de type zorg die u wilt krijgen. U kunt ook kiezen voor meerdere typen zorg. Klik op de 'Volgende pagina' knop.

<input type="checkbox"/> Advies en begeleiding	<input checked="" type="checkbox"/> Ondersteunende begeleiding
<input type="checkbox"/> Advies, instructie en voorlichting	<input type="checkbox"/> Persoonlijke begeleiding
<input type="checkbox"/> Huishoudelijke verzorging	<input type="checkbox"/> Verpleging

Als u het type zorg heeft gekozen kunt u naar de volgende pagina.

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Volgende pagina

Volgende pagina

Graduation thesis Harald Bouwman

44

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Voorkeur aangeven

Geef hier een welke criteria voor u van belang zijn gezien de zorginst die u heeft gekozen op de vorige pagina.

U mag meerdere criteria meer belangrijk vinden. De criteria gaan over uw voorkeuren aangevuld de Thuiszorginstelling zelf.

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1 = Niet belangrijk, 2 = Minder belangrijk, 3 = Neutraal, 4 = Belangrijk, 5 = Zeer belangrijk

Planning en levering

Telefonische bereikbaarheid

Informatie omtrent organisatie

Zorgplan, afspraken en overleg

Flexibiliteit bij het plannen van zorg

Aandacht voor veiligheid in huis

Betrouwbaarheid organisatie

Als u alle criteria van een offer heeft voorzien kunt u naar de volgende pagina.

Thuiszorg Adviseur

[vorige pagina](#)
[volgende pagina](#)

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Voorkeur aangeven

Geef hier een welke criteria voor u van belang zijn gezien de zorginst die u heeft gekozen op de vorige pagina.

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Deskundigheid

Umgang met cliënten

Clintgerichtheid

Communicatie

Ondersteuning aanvullende diensten

Aandacht voor mantelzorg

Betrouwbaarheid medewerkers

Als u alle criteria van een offer heeft voorzien kunt u naar de volgende pagina.

Thuiszorg Adviseur

[vorige pagina](#)
[volgende pagina](#)

Thuiszorg Adviseur

Voorkeur aangeven

Geef hier een welke criteria voor u van belang zijn gezien de zorginst die u heeft gekozen op de vorige pagina.

U mag meerdere criteria meer belangrijk vinden. De criteria gaan over uw voorkeuren aangevuld de Thuiszorginstelling zelf.

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Clintgerichtheid

Communicatie

Ondersteuning aanvullende diensten

Aandacht voor mantelzorg

Betrouwbaarheid medewerkers

Als u alle criteria van een offer heeft voorzien kunt u naar de volgende pagina.

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[vorige pagina](#)
[volgende pagina](#)

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De zorgaanbieders

Deze zorgaanbieder hebben het meest overeen met uw voorkeuren. De zorgaanbieder heeft gekozen van een vijfsterren instelling van uw voorkeuren. De koppeling van de zorgaanbieder die het meest overeenkomt met uw voorkeuren.

1. Nieuw: 7.8

2. Zorgplek: 7.5

3. Curo: 7.1

Mede = staat in het op de lijst u kan kiezen welke u het meest belangrijk vindt.

Bekijk voor uw interesse in de Thuiszorg Adviseur

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These screenshots represent the final design. As can be seen two changes took place in respect to the third design. The instruction as in how to go to the next page is removed from the other instructions and placed near the buttons “next page”. To promote the readability more space was put between the sentences.

5.2. Benefits of this work

This thesis has several practical implications. First of all, the proposed framework can function as a blueprint for a market operator that wishes to facilitate in the home care services market electronically. Its purpose is to act as guidance. By identifying the characteristics and the environment of the home care services, a market operator knows the market elements it has to deal with. Using this blueprint, the market operator is able to get insight in the market aspects and help with the necessary steps to take, such as the determination of the market strategy, the trading process, the complementary services and IT infrastructure needed to support the previous market elements.

The complementary service treated in this thesis may be seen as an online advisory and concerns the match between demand and supply. By focusing on the match between demand and supply and providing the home care organisations and their quality scores, a home care consumer is able to obtain the information it needs to make an informed choice for a home care supplier based on his or her preference. This can enhance the accessibility. Next to the accessibility threat mentioned in the introduction, other rising bottlenecks are tackled as well; a strong increasing demand of home care services and decreasing availability of home care personnel. Support in the information phase of the process enables home care organisations to focus more on their core business, which is to supply the service and not in the attainment and retainment of home care consumers and thus allows them to work more efficiently in this phase.

Furthermore, assessing the home care suppliers at the end of the process may help to improve the quality of services as well. As the number of users and therefore quality assessment editors grows, the quality of information improves, encouraging more users to turn to it as a source of information; some of the new users in turn become editors, continuing the process and encouraging care providers to become more competitive and improve their services. It will also help the changing position of the patient in obtaining self empowerment.

5.3. Open problems and suggestions for further research

There are at least two possibilities for future work. First of all, the proposed framework is derived from characteristic differences with the one developed for knowledge sharing. This is mainly conducted through desk research. Furthermore, an expert on electronic trading was consulted as well. As stated before the framework is intended to act as a blueprint to help the market operator to get insight in the market elements and the necessary steps to take. When used, the framework should be revised when gaps or shortcomings are experienced.

For usability testing of the matching tool, empirical research took place by testing and evaluating the tool with end-users. The final design is the result of these steps and promotes the usability. A remark that must be made is that only qualitative data was gathered. As stated before due to the use of two different devices (normal computer and a touch screen device) two separate designs were made. The elders preferred the button version against the slider version on both devices. Buttons were simply found more familiar and easy to use.

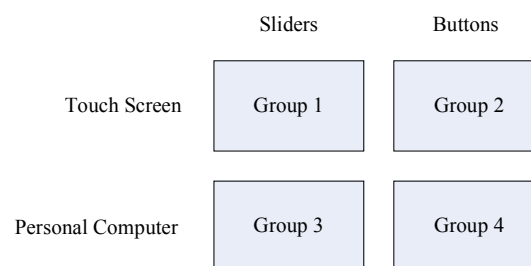
However, to gain deeper knowledge about the preference for the use of sliders or buttons, and validate this conclusion even further, an experiment can be conducted. The elder portal PAL4 for which this assignment is conducted is still in development. Therefore the amount of PAL4 participants at the time of testing was low. More and more connections are made every week. When the amount of touch screens are sufficient, one can investigate even further on the preference for one of the two designs. The objective of the experiment is then to test the following hypotheses:

Elders prefer using buttons over sliders when it comes to giving weights on the quality criteria .

The essence of the experiment is to introduce a change in a system (the independent variable) and to study the effect of this change (the dependent variable). Thus the independent variable is the design of the application (slider or buttons) and the dependent variable is their preference.

Design of experiment

A possible way to test the hypotheses is with a 2 x 2 design. For this experiment at least 80 PAL4 participants are needed. 40 participants with a touch screen and 40 participants with a normal computer.



Group 1 and 2 will then consist of 40 participants who use a touch screen device. Group 3 and 4 will consist of 40 participants as well, but use a normal computer. These participants should then be randomized in two separate groups. One half of the group with a touch screen will then be given a task to perform on the matching tool using the button design. The other half will be asked to perform the same task but then with the slider design. The task at hand is to let the participants get familiarized with the tool. This experiment is duplicated for the users with a normal computer. After completing the task, participants will fill in a survey that has the purpose of testing the usability. The outcomes can then be analyzed and compared between the four groups and see if the results from the current study remain valid.

6 References

- Belton, V., Stewart, T.J. (2002). Multiple Criteria Decision Analysis, An integrated approach. Kluwer Academic Publishers, Boston, 2002 pp. 85-103
- Constantinides, E. (2002). The 4S Web-marketing Mix framework. Elsevier Science : Electronic Commerce Research and Applications. pp.57-76.
- Constantinides, E. (2006). The Marketing Mix Revisited: Towards the 21st Century Marketing. Journal of Marketing Management 2006, vol. 22, pp 407-438.
- Coppel, J., 2000. E-Commerce: Impacts and Policy Challenges. OECD Economics Department, Working Paper No. 252, Organisation for Economic Co-operation and Development OECD, June, (retrieved from website <http://www.oecd.org/eco/eco>).
- Choi, S.-Y., Stahl, D. O. and Whinston, A. B., The economics of electronic commerce. Macmillan Technical Publishing, Indiana, 1997.
- Daft, R.L. (2001). Organisation theory and design. 7th edition. Cincinnati: South-Western College Publishing.
- Dubosson-Torbay, M., (2001), eBusiness Model Design, Classification and Measurements. Thunderbird International Business Review, January 2002, vol. 44, no. 1: 5-23
- Economides, N., (1996). The economics of networks. International Journal of Industrial Organisation. Vol 14 issue 6, pp:673–700.
- Gebaur, J., Scharl, A. Between Flexibility and Automation: An Evaluation of Web Technology from a Business Process Perspective. vol. 5 issue 2 Electronic Commerce and the Web
- Golden, B.L., Wasil, E.A., Harker, P.T. The analytic hierarchy process: applications and studies, Springer, Berlin, pp. 3-33: The Art and Science of Decision Making: The Analytic Hierarchy process.
- Goodwin, P. Wright, G.(1991). Decision analysis for management Judgement. New York. pp. 7-26
- Holtmann, C.,Neumann, D, Weinhardt, C. (2006). Market Engineering as a holistic Approach. MKWI 2006, Passau, Germany.
- Keeney, R.L., Raiffa, H. (1976). Decisions with Multiple Objectives. New York. paragraph 4.10.4, 5.10 and 7.7.2
- Miles, M.B., and Huberman, A.M. Qualitative Data Analysis. A Source Book of New Methods, Sage, Beverly Hills, 1994.
- Marshall, A., (1961). Principles of Economics. Macmillan for the Royal Economic Society. London: Macmillan and Co, vol. 2.
- Müller, R. M (2005) Knowledge sharing and trading on electronic marketplaces
- Narayanan, V.K. (2001). Managing technology and innovation for competitive advantage. 1st edition. New Jersey: Prentice Hall.
- Neumann, D. (2004). Market Engineering - A structured design process for electronic markets. Fakultät für Wirtschaftswissenschaften. Karlsruhe, Universität Karlsruhe (TH).
- Neumann, D., J. Maekioe, et al. (2005). CAME - A Toolset for Configuring Electronic Markets. ECIS, Regensburg.

- Perry, C. (1998). A structured approach to presenting theses: Notes for students and their supervisors. *Australasian marketing Journal*, vol. 6, no. 1, pp. 63-86.
- Porter, M.E. (2001). *Strategy and the Internet*, Harvard Business Review, pp. 63–78.
- Roth, A. E. (2000). Game theory as a tool for market design. *Game practice: contributions from applied game theory*. F. Patrone, I. Garcia-Jurado and S. Tijs. Dordrecht, Kluwer: 7-18.
- Roth, A. E. (2002). The economist as engineer: game theory, experimental economics and computation as tools for design economics. *Econometrica* 70(4): 1341-1378.
- Smith, M., Bailey, J., & E. Brynjolfsson (1999). *Understanding digital markets: review and assessment*. MIT Press.
- Verschuren, P. & Doorewaard, H. (2000). *Het ontwerpen van een onderzoek*. 3e druk. Utrecht: Lemma.
- Vincke, P. (1992). *Multicriteria decision aid*. pp. 57-67
- Vulto, M.E., (2002). *Welzijn en waardigheid voor langdurige zorggebruikers. Op weg naar 2020*. Elsevier gezondheidszorg
- Weinhardt, C., C. Holtmann, et al. (2003). Market engineering. *Wirtschaftsinformatik* 45(6): 635-640.
- Weinhardt, C., D. Neumann, et al. (2006). Computer-aided market engineering. *Communications of the ACM* 49(7): 79.
- Weinhardt, C., Schnizler, B., Luckner, S. (2007). *Market engineering*
- Wheelwright, S. & Hayes, R (2005). *Operations, strategy, and technology. Pursuing the competitive Edge*.
- Williamson, O.E. (1985). *The economic institutions of capitalism: firms, markets, relational contracting*. New York, London: Free Press, Collier MacMillan.
- Yinsheng, L., Xiaohua, L., Kuo-Ming, C., Ying, H., Muhammad, Y. (2006). *The realisation of service-oriented e-marketplaces*. Springer Science.
- Website of Focus Cura. <https://www.focuscura.nl> Last accessed: 02.12.2007, Focus Cura, 2007.
- Website of Ministry of Public Health, Wellbeing and Sports. <https://www.minvws.nl> Last accessed: 02.02.2008, Ministry van Volksgezondheid, Welzijn en Sport, 2008.
- Website of the Personal Medical Budget Consultancy. <https://www.stichting-pgb.beheert.nl> Last accessed: 03.02.2008, Stichting PGB Beheer, 2008.
- Website of Zibb <https://www.zibb.nl> Last accessed: 23.03.2008, Zibb, 2008.
- Website of the Gateway of the European Union. <http://europa.eu> Last accessed: 07.02.08, The future of healthcare and care for the elderly: guaranteeing accessibility, quality and financial viability, SCADplus, 2008.

Appendix A: List of Abbreviations

AWBZ Algemene Wet Bijzondere Ziektekosten (Exceptional Medical Expenses Act), 1968
CG-Raad Raad voor Chronisch Zieken en Gehandicapten (Council for the Chronically Ill and Disabled)
CPB Centraal Plan Bureau (Central Plannings Office)
CTG/ZAio College Tarieven Gezondheidszorg/Zorgautoriteit in oprichting (Healthcare Tariffs Board/Care Authority to be)
CTZ College Toezicht Zorgverzekeringen (Health Insurance Monitoring Board), 2006
CVZ College voor Zorgverzekeringen (Healthcare Insurance Board), 2006
DBC Diagnose Behandelingscombinatie (Diagnosis Treatment Combination)
DCG Diagnostic Cost Group
DHCPR The Dutch Healthcare Performance Report
DRG Diagnosis Related Group
HMO Health Management Organisation
IGZ Inspectie Gezondheidszorg (Healthcare Inspection)
LVH Landelijke Vereniging Huisartsen (National Association of Family Doctors)
NMa Nederlandse Mededingingsautoriteit (Dutch Market Authority)
NPCF Nederlandse Patienten en Consumenten Federatie (Dutch Patient and Consumer Federation)
NZa Nederlandse Zorgautoriteit (Dutch Care Authority), 2006
PCG Pharmacy Based Cost Group
RIVM Rijksinstituut voor Volksgezondheid en Milieu (National Institute for Public Health and the Environment)
SPC Samenwerkende Patienten en Consument Organisaties (Collaborating Patient and Consumer Organisations)
VWS Ministerie van Volksgezondheid, Welzijn en Sport (Ministry of Public Health, Well being and Sports)
WGBO Wet op de Geneeskundige Behandelingsovereenkomst (Medical Treatment Agreement Act)
WHR World Health Report
WMG Wet Marktordening Gezondheidszorg (Health Market Regulation Act), 2006
WMO Wet Maatschappelijke Ondersteuning (Social Support Act)
WTG Wet Tarieven Gezondheidszorg (Healthcare Tariffs Act), 1991
WTZ Wet op de Toegang tot de Ziektekostenverzekering (Access to Health Insurance Act), 1986
WZV Wet Ziekenhuisvoorzieningen (Hospital Provision Act), 1971
ZFW Ziekenfondswet (Sickness Fund Act), 1964
ZN Zorgverzekeraars Nederland (Healthcare Insurers Netherlands)
ZVW Zorgverzekeringswet (Health Insurance Act), 2006

Appendix B: Definitions of concepts

In this paragraph some definitions which will be used in this research are described. This helps the research and to delimit where in the library and in empirical reality must be searched to answer the questions from the previous paragraph.

ADLs (Activities of daily living), are "the things we normally do in daily living including any daily activity we perform for self-care (such as feeding ourselves, bathing, dressing, grooming), work, homemaking, and leisure." Health professionals routinely refer to the ability or inability to perform ADLs as a measurement of the functional status of a person. This measurement is useful for assessing the elderly, the mentally ill, those with chronic diseases, and others, in order to evaluate what type of healthcare services an individual may need.

AWBZ (Algemene Wet Bijzondere Ziektekosten) is a Dutch law concerning exceptional medical expenses and is a collective health insurance for individuals for which no other insurance exists. On the basis of this law one can get compensation for costs incurred due to particular medical expenses such as costs of long-term hospital admission or other costs that are not compensated by insurance.

B2B (Business to business) is a term commonly used to describe the transaction of goods or services between businesses, as opposed to that between businesses and other groups, such as transactions between business and individual consumers (B2C) or business to public administration (B2G) transactions. It is a term that originated and is almost exclusively used in electronic commerce and usually takes the form of automated processes between trading partners. It is typically performed in much higher volumes than (B2C) applications.

B2C (Business to consumer) describes activities of commercial organisations serving the end consumer with products and/or services. It is usually applied exclusively to electronic commerce.

C2C (Consumer-to-consumer) is electronic commerce which involves the electronically-facilitated transactions between consumers through some third party. A common example is the online auction, in which a consumer posts an item for sale and other consumers bid to purchase it; the third party generally charges a flat fee or commission. The sites are only intermediaries, just there to match consumers.

CIZ (Centrum Indicatiestelling Zorg) is a organisation which determines the sort and amount of care granted in hours per week.

E-procurement (Electronic Procurement) is either the business-to-business or Business-to-Consumer purchase and sale of supplies and services through the Internet. Typically, e-procurement web sites allow qualified and registered users to look for buyers or sellers of goods and services.

Extramural means functioning outside or beyond the walls, boundaries, or precincts of an organized unit (as a school or hospital).

Home Care, also known as domiciliary care, is healthcare provided in the patient's home by healthcare professionals (often referred to as home healthcare or formal care) or by family and friends (also known as caregivers, primary caregiver, or voluntary caregivers who give informal care). Often, the term home care is used to distinguish non-medical care or custodial care, which is care that is provided by persons who are not nurses, doctors, or other licensed medical personnel, whereas the term home healthcare, refers to care that is provided by licensed personnel.

Intramural means being or occurring within the limits usually of a community, organisation, or institution.

MCDA (Multi-Criteria Decision Analysis): a discipline aimed at supporting decision makers who are faced with making numerous and conflicting evaluations. MCDA aims at highlighting these conflicts and deriving a way to come to a compromise in a transparent process.

PGB (persoonsgebonden budget) is a personal budget which someone receives individually in order to buy healthcare. With this money people can choose themselves from which provider they would like to get treated.

PVB (persoonsvolgend budget) is a personal budget with which people with a disability can pay institutions for services delivered. This budget can be used for other institutions in case one moves to another place.

WMO (wet maatschappelijke ondersteuning) is a Dutch Law. It forms the basis of the national healthcare system. Besides the WMO, there is the Exceptional Medical Expenses Act (AWBZ) and the Healthcare Insurance Law (ZVW). The WMO has been effective since January first 2007 and has replaced the Law for Well-being, the Services for the Disabled Act (WVG) and parts of the AWBZ.

ZVW (Zorgverzekeringswet) is a Dutch law from January first 2007. De ZVW and the AWBZ form the Dutch healthcare system. The ZVW forces every inhabitant of the Netherlands to be insured for healthcare.

Appendix C: Research Planning

ID	Task Name	okt 2007			nov 2007			dec 2007			jan 2008			feb 2008			mrt 2008			apr 2008		
											1-6			2-3			3-2	3-9			4-6	
1	Research proposal																					
2	Literature study																					
3	Masterclass Innovation Man.																					
4	E-marketplace framework																					
5	Matching tool																					
6	Tests & evaluation tool																					
7	Concept thesis																					
8	Finalizing thesis																					