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RESIDENTIAL CARE CONCEPTS

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RESIDENTIAL CARE CONCEPTS OFFER A SOLUTION FOR HEALTH CARE INSTITUTIONS

MASTER THESIS REAL ESTATE AND HOUSING

GRADUATION REPORT

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PREFACE

After a few years of studying on and off at the Faculty of Architecture and the Built Environment, finally my time as a student at the TU Delft is coming to an end. During this time I have learned quite a lot, both through education and the many extracurricular activities, but also in my private and professional live. Undoubtedly there is still a lot to learn.

In the Real Estate & Housing Lab choosing the topic of this thesis was made easily, because of my professional interest and involvement in the subject. Although my involvement was limited to renovation of this type of healthcare real estate, it was very intriguing to gain insight in more holistic approaches from the perspective of the health care institutions when faced with challenges under changing context. Tackling these problems requires a broad range of consideration.

Under the conditions of the recent healthcare legislation the health care institutions have been forced to become financially responsible for the results and risks of their real estate investments. To deal with the contextual change many suggestions have been made as to what could and should be different. In order to get more insight into the practices of healthcare real estate development I chose to focus on the real estate strategy as one of the central point of real estate development.

I would like to thank my graduation supervisors Clarine van Oel and Ilir Nase for their valuable assistance, guidance and feedback on writing this report.

S.S.Azizyar,

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EXECUTIVE SUMMARY

Introduction

The sustainability of current healthcare systems is threatened by several societal and economic developments, including an aging population, an increase of unmet medical needs and rising healthcare costs. The consequence of these developments gave rise to new healthcare legislation. These new healthcare legislations force health care institutions to become financially responsible for the profits and risks of their real estate investment.

In the Netherlands there are about 1,300 caring homes and some 340 nursing homes with a capacity of respectively 100,000 and 65,000 places. The standard elderly care institutions offer nursing care and residential care as well as homecare from various locations and also on location. These locations may either be owned by the health care institutions or be rented from housing associations or other private parties. A combination of owned and rented locations is also possible. Housing associations own more than 50,000 units of these caring homes. The nursing and caring capacity will diminish over the coming years, due to reform in the government policy that elderly people should live as long as possible independently, but also as a result of the growing need of this elderly people to live independently as long as possible.

The vacancy risks for housing associations and health care institutions are increased due to a number of new healthcare legislations. First, of all from 2018 onwards, the health care institutions will bear the entire risk of vacancy. This is due to the gradual introduction of the so-called normative housing component (NHC). In contrast to the past, health care institutions will get fees which will be linked to the actual number of clients in the healthcare facility. No client, no fee. Because of this the health care institutions it is expected that they will have significantly lower incomes due to vacancy. Second, contrary to the former situation, the residential- and care component are now separately funded and financed. The client pays for his/her residence rent, whereas received care is separately paid for by the Health Insurance Act, Social Support Act (SSA), Exceptional Medical Expenses Act (EMEA) and possibly own resources. For caring homes (for example, caring homes with large common areas) the housing costs may be bring along higher costs than the rents of a room or apartment that the caring homes can ask. This makes renting these homes financially unprofitable.

For health care institutions with elderly care real estate, it is important that both the services offered by them as well the real estate owned by them will be involved in decision making and is thus properly addressed in the underlying business model. This is important because in the past, caring homes were often an important source of the revenues, which was invested in the nursing homes. Health care institutions must also respond to the opportunities offered by the new playing field by better addressing the needs of their (future) clients. The aim of this research is to gain insight into how real estate can offer opportunities for business operation by developing Residential Care Concepts in conjunction with a real estate strategy as an input of their business model, to better deliver care and services to elderly.

Scope
The focus of this research is on Dutch health care institutions and the research takes on this perspective. For the purpose of this study the scope of this research has been narrowed down to only include health care institution providing care and services to elderly, and to not include different target group like those focussing on dementia sufferers, disabled people or people with psychiatric illnesses. Because new healthcare legislations strongly impacted the elderly care institute, only health care institution with large real estate portfolio for elderly care were included in this research. In total 127 elderly care institutions were so included in this research.

Methods

Literature study - A literature study addressed several topics. First the existing work regarding the specialities of real estate strategies for health care institutions in recent years was explored. Suggested strategies from authors discussing possible solutions and its impact on the financial consequences regarding the core business, staff and real estate of the elderly care institutions were used to identify a number of strategies that potentially could be implemented. In particularly, the Horizon projection model developed by a Dutch organization for Applied Scientific Research (TNO) outlined a more holistic model by identifying several client and care profiles. Finally, from the on business model literature, the CANVAS business model was identified and used in further r analyses.

Interviews- In total 4 interviews were conducted concurrently with exploration of the literature, because it appeared that there were not many empirical studies identified in the literature study. The experts were questioned about existing real estate strategies, use of business models, analyses of target groups and what residential care concepts were identified or used by health care institutions. The results of the interviews are used to develop the residential care concept- and business model.

Existing databases – During the study, a large database was identified. Therefore, main statistical modelling was done using existing data extracted from Care on the Map ('Zorg op de Kaart'). Care on the Map is a platform created by TNO and commissioned by the Ministry Health Welfare and Sport for municipalities, housing corporations, health care institutions and healthcare office to assess their policies and to test their strategies. This platform contains huge amount of data on demand for care, healthcare real estate, financial position of the health care institutions and demographic data of the municipalities. The available data on this platform provide sufficient information for statistical analyses. To this end a database was extracted from several layers: Key Registers of Addresses and Buildings, Care office, financial report of the health care institution and TNO (Horizonline)

Results from theoretical research

TNO developed I the HORIZON model as a residential care concept model (figure 1). This model links the target group profiles to the pertaining care, services and real estate strategy, thus creating parameters for residential care concepts in the context of a business model.
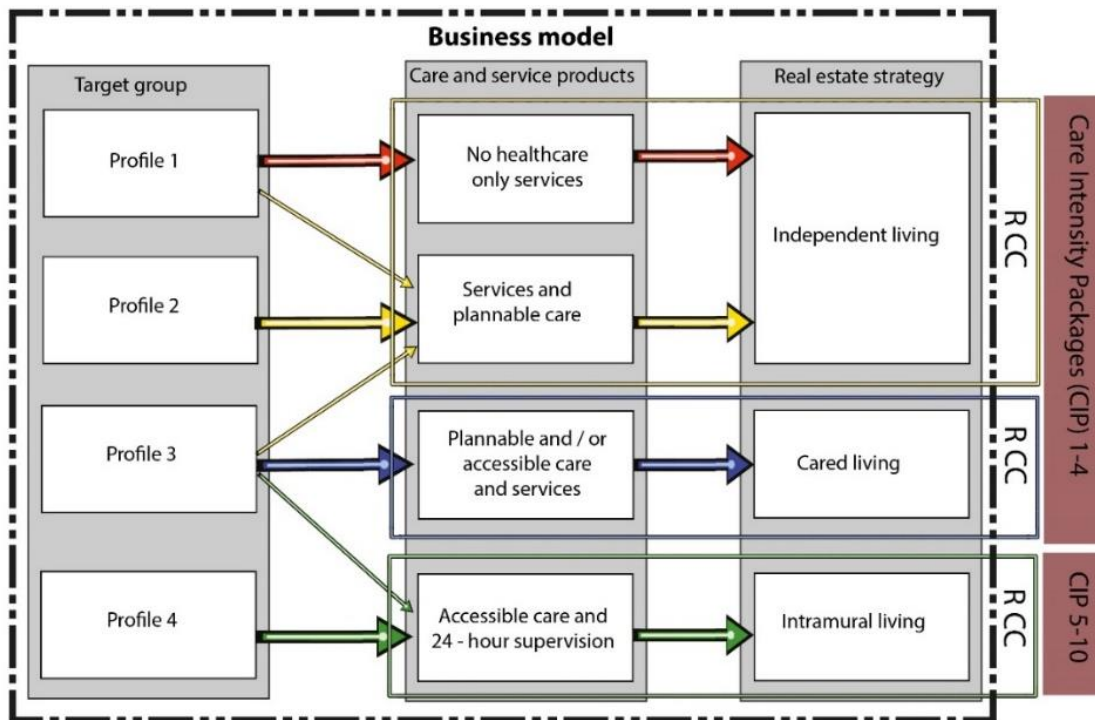

Figure 0.1: Scheme for outlining of Residential Care Concepts (RCC) in the context of business model

The model has five components: target groups, care and service products, real estate strategies, residential care concepts and business model.

Target groups

- Profile 1: elderly people with little or no mobility limitations in independent living;
- Profile 2: elderly people with mobility limitations for instance in: climbing stairs, leave and enter the house and move outdoors;
- Profile 3: elderly people with mobility- and personal care limitations;
- Profile 4: the elderly with many functional limitations.

Residential care concept

From this model three types of residential care concepts are generated:

- Residential care concept 1: intramural living with standard all-inclusive care and service packages suited for profile 4 and possibly profile 3 of the target group.
- Residential care concept 2: Cared living with standard all-inclusive care and service packages, also only as care packages of service packages and as variable composite packages, which will be typically preferred by profiles 2 and 3 but will also be applicable for those in profile 1.
- Residential care concept 3: Independent living with only care packages of service packages and variable composite packages. Primary target group will be profile 1, but those in profile 2 and 3 are also relevant for this concept

Real estate strategies
Strategy 1 (consolidation and extension): Increase the nursing capacity (care intensity package 5-10).
Strategy 2 (refurbishment): renting of the care apartments and (possibly) providing extramural home care.
Strategy 3 (sale/ disposal): reorganization of real estate portfolio and expanding home care capacity.
Strategy 4 (redeployment and sale/ disposal): alternative use of the property with the ultimate goal of disposal.

      The overarching goal of these strategies are reducing vacancy and increasing profitability of elderly care institutions. With this in mind fundamental decisions can be made about medium- and long-term objectives and activities of elderly care institutions. After identifying these core strategies as a central component of a business model, the business model can take on a concept and depict a logical roadmap for value creation and adds to a holistic and more aggregated approach of company activities.

Business model

      A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing a company's logic of earning money. A business model describes the rationale of how an organization creates, delivers, and captures value (Business Model Generation).

      It describes how marketable products and services are generated by means of a company's value added component. In addition to the architecture of value creation, strategic as well as customer and market components are taken into consideration, in order to achieve the overall goal of generating the competitive advantage and securing continuity. To fulfil this latter purpose, a current business model should always be critically regarded from a dynamic perspective, thus the need for evolution or innovation of a business model, due to internal or external changes over time is crucial for the success of the business model and securing the continuity of an company (Wirtz, 2015). A framework that is currently popular for defining a business model is the business model canvas by Osterwalder. This canvas model is a framework (blueprint) that can be filled with critical success factors and choices to describe the implementation of the value proposition for elderly care institutions. The framework is useful as it describes the entire value creation logic and is a guide for making sure that all nine aspects necessary for value creation are addressed (Osterwalder & Pigneur, 2010).

      One of the key problems in the canvas business model is the complexity that emerges because of the many components, requiring additional attention (Wirtz et al., 2015). Based the canvas model, a new model is outlined that better suits the purpose of this research (figure 2). This reduced model now only contains six components of the original model, namely: the cost structure, the key resources, the key activities, the revenue streams, the value propositions and the customer segment. The other components, being the channels, the key partnerships and the customer relationships although outlined are beyond the scoop of this research. Partly, this is so, because the available data collected by the research limit the scoop of the research to these six components.

The new model
In the new model the cost structure is identified by the key resources and the key activities as identified in the existing database extracted from Care on the Map. The overlapping sub-component operating activities links the key resources needed to provide key activities that creates value proposition for the customer segments. Subsequently these value propositions generate the revenue streams for the health care institutions.
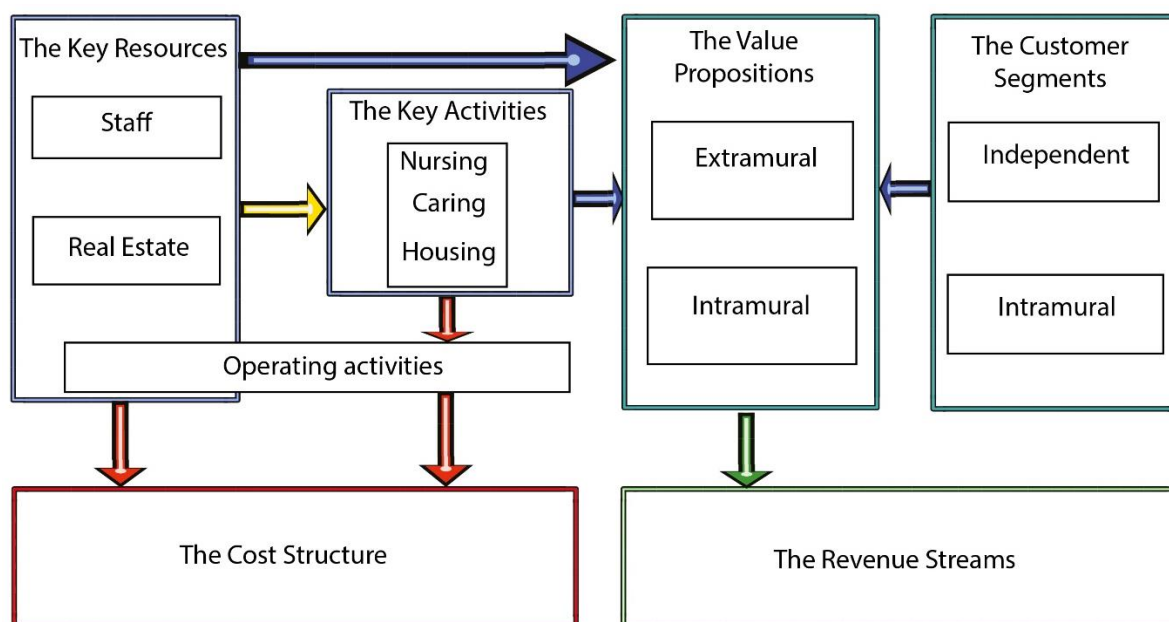
Figure 0.2: Diagram new business model based on the canvas model

The key resources that the new model identifies are the staff (fulltime-employees equivalents) and the real estate owned by the health care institutions. These resources support the key activities provided by the health care institutions. These activities are providing nursing, care and housing for the customer segment. To perform the activities and utilize the resources the care institutions need to operate these activities. These two components and sub-component constitute the structure of the cost that is needed to develop the value propositions. The cost of the key resources are identified as staff costs and depreciation of the fixed assets. The cost of the key activities is operating expenses to provide care, nursing and housing. The health care institution has two main revenue streams by providing intramural and extramural value proposition for the customer segment intramural living and independent living.

Results from empirical research

Using the model from Figure 2 linear regression modelling was conducted. A forward selection of variables was used to avoid issues that arise from explaining factors that were highly correlated. Table 4.5 shows which variables best explained the revenue streams using EBITDA% as the dependent variable. Since only independent factors were included that significantly explained differences in EBITDA% using a threshold of $p < 0.05$, not all variables from Figure 2 are included in Table 4.5. Descriptive information about the independent factors can be found in table 4.1 to table 4.4 as discussed in paragraph 4.1.

Table 0.1: Final model Output (forward method)

	B	SE B	β
Constant	18,74	3,604	
Number of extramural cutomers	0.009	0,004	0,290
Age 65 and older in the municipality	-0,378	0,188	-0,168
Number of household in the municipality	-2,972	0,933	-0,271
Book value 2013	0,219	0,080	0,527
Staff costs 2013	-0,836	0,140	-1,289
Depreciation of the fixed assets 2013	3,976	1,347	0,700

$R2 = .36$; ($p < .05$)

The results of the regression modelling show that the revenue streams (EBITDA%) is significantly influenced by the following parts of the business model in Figure 2:

Key resources:
Staff costs, book value and depreciation of the fixed assets were all significantly explaining differences in revenue streams. As one might expect, book value positively influenced the revenue stream, with a beta coefficient of 0.53. The beta coefficient can be understood as the weight a factor has in explaining differences in profitability amongst elderly health care institutes. Similarly, the staff costs were found to lower the revenue streams, and this factor has a strong impact on the revenue streams as might be inferred from the beta coefficient of -1.29. Depreciation of the fixed assets over 2013 was positively (0.70) related to the revenue streams. One would not expect such at first sight, because Depreciation of the fixed assets associated with cost of owning a building and as such, it should negatively influence the revenue stream. But because the nature of the outcome variable the EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization), the rise in Depreciation of the fixed will have positive effect on the EBITDA value due to its tax deductibility.

Key activities:
The database included one variable, operating costs, that represents this part of the business model. However, this factor did not significantly influence differences in revenue streams.

Value proposition
From the two variables identified as the value proposition, number of extramural and intramural customers only the number of extramural customer significantly influenced differences in revenue streams. The number of extramural customer positively influenced the revenue stream, although rather slightly, with a beta coefficient of 0.29.

Customer segments
The number of households and the percentage of elderly aged 65 years and older in the municipalities, were both all significantly explaining differences in revenue streams.

Conclusions

This research addressed the question which Residential Care Concepts can be best aligned to what kind of real estate strategy to constitute a business model for elderly care institutions that may underlay decision making now that care legislation has profoundly changed the access and financing of care institutions. Such a business model is needed in order to address these threats and to achieve a proper balance between the demand for care and the capacity to supply it. The present study tends to support the hypothesis that alignment of Residential Care Concepts with real estate strategies in business models might support profitability for health care institutions. The results suggest that adapting well described residential care concepts (see chapter 2.1.2) and expanding the extramural care provision may have a positive effect on the overall financial performance of the health care institutions In addition, the results suggest that merely focusing on the intramural care in the short and long-term may have adverse effects on the revenues of the health care institutions, given the current policies being very focused on the deferral of intramural care growth.
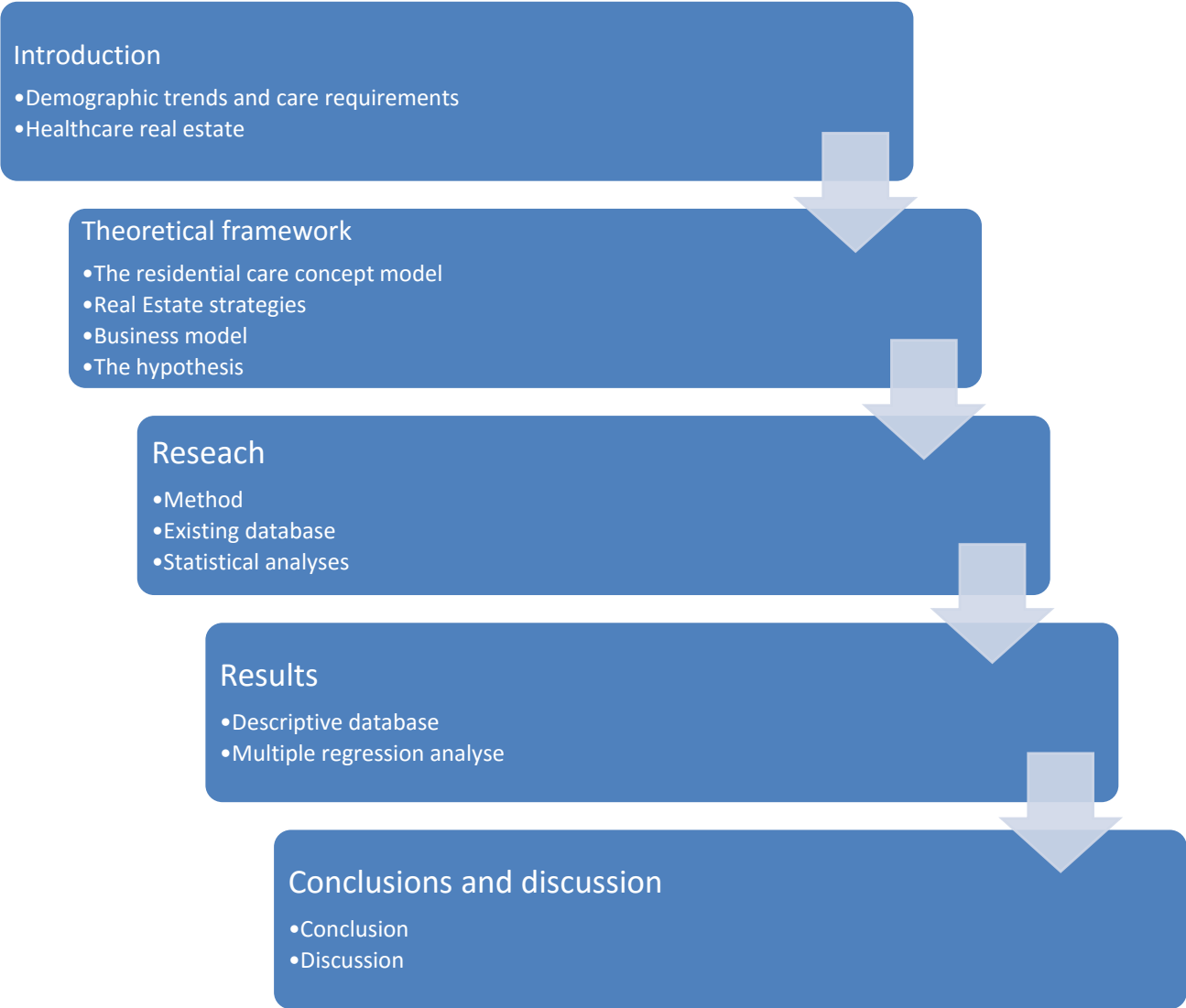
The main shortcoming of the current approach, is that multiple regression modelling was used. The outcomes show that the percentage of residents aged over 65 years had a negative impact on the profitability. This might be so, because the areas with higher numbers of elderly are likely to have multiple care institutions, and this may therefore suggest competitiveness between care providers.

Whether or not such is the case, needs further research that takes into account the spatial distance to competitors, which requires spatial regression analyses. Unfortunately, this was beyond the scope of this research. This also applies to another issue. In the current research, only those care institutions were included that predominantly delivered elderly care. Further insights might be gained by also included care institutions providing elderly care in addition to another kind of primary care.

The merit of the current study is that it provides empirical support how to deal with the vacancy issues in their real-estate and providing adequate housing and services for the intramural target groups and proper services for the extramural target groups. This allows for the feasibility and continuation of their company and as a result providing job guarantee for their employers. This translates to the care user as receiving the high quality service they are entitled to and the right housing facilities and accommodation connected to their target group profiles. As the government promotes high quality of life and opts for a participatory society, having an institution that can provide high quality service and facilities promotes this in the best possible way.

READING GUIDE

This thesis is structured as followed. First, the introduction describes the problem statement flowed by the aim and research questions. Next in the Theoretical framework section, the basic characteristics of theoretical framework (the model) are related to concepts of real estate strategies, target groups, care- and service products and the business model. Subsequently, the research design and method section, will elaborate on the design of research, through the residential care concept model, which was addressed in interviews with experts in the field. This lead up to the main research method, being linear regression modelling of data extracted from the Care on the map database. The findings are described in the results section. Finally, in the conclusion and discussion the research questions are answered and the results are discussed.

Introduction
- Demographic trends and care requirements
- Healthcare real estate

Theoretical framework
- The residential care concept model
- Real Estate strategies
- Business model
- The hypothesis

Reseach
- Method
- Existing database
- Statistical analyses

Results
- Descriptive database
- Multiple regression analyse

Conclusions and discussion
- Conclusion
- Discussion

CONTENTS

# INTRODUCTION

Care homes the Schild, Wolfheze
Gelderland

1   Introduction

The sustainability of current healthcare systems is threatened by several societal and economic developments, including an aging population, an increase of unmet medical needs and rising healthcare costs (Janssen, 2013). The consequence of these developments leads to new healthcare legislation. These new healthcare legislations force the health care institutions to become financially responsible for the profits and risks of their real estate investment.

The Netherlands has about 1,300 caring homes and 340 nursing homes with a capacity of respectively 100,000 and 65,000 places. The average health care institutions offer nursing care and residential care on location, but also homecare from various locations. These locations are owned by the health care institutions or can be rented from housing associations or private parties. The combination of owned and rented locations is also possible. Housing associations own more than 50,000 units of these caring homes (Meijdam, 2014). The nursing- and caring capacity will shrink in the coming years, due to reforms in the government policy. This policy reform implies that elderly people should live as long as possible independently. It also addressed growing wish of elderly people for living independently as long as it is possible.

1.1   Problem description

The vacancy risks for housing associations and health care institutions are increased due to a number of new healthcare legislations. First, of all from 2018 onwards, the health care institutions will bear the entire risk of vacancy. This is due to the gradual introduction of the so-called normative housing component (NHC). In contrast to the past, health care institutions will get fees which will be linked to the actual number of clients in the healthcare facility. No client, no fee. Because of this the health care institutions will have significantly lower income due to vacancy (Meijdam, 2014). Second, as of January 2015, the residential- and care component are funded separately and are now thus financially separated. The client pays for his/her residence the rent or mortgage, whereas care is separately paid for by the Health Insurance Act, Social Support Act (SSA), Exceptional Medical Expenses Act (EMEA) and possibly own resources (figure 1 and 2). For caring homes (for example, caring homes with large common areas) the housing costs may be higher than the rents they can ask. This makes renting these homes financially unprofitable (Kiers, 2013).
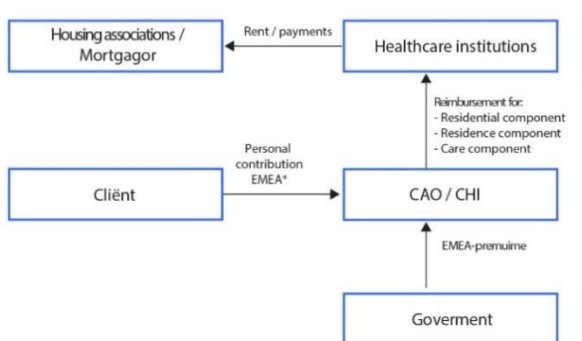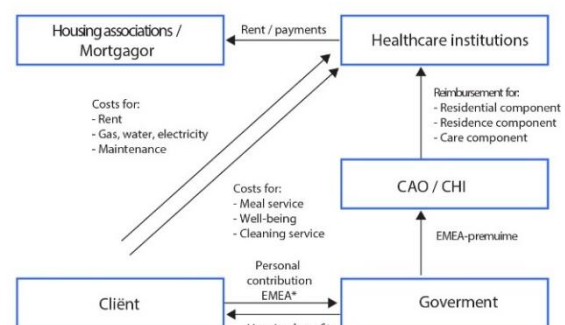
Figure 1.1: Cash flow under old healthcare legislation.

Figure 1.2: Cash flow under new healthcare legislation.

Vacancy rate and the composition of this healthcare real estate vary by region and building year (Kiers, 2013). One third to half of all healthcare real estate in many provinces have been built before 1975 (Mak,

2014). Only a few provinces have a significant portion of the stock built since 2000. These have a more flexible layout and usually have higher building quality (Kiers, 2013, p. 4).

1.1.1 Demographic trends and care requirements

Nowadays more than 85% of elderly aged over the 80 lives independently. In recent years, disposable income on average increased for all age groups. But in particular, the average income of 65-year-olds has grown. This is partly because older people obtained an increasingly higher level of education (Winkel, 2013b). Increasing prosperity and higher education contribute to a better health and an increasing life expectancy.
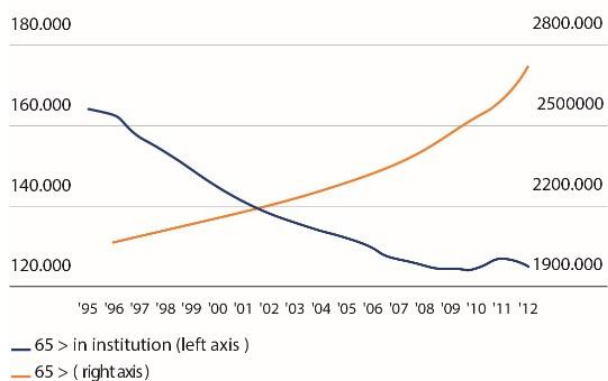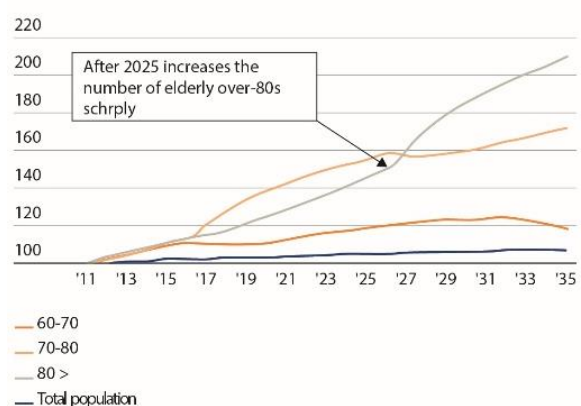

Figure 1.3: Changes in residential need

Figure 1.4: Changes in population

Because of a lower birth rate the Dutch population is aging and after 2025 the group aged over 80 years will grow by an average of 3.7% per year. The aging population can and will continue to live independently and has a greater need for autonomy and more control in their own hands. Based on these demographic projections a forecast for demand in care can be given related to the need for the various living and residential facilities.

Health care institutions and independent living

For a health care institution it is attractive to gain the loyalty of older people as soon as possible, because by doing so they can avoid future vacancy. This can be done by offering services to independently living older people, so that they do not have to quickly move once their health declines. Health care institutes may also offer facilities for independent living in the vicinity of a nursing home. This may mean, a reintroduction of sheltered housing for the elderly like the so called 'aanleunwoningen'

The health care institutions can apply themselves to offering off-site home care and plannable care. But they may also consider transforming and clustering of their real estate for elderly care. What would be the best option depends on the pressure in the housing market, the typology of housing and the expected municipal resources needed for home modifications as the municipal holds the budgets for home modifications allowing elderly to stay in their housing. Choosing for the off-site option is only relevant for health care institutions with small healthcare property, because disposing these properties will be financially less painful than other potential alternatives. For housing associations this offers opportunities to refurbish their old property in collaboration with health care institutions and offer these to elderly people in need of independent living accommodation (Hermus, 2014). The alternatives for the various target groups relate to the clustered or dispersed facilitation of intensive care. The categorical or integral facilitation of care depends on the current infrastructure, effectiveness and in what way certain groups do or do not correspond

to each other. For, instance cohousing fit and healthy elderly with ill and dementing elderly may not be preferable for neither of the target groups.

Because health care institutions themselves will become fully responsible for their real estate risks, in recent years the real estate management has gained a growing economic impact within their organizations. The optimal (strategic) use of real estate, professional management and marketing, contributes to the ability to achieve a long-term positive operating results. A good real estate policy and a thought thru vision are essential to achieve the strategy and objectives of the health care institution(Hermus, 2014). This means that health care institutions have to perform a reassessment of their position, services and facilities even through real estate was often considered by many health care institutions as a supporting asset and has been run as such for many years. Real estate can offer opportunities for business operation by evaluating and optimizing it. In many cases, a good real estate policy also leads to delivery of better care (Hermus, 2014).

1.2 Healthcare real estate

The part of nursing apartments built before 1985 has technically and functionally limited possibilities for care. They were built at the time of pliant construction standards (limited living space and sanitation) and are also financially largely depreciated. The nursing apartments built since 1985 are more spacious and lend themselves (much) better for alternative use (Vroon, 2005). Figure 1.5 and 1.6 show the average residential units size and size distribution of these residential units in care homes per province.
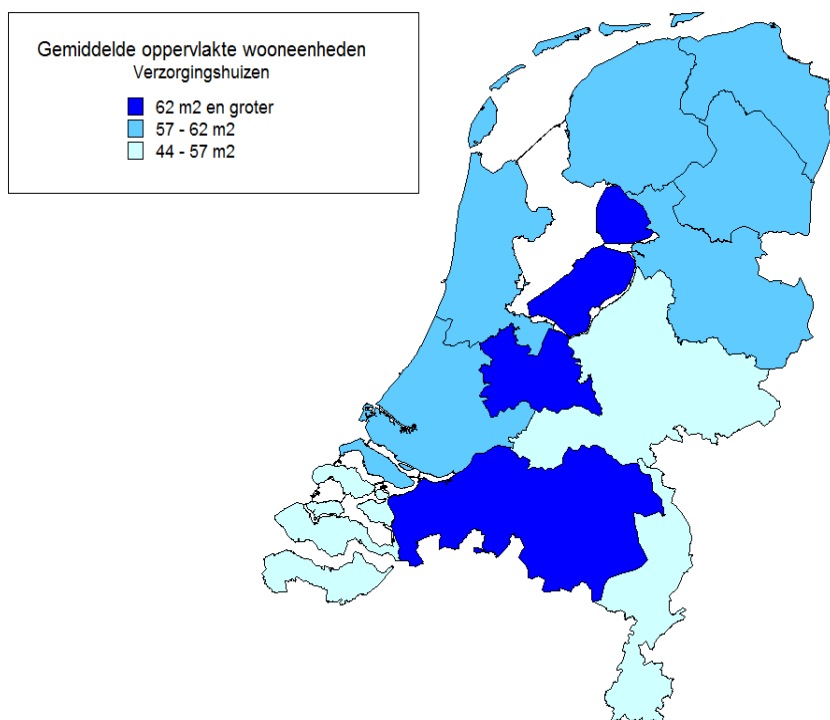

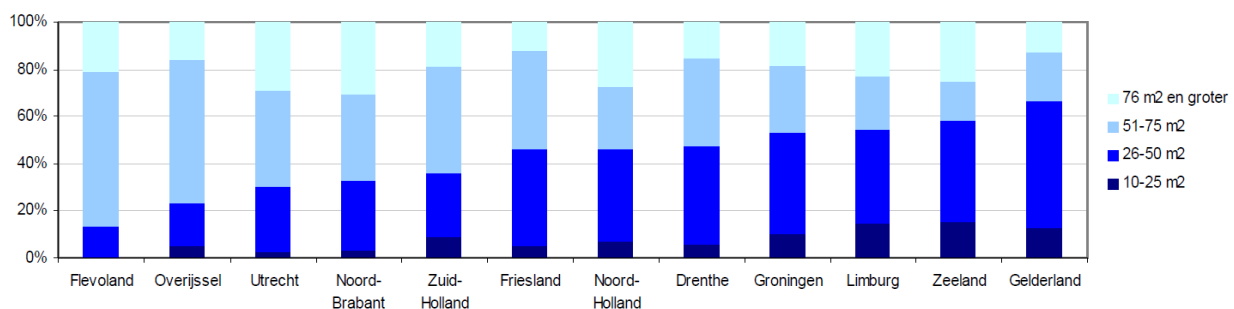Figure 1.5: Main surface units in nursing homes (Brugman, 2014a).

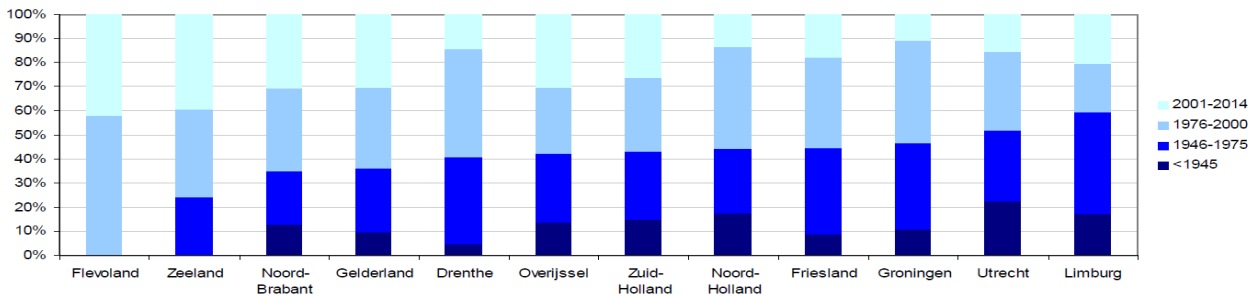Figure 1.6: Distribution size units (Brugman, 2014c).

Figure 7: Distribution of construction period (Brugman, 2014b).

In the provinces of Utrecht and North Brabant the care homes have the most square meters per room. This makes a greater share of these stock suitable for transformation into independent residential units. In Gelderland, Zeeland and Limburg care homes have the smallest square meter per room and this makes these less suitable for the transformation. Figure 7 shows that in many provinces a third to half of these property was built before 1975. As to be expected the largest share of new care homes is in Flevoland. Because Flevoland is the youngest province in the Netherlands and care homes are all developed after 1975. Also in Zeeland, North Brabant, Gelderland and Overijssel, a significant share of the stock is built after 2000 (Kiers, 2013).

Although more spacious than care homes built before 1975, even complexes that were built before 1985 are less suitable for transformation. These are often designed for one specific purpose and difficult to adapt to the current requirements (Bergvelt, 2011). Thereafter, complexes have greater flexibility in layout and usually of higher quality, making them better suited for transformation into, for example nursing homes (Mak, 2014) or other residential care concepts.

1.3   Problem statement

Elderly people prefer to obtain and to gain more control of their own care. This has implications on the way care is organized, because the elderly also has an increasingly critical attitude toward the functioning of the health system. The question is whether health care organizations make the right strategic choices in real estate management to facilitate their needs. Although policy changes were announces, its implications for real estate were only recently addressed. Over the last period insufficient progress has been made with thinking thru the need for real estate transformation, particularly for the accommodation of the lighter care group. This puts the traditional healthcare business model under pressure.

For health care institutions with elderly care real estate, it is important that both the services offered by them as well as the real estate owned by them will be involved in the decisions about the development of a good business model (or revenue model) (Olde Bijvank, 2012). In the past, often the caring homes have been the source of the revenues, which was invested in the nursing homes (Ginneken, 2014). In addition, health care institutions must also respond to the opportunities offered by the new playing field by better aligning with the needs of their (future) clients. The aim of this research is to gain insight into how real estate can offer opportunities for business operation by developing a business model that aligns Residential Care Concepts with real estate strategies to deliver better care and services.

1.4   Research question

Against this background, this research addresses the question how to design a business model that aligns Residential Care Concepts with real estate strategies for elderly care institutions. More specifically, the following sub questions will be addressed:

1.   Which target group profiles can be distinguished for health care institutions?

2. Which factors are important for Residential Care Concept that focuses on independent living?
3. Which real estate strategies are deployed within the current healthcare legislation?
4. Which real estate strategies can be aligned with these Residential Care Concepts to formulate a business model?

THEORETICAL FRAMEWORK

Care homes Zonnehuis Luingaborg, Bierum
Groningen

2 Theoretical framework

Because of this rapid changes in the elderly care sector, it becomes increasingly important to tune the strategies of different business functions. In order to add maximum value to the organization, real estate strategies have to be aligned with corporate strategy.

In Corporate Real Estate Management (CREM) different models have been developed to negotiate the best possible match between demand and supply on both building and portfolio level, and to link real estate strategy with business model. One of these models is HORIZON developed by a Dutch organisation for Applied Scientific Research called TNO (College bouw zorginstellingen, 2007).

The HORIZON model estimates the demand and supply for care and adequate housing for the elderly. This model has sufficient potential to be used as a blueprint in developing a model that copes not only with the current mismatch in the supply and demand but also gives a starting point for formulating a suitable business model for the elderly care institution.
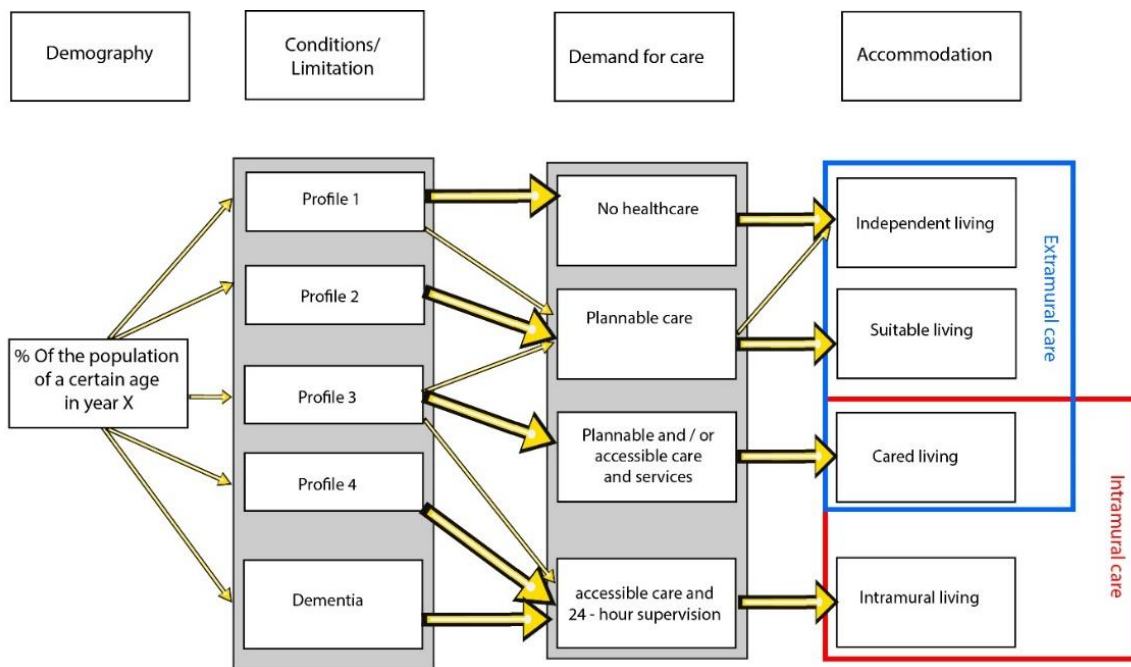
Figure 2.1: Projection Model Horizon (College bouw zorginstellingen, 2007)

A key part of this model is a tool for estimating future demands for care, particularly the demands for residential care. For this model, the profiles of elderly were determined using statistics. First the profiles of nursing home residents were distinguished. After that an investigation was made whether these profiles also appear in nursing homes as well as with independently living elderly. The research showed that based on physical limitations four profiles can be distinguished (College bouw zorginstellingen, 2007).

The following profiles can be distinguished while considering what kind of care may be implicated:
Extramural care
Profile 1: the elderly in this profile have no or little mobility limitations.
Profile 2: elderly people with mobility limitations: for instance, in climbing stairs, leave and enter the house and moving outdoors;
Intramural care
Profile 3: elderly people with mobility- and personal care limitations;
Profile 4: elderly with many functional limitations.

Dementia: TNO specifically distinguished the group of elderly with dementia at the care stage from other elderly in profile 4. Therefore, the Dementia profile emerged as a fifth profile of the elderly.

These profiles are related to the demand for care and residence status. Elderly people in profile 1 generally have no need of care and support and can live independently in an ordinary apartment and the accommodation form is therefore referred to as independent living. Elderly in profile 2 can live independently, but the home must be suitable considering their mobility limitations. They need, for instance dwellings without stairs and this kind of accommodation is therefore referred to as "Suitable living". Elderly in profile 3 are in need of care and support on demand, beside suitable residence. This type is therefore referred to as "Cared living". These accommodations need not only to be easy accessible, but also require the vicinity of the health care institutions. Elderly in profile 4 and in the profile of dementia are eligible for intramural living.

Table 2.1: The relationship between the profile, demand and the accommodation form.

Profile	Demand for care	Accommodation form Up to 2012	From 2012
Profile 1	No need for care	Independent living in an ordinary house.	Exramural
Profile 2	Little need for (plannable) care, however mobility limitations	Independent living in a suitable house	
Profile 3	Need for (plannable) care and support on demand	Cared living	
Profile 4	Accessible care and 24-hour supervision	Intramural	Intramural
Profile dementia	Idem	Idem	

This model was developed under previous healthcare legislation. The separation of residential- and care component has profound impact om this model. It mainly impacts the exclusion of services from the accommodation arrangement. Under the new legislation, only three types of accommodation arrangements remain: Intramural, Cared and Independent living. For the Cared- and Independent living the residential component is singled out and needs to be paid for by the residents. The Intramural accommodations are reimbursed by health insurers funded under the Exceptional Medical Expenses Act.

2.1 The residential care concept model

Base on the HORIZON model, the adapted residential care concept model is outlined (figure 2.2). This model links the target group profiles to the pertaining care, services and real estate strategies, thus creating parameters for residential care concepts that will be used in a business model.
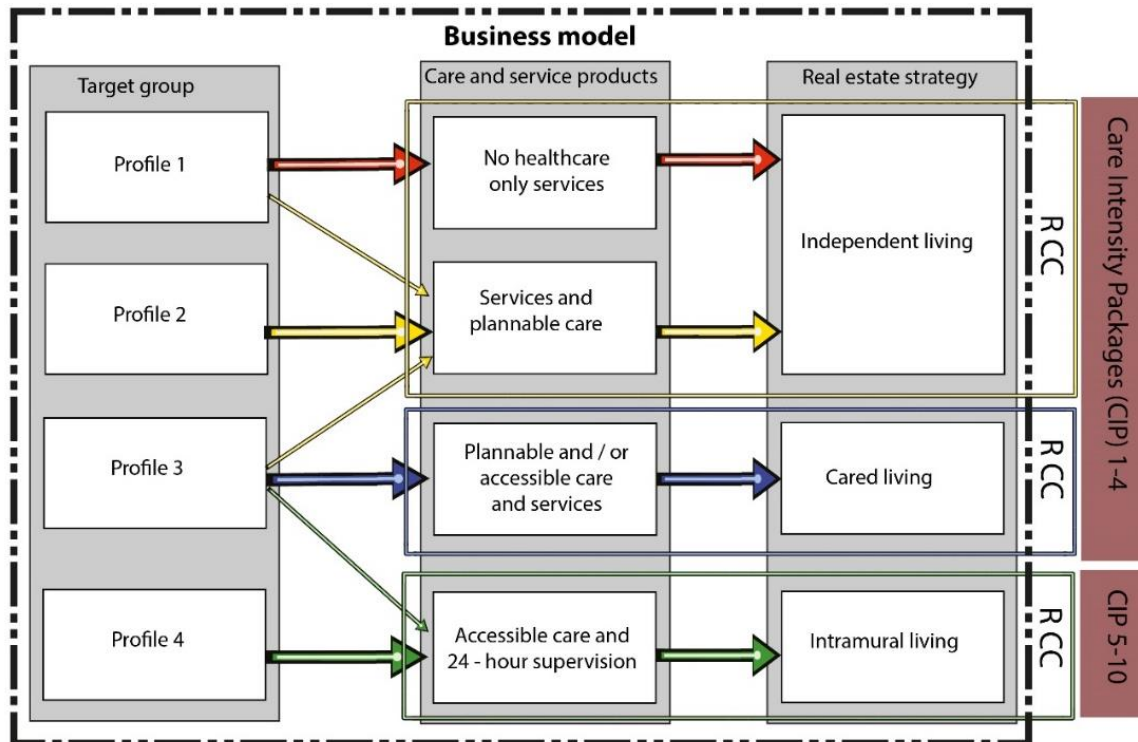

Figure 2.2: Scheme describing the Residential Care Concepts (RCC) for further development of a business model

A few necessary steps are needed to identify and depict the component of this residential care concepts model. This model has five components: target groups, care and service products, real estate strategies, residential care concepts and these components will be aligned in a business model. The target groups are already defined in the HORIZON model, and only concern the profiles which are still relevant to a business model describing the future demand for care, service and accommodation of elderly people. The profile dementia is here discarded, because the patients in this profile are eligible for medical care and thus their residence will be provided under the medical care act. This chapter will elaborate on the remaining four components of this model.

2.1.1 Care and services products

Interviews with 4 experts (three consultants and one independent organization) revealed several distinctions within the care and service products, and identified differences in the facilitation of these products to the different types of target groups and accommodation.

Care packages include Personal care, Nursing and 24-hous care. These care packages are all included for intramural living, but could be provided separately as plannable- and accessible care to other types of accommodation. These care packages are funded by either care offices, municipalities or Health Insurers.

Service packages include: 24-hour presence of supervision, Meal service, Cleaning of common areas, Maid service apartments, Concierge services, Laundry service, Reception Facility, Shopping Facility, Restaurant Facility as well as, Mental care and the amenities Warehouse, Logistics and Laundry Room. These service

packages are paid for by all residents, except for the intramural residents. For the latter residents these services are funded either by care offices or Health Insurers.

This care and service products are offered by the same health care institution either as standard all-inclusive care, or as service packages with or without accommodation. However, the care and service products may be also offered as only care- or service packages with variable constitute packages. The provision of these care- and service packages is either internally organized by the health care institution or externally (outsourced).

2.1.2 Residential care concept

The insights gained from the interviews with the experts in the field were used to improve the model summarized in figure 2.2. Consequently, three types of residential care concepts were formulated, being:

Residential care concept 1: intramural living with standard all-inclusive care- and service packages. It is a type of housing and residence with 24-hour immediate care and supervision, so this concept qualifies as not independently living. The real estate can be best described as specific buildings, both in appearance and the level of facilities, where the quality of finish and investment rises well above normal housing. Moreover, there is extra space for 24-hour care provision, and for supervision and guidance. Typically, these are the buildings with large common living rooms, general facilities such as a reception desk, and with therapy - and treatment facilities. This may offer individual residence, either with its own kitchen and bathroom, or clustered residence in a group. In clustered residence groups of residents shared the kitchen, living room, and possible toilet- and bathroom as well. This latter concept is often chosen for elderly people with dementia. This can be realized both as small scale unit within a district or as part of a larger setting.

Residential care concept 2: Cared living with standard all-inclusive care- and service packages, but also as variable compilation of care- and / or service elements. This concerns arrangements with "zero step" dwellings aligned, with the possibility of getting extramural care, nursing and counselling and hotel- and welfare services as an inseparable part of these arrangement. Care on demand is possible. Clients reside in close physical proximity of the care and services facilities (possible within the complex). These 'zero step' dwellings are generally clustered.

Residential care concept 3: This concept qualifies for independent living with limited and selected care- and/or service packages as variable composition packages. Elderly people in this profile generally have little or no need for care and support. They live independently in their own owned or rental dwelling. Also the customized residents fall within this concept. To accommodate the customized residents, this concept allows them to adapt packages to meet the changing needs throughout the course of their lives. It includes the possibility to move into housing in the vicinity of a health care institution may they wish so. It is a suitable dwelling for care, it is a dwelling in which all primary areas (living room, kitchen, bathroom, and at least one bedroom) are located at one level. Al so the front door is accessible without stairs, doorsteps or low doorsteps. In this dwelling there is no 24-hour immediate care or care on demand offered. However, it can be provided by arrangement (plannable care) such as home care in short notice.

2.2 Real Estate strategies

After defining the target group, care and service products and residential care concept, the next step is to define the possible real estate strategies that accommodates the demands of the target group and the supply of care and service products for health care institution. Vijverberg (Vijverberg, 2002) shows some necessary steps in analysing the current supply as an input to make a well-considered choice between six real estate strategies at the building level: these steps are: consolidation, refurbishment, redeployment, conversion, extension, sale/ disposal and demolition. These steps include a consumer evaluation of the current supply (actually a test of match or mismatch with the current and/or future demand) and a professional assessment

of operating prospects, technical condition, adaptability and expansibility. The average rating of the valuation of these aspects is an indicator of the present and future value of the current supply. The assessment can be used as a tool to decide what to do with the current supply, as a starting point for choosing the best possible strategy to transform the current supply into the future supply (Zwart, 2010).

The choice of these strategies or a combination of these strategies is highly dependent on the regional demand now and in the future, and the composition of the healthcare property. The position of the health care institutions determines which (combination of) strategy (ies) to follow. Each (combination of) strategy has a diverse effect on the provision of care, the staff, the real estate and has different risks and required investments (Table 2) (Winkel, 2013a).

Strategy 1: Increase the nursing capacity (care intensity package 5-10). One possible strategy is to increase the nursing home capacity while reducing the caring home capacity. In the recent past. this strategy was frequently applied by health care institutions at the 'natural' moments to transform old nursing homes into new locations where more intensive (intramural) care could be offered. Application of this strategy has an impact on the care product, staff and real estate. It is currently a risky strategy because even though quite a number of elderly care institutions adopt this strategy, the government is very focused to restrain and temporize the intramural care growth. The possibilities to adapt this strategy are therefore limited and dependent on the cooperation of health insurers and particularly the local conditions.

Strategy 2: The renting of care apartments in alignment with the possibility to provide extramural home care. In addition to increasing the nursing capacity, the vacant care-apartments can be rented to new clients of any age without a formal need for home care or only for elderly over the 65 with no formal need of home care. These locations provide the opportunity for a safe living environment where (in the future) care and nursing could be provided. The classic large caring homes would be transformed into regular housing types with care infrastructure. This means for elderly care institutions that they must develop multi-purpose apartments and have a flexible shield of workforce. This makes the supply of locations more flexible and allows for a rapid response to changing market conditions. When an older building is already fully depreciated, at this location a new building can be developed with or without a strategic partnership with an investor, construction organization and / or housing association. Such a strategy offers the opportunity to serve a wider population. A merit of such strategy would be that is creates flexibility within the property portfolio. The challenge is that the locations actually must be transformable to independent rental apartments. Clients will be critical to the quality of the apartments as well as the different services because they themselves can hire services and finance facilities. The healthcare logistics becomes more complex as the relationship between healthcare consumers a residential consumer will significantly change. In addition, the risk of this strategy is that it is based on the assumption that in the long run elderly without need of care still want to stay in a healthcare setting.

Strategy 3: The reorganisation of real estate portfolio and expansion of home care capacity. Despite applying a single or a combination of the aforementioned strategies, a health care institution can still face vacancy, because the demands for care drop and the vacant capacity cannot be used as nursing home or can be rented. For these reasons, an elderly care institution can consider to dispose of owned real estate and expand the home care capacity. It is a challenge to provide both intramural and extramural care. It is important to acknowledge that extramural care constitutes a different market. In the extramural care market, a health care institution needs to deal with municipalities and health insurers. It is a different market with its own dynamics. Extramural care should therefore not be easily considered a substitute for intramural care. Yet, the advantage of providing both intramural and extramural care are noticeable. Focusing on home care, client bond and visibility for the (future) client is also important. The patient flow may be secured as put forward by one of the interviewees "by focusing on the creation of centre's in areas with

large aging population with independent living and sheltered housing" so that elderly care institution could provide care from this central point to clients at home.

Strategy 4: The alternative use of the property with the ultimate goal disposing of it. If the real estate for various reasons cannot be disposed of in short notice, the last strategies outlines the option of looking at alternative uses for the site(s). Elderly care institutions may consider renting these locations to students, companies or migrant (workers). Students may be an interesting target group because they are looking for housing with a short term lease and they are very flexible. In this strategy there is no need for care product and the care staff, it is also not needed. The staff possibly can be deployed at other locations. Clearly, this option holds the risk that elderly care institutions enter an entirely different area. Here also applies that a new market has its own dynamics, and therefore it seems obvious that this alternative requires outsourcing. The success of this strategy is strongly linked to the location. The location should be attractive to students, companies or migrant (workers).

Table 2.2: degree adjustment, risk and investment required (translated)(Winkel, 2013b).

	Level of adaptation			Risks	Required Investment in:
	Care product	Staff	Real estate		
Strategy 1	• Expanding care product including: intensive dementia care, care and nursing specific disorders	• Expanding the number of specialists such as: nursing specialists and higher professional educated elderly nurses	• Real estate possible adjust • Enough space required for nursing home	• Risk of oversupply • Government is directed to the deferral of intramural growth	• Higher educated staff • Modifications property • Redevelopment care product
Strategy 2	• Low impact care product • Clients are responsible for rent, service and facility costs	• Flexible staff capacity is required • Health Care Logistics becomes more complex	• Real estate possible adjust • Independent apartments required	• Uncertainty around future supply and demand • Income insecurity of targetgroupe increases. • Each municipality can conduct a different Wmo policy.	• Health Care Logistics • Modifications property
Strategy 3	• Product Care continues equal • Care is provided outside the institution instead of in the institutions	• Moderate impact on staff •Care product remains the same, but now location • Individualistic way of working	• Reducing the amount of real estate instead of adjusting it. • The lease contract terminate or dissolute • In case of purchase contract sell the real estate.	• Home Care Market has its own dynamics • Concentration of vacancy assignment	• Sale of real estate is a divestment • In case of early termination of the lease contracts the institution must buy these out
Strategy 4	• Care Product disappears	• No staff in care needed anymore	• Little or no adjustments, • For the lease contracts this strategy may require collaboration with housing association	• Very different discipline • The success of this strategy strong location bound	• Minimum: The location will be used at the lowest possible investment for alternative

Low █ (green)
Average █ (light yellow)
Medium-High █ (orange)

In conclusion, the overarching goal of these strategies is reducing the vacancy and increasing the profitability of the elderly care institutions. With this in mind some important decisions could be made about medium- and long-term objectives and activities of elderly care institutions. This makes these strategies a central component of a business model (Hamel, 2000). The business model then can take on a concept and depicts a logical roadmap for value creation with a holistic description of company activities in an aggregated form (Osterwalder, Pigneur, & Tucci, 2005).

2.3 Business model

A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing a company's logic of earning money. A business model describes the rationale of how an organization creates, delivers, and captures value (Osterwalder & Pigneur, 2010). It describes how marketable products and services are generated by means of a company's value added component. In addition to the architecture of value creation, strategic as well as customer and market components are taken into consideration, in order to achieve the overall goal of generating the competitive advantage and securing continuity. To fulfil this latter purpose, a current business model should always be critically regarded from a dynamic perspective, thus the need for business model evolution or business model innovation, due to internal or external changes over time (Wirtz, 2015).

Business models are frequently described in literature through the definition of the different components. The result of it is a simplified descriptions of companies (Doganova, 2009). These simplifications shift the focus towards particular aspects of business models, leading to different definitions because of their different use.

In general there are three typologies of the business models that can be distinguished (Morris, 2005). The first typology is an economic approach, emphasizing the generation of profits with cost structures and revenues as variables. The second typology is an operational approach emphasizing the architecture of a company on how it creates value through a business infrastructure. The third typology describes a strategic approach, emphasizing the positioning of a company in a market and with certain opportunities.

There are different types of the business models that may be applicable for the specific purpose of this thesis. The business model canvas developed by Osterwalder et al. showed both scientific as well as practical relevance (M. Richter, 2012). This provides a reasonable starting point to the applicability of this kind of models for this research.

2.3.1 The business model canvas

A framework that is currently popular in defining a business model is the business model canvas by Osterwalder (Figure 10) (Osterwalder & Pigneur, 2010). The business model canvas depicts four major aspects of a business; The value proposition, the value delivery, value creation and the financial stream. The four aspects are divided in nine rationally interlocking building blocks. In the mid there is the value proposition. The top three blocks on the left-hand side of the diagram deal with the required organizational aspects, that is, the key activities, resources, and partners. The top three blocks on the right-hand side deal with who the customers/users are and how to interact with them. At the bottom are the financial aspects. Creating and offering value generate costs, and a revenue model is necessary to capture value back to at least cover these costs. This canvas is a framework (blueprint) that can be filled with critical success factors and choices to describe the implementation of the value proposition for health care institutions. The framework is useful as it describes the entire value creation logic and is a guide to ensure that all nine aspects necessary for value creation are addressed. The framework also helps to classify and aggregate the components of a business model (Osterwalder & Pigneur, 2010) (Osterwalder & Pigneur, 2010).
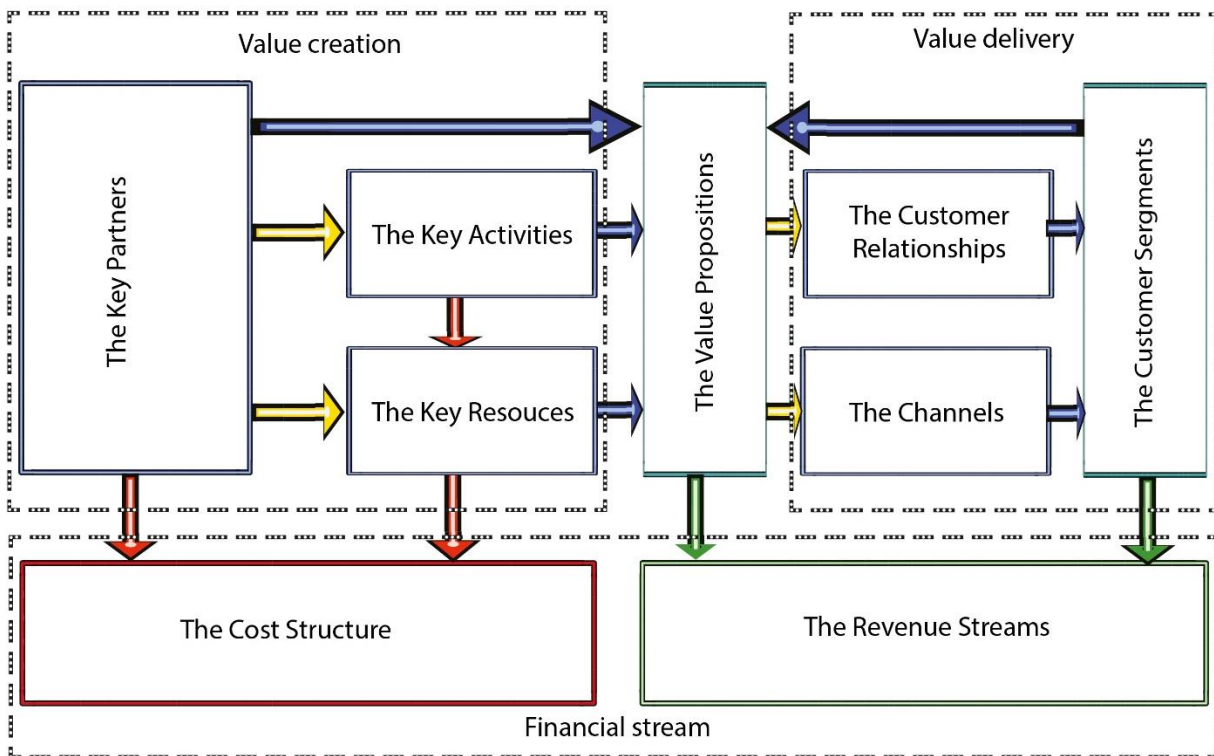
Figure 2.3: Diagram business model canvas (Osterwalder & Pigneur, 2010)

The customer segments

The customer segments building block defines the different target groups that health care institution aims to reach and serve. In order to better satisfy these customers, the health care institutions have to group them into distinct segments with common needs, common behaviours or other attributes. This business model defines them in to two large Customer Segments. Namely the *intramural* and *extramural* customers.

The value propositions

The value propositions building block describes the bundle of care & service products and accommodation that create value for the target groups. It solves a customer problem or satisfies a customer need. These bundles are identified as the Intramural Residential Care Concepts and extramural Residential Care Concepts. In this sense, the Residential Care Concepts are the aggregation of benefits that a health care institution offers to the customers. The value propositions (Residential Care Concepts) are designed to facilitate the elderly people's need for care and/or services for living independently (see chapter 2.1.2).

The channels

The channels building block describes how the health care institution communicates with and reaches its customer segments to deliver the value proposition. The value propositions are delivered through different channels to the customers. The intramural Residential Care Concepts may be offered to target groups in profile four and possibly profile three. These are customers in need of intensive care and they are eligible to this, under the medical care act. There are limited number of beds available for these customers due to the contracts with the care office. In this case the health care institution is approached by the customer themselves or due to the internal shift within existing costumer segment because of deterioration of their health condition.

The extramural Residential Care Concepts customer in need of the cared living are approached by the health care institutions through their online platforms, advertisements, care offices and the partners (municipalities and housing association). The care, services (on the daily, weekly and Monthly) and accommodation are

delivered on location within the vicinity of the health care institution. The profiles two and three of the target groups are most suited for these concepts.

The extramural customers are the most valued customer for health care institution. Because not only the modified care and service packages from other value propositions could be delivered to them, but also gaining their loyalty may mean future recruitment as an intramural customer.

The health care institution can choose between reaching its customers through its own channels, through partner channels, or through a mix of both. Partner channels lead to lower margins, but they allow an organization to expand its reach and benefit from partner strengths. Owned channels and particularly direct ones have higher margins, but can be costly to put in place and to operate. The trick is to find the right balance between the different types of channels, to integrate them in a way to create a great customer experience, and to maximize revenues.

The customer relationships

The Customer Relationships Building Block describes the types of relationships a health care institution establishes with specific customer segments. Due to the nature of the value propositions (providing care, service and accommodation) almost all relation with customers are personal. The superordinate goal of these relation is to acquire, retain and boost each customer segment. Establishing firm relation with the extramural customer segment on frequent basis should be highly beneficial for the health care institution. Although it is costly at the beginning, in the long-term it is thought to cost efficient by gaining the loyalty of the customers. For this reason, substantial market- and target group research is needed to underpin the type of relation interface.

The revenue streams

The revenue streams building block represents the cash a company generates from each customer segment (costs must be subtracted from revenues to create earnings) If customers comprise the heart of a business model, revenue streams are its arteries. The health care institution has three main streams of revenues by providing care, services and accommodation. As landlord they generate revenue by renting residential accommodation to the customer. Also providing care and service to customers generates revenues to the health care institution. The extramural customer provides revenue by utilizing the care and service product of health care institution. The diversity and flexibility of these care and service packages are crucial to attract and enlist these extramural customers, because these packages are paid for by the customers.

key resources

The key resources building block describes the most important assets required to make a business model works. One of the key resources owned by health care institution is the extensive knowledge as of how to provide care and service, but also their real estate is a very valuable asset. These resources allow health care institutions to create and offer the value proposition, reach markets, maintain relationships with customer segments, and earn revenues.

The key activities

The key activities building block describes the most important things a company must do to make its business model works. For the health care institution the key activities are renting out their property, providing onsite and /or offsite their care and service products. These are the most important actions the health care institution must take to successfully operate. They are required to create and offer a value proposition, reach markets, maintain customer relationships, and earn revenues.

The key partnerships

The key partnerships building block describes the network of suppliers and partners that make the business model works. In this business model there are three types of partnerships distinguished. Strategic partnerships between the health care institutions, joint ventures with the other health care institution or housing associations to develop the value proposition, and buyer-supplier relationships with the healthcare office, health insurance company, municipality, housing association and other health care institutions. Creating these alliances will optimize their business models, reduce risks and acquire resources. Few health care institutions own all the resources or perform all the activities described by the business model. Rather, they extend their own capabilities by relying on other firms to furnish particular resources or perform certain activities. For instance, renting residence for a customer segment acquires resources and certain activities that are not the core business of health care institution, thus in most cases outsourcing these activities to the housing association would be a better alternative to establishing, developing and running hem selves.

The cost structure

This building block describes the most important costs incurred while operating under this business model. Creating and delivering value, maintaining customer relationships, and generating revenue all incur costs. Such costs can be relatively easily calculated after defining key resources, key activities, and key partnerships.

One of the key problems in the canvas business model is the complexity that emerges because of the many components, which requires additional attention (Wirtz, 2015). Therefore, using the canvas model a new model is outlined that better suits the purpose of this research (figure 2.3). This new model contain only six component of the original model, namely: the cost structure, the key resources, the key activities, the revenue streams, the value propositions and the customer segment. The components, the channels, the key partnerships and the customer relationships although already outline above are beyond the scope of this research. This is partly so, because available data collected during the research limits the scope of the research to these six components.

2.3.2   The new model

In this model the cost structure is identify by the key resources and the key activities. The overlapping sub-component operating activities links the key resources needed to provide key activities that creates value proposition for the customer segments. Subsequently these value propositions generate the revenue steam for the health care institutions.

The key resources that identified were the staff (employee) and the real estate owned by the health care institutions. These resources support the key activities provided by the health care institutions. These activities are providing nursing, care and housing to the customer segment. To perform the activities and utilise these resources some operating activities are needed. These two components and sub-component constitute the structure of the cost that are needed to develop the value propositions. The cost of the key resources is identified as staff wages and real estate costs (rent and mortgage). The cost of the key activities are the operating expenses of the health care institutions to provide care, nursing and housing. The health care institution has two main revenue streams, by providing intramural- and extramural care, services and housing for the customer in need of intramural- and independent living.
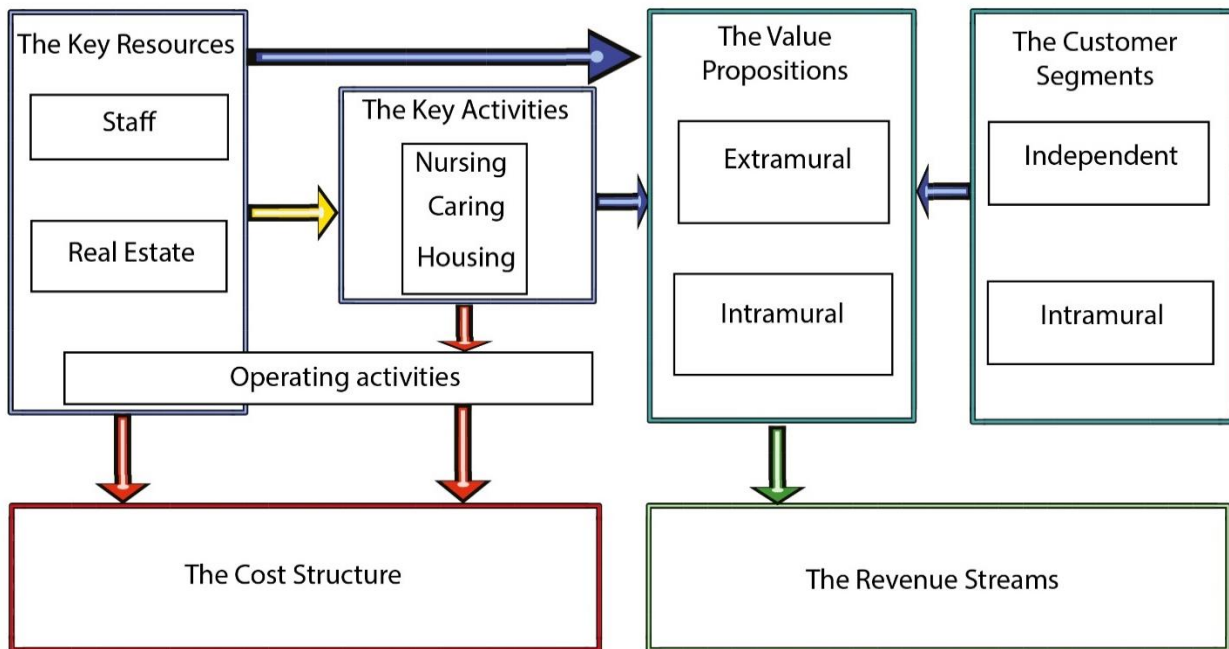
Figure 2.4: New business model

In conclusion, this model provides sufficient support to formulate a hypothesis regarding possible choices involving the residential care concepts and real state strategies. Before outlining the hypothesis, the link between the possible real estate strategies (see section 2.2) and established Residential care concepts (see section 2.1.2) should be further clarified. The four real state strategies correspond to three established residential care concepts, which give rise to the hypothesis about the impact of these on the components of the business model.
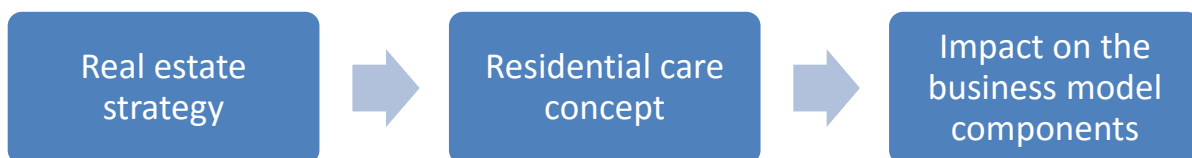

Figure 2.5: Hypothesis of the business model

The first real estate strategy implies to increase the nursing capacity by developing and focusing on the residential care concept of intramural living. *The line of reasoning here is that on the one hand the investment in the key resources (real estate and staff) and the key activity (care products) (see table 2.2) will have negative impact om the revenue streams (level of the profitability). On the other hand, the number of the intramural customer will have positive effect on the revenue stream.*

Contrary to the first real estate strategy, the second real estate strategy advocates more extramural care provision by renting of the care apartments and providing extramural home care. Such corresponds to the residential care concept of cared living. *Here the line of reasoning is that the number of the extramural customers will have a positive effect on the revenue streams, while operating activities (for providing housing and care) and real estate adjustments will have a negative impact on the revenue streams.*

The focus of the last two real estate strategies is at reducing the amount of real estate instead of adjusting the real estate. This means emphasising the residential care concept of independent living. Thus providing extramural care and services without offering housing. This allows the health care institute either to sell the vacant real estate, which is considered the better alternative, or proposes alternative use of

properties with the ultimate goal disposing of it. *Here the line of reasoning is that selling or disposing of vacant real estate may have a negative impact on the key resource (real estate), because of possible residual debts after selling the properties. But also in the case of rented properties the premature termination of lease contracts will have negative financial effects on the revenue streams. On the plus side though, the number of the extramural customers is thought to have a positive effect on the revenue stream.*

2.3.3   The hypothesis

As outlined before, the main hypothesis in this study is that the application of a business model in which intra- and extramural residential care concepts are aligned with different real estate strategies better explain the level of the profitability (the revenue streams) for health care institutions than only real estate strategies.

As will be explained in the following section, this hypothesis will be tested using data extracted from the website 'Care on the map'(www.zorgopdekaart.nl, 12-2015) using linear regression modelling.

RESEARCH DESIGN & METHODES

Apartments in nursing home De Geinsche Hof, Nieuwegein, Utrecht

3 Research design and methods

This section describes the research design and the applied methods for data collection to provide answer to the research questions and to test the hypothesis. Both qualitative (interviewing) and quantitative research methods (statistical modelling) were used.

In the research design three main parts can be distinguished. First a literature review and expert interviews were conducted to develop the theoretical underpinning of this study. This resulted in the theoretical framework as outlined in chapter 2, which describes four target group profiles, four possible the real estate strategies and different combinations of type of care and service products. Subsequently these profile, strategies and products were combined in business model using the business model canvas as underpinning. This was furthered into a less complex conceptual model and used to develop the main hypothesis of this study that the application of a business model in which intra- and extramural residential care concepts are aligned with different real estate strategies better explain the level of the profitability (the revenue streams) for health care institutions than only real estate strategies would do.

To test the hypothesis, data from several databases available through the website 'Care on the Map' (www.zorgopdekaart.nl, 12-2015).These data were analysed using statistical modelling as will be further explained in paragraph 3.2.

Based up on the model (The residential care concept model) the research design is developed which consists of three main part. Namely literature research, method of gathering information and results. The literature review provides a theoretical framework on the definition of target group profile, possible the real estate strategies and the type of care and service products. But also the gathered information from the interviews were initially used to formulate survey questions. This survey was intended to yield the data for statistical modelling. However, the results of the survey was not included in the further reporting because of a too low response rate at the time this study was finalized. Instead, the database Care on the Map was identified and considered to be a useful alternative to the survey. Subsequently these profile, strategies and products ware aggregated in the business model. The business model is used to create a statistical model to analyse data from data base of Care on the Map. At a later stage, but beyond the scope of this study. The result of the survey will be used to interpret the finding from the statistical model.
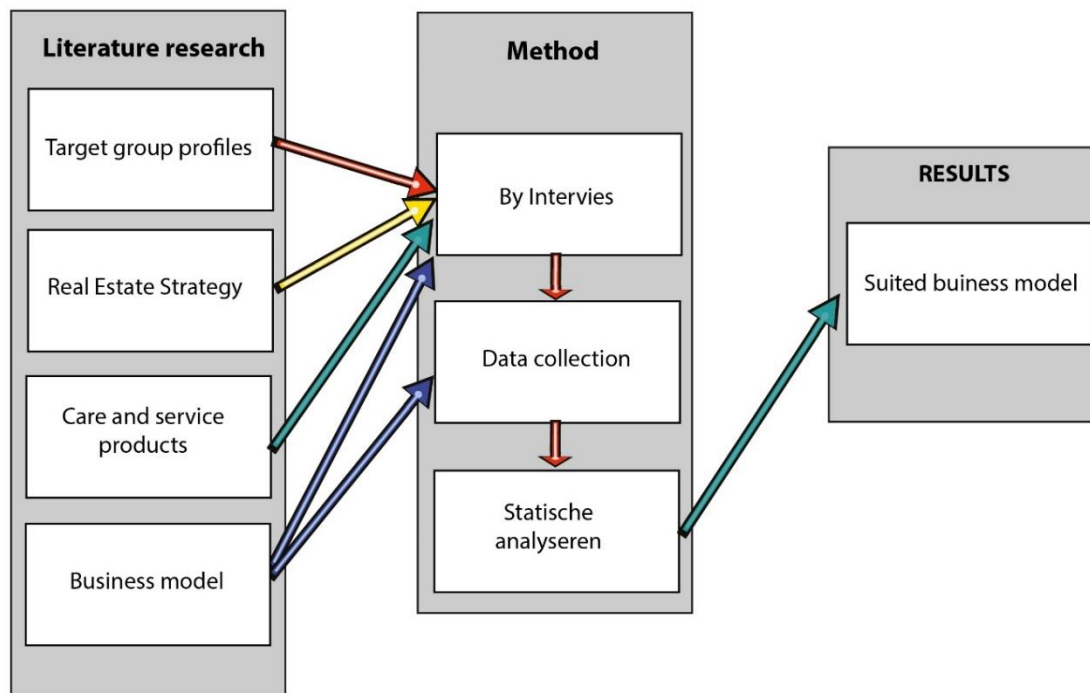
Figure 3.1: Research Design and method

3.1   The interviews

An interview protocol was developed to gain information on the current state of affairs from experts in the field (Appendix I). In total four experts from consultants (3) and independent organizations (1) were interviewed.

The interview was structured as followed: after establishing the interviewees background and their field of expertise, in the first part of the interview the experts were asked about the real estate strategies that are being deployed by elderly care institutions. Furthermore, their opinion was asked as of which strategies should be implemented to coop with the current threat of vacancy in the elderly care real estate stock. All experts estimated that the majority (more than 50%) of the health care institutions did not have a clear and effective real estate strategy for their existing elderly care stock. This estimation was based up on their advisory portfolios as there is little to non-empirical studies on the subject. As to which real estate strategies should be implemented, the experts indicated that such highly depends on the size of the organisation and composition of their real estate (whether it is rent or owned; functional quality of the property), the type of care provided by the organisation (intramural vs extramural care) and regional differences regarding target populations, as well as the strength of competition between health care institutes in their regions.

There was consensus amongst all the experts that exclusively focusing Strategy 1(Increasing the intramural capacity) would be a very risky strategy because the government is very focused on to restrain the intramural care growth. Also there is a limited capacity because health care agencies only offer one year contracts which restricted long term thinking.

The second part of the interview addressed the use of a business model by elderly care institutions. Almost elderly care institutions are currently reassessing their revenue models. The transition from intramural to extramural care and service provision proceeds with difficulty. The revenue model based on intramural care and service was considered as not suitable for the provision of extramural care and service and considered

unprofitable. The experts plead for more tailored care and service packages with good marketing nad competitive price ranges.

In the third section of the interview the expert were asked to elaborate on target group that elderly care institution can serve and want to serve and how to profile these target groups. To make a tailored care and service packages it very important to identify the needs of this target groups stated the experts. The profiling of this target group could be done on bases of the physical limitations, medical care and incomes. The presented profile out of the model is a good starting point according to experts.

In the final part of the interview the experts were asked about the residential care concepts. They explained that housing corporations are having an essential role in the development of such a concept. That is because health care institutions are not experts in management of rental real estate. It is not their core business to operate in the field of housing provision. The experts thought they should either outsource their housing component to other professional parties or heavily invest in their own real estate department. One of the expert mentioned that since the new legislation (separation of residence and care) the cooperation between the housing association and elderly care institution deteriorated. The elderly care institutions were used to outsource their housing operation to housing associations because of their knowhow and capacity, but after the new legislation the balance between costs and benefits associated with housing operation has deteriorated exponentially. Housing corporations here see little profit margins for these activities and now often declined to provide services.

3.2 Existing database combined in "care on the map"

To test the hypothesis data were collected from Care on the Map (www.zorgopdekaart.nl, 12-2015). Care on the Map is a platform created by TNO and commissioned by the Ministry Health Welfare and Sport for municipalities, housing corporations, health care institutions and healthcare office to assess their policies and to test their strategies. This platform holds detailed information about the demand for care, healthcare real estate, financial position of the health institutions and demographic data of the municipalities. The available data on this platform provide sufficient information for executing the research with statistical analysis. A data base was developed extracting data from four major databases: Key Registers of Addresses and Buildings, Care office, financial report of the health care institution and TNO (Horizonline) using several key identifiers across these databases.

3.2.1 Overview of involved database

Database Key Registers of Addresses and Buildings (2013)

Key Registers for Addresses and Buildings contains the official data of all addresses and buildings in the Netherlands. The municipalities are responsible for the registration and maintenance of this data. All municipalities shall ensure that a copy of this data is sent to the Land Registry. Any change that the municipality does in this database registration is automatically sent to the Land Registry. The Land Registry collects all data from all municipalities into one new national facility. The Land Registry also ensures that customers are able to access data from this national facility. The collected data from this database contain information on the care homes, such as the owner, quantity, building year, address and geographical coordinate. This database had a sample size of n=1385

Database Care offices (2013)

Care offices carry out some of the long-term care. They are self-employed firms that are closely allied to the biggest insurer on the spot. They are responsible that all the clients in their region get the appropriate long-term care they deserve. For this purpose, the care offices register all the data on supply and demand for care. this database contained n=396 samples

Database financial report of the health care institution (2013)
All health care institutions are obliged to publish their annual financial report. This database contained information about the financial estate of the institutions, for instance turnover, business outcomes, staff cost etc. This database contained n = 674 samples

Database Horizonline (2013)
Horizon Line database presents the (expected) health of people aged 55 and older, and the related demand for housing. The data were broken down by street, neighbourhood and municipality. Horizon Line is primarily intended for local government, healthcare organizations, housing associations and health insurers. This database contained n=409 samples

Database Care on the Map (2013)
The Care on the Map platform (www.zorgopdekaart.nl, 12-2015) superimpose these data sources using a geographical map. These means there is no one aggregated database available from the platform, but instead there were four separate databases layered to the geographical coordinate map. Because the data comes from different sources there is some discrepancy in the definition of the variables, for instance the Database Key Registers of Addresses and Buildings has slightly different nominations for owners of the care homes than did the Database Care offices. These made the extraction and alignment using key indicators vary laborious and tedious, but in the end checks pointed out that a reliable subset of elderly care institutes could be extracted.

Data sources were combined in to one aggregated database. This at was done at the 6PC level. After combining the data in to one dataset, t 127 reliable cases were left over, leaving only independent care institution with owned real state property.

For the making a reasonable statistical analysis these data sources are combined in to one aggregated database. That is done at the 6PC level. After combining the data in to one dataset, there is 127 relabel samples left over, leaving only independent care institution with owned real state property. That due to above mentioned problem with data sources.

3.3 Statistical analyses
This section of the report describes the fundamentals of the statistical model that was used to test the hypothesis by analysis when analysing the relationship between the cost structure and the revenue streams. It provides an explanation of how the variables used in the statistical analyses were derived. Explanations and justifications are given to support the choices that have been made according to the methods and data that were used.

Regression analysis is used to fit a model to an available data set and to predict the value of the dependent variable based on an independent variable. The dependent variable is unknown and it is the goal of the model to predict its value. The independent variable is known and is input for the model. In short regression analysis is a way of predicting an outcome variable (dependent) from one or several predictor variable(s) (independent and explanatory). Because the statistical model used for testing the hypothesis includes more than two predictor variables, multiple regression analysis is used to fit a model to the available data set.

The regression analysis can be described by using the following equation:

$Outcome_i = (model) + errar_i$ (1)

Equation 1 means that the outcome of a particular revenue streams can be predicted by whatever model is fitted to the data plus some kind of error. A multiple regression analysis is represented by the following equation:

$$Y_{it} = (b_0 + b_1 X_{1i} + b_2 X_{2i} + \ldots + b_n X_{ni}) + \varepsilon_i \qquad (2)$$

The slope of the line (b_1) and the point at which the line crosses the vertical axis of the graph, known as the intercept of the line (b_0). These parameters are known as regression coefficients and reflect the importance of the predictor(s) included in the model. Furthermore a residual term (ε_i) is added to the equation. This residual term represents the difference between the predicted outcome (Yit) and the outcome that is actually obtained. The ultimate goal with regression is to find a line, as described by equation 2, that best described the collected data. Given that several values of Xi (predictor) and Yi (outcome) have been collected the unknown parameters in the equation can be calculated. When applying multiple regression to the topic of this research, in combination with several predictors as provided in the example in the paragraph 2.3.2 the following equation can be derived:

Revenue streams = (b_0 + b_1 Key resources + b_2 Key activities + b_3 Operating activities + b_4 Value propositions + b_5 Customer segments) + ε_i (3)

Method of multiple regression
When constructing a complete model with several predictors it can be difficult to decide which predictors to use. These predictors should be selected with a great deal of care since the values of the regression coefficient depend upon the variables (predictors) in the model. In perfect circumstances predictors are selected based on past research (Field, 2009). In the case when new predictors are added to existing models they should be selected based on substantive theoretical importance. When performing multiple regression analysis there are three ways in which variables can be entered into a model; hierarchical regression, forced entry method and stepwise regression. The current study used stepwise forward regression.

Assessing the goodness of fit of the model
The fit of a model can be assessed by looking at the deviations between the model and the actual data collected. To be more specific, the vertical distance from each measurement point to the regression line is measured. These can also be referred to as residuals. Since the residuals can be both positive and negative the value needs to be squared in order to come up with a representative number. Of all possible lines that could be drawn, the one regression line with the lowest sum of residuals (SS_R) is the line with the best fit. The sum of all residuals represents the accuracy of the regression line and therefore provides a clear indicator for the reliability of the regression model. If the squared differences are large, the line is not representative of the data. If the squared differences are small, the line is representative. This method is known as the method of least squares. It is a good measure when assessing the goodness of fit and is represented by the following equation:

Deviation = Σ (observed – model)^2 (4)

There is the possibility that anomalies are present within the data set. These are usually referred to as outliers and substantially differ from the main trend of the data set. Outliers can cause a model to be biased since they affect the values of the estimated regression coefficients. Due to the presence of an outlier the gradient of the regression line can reduce or increase substantially and thereby influencing the accuracy of the regression analysis. Dealing with outliers is crucial to the goodness of fit of the regression model. However, one cannot simply ignore an outlier when it does not fit the model. Doing such a thing influences the reliability of the research as a whole. Therefore, possible outliers and the way in which they are dealt with are discussed in the chapters 'Results' and 'Discussion'.

3.3.1 Selection of the variables for analysis

This paragraph elaborates on the variables that are used in this research in order to describe the cost structure and revenue streams. It will provide an explanation how all different variables were measured and processed. Figure 3.3 provides a schematic overview of the variables and their relation towards each other. Figure 3.2 provides an overview of the way in which the variables add up towards the final result of this research.
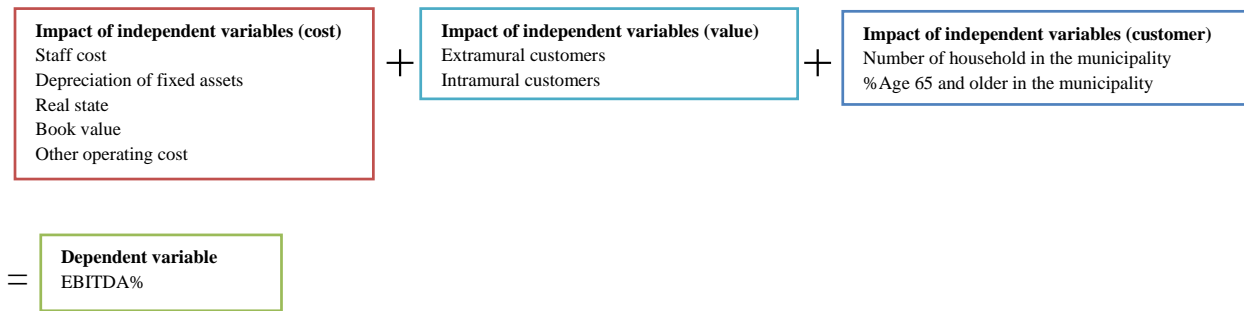

Figure 3.2: Diagram selection of the variables for analysis

Dependent (outcome) Variable

The outcome variable (the revenue streams) is identify as: Earnings before interest, taxes, depreciation, and amortization (EBITDA%). This is a percentile value given variable in the database. EBITDA or Earnings Before Interest, Taxes, Depreciation and Amortization is the American counterpart of the Gross business surplus. This surplus represents the difference between operating income and operating expenses. In more detail EBITDA: Gross business surplus = Value added + farm payments - taxes, duties and assimilated payments (without tax on profits) - personnel and social charges - net addition to the provision for impairment of current assets and for risks and operating expenses + other operating income - Other operating expenses. *A negative EBITDA indicates that a business has fundamental problems with profitability and with cash flow*.

Independent (explanatory, predictor) variables

This paragraph elaborates on the independent variables that have been included in this study and the steps that were made in developing the final regression model. There are numerous variables that might predict the revenue streams in a regression analysis. Due to the large number of variables that could be relevant a selection was made beforehand using the conceptual model as depicted in figure 2.3 as an input. This selection was used to test the hypothesis (see 2.3.3) that a business model that aligns residential care concepts with a real estate strategy has an impact on the profitability (the revenue streams) of health care institutions. The hypothesis puts forward that both real estate strategy and residential care concepts features have an impact on the specific revenue streams of the business model as showed in figure 3.3.

At the bottom right-hand side of the model are the revenue streams (outcome variable), which is a composite of two other business model components. These two components are on the top right-hand side of the model, e.g. the customer segment and the value propositions. The customer segment is identified by two variables from the database which impacts the customer segment. These are the *number of household and the percentages of residences age 65 years and older* in the municipality, being potential customers for the health care institutions. The value proposition is also identified by two variables. These are the number of *intramural- and extramural customers* of the health care institution. These variables represent the ratio of the Intramural- and extramural Residential Care Concepts that are provided by the health care institution.

This indicates which portion of the revenue is generated by the intramural and extramural care, services and housing provision
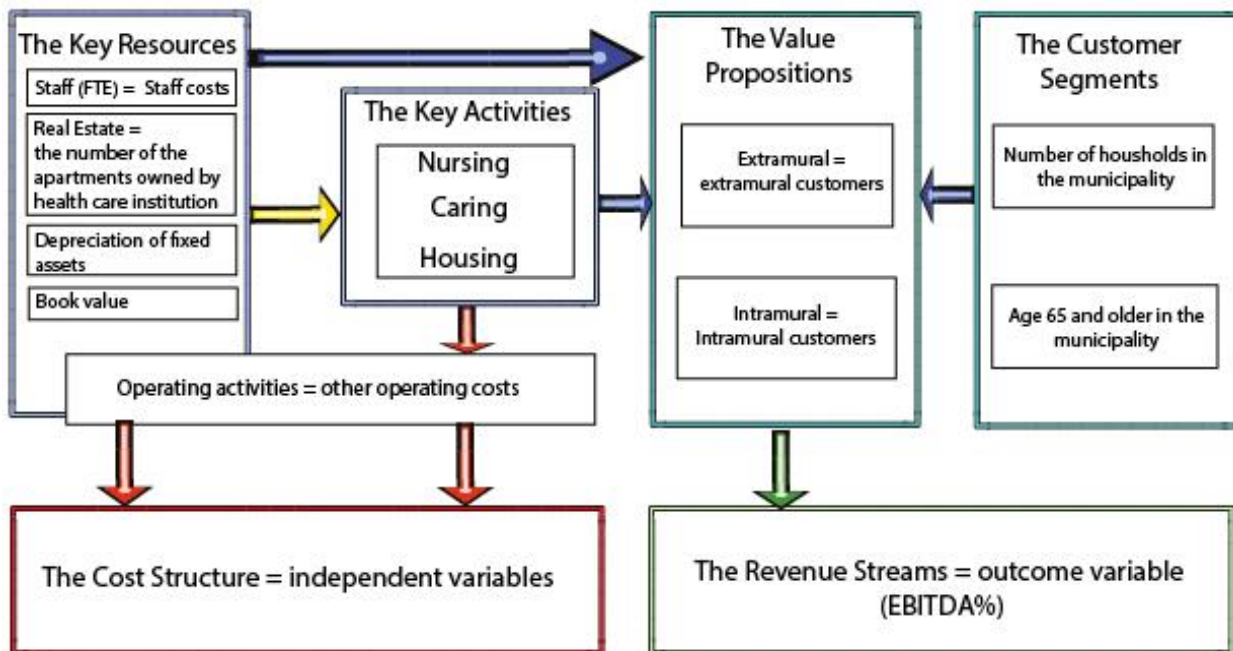

Figure 3.3: The statistical model base on the new business model

At the bottom on the left-hand side of the model is the cost structure (the independent variables), which is also an aggregate of two other business model components. The two components are on the top left-hand side of the model, e.g. the key resources and the key activities. The key resources for the health care institution are their employees and their real estate. Owning and operating these resources the health care institutors require them to pay the employee their wages, but also to pay any mortgages for their own real estate. In total there are four variables identified within the key resources component: *The staff cost*, real estate (*number of apartment*) owned by health care institution, *depreciation of fixed assets* and *the book value* of the health care institution. To provide the nursing, care and housing there are costs associated with these activities, this is the variable labelled other operating costs.

As shown in figure 3.3 this study has taken the point of view in which the revenue streams of a health care institution can be explained by four component of the business model. Nevertheless, there will always be 'change because of change' and as such a residual has been added to the model. In mathematical terms this residual reflects an error that is present within all statistical models. In the 'real world' this error equals the impact of variables beyond the ones that have been included as input variables (3.2, equation 1). The previously described aspects that influence the business model revenue streams (EBITDA%) are represented by the following formula in regression modelling.

EBITDA% = (b_0 + b_1 Staff cost + b_2 Real estate + b_3 depreciation of fixed assets + b_4 book value + b_5 Other Operating cost + b_6 Number of intramural customers + b_7 Number of extramural customers+ b_8 Number of household in the municipality + b_9 Number of residences age 65 years and older in the municipality) + ε_i (3)

Table 3.1 provides overview of the variables that have been included in the model, whether the variable was taken as included in the original database or whether some transformation was used in the further analyses.

Table 3.1 The Key resource

Variable Name		Label	unit conversion	unit
Dutch	English			
Personeelskosten - 2013	Staff (FTE)	Staff costs	in million	€
Aantal appartementen	Real estate	Number of apartments	none	number
Afschrijvingen vast eactiva - 2013	Depreciation of fixed assets	Depreciation of fixed assets	in million	€
Boekwaarde - 2013	Book value	Book value	in million	€

Table 3.2 The Key activities

Variable Name		Label	unit conversion	unit
Dutch	English			
Overige bedrijfskosten - 2013	Operating activities	Other operating cost	in million	€

Table 3.3 The Value propositions

Variable Name		Label	unit conversion	unit
Dutch	English			
Aantal cliënten extramuraal (GHZ & VVT)	Extramural	Number of clients extramural	none	number
Aantal cliënten intramuraal (GHZ & VVT)	Intramural	Number of clients intramural	none	number

Table 3.4 The Costumer segments

Variable Name		Label	unit conversion	unit
Dutch	English			
Aantal huishoudens	Number of household in the municipality	Number of household	in thousands	number
Leeftijd 65 jaar en ouder	Number of residences age 65 years and older in the municipality	Age 65 and older	none	%

RESULTS

Apartments in care home Vilente De Pleinen, Ede, Gelderland

4 Results

This chapter provides in depth information regarding the results of the statistical analysis that were performed on the dataset extracted from 'Care on the Map'(www.zorgopdekaart.nl, 12-2015). Figure 3.3 shows how the variables that were available in this database related to the conceptual model. The main outcome here is the revenue streams that concern the profitability of the health care institutes. This is measured using the variable EBITDA%. All results are discussed in relation to this variable. At first results based upon the key resources are discussed. Thereafter other operating costs caused by the key activities are discussed. This is followed by variables reflecting trends in the customer segment within the municipalities. Finally, specific value propositions components are linked to the revenue streams in the final statistical model.

4.1 Descriptive information of variables "Care on the Map"

In total 127 health care institutes were included in the database. Their average profitability or revenue streams, as expressed in EBITDA% was 9.8 (95% CI). There were 8 with a negative results, and 119 with a positive result. Indeed, the lowest performance was as low as -11.16%, whereas the highest performance of an institute was 36.70%.

Figure 4.1 shows the spatial distribution of all elderly care institutes across The Netherlands. The highly performing institute was an institute with EBITDA% value of 36.70 in the municipality Zutphen. Although a small health care institution with only 55 employees they had very exceptional good financial results. In the further statistical modelling this institute was identified as an outlier.

Figure 4.1: The spatial distribution of all elderly care institutes.

Furthermore, there are only two elderly care apartment in the province Flevoland in the population sample. These are indeed built after 2002. This confirms the findings in the literature research that the largest share of new care homes is in Flevoland (paragraph 1.2). This also points out the limitation of the sample, which contain predominantly elderly care apartment built before 2002.

Table 4.1: Descriptive information key resources variables

	Mean	Std. Deviation	95% CI_LB	95% CI_UB
Staff costs*	10,7	11,8	8,6	12,8
Number of apartments	82,6	43,2	75	90,3
Depreciation of fixed assets*	0,9	1,3	0,7	1,2
Book value*	11,8	18,5	8,5	15

* in million €

Table 4.1 provides the descriptive information for the key resources. The average elderly health care institute included in this study had about 83 apartments, but there are rather larger differences between institutes considering the large standard deviation here. Average number of intramural clients was 195, and this was only slightly higher than the number of extramural clients 175 (see Table 4.2).

Table 4.2: Descriptive information value propositions variables

	Mean	Std. Deviation	95% CI_LB	95% CI_UB
Number of clients extramural	175	249,8	129,4	220,5
Number of clients intramural	195	195	159,4	230,6

As appears from table 4.1 staff costs were about 11 million euros in 2013. The book value in 2013 was nearly 12 million euro. Depreciation was about 1 million euro and this suggest that these health care institutions on average up to 2013 less than expected depreciation of the fixed assets. One explanation could be that they have more rented property than what they own.

Table 4.3 shows that the additional average operating costs are 3,7 million. This includes f.i. costs for provision of key activities such as providing care, nursing and housing.

Table 4.3: Descriptive information key activities variable

	Mean	Std. Deviation	95% CI_LB	95% CI_UB
Other operating cost*	3,7	3,7	3	4,4

* in million €

Table 4.4 describes two trend indicators that are thought to be important for the profitability and the decision making of the health care institutions in the long run. The number of households in the municipalities where the elderly care institutes are located is on average 42500. This compares to f.i. Leeuwarden, Deventer.

Table 4.4: Descriptive information costumers segment variables

	Mean	Std. Deviation	95% CI_LB	95% CI_UB
Number of household in the municipality*	42,5	69,4	30,3	54,6
Number of residences age 65 years and older in the municipality**	13,6	16,9	10,7	16,6

* in thousands ** in percentage

The number of residences aged over 65 years and older is a percentage and this is expect to be rapidly increasing due to demographic changes and higher life expectancies (see paragraph 1.1.1). One needs to keep in mind here that the number of households include both single as well as more persons households. Therefore, both trend indicators might be relevant to the business model.

4.2 Results: final model

Using the model from Figure 3.3 linear regression modelling was conducted. A forward selection of variables was used to avoid issues that arise from explaining factors that were highly correlated. Table 4.5 shows which variables best explained the revenue streams using EBITDA% as the dependent variable. Since only independent factors were included that significantly explained differences in EBITDA% using a threshold of $p < 0.05$, not all variables from Figure 3.3 are included in Table 4.5. Descriptive information about the independent factors can be found in table 4.1 to table 4.4 as discussed in paragraph 4.1.

Table 4.5: Final model Output (forward method)

	B	SE B	β
Constant	18,74	3,604	
Number of extramural cutomers	0.009	0,004	0,290
Age 65 and older in the municipality	-0,378	0,188	-0,168
Number of household in the municipality	-0,297	0,933	-0,271
Book value 2013	0,022	0,080	0,527
Staff costs 2013	-0,836	0,140	-1,289
Depreciation of the fixed assets 2013	0,398	1,347	0,700

$R^2 = .36$; $(p < .05)$

The results of the regression modelling show that the revenue streams (EBITDA%) is significantly influenced by the following parts of the business model in Figure 4.1:

Key resources:
Staff costs, book value and depreciation of the fixed assets were all significantly explaining differences in revenue streams. As one might expect, book value positively influenced the revenue stream, with a beta coefficient of 0.53. The beta coefficient can be understood as the weight a factor has in explaining differences in profitability amongst elderly health care institutes. Similarly, the staff costs were found to lower the revenue streams, and this factor has a strong impact on the revenue streams as might be inferred from the beta coefficient of -1.29. Depreciation of the fixed assets over 2013 was positively (0.70) related to the revenue streams. One would not expect such at first sight, because Depreciation of the fixed assets associated with cost of owning a building and as such, it should negatively influence the revenue stream. But because the nature of the outcome variable the EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization), the rise in Depreciation of the fixed will have positive effect on the EBITDA value due to its tax deductibility.

Key activities:
The database included one variable, operating costs, that represents this part of the business model. However, this factor did not significantly influence differences in revenue streams.

Value proposition
From the two variables identified as the value proposition, number of extramural and intramural customers only the number of extramural customer significantly influenced differences in revenue streams. The number of extramural customer positively influenced the revenue stream, although rather slightly, with a beta coefficient of 0.29.

Customer segments

The number of households and the percentage of elderly aged 65 years and older in the municipalities, were both all significantly explaining differences in revenue streams.

Using the results from the linear regression modelling Figure 4.1 shows the final business model as a further adaption of the canvas business model.
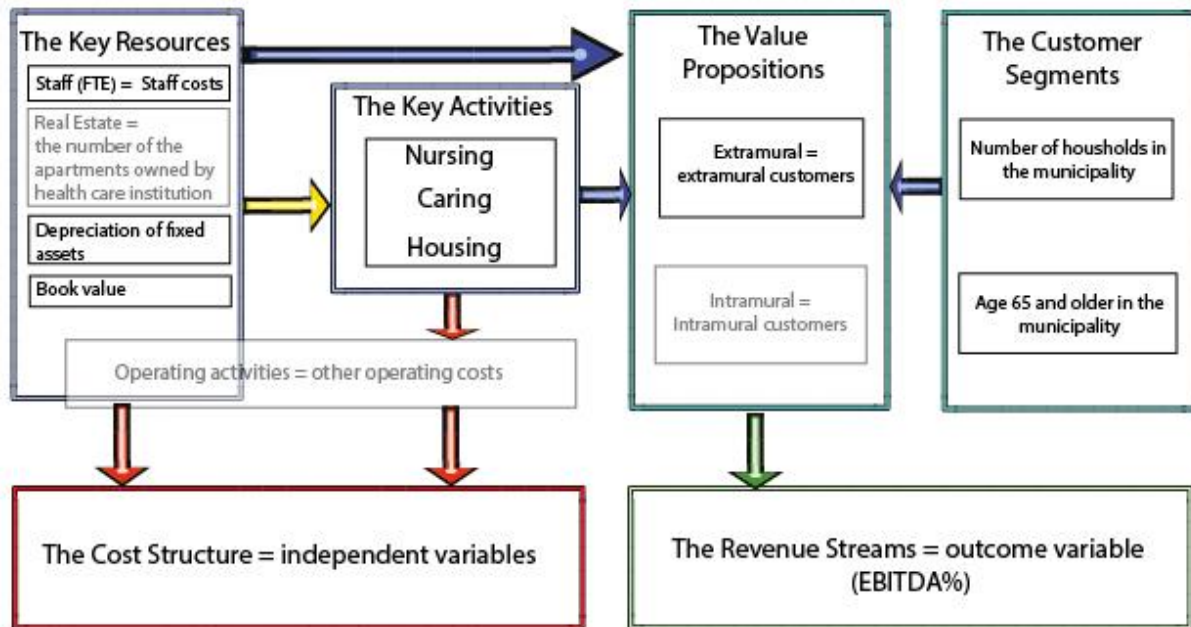

Figure 4.2 The final business model

Indeed, table 4.6 shows that the final business model is also a better model than just using the mean value of the revenue as a 'best guess'. In this table he F-ratio represents the ratio of the improvement in prediction that results from fitting the final business model, relative to the inaccuracy that is present in the model.

The value of the sum of squares for the model represents the improvement in prediction resulting from fitting a regression line to the data rather than using the mean of EBITDA% as an estimate of the revenue streams. The residual sum of squares represents the total difference between the model and the observed data, thus the squared distances to the line. The null hypothesis that the mean of EBITDA% is the better model is rejected as the F-ratio is 11 with $p < .001$. Therefore, it is concluded that the final model significantly improves the ability to predict the revenue streams.

Table 4.6: ANOVA

ANOVAa

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2604	6	434	11	,000[b]
Residual	4719	120	39		
Total	7323	126			

a. Dependent Variable: EBITDA 2013

b. Predictors: (Constant), Depreciation of the fixed assets, Age 65 and older in the municipality, Number of household in the municipality, Number of extramural cutomers , Book value , Staff costs

Explained variance of the new business model

The final model explains 36% of the total variance in revenue streams (EBITDA%). Table 4.7 summarizes the explained variance of the new business model. The column labelled R gives the values of the multiple correlation coefficient between the predictors and the revenue streams. The next column gives a value of R^2, and expresses how much of the variability in revenue streams is accounted for by the independent factors in the business model. The R^2 for the model its value is .0.356, which means that the final business model has some important factors, but at the same time lacks other important ones, as a perfect model would explain 100% of the variation in EBITDA%.

Table 4.7: Model summary

				Change Statistics					
R	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**	**Durbin-Watson**
,596ᵃ	,356	,323	6,271	,356	11,038	6	120	,000	2,216

a. Predictors: (Constant), Depreciation of the fixed assets, Age 65 and older in the municipality, Number of household in the municipality, Number of extramural cutomers , Book value , Staff costs
b. Dependent Variable: EBITDA 2013

The adjusted R^2 indicates how well the business model can be generalized, and the difference with the R^2 should not be too large. Indeed, the shrinkage is not too bad here, about 3%. This shrinkage means that if the model were derived from the population rather than a sample it would account for approximately 0.3% less variance in the outcome.

According to Field (Field, 2009) by applying Stein's formula to the R^2 is possible to get some idea of its likely value in different samples. Stein's formula is given below and can be applied by replacing n with the sample size (127) and k with the number of predictors (6):

$$R^2 = 1 - \left(\left(\frac{n-1}{n-k-1}\right)\left(\frac{n-2}{n-k-2}\right)\left(\frac{n+1}{n}\right)\right)(1 - R^2)$$

$$R^2 = 1 - \left(\left(\frac{127-1}{127-6-1}\right)\left(\frac{127-2}{127-6-2}\right)\left(\frac{127+1}{127}\right)\right)(1 - 0.356)$$

$$R^2 = 1 - ((1,05)(1,05)(1,008))(0,644)$$

$$R^2 = 0,284$$

This value is not similar to the observed value of R^2 (.356) indicating that the cross-validity of this model is somewhat under pressure as it deviates by 7,2% from 0.356.

Table 4.7 also provides a test whether one of the assumptions of linear regression modelling holds. The Durbin–Watson statistic is used to consider whether the assumption of independent errors is tenable. As a conservative rule this value should be not less than 1 nor greater than 3. The closer to 2 that the value is, the better, and for these data the value is 2.216, which is so close to 2 that the assumption is reasonable.

There is one other issue that need to be addressed. Table 4.8 shows the tolerance and the VIF. These values need to be considered to investigate whether there the explaining factors show multicollinearity, which can be understood as that two factors are more or less measuring the same. Some degree of correlations between the independent factors is acceptable. But if this is too high or in the worst case perfect, one independent factor is a linear transformation of the other independent factor, and then the weights in the regression model are implicated. According to Field a correlation between variables of 0.90 or higher, and if the largest VIF has a value of greater than 10 there is cause for concern. The tolerance becomes problematic below 0.2

and if below 0.1 there is a seriously serious problem. Clearly, there is something problematic here, as the VIF value of the depreciation of the fixed assets 10.469 is just above 10. The tolerance for this variable shows 0.096 which also just under 0.1. But if the *average* VIF is substantially greater than 1 then the regression may be biased. To calculate the average VIF we simply add the VIF values for each predictor and divide by the number of predictors (k):

$$\frac{\sum_{i=1}^{k} VIFi}{k} = \frac{3.187 + 1.298 + 1.344 + 6.884 + 8.627 + 10.469}{127} = 0.25$$

The average VIF is not greater than 1 and that indicates that there's no cause for concern. This confirms that collinearity is not major issue for this model.

Table 4.8: Collinearity statistics

	Tolerance	VIF
Number of extramural cutomers	0,314	3,187
Age 65 and older in the municipality	0,771	1,298
Number of household in the municipality	0,744	1,344
Book value 2013	0,145	6,884
Staff costs 2013	0,116	8,627
Depreciation of the fixed assets 2013	0,096	10,469

To summarize, according to the final business model several strategies seems to be possible:

The first real estate strategy implies to increase the nursing capacity by developing and focusing on the residential care concept of intramural living. The line of reasoning here is that on the one hand the investment in the key resources (real estate and staff) and the key activity (care products) (see table 2) will have negative impact on the revenue streams (level of the profitability). On the other hand, the number of the intramural customer will have positive effect on the revenue stream.

Although the model conforms on the one hand the key resource *Staff costs* has negative impact om the revenue streams. On the other hand, key resource depreciation of fixed assets and book value of the health care institution has positive effect on the revenue stream. *The most important assumption of the strategy, that the number of the intramural customer will have positive effect on the revenue stream is rejected. The model shows no significant impact of this variable on the outcome variable the revenue streams.*

Second, contrary to the first real estate strategy, the second real estate strategy advocates more extramural care provision by renting of the care apartments and providing extramural home care. Such corresponds to the residential care concept of cared living. Here the line of reasoning is that the number of the extramural customers will have a positive effect on the revenue streams, while operating activities (for providing housing and care) and real estate adjustments will have a negative impact on the revenue streams.

The final model conforms first assumption of this strategy, that the number of the extramural customers will has a positive effect on the revenue streams, but the negative impact of the operating activities (Other operating cost) shown no significant effect on the outcome variable the revenue streams.

Finally, the focus of the last two real estate strategies is at reducing the amount of real estate instead of adjusting the real estate. This means emphasising the residential care concept of independent living. Thus providing extramural care and services without offering housing. This allows the health care institute either to sell the vacant real estate, which is considered the better alternative, or proposes alternative use of

properties with the ultimate goal disposing of it. Here the line of reasoning is that selling or disposing of vacant real estate may have a negative impact on the key resource (real estate), because of possible residual debts after selling the properties. But also in the case of rented properties premature termination of lease contracts will have negative financial effects on the revenue streams. On the plus side though, the number of the extramural customers is thought to have a positive effect on the revenue stream.

As it already mentioned, the assumption of the positive effect of extramural customers on the revenue stream is confirmed by the model, which support the line of reasoning of these last two strategies. *But unexpectedly the negative impact of the key resource (real estate) shown no significant effect on the revenue streams. Furthermore, the depreciation of fixed assets has positive significant effect on the revenue streams.*

DISCUSSION & CONCLUSION

5 Discussion and Conclusions

This research addressed the question which Residential Care Concepts can be best aligned to what kind of real estate strategy to constitute a business model for elderly care institutions that may underlay decision making now that care legislation has profoundly changed the access and financing of care institutions. Such a business model is needed in order to address these threats and to achieve a proper balance between the demand for care and the capacity to supply it.

The present study tends to support the hypothesis that alignment of Residential Care Concepts with real estate strategies in business models might support profitability for health care institutions. The results suggest that adapting well described residential care concepts and expanding the extramural care provision may have a positive effect on the overall financial performance of the health care institutions in addition, the results suggest that merely focusing on the intramural care in the short and long-term may have adverse effects on the revenues of the health care institutions, given the current policies being very focused on the deferral of intramural care growth.

The health care institutions are facing the threat of vacancy due to the new healthcare legislation. This coincides with trends in society that the elderly people would like to remain in control of their own life. This has implications on the way care is organized, because the elderly also have an increasingly critical attitude toward the functioning of the health system. They may for instance experience with increasing age and declining health difficulties with mobility and become more anxious or suffer from increasing isolation. These developments will probably change the way health care institutions manage their real estate, the location choices they make and the building typology they choose. The present study suggests that expanding business strategies that attract extramural patients, could be a valid one. Though not necessarily so, one such strategy might be to transform some real estate, particularly real estate built after 1985, into independent living for elderly and offer a choice in services that are already provided to intramural clients. Alternatively, hooking up with a housing association might be a fruitful business case strategy if vacant real estate is not easy transformable, as a more general business strategy.

Whether or not it would be better not to transform vacant real estate but instead to dispose of it, either in the short or the long run is another alternative that seem to fit with the new business model canvas for health care institutes.

Remarkably, the number of apartments owned by health care institutions did not have shown any impact on the financial performance of the institutions. Initial results of the survey show that some institutions have a vacancy rate up to 30% on their elderly care apartments. It could be argued that, as the data from were from 2013, this may suggest that the effect of the new legislation, thus the high vacancy rate due to these new legislations, is not yet visible. As an alternative explanation, because the variable depreciation of fixed assets already contains the losses due to high vacancy rate, the number of actual apartments did not have a profound impact on the financial performance of the institutions.

Clearly, the here proposed new business model for health care institutions is but a start. The available data were from 2013, about two years before the formal change in legislation occurred. Also, the model can be further improved, as there seems to be some problems with generalizability. It seems likely that the business model may also be better able to predict profitability by including some more factors as the explained variance was quite moderate. Key activities for instance was only modelled by means of one variable, other operating costs, and further reasons may be addressing better ways of operationalizing this part of the business model canvas from other parts that were left out were key Partners, customer relationships, channels and customer relationships.

An important shortcoming of the current approach, is that multiple regression modelling was used. The outcomes show that the percentage of residents aged over 65 years had a negative impact on the profitability. This might be so, because the areas with higher numbers of elderly are likely to have multiple care institutions, and this may therefore suggest competitiveness between care providers. Whether or not such is the case, needs further research that takes into account the spatial distance to competitors, which requires spatial regression analyses. Unfortunately, this was beyond the scope of this research. This also applies to another issue. In the current research, only those care institutions were included that predominantly delivered elderly care. Further insights might be gained by also included care institutions providing elderly care in addition to another kind of primary care.

The merit of the current study is that it provides empirical support how to deal with the vacancy issues in their real-estate and providing adequate housing and services for the intramural target groups and proper services for the extramural target groups. This allows for the feasibility and continuation of their company and as a result providing job guarantee for their employers. This translates to the care user as receiving the high quality service they are entitled to and the right housing facilities and accommodation connected to their target group profiles. As the government promotes high quality of life and opts for a participatory society, having an institution that can provide high quality service and facilities promotes this in the best possible way.

5.1 Conclusions

It can be concluded that the components of the business model, for health care institution, are a crucial element in the financial performance of their business. The key resource factors, such as the staff cost, depreciation of fixed assets and the book value definitely influences the business model performance, and thus the profitability of the elderly health care institution. The significant impact of intramural customers does not hold up on the long run. But the number of the extramural costumers most certainly has significant impact on the revenue streams.

This study shows that the business model component play a decisive role in a health care institution financial performance. More interesting though, is the negative impact the number of households and the number of elderly age above 65 in a municipality, have on the financial performance of a health care institution. One could be argued that the density of the elderly population within the vicinity of a health care institutions should have positive effect on the financial performance of the institutions. One possible explanation for this negative impact would be the competition between the health care institutions. The region with a high density of elderly population has more health care institutions and the competition between these institutions, for the same target group (elderly age above 65 years), could be the explanatory factor for this negative impact. Therefore, their validity should be questioned, since a track record is missing.

Finally, the number of apartments owned by health care institutions have shown no particular impact in determining the financial performance of the institutions. Although according to the survey result some institutions have a vacancy rate up to 30% on their elderly care apartments. It could be argued that, for once the data from the Care on the Map is from 2013 and the effect of the new legislation, thus the high vacancy rate due to these new legislations, is not yet visible. Secondly, because the variable depreciation of fixed assets already contains the losses due to high vacancy rate, the number of actual apartments would show no particular impact in determining the financial performance of the institutions.

REFLECTION

6 Reflection

This graduation topic has given me the opportunity to combine in some sense my professional interest with my academic research. Although this might have narrowed my vision, it provided me with the necessary energy and persevering attitude to tackle this problem.

Performing a quantitative study on this topic proved to be a challenging task. Classified data regarding the financial performance of health care institution, in combination with a wide range of technical details was needed. After an unsuccessful attempt to gather this information via survey, distributed by a contact person at the Aedes-Actiz Kenniscentrum Wonen-Zorg (umbrella organization for housing association and health care institution), I eventually found the necessary data on the Care on the Map platform to compose my database. The most significant misconception I came across is the availability and uniformity of data. It took numerous hours to gather and combined the required data, with the help and guidance of both my mentors, especially my first mentor Clarine van Oel. Furthermore, many hours of restructuring and revising the database was needed to reassure the uniformity of the data. Nevertheless, it turned out to be worth going the extra mile, since it yielded many surprising and interesting findings.

Furthermore, a piece of advice to all students would be to start writing immediately. Obviously the analysis is the most interesting and satisfying aspect of a graduation project. Nevertheless, all findings and decision that have been made need to be written down in a comprehensive manner. The easiest way to achieve this is to put it on paper the moment that you come across such findings.

This graduation project has been instructive in many ways. I have explored the elderly care system's inner working and analysed their business models. Interviews with the expert in the field have been a huge contribution to this.

Personally I have experienced the graduation process to be very intensive yet satisfying. I have grown on a personal as well as academic level. Throughout the last semester I have come across many challenges and have succeeded in coping with them.

Due to this graduation project I was able to learn many things in different domains. I have amassed knowledge in healthcare real estate strategies and the business modelling amongst others due to excellent guidance of Ilir Nase, my second mentor. I have learned about the advantages of statistical modelling for which Clarine van Oel, my first mentor, was of great help.

At the same time the writing of this thesis has led to more personal insight on taking on a workload that is difficult to keep up to standard for a longer period. After some very busy years and various activities, such as managing my company, the writing of this thesis and the required productivity and performance suffered. This process has helped in gaining the knowledge to make better judgment calls and prevent such issues in the future.

List of figures and tables

Figures

Tables

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Appendix I

Interview Protocol Form
Company: _____
Interviewee (Title and Name): _____
Interviewer: S. S. Azizyar
Survey Section Used:
_____ A: Interview Background
_____ B: Residential care concepts
_____ C: Business model of health care institutions
_____ D: Target group profiles
_____ E: Residentialare concepts
_____ F: Demographics (no specific questions)

Other Topics Discussed:_____
_____
Documents Obtained: _____
_____
Post Interview Comments or Leads:
_____

Residential Care Concepts Interviews

Introductory Protocol
I'm S.S.Azizyar, student at the TU Delft. I'm graduation for the Master of Science degree programme in Real Estate & Housing faculty. I am doing a research project to finalize my master thesis. To facilitate my note-taking, I would like to take audio recording of our conversations today. Just for the record, I like to have permission included in the recordings. Can I take recordings of the interview? Personal information in this interview will be kept confidential. I might use citations, but then I will refer to you in a anonymized way, f.i. as mr x The interview will last approximately 30 min. Thank you for your agreeing to participate.

Introduction
You have been approached because of your expertise in the field I am currently researching. My research project focuses on the improvement of the real estate strategy of health care institutions under the current legislation. The focus is on understanding how residential care concepts can provide a suitable business model for health care institutions. I am trying to learn more about how business models may contribute to a real estate strategy of health care institutions.

A. Interviewee Background
How long have you been advising health care institutions about their real estate strategies/ business models?
_____ in your present position?
_____ at this institution?
Interesting background information on interviewee:
What is your previous work experience that is relevant to this function?
What is your field of study?

1.   Could you briefly describe the real estate strategy for this health care institution?

2.   Could you briefly describe your role as it relates to this real estate strategy?

Probes: How are you involved in advising them?

How did you get involved?

3.   What motivates you to work in this field as an advisor?

The size and composition of the advisory portfolio.

4.   How many health care institutions are you advising?

5.   Is there a gradient of success across them?

6.   Does this have a geographical pattern?

7.   What it is based on the characteristics of their existing stock or any other factor?

8.   Which are the best performers and any reasons why?

B. Real estate strategy

Discerption of the health care institution attitude towards real estate strategy

9.   How does the health care institution view their asset(burden/cost/opportunity)?

What is your advice about health care institution real estate?

10.   What are some of the major challenges the health care institutions face due to the new legislation?

What are the major opportunities?

Probes: How can opportunities be maximized?

How can barriers be overcome?

11.   Which real estate strategies are deployed within the current healthcare legislation?

C. Business model of health care institutions

Current state of the affairs

12.   Is there increased in the vacancy rate since the new healthcare legislation cam to function?

13.   Does the existing business model cope with these changes?

Description of the health care institution attitude towards business model?

14.   Does the real estate owned by them involved in developing of a business model?

15.   Does the health care institution see their real estate as a goal and or means to develop a business model?

16.   Does the health care institution involve the care product, staff and real estate for developing of a business model.

17.   What is the strategy at the health care institutions for improving their business?

Probes: Is it working – why or why not?

Care product, Staff, Real estate, Recent initiatives

18.   What other resources are important to their business model?

19.   What is changing in the business model due to the new legislation?

20.   How important is real estate in developing of a business case?

D. Target group profiles

21.   Do you distinguish the target group profiles for the health care institutions and How?

Probe: Own research / existing classifications or combination of both?

22.   Which factors are essential in distinguishing the target group profiling?

E. Residential care concepts

Current state of the affairs

23.   Does the health care institution have Residential Care Concept that focuses on independent living?
Probe: Which were introduced recently?
24.   Which factors are important for Residential Care Concept that focuses on independent living?
Probe: criteria and evidence
25.   Which real estate strategies can be used to support these Residential Care Concepts?
Probe: Why or why not? (reasons, influences)
F. Demographics
Post Interview Comments and/or Observations:

Appendix II

REGRESSION
 /DESCRIPTIVES MEAN STDDEV CORR SIG N
 /MISSING MEANSUBSTITUTION
 /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT EBITDA2013
 /METHOD=ENTER AantalclientenextramuraalGHZampVVT Leeftijd65jaarenouder AH
  BOEKWD PersoneelKOST AFVASTACT
 /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
 /CASEWISE PLOT(ZRESID) OUTLIERS(3).

Descriptive Statistics

	Mean	Std. Deviation	N
EBITDA 2013	9,8025	7,62338	127
Aantal clienten extramuraal (GHZ & VVT)	174,96	240,744	127
Leeftijd 65 jaar en ouder	17,72	3,382	127
AH	4,2467	6,94115	127
BOEKWD	116,8260	183,63893	127
PersoneelKOST	105,8854	117,50211	127
AFVASTACT	9,3469	13,41870	127

Correlations

		EBITDA 2013	Aantal clienten extramuraal (GHZ & VVT)	Leeftijd 65 jaar en ouder	AH	BOEKWD	PersoneelKOST	AFVASTACT
Pearson Correlation	EBITDA 2013	1,000	-,091	-,011	-,116	,242	-,071	,185
	Aantal clienten extramuraal (GHZ & VVT)	-,091	1,000	,069	-,076	,460	,772	,518
	Leeftijd 65 jaar en ouder	-,011	,069	1,000	-,446	-,025	-,013	,018
	AH	-,116	-,076	-,446	1,000	,190	,088	,166
	BOEKWD	,242	,460	-,025	,190	1,000	,789	,923
	PersoneelKOST	-,071	,772	-,013	,088	,789	1,000	,856
	AFVASTACT	,185	,518	,018	,166	,923	,856	1,000
Sig. (1-tailed)	EBITDA 2013	.	,155	,452	,098	,003	,213	,019
	Aantal clienten extramuraal (GHZ & VVT)	,155	.	,221	,198	,000	,000	,000
	Leeftijd 65 jaar en ouder	,452	,221	.	,000	,389	,441	,422
	AH	,098	,198	,000	.	,016	,162	,031
	BOEKWD	,003	,000	,389	,016	.	,000	,000
	PersoneelKOST	,213	,000	,441	,162	,000	.	,000
	AFVASTACT	,019	,000	,422	,031	,000	,000	.
N	EBITDA 2013	127	127	127	127	127	127	127
	Aantal clienten extramuraal (GHZ & VVT)	127	127	127	127	127	127	127
	Leeftijd 65 jaar en ouder	127	127	127	127	127	127	127
	AH	127	127	127	127	127	127	127
	BOEKWD	127	127	127	127	127	127	127
	PersoneelKOST	127	127	127	127	127	127	127
	AFVASTACT	127	127	127	127	127	127	127

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	AFVASTACT, Leeftijd 65 jaar en ouder, AH, Aantal clienten extramuraal (GHZ & VVT), BOEKWD, PersoneelKOST[b]	.	Enter

a. Dependent Variable: EBITDA 2013

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	,596[a]	,356	,323	6,27066	,356	11,038	6	120	,000	,876

a. Predictors: (Constant), AFVASTACT, Leeftijd 65 jaar en ouder, AH, Aantal clienten extramuraal (GHZ & VVT), BOEKWD, PersoneelKOST

b. Dependent Variable: EBITDA 2013

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2604,073	6	434,012	11,038	,000[b]
	Residual	4718,538	120	39,321		
	Total	7322,611	126			

a. Dependent Variable: EBITDA 2013

b. Predictors: (Constant), AFVASTACT, Leeftijd 65 jaar en ouder, AH, Aantal clienten extramuraal (GHZ & VVT), BOEKWD, PersoneelKOST

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	95,0% Confidence Interval for B Lower Bound	Upper Bound	Correlations Zero-order	Partial	Part	Collinearity Statistics Tolerance	VIF
1	(Constant)	18,735	3,604		5,199	,000	11,601	25,870					
	Aantal clienten extramuraal (GHZ & VVT)	,009	,004	,290	2,220	,028	,001	,017	-,091	,199	,163	,314	3,187
	Leeftijd 65 jaar en ouder	-,378	,188	-,168	-2,008	,047	-,750	-,005	-,011	-,180	-,147	,771	1,298
	AH	-,297	,093	-,271	-3,185	,002	-,482	-,112	-,116	-,279	-,233	,744	1,344
	BOEKWD	,022	,008	,527	2,740	,007	,006	,038	,242	,243	,201	,145	6,884
	PersoneelKOST	-,084	,014	-1,289	-5,988	,000	-,111	-,056	-,071	-,480	-,439	,116	8,627
	AFVASTACT	,398	,135	,700	2,952	,004	,131	,664	,185	,260	,216	,096	10,469

a. Dependent Variable: EBITDA 2013

Collinearity Diagnostics[a]

				Variance Proportions						
Model	Dimension	Eigenvalue	Condition Index	(Constant)	Aantal clienten extramuraal (GHZ & WT)	Leeftijd 65 jaar en ouder	AH	BOEKWD	PersoneelKO ST	AFVASTACT
1	1	4,800	1,000	,00	,01	,00	,01	,00	,00	,00
	2	,994	2,197	,01	,01	,01	,12	,01	,00	,01
	3	,724	2,575	,00	,03	,00	,42	,01	,00	,00
	4	,366	3,623	,00	,29	,00	,20	,04	,00	,02
	5	,066	8,512	,00	,36	,00	,00	,61	,37	,10
	6	,038	11,237	,01	,28	,01	,01	,31	,56	,80
	7	,012	19,612	,98	,02	,97	,23	,01	,07	,07

a. Dependent Variable: EBITDA 2013

Casewise Diagnostics[a,b]

| Case Number	Std. Residual	EBITDA 2013	Predicted Value	Residual
127	3,313	36,700	15,9260	20,77401

a. Dependent Variable: EBITDA 2013

b. When values are missing, the substituted mean has been used in the statistical computation.

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-9,7290	24,0995	9,8025	4,54612	127
Residual	-15,35418	20,77401	,00000	6,11954	127
Std. Predicted Value	-4,296	3,145	,000	1,000	127
Std. Residual	-2,449	3,313	,000	,976	127

a. Dependent Variable: EBITDA 2013

Histogram

Dependent Variable: EBITDA 2013

Mean = -6,35E-16
Std. Dev. = 0,976
N = 127
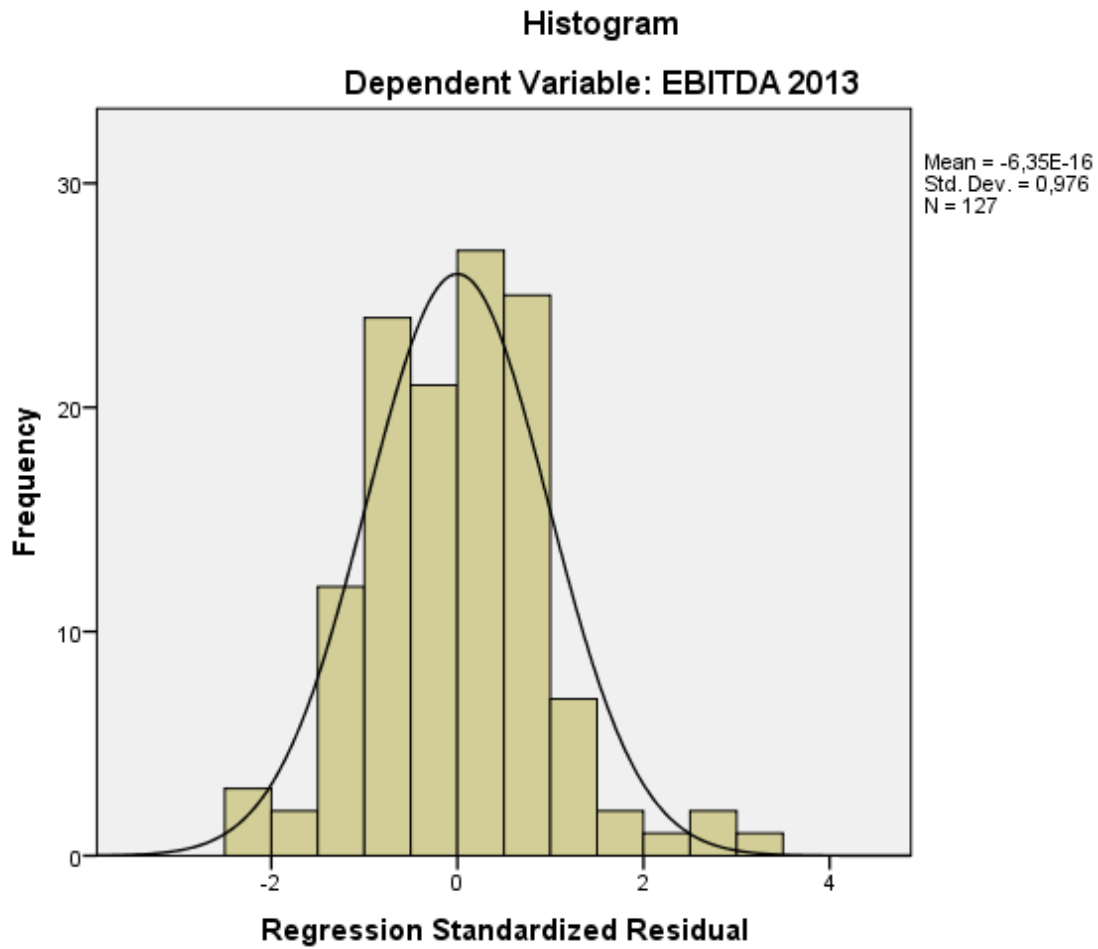
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: EBITDA 2013