A review of public entrepreneurship among Dutch healthcare institutions

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A review of public entrepreneurship among Dutch healthcare institutions

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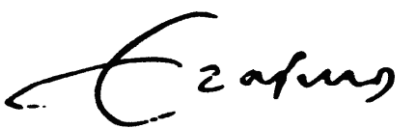

Abstract

In this thesis, the Dutch healthcare sector will be evaluated on the level of entrepreneurship involved in the organisations that are part of it. Changes in healthcare policy in the Netherlands are making this an interesting topic to review. With these changes, the government is trying to implement an entrepreneurial spirit in this industry. These policy changes are initialized by the second chamber of the Netherlands and modelled after recommendations of the industry organisation and scholars (Cools, 2008; Poortvliet et al, 2012). In this implementation, one of the main goals is decreasing costs, while increasing innovation, quality and efficiency. The economic circumstances are the reason for the sudden acceleration of the implementation of these rules.

With this research, a void in healthcare entrepreneurship is being explored; in deriving the relevant theory, but especially with the insights this paper provides on a national and institutional level. To realize this evaluation, a dataset of the Dutch ministry of health, well-being and sports will be analysed, which contains the year reports of all institutions that are obliged to report to the government. Empirical research on the effects of entrepreneurship is measured in the output; performance, and the input; entrepreneurial characteristics. Performance is in its turn defined in financial and organisational dimensions. Entrepreneurship is measured with respect to the theoretically relevant characteristics in the healthcare industry. Results indicate that several entrepreneurial indicators are of significant influence on performance, but the overall hypothesis; *entrepreneurial characteristics have a positive association with organisational and financial performance in the healthcare industry*, cannot be supported. Despite this result, strategic recommendations and implications can be drawn from the results of this thesis.

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1 Introduction

Healthcare is a key element in a society. Curing individuals of their diseases or injuries and caring for the ones who need it provides significant economic value to a population (Murphy and Topel, 1999). Organising healthcare in a successful way proves to be a big challenge. When reviewing the case of the Netherlands, the healthcare programme has been of good quality, and improving, since the Second World War. However, the economic characteristics of the industry prove difficult to manage. For example, cost containment and market reforms have proven to be challenging goals (Schut and van de Ven, 2005). Government, businesses and individuals all contribute in some way, but balance is yet to be found.

In the years 2008 until 2012, change has swept across the globe, due to the multiple crises that have been occurring. Consequently, a situation where the costs of healthcare were already reaching untenable levels escalated further, and due to the crises it is decision time for healthcare policy makers. Because of these high costs, changes have to be made. The government, scholars and industry consultants agree that a transition to more public entrepreneurial activity is a possible solution for healthcare in the Netherlands. Examples of the beliefs of the government are quotes like: *"Health institutions and health insurance companies should position themselves as public enterprises: like private organisations who manage public interests"* (Second chamber, 1998[1]) or *"We are publicly supported, and convinced ourselves, that transitioning to more public entrepreneurship in health institutions can be done responsibly and will ultimately be of best interest to the client"* (Minister A. Klink, 2007, p.16). These are quotes made a couple of years ago, which makes it interesting to review their impact in 2011. Is it possible to characterize the Dutch healthcare sector as being entrepreneurial? Or is this policy proven to be based on incorrect information?

Back in 1985, the notion of the public entrepreneurial organisation and its importance was already defined (Drucker, 1985). Its advantages of innovation and efficiency appeared appealing in the public domain, which is more than often characterized by the opposite (Grossman, 1988). Modernisation, increasing operating efficiency and a healthy financial household are likely consequences of public entrepreneurial organisations operating in the field of healthcare (Saltman et al., 2002). In the Netherlands, the healthcare system evolved

[1] In: Putten (1998), p.5

from the Second World War onwards. During this evolution, several problems were solved, such as accessibility and waiting lists. However, managing the systems costs have been the major challenge from 1990 onwards. Due to the ageing of society, healthcare is consuming a rather large portion of the gross domestic product. For example, in 2011 9% of GDP was spent on healthcare with a total cost of 90 billion euro, almost 50% of which was spent on hospital and elderly care[2]. Providing a solution in which previous, contemporary and future problems are solved can be identified as a major goal in the Dutch health system.

Entrepreneurship is suggested as the solution, as it theoretically renders positive external effects. But is it relevant to implement a characteristic which is not inherent to an industry? And is it possible to measure the hypothesized effects? An attempt is being made through defining performance and public entrepreneurship, both in several ways. With these definitions, an evaluation of the industry will be made. To what degree are entrepreneurial indicators contributing to performance? What are ways to measure performance in an industry that does not revolve around making profit, but is about helping people? Questions which this thesis will attempt to answer, in order to contribute to policy and management literature in this field of research.

This thesis will therefore attempt to review the current state of the Dutch healthcare industry concerning public entrepreneurship, and will try to predict the increase in financial and operating performance that is a theoretical consequence of entrepreneurial activity. The research questions will be: does performance of a health institution depend on characteristics of an entrepreneurial organisation? And what strategic advice can be given based on these characteristics, on a national and institutional level?

The Dutch healthcare industry itself followed a path of non-radical development. It grew from providing basic healthcare to a gross domestic product consuming industry. Full payment per treatment and a lack of supply restrictions are characteristics of the system during the years from 1960 until 1980. From 1990 onwards, policy makers are trying to build a more sustainable system, but the latter part of the improvements is still to be accomplished. Therefore, research on policy and strategy in this industry is of importance.

[2] CBS. (2012). Zorguitgaven per sector, € miljard, 2000-2011. CBS Statline.

Public entrepreneurship in the Dutch healthcare sector is an unexplored field of research, and through evaluating it, two theoretical contributions are made (Shane and Venkatarama, 2000). The industry is evaluated on the state of development concerning entrepreneurship; in theory and practice. Afterwards, strategic advice can be given regarding the future of the industry. The goal is to provide implications for the government and institutions. A definition of the concept public entrepreneurship, in individuals and organisations, is made at first. Second, the Dutch healthcare market is evaluated on its composition. After that empirics on the state of the healthcare market are presented. This will be done through evaluating a dataset of the Dutch ministry of public health, wellbeing and sports with linear regression as a method. As a conclusion, a solution is offered through applying strategic entrepreneurship in this market.

2 Public entrepreneurship

In this part, existing theory of entrepreneurship, public entrepreneurship and healthcare entrepreneurship will be elaborated on. This is of importance as characteristics of entrepreneurship will serve as the basis of the empirical review.

2.1 Entrepreneurship

The foundations of entrepreneurship as a field of research are created by some leading figures. Cantillon, Turgot and Say, and Schumpeter can be identified as these figures (Bruyat and Julien, 2000). Their respective views on the entrepreneur are: the entrepreneur is the one assuming the risk and generates appropriate profits from that (Cantillon), the entrepreneur is the one that recombines production factors in order to create value (Turgot and Say) and the entrepreneur is the innovator (Schumpeter). Nowadays, these notions are widely diversified into different research fields concerning entrepreneurship; research on venture capital decisions and characteristics (Sahlman, 1990), the impact and history of entrepreneurship education (Katz, 1999) or social entrepreneurship (Dees, 1998) are but only examples of significant work and fields of research.

The general importance of entrepreneurship as a field of research is abundantly supported before, in and after Cassons' book. Shane and Ventkataraman (2000) provide a comprehensive overview of some of the characteristics positively associated with entrepreneurship. Entrepreneurship, for example, allows society to benefit technological information by translating it into an enterprise which sells a product or service (Arrow, 1962) and the phenomenon entrepreneurship provides a mechanism which detects and exploits inefficiencies (Kirzner, 1997). Furthermore, an important view on entrepreneurship is the Schumpeterian view: entrepreneurial product and process innovations are the engine behind the process of change (Schumpeter, 1934).

Summarizing, entrepreneurship is perceived to be an important concept in the field of economics. Casson (1982, P.12) proposes the assumption that entrepreneurs have a positive influence on national economic success measured as national income. This assumption is vastly adopted nowadays (Wennekers and Thurik, 1999) and although exceptions on some parts of this notion exist, the concept as a whole is widely accepted and will be so in this

paper. An example of such an exception is unproductive entrepreneurship, which does not deliver any value to society (Baumol, 1990). Consequently, it is desirable to create a national and global economic environment in which productive entrepreneurship thrives. This indicates that understanding entrepreneurship and its characteristics and knowing how to stimulate it can provide value to society. To increase the chance of providing this value, a small scope will be adopted in this paper. The subfield public entrepreneurship in the healthcare industry will be addressed.

2.2 Public/healthcare entrepreneurship

Specifying on the organisational level, as is the goal in this paper, a conceptual model is provided by Anderson et al (2009). This paper provides the conclusion that organisations can and should be described as entrepreneurial institutions. They can cause change through innovative use of production factors. Therefore, these authors claim that entrepreneurial attitude should naturally be integrated with the strategy of an organisation. With this integration, the organisation strategically takes risks, innovates and changes the environment as entrepreneurs do, and as is a goal in the Dutch healthcare sector. A similar notion can be found elsewhere in the literature. For example, Peterson and Berger (1971) state that Schumpeterian view on entrepreneurship, of recombination of pre-existing production factors, dictates that entrepreneurship is a process variable that should lead to strategy in the organisational context. Adopting entrepreneurship as a process variable leads to an efficient strategy in a turbulent market, or any market for that matter. Besides, corporate entrepreneurship is proven to have a positive association with financial performance, if adopted as a long-term strategy instead of an attempt to boost short term performance (Zahra and Covin, 1995).The concepts innovation, risk and recombining production factors are known to be strongly related to entrepreneurship. It is, for this paper, of importance to compare these concepts with the definition of public entrepreneurship, and conclude concerning the similarities and differences. Besides, through defining the notion public entrepreneurship and its dimensions, a theoretical framework is built from which empirical research can be done.

Roberts (1992) defines public entrepreneurship as the design and implementation of an innovative idea in a public sector context. In this definition, Roberts dissects three sub-processes. The first is creation, which involves the generation of the idea. The second is

design; this is the process of defining the idea and planning the resource commitment. The third process is implementation. This is a phase that involves testing in order to evaluate its viability in reality. When testing turns out to be successful, the idea can be implemented into practice. Roberts therefore provides the mechanism for stimulating and implementing innovation in a healthcare organisation.

Furthermore, according to Boyett (1996), public entrepreneurial behaviour can be summarized as non-routine and innovative behaviour that causes new combinations of production factors, but also the utilization of production factors and abilities that are hidden, scattered or inappropriately used. Consequently, the characteristics of the individual public entrepreneur are strong persuasive powers, risk-taking ability, creativity and the need for achievement. The difference between public sector entrepreneurs and business entrepreneurs is the motivation for entrepreneurial profit, which is contradicting with Cantillon's view on entrepreneurship. The definition by Boyett (1988) states that public sector entrepreneurs operate in an uncertain environment, under reallocation of resource ownership. Besides, the public entrepreneur has to have the ability to manipulate stakeholders and therefore can chase market opportunities. Finally, the public entrepreneur has a strong desire for self-satisfaction. A definition that is applicable in this case, regarding the need for implementation of entrepreneurship in the Dutch healthcare industry. In addition, Phillips (2006) defines entrepreneurship in the healthcare industry as the pursuit of an opportunity without regard to the currently available resources. Intra- and entrepreneurship are addressed in a definition by Phillips, reflecting the practical similarities of these concepts. Regarding this definition, a valuable recommendation to an entrepreneurial healthcare institution is made (Philips, 2006; P. 481): '*An institutional focus on encouraging initiative, identifying opportunities, and developing appropriate alliances and mechanisms for exploiting opportunities that extend beyond the perceived strategies or missions of the entity can help healthcare organizations leverage their resources and take advantage of the benefits of entrepreneurship*'. A valuable finding as developing mechanisms that will contribute to building an entrepreneurial organisation is one of the goals in this paper.

Mack et al. (2008) rightfully remark that the term public entrepreneur can be easily misinterpreted as it can relate to any public or social sector related individual. Therefore they come up with their specific definition. The public entrepreneur, according to the writers of

this paper, is any elected official, bureaucratic or non-profit manager whom, by their environment, is perceived to cause innovative change in a public entity. Moreover, Lapsley (2008) advocates that entrepreneurialism or characteristics of entrepreneurship in the public sector are firmly documented among researchers (Osborne and Gaebler, 1993; Bellone and Goerl, 1993). The reinvention of organisations and the tension concerning risk in the public domain are found to be consequences of public entrepreneurship.

Among researchers, contradictions on the consensus described above also exist. Entrepreneurship, in their perception, has limited possibilities in public institutions as '*many of its central assumptions and activities rarely match a public service conception*' (Cervera et al., 2000: Harrow and Willcocks, 1992 p.62). But when the common denominators of entrepreneurship are reviewed; risk, innovation and other positive organisational effects, it can be concluded that those are dimensions can all be found in the public entrepreneurship domain. For example, healthcare institutions in the Netherlands experience risk in the proceeding of their funding and are responsible for their own financial household.

The focus of this paper is on the healthcare industry in the Netherlands. Therefore, besides an appropriate definition for public entrepreneurship, focus on the healthcare industry is of importance. Previous research regarding health related public entrepreneurship provides some additional theory. Rowe et al. (2004) empirically find that the following factors are positively influencing successful entrepreneurship in the healthcare industry: innovative role models, little bureaucracy, specialized staff for decision making and consistent objectives. Besides, other indicators of public entrepreneurship are risk, specialisation and organisational autonomy (Sadler, 2000). Saltman et al. (2002) claim, based research in Europe, that entrepreneurialism can be a powerful instrument in order to convey changes in healthcare institutions. Implementing entrepreneurialism in healthcare organisations, they state, will cause modernisation and an increasing operating efficiency. The variables that measure these outcomes are; improved volume and quality of service to clients, financial benefits and the possibility of gaining market share, if applicable in the respective market. On the other hand, Greene (1986) casts doubts on the phenomenon entrepreneurship in the field of healthcare because it should not be about self-interest. This can be explained through the commercial approach in the market that is analysed, opposed to the semi-public scope that is adopted in the other definitions. Concluding, characteristics of entrepreneurialism in the healthcare

industry are known, and entrepreneurship in this industry is theoretically found to be an improvement when compared to a non-entrepreneurial industry.

Public entrepreneurship in the field of healthcare appears to revolve around risk, innovation and an entrepreneurial mind-set and strategy in an organisation, as stated above. This description can provide a perfect theoretical fit to the goals of an organisation in this industry, but implementing it in practice can provide some challenges. For example, public organisations often operate und a public and political acceptable amount of risk (Cervera et al., 2000). This could be a restriction on entrepreneurship and its effects in the dataset. Besides, according to Amabile (1996), creativity is a necessary condition for innovation. This is a view that coincides with Schumpeter's' creative destruction. Entrepreneurial creativity is defined as the implementation of a novel idea in order to produce a new product or service. When translated to the public health sector, this means implementation of innovations, as a consequence of creativity, in the public health context by producing new products or services. West (2002) also follows this chain of thought by stating that creativity and innovation represent two stages in the innovation process. Among research on innovation, the previous observation is often made and can be characterized as accepted among researchers (Woodman et al., 1993). Creativity within the healthcare institution can therefore be concluded to be conditional upon the important entrepreneurial characteristic innovation.

Previous research within the Dutch healthcare industry finds that it is characterized by organisations that mainly take on the management role, who perform a little innovation and market research but barely take risk (Prince et al., 2005). Timmermans et al. (2008) conduct research on the entrepreneurialism per sub sector in the Dutch healthcare industry. In this paper, a moderate entrepreneurial environment is found when three companies per sub sector are interviewed. Incentives for acting entrepreneurial are lacking, there is no opportunity to advertise and risk is mostly avoided. Sub sectors that do appear to be entrepreneurial are home care, dentists, social service centres, occupational services and physiotherapists. With a broader dataset, this thesis attempts to test similar characteristics on the sector as a whole.

2.3 Related fields of research

Previously, it was established that the public entrepreneur differs from the commercial entrepreneur in the motivation for entrepreneurial profit (Boyett, 1988). However, it can be

questioned whether the individual level public entrepreneur is not in fact more of an intrapreneur. Antonic and Hisrich (2003) support this notion by stating that one of the three focus areas of research on intrapreneurship is the focus on the entrepreneurial organisation. Furthermore, intrapreneurship, according to them, is anything between; individuals who pursue opportunities within an existing organisation and entrepreneurial spirit within an established organisation. This implies that virtually no difference can be made between intrapreneurship and public entrepreneurship. Consequently, the field which is known as public entrepreneurship has a large resemblance with the concept known as intrapreneurship.

In the addition to the relation with intrapreneurship, public entrepreneurship and new public management or NPM also appear to be two highly interrelated concepts. New public management is the concept of a lean public sector that has a strong interest in the value of business (Denhardt and Denhardt, 2000). Besides, NPM coincides with one of the main characteristics of an entrepreneurial public organisation which is the efficiency (Christensen and Laegreid, 2010). The resemblance goes on according to these authors, in stating that just as for entrepreneurs, external incentives are of great importance on good governance in an organisation. One can therefore view at New Public Management as an implementation of characteristics of entrepreneurship on a public sector level. Characteristics of an entrepreneurial organisation can therefore also be compared to characteristics from the theory of new public management when reviewing their effects.

2.4 Defining healthcare entrepreneurship

When defining public entrepreneurship based on previous research, a variety in definitions can be found. The scope, depth and detail differ per definition. Controversially, some common denominators can be found. Public entrepreneurial organisations take risk (Anderson et al., 2009; Philips, 2006), generate and implement innovative ideas and are perceived to do so (Roberts, 1992; Boyett, 1988; Mack et al., 2008; Rowe at al. 2004 and Saltman and Busse, 2002) and resemble organisations as described in New Public Management (Denhardt and Denhardt, 2000; Christensen and Laegreid, 2010). Summarizing from these elements a framework for public entrepreneurship can be drawn. Public entrepreneurial organisations are the ones that are perceived to generate and implement creative and innovative ideas, who take risk and who have the power and influence to do so.

3 The Dutch healthcare context

This part will evaluate the Dutch healthcare industry on its composition and the relevant characteristics for this paper. The composition (Table 1), difficulties and nature of the research question will be clarified. Furthermore, the concept of healthcare has many dimensions and can be specified in an equal amount of definitions. In this part of the paper, both 'care', which consists of institutions like nursing homes, and 'cure', which consists of institutions like hospitals, are reviewed.

3.1 History

The Dutch healthcare system is evolved through history following a path of non-radical changes (Helderman et al., 2005). The institutional interpretation of this path describes that a certain (healthcare-) system holds until external demands for change surpass the power of the current system (Genschel, 1997). The incremental nature of the changes in the Dutch healthcare system is partly attributable to the political system that is in place in the Netherlands (Hemerijck, 1993). It is a political system in which gaining absolute majority in elections very unlikely and coalitions have to be made. This causes a large fraction of the decisions to be based on negotiation and compromise. One can image that there is a low chance of making radical changes in such an environment, especially on a subject as fundamentally important for the population as the nations' healthcare system.

Schut and van de Ven (2005) provide a comprehensive summary of the Dutch healthcare system. They recognize several stages throughout its history. According to these authors, this evolution started at the beginning of the 20th century and the first stage lasted until the 1970's. In this stage, there were several basic goals in providing healthcare. Promoting public health across the inhabitants of the Netherlands, guaranteeing a certain standard of the professionals working in healthcare and providing healthcare for every inhabitant were the main concerns of the government. From 1960 until 1980 healthcare expenses were booming. Health insurers were obliged to cooperate with every willing provider and full payment was given per treatment. No restrictions on supply were in place. With the growth of cost trough these years there was the risk that in the future it would not be possible to cover these costs. Besides, the rapid growth of healthcare costs could damage the Dutch export position, for example, due to the rising costs of labour. Simultaneously, a public dissatisfaction about waiting lists emerged,

and the government came to realize that efficiency should be forced to increase in the healthcare sector. This became a priority from the 1990's onwards.

The building blocks of the Dutch healthcare system are the Sickness Fund Act (ZFW) and the Exceptional Medical Expenses Act (AWBZ). The first dates from 1941 and ensures health insurance for the lower and middle income group in the Dutch society. During peacetime this act never got enough support to adopt. However, during World War II the Germans forced the adoption (Van Grinten, 2001). In 1967 the AWBZ act was adopted, which in its turn is a collective health insurance for the costs of exceptional health conditions, for example; the funding of long term care. The act was the basis on which nursing homes started to evolve (Ribbe, 1993). Rule of thumb is that the AWBZ act covers expenses that the vast majority of the population is unable to bear (den Exter, 2010). These two acts were sufficient to provide healthcare to about two third of the population. In 1986 the Health Insurance Access Act (WTZ) was adopted, in order to standardize premiums for the high risk groups of insured individuals, such as the elderly or disabled of society. AWBZ funded care is granted if an individual is indicated to need this by the centre for indication of healthcare (Peeters and Francke, 2007).

3.2 Contemporary context

One of the suggested solutions is making healthcare institutions act like entrepreneurial organisations (Second chamber, 1998; Minister A. Klink, 2007). The goal of which is to reduce costs, increase efficiency and innovation and doing this by increasing the entrepreneurial mind-set in healthcare institutions, as recommended by Cools (2008). The need to do so is determined by the previously mentioned costs. Throughout the years the system has grown into state in which it consumes a rather large percentage of the gross domestic product. Due to the economic situation the world is experiencing since 2008 and especially due to the Euro-crisis, budget cuts are found to be an absolute necessity (spring agreement, 2012). Entrepreneurial organisations promise to be the way to accomplish these changes.

Research has been done on the characteristics of the cost issues in the Netherlands (Meerdink et al., 1998). Although a patient specific scope is adopted, it is concluded that healthcare costs increase exponentially after the age of 50, and most of the costs that are made were made on

the previously mentioned care and not . Consequently, the aging of society will drive the costs upwards in the future. A solution, as researched in Saltman et al. (2002), is letting entrepreneurship increase, for example through regulation. Healthcare entrepreneurship will, according to them, combine the social passion for healthcare with corporate discipline and innovations and improvements associated with public entrepreneurship.

3.3 Sub- sectors

According to Ribbe (1993; p. 215), a nursing home can be described as: "*an institution which provides temporary or permanent multidisciplinary treatment, guidance and support, and nursing care for elderly patients with long-term, complex health problems, expressed primarily in functional disorders and handicaps.*" A remark has to be made, as the patients are not necessarily old, but generally require care for their psycho geriatric and somatic conditions. The functions of a nursing home, according to this author, involve care in short term rehabilitation, complex multidisciplinary care for long term patients, terminal care, continuation, observation and hospital care. Previous research has found several factors to be of importance when assessing the degree at which individuals feel 'at home' in a nursing home i.e. delivering quality to the client (de Veer and Kerkstra, 2001). For example, nursing homes that are situated in a strongly urbanized environment are found to be associated with significantly less satisfied inhabitants. Furthermore, client perceived quality is found to be influenced by; the resident-centeredness, the degree of disturbance caused by other inhabitants, residents' assessment of the building and the flexibility of the prevailing routines. Regarding the staff of a nursing home, interpersonal relations with nurses are found to be of vital importance upon the degree of satisfaction in that home (Grau et al., 1995). Nurses have to be able to qualitative and quantitative social interaction with the patients and should be trained to recognize the heterogeneity of patients and their needs. Specialisation on a specific target group of clients is a way to accomplish this. Besides, their incentive should be based on satisfying benefits, advancement opportunities and humane and fair supervision (Bishop et al., 2008). Employees therefore are indicated to perform in above average if monetary compensation and specialization- and career opportunities are offered.

An example of a change the Dutch government is making is the case of the nursing homes. A change that the Dutch government has made is that individuals with the three least severe care levels are going to be obliged to pay the housing component in nursing homes on their own,

apposed tot the current situation where it is paid for (Loghum, 2011). This decision has a severe impact, as this concerns a great part of the individuals who receive healthcare in nursing homes. The expectation due to this fact is that people will opt to receive care and treatment at their current living location, which will cause vacancy at healthcare institutions, but renders opportunities for home care. Since politicians are fiercely trying to minimize deficits, these changing regulations are effective earlier than expected by the industry. For these health institutions this will cause a great shift from in home care to out of home care.. The need for (entrepreneurial) solutions will therefore increase in the short term.

Aside from nursing homes, hospitals are also reviewed in this paper. Researchers have established the indicators that are of importance in the client perceived quality that is delivered in a hospital. Communication proves to be one of the most important characteristics influencing this indicator. The fact that patients are involved in decisions concerning their healthcare process has two beneficial effects; on the one hand they experience a sense of control, which can be beneficial for their health, and on the other hand it provides the needed information for the healthcare professionals (Cleary et al., 1991). Besides communication, a significant difference in performance is found when comparing academic and non-academic hospitals, hospitals in different regions and profit and non- profit hospitals (Jha et al., 2005). Concerning these institutional characteristics, non-academic and profit oriented hospitals are concluded to have a better performance as well as hospitals in certain regions. Size appears to have no significant influence on performance. The fact that profit oriented hospitals have a better performance is in line with the positive consequences of the entrepreneurial search for profit opportunities (Schumpeter, 1934). It has to be note that this research uses 10 indicators of quality applied on 3 common diseases (myocardial infarction, congestive heart failure, and pneumonia). A more economic approach concerning the definition of quality will be used in this thesis.

Timmermans (2008) provides an overview of the opportunities of entrepreneurship per sub-sector in the Dutch healthcare industry. Performance influenced by entrepreneurial characteristics can be found in the sub-sectors; home care, pharmacists, dentists, social service centres, union health services and physiotherapists. Sub-sectors where entrepreneurship provides a challenge are: nursing homes, disabled care and hospitals. On average, the healthcare environment is found moderately entrepreneurial with an 5,3 out of 10 grade.

Gray (1985) addresses, with reason, several issues which surface in an entrepreneurial and competitive healthcare environment. The first issue is the quality and accessibility of healthcare. A goal is to provide healthcare for every individual in the Netherlands, but in a competitive/entrepreneurial environment this is not guaranteed. The second issue is of a more institutional nature. The switch to an entrepreneurial environment in a government funded industry has to be executed in a very precise way in order to avoid, for example, governmental exploitation by commercial entities. As described in Gray (1985; p.21): *"The playing field has to be level"*, for example equality in tax exemptions, access to equity markets, cost of capital and social responsibilities. The third issue has an even broader perspective. In a capitalist system, supply and demand influence the price, efficiency and profit. But it is questionable to desire these forces in a healthcare system as they may bring negative internal and external effects. Mariner (1995) concludes that it is vital to the success of an entrepreneurial healthcare system to establish a new set of standards, ethics and rules that guide them between doing business and healthcare.

Table 1[3] Description of the industry

Healthcare sector	**% of healthcare budget**
Hospital care	32.1
Nursing homes	8.9
Old people's homes	9.1
Psychiatric care	7.1
Institutions for mentally and physically disabled people	8.6
Primary medical and paramedical services (excluding dental care)	5.7
Dental care[4]	4.0
Pharmaceutical care[5]	8.8
Home care and other small sectors	10.4
Healthcare administration	5.3

[3] Percentage of healthcare budgets spent on different sectors of care in Netherlands, 1994 (Meerding et al., 1998).
[4] [3]Not included in dataset.

4 Research definitions

In this part, the hypothesis that will be tested in the empirical analysis will be derived from the relevant theory. It gives a description of the choices that are made regarding the connection between the theory, the empirical analysis and the outcome of this paper.

4.1 Theoretical framework

Entrepreneurship is a powerful instrument to force positive changes in healthcare institutions (Saltman and Busse, 2002). The Dutch government acknowledges this through stating that efficiency and effectiveness have to be achieved through entrepreneurialism in the healthcare system. The goal of this policy is to reduce costs and increase the quality and innovativeness. This is a goal that does not take into account whether entrepreneurship is already incorporated in the sector or whether it has a positive association on the outcome of the healthcare process.

According to the theory of entrepreneurship, stimulating it will have a positive impact on national and institutional economic success (Wennekers and Thurik, 1999). Entrepreneurship itself has some common denominators. Innovation, risk and causing change are the ones that are not only applicable entrepreneurs, but organisations can also adopt through behaving as an entrepreneur (Anderson et al., 2009). As concluded in the theory, entrepreneurship is a process variable that, if adopted, leads to an organisational strategy that is of positive influence on performance (Peterson and Berger, 1971).

The theory of public entrepreneurship shows a lot of resemblance to entrepreneurship in the commercial context. The most important difference can be defined as the lack of entrepreneurial profit. Consequently, theorists on public entrepreneurship conclude that some concepts resembling regular entrepreneurship are strongly related to public entrepreneurship. Recombining production factors and utilizing scattered and inappropriately used production factors without regard to available resources will lead to innovation within healthcare institutions (Boyett, 1988; Phillips, 2006). Furthermore, an entrepreneurial healthcare institution has to be designed in such a way that opportunities are recognized and exploited, with little bureaucracy and consistent objectives (Phillips, 2006; Rowe et al., 2004). Little bureaucracy is vital in order to run a lean organisation, and so are consistent objectives as improvements and innovations will cause many barriers in the transition to an entrepreneurial

healthcare industry, and consistent objectives should help staying focussed on this transition (Phillips, 2006). Innovation, quality and low costs seem like a nirvana for policy makers and executives in the healthcare industry. Politicians and industry organisations believe the way to realize these positive market characteristics is to implement an entrepreneurial finance, management and strategy style in the industry. Consequently, this is a choice that can be discussed because of the core competence of this industry (Gray, 1985). It is desirable that healthcare is accessible, has a certain quality standard and operates with respect to the ethics and rules involved. Previous research on the sub-sectors of the healthcare industry indicates that communication (Cleary et al., 1991), flexibility (Grau et al., 1995) and specialized and well rewarded staff are of positive influence on quality (Bishop et al., 2008). Furthermore, entrepreneurialism is found to be graded 5,3 out of 10 in the Dutch healthcare sector (Timmermans, 2008). This can be attributed to the fact that some sub-sectors provide the opportunities for organisational entrepreneurship, however, there are little entrepreneurial incentives, little advertising opportunities and risk is mostly avoided.

Summarizing, it is desirable to create a system that offers high quality and innovative healthcare with financially healthy institutions. The government and industry representatives predict that applying organisational entrepreneurship to this industry, will lead to achieving these effects. In order to investigate whether this hypothesized industry improvement actually contributes to these goals, an empirical analysis on this industry will be performed. To ensure the relevance of this analysis, a dataset provided by the Dutch government will be used. Furthermore, the problem will be dissected into researchable sub-hypotheses, giving the ability to conclude at a more specific detailed level.

4.2 Definitions

In order to transform the previously described problem into a researchable hypothesis, several concepts need definition. The output of the healthcare process needs to be defined in a qualitative and quantitative manner and has to consider the interests of the stakeholders involved. The input, entrepreneurship, needs to be defined in a similar way.

4.2.1 Performance

To define the output, the concept ‘performance’ needs definition. The indicator performance will be used in this context because it can describe both ‘soft’ indicators such as quality and ‘hard’ indicators such as revenue. Moreover, the term performance still covers a broad array

of indicators and measures (Murphy et al., 1996). Efficiency, growth and profit are the most commonly used dimensions, but are insufficient to measure the output in this specific industry. Most commercial enterprises have profit as a goal, whereas a health institution should focus quality of the process and financial prosperity (Murray and Frenk, 2000). Therefore, measures in both the financial and operational dimension will be used to define the performance of the healthcare industry. Financial performance indicators are measured in the dimensions efficiency, growth and size liquidity (Murphy et al., 1996). Operational performance will be defined as the perceived quality, taking into account that a health institution has multiple stakeholders (Venkatraman and Ramajun, 1986).

In this section, the financial dimensions efficiency, growth and size liquidity, and the operational dimension quality will be elaborated on. For example, the output variable efficiency will be reflected by gross revenue, as is done in research of Chakravarthy (1986). There, in an attempt to measure strategic performance of a firm, it is used to reflect a part of the firms' financial performance. Zahra and Covin (1995) evaluate corporate entrepreneurship and the financial performance effects it has. In this paper, they define growth in revenue as the ratio of this year's revenue with respect to last year's revenue. For them, it is one of the measures that should determine whether corporate entrepreneurship has a positive effect on financial performance. Both the evaluated phenomenon, corporate entrepreneurship, and the tested hypothesis have similarities with this paper. Therefore it provides valuable information concerning the measures of financial performance in the efficiency dimension; revenue is a valid way to measure performance in this paper. Furthermore, the current ratio will be used. The current ratio reflects the slack resources that are needed for corporate entrepreneurship (Zahra, 1996). This is stated in a paper where the goal was to investigate the consequences of ownership to corporate entrepreneurship in fortune 500 companies. It is interesting to see that Zahra concludes that ownership of a company's stock among executives has a positive effect on firm performance. The current ratio will be used opposed to the quick ratio as it is the measure that contains more information about balance sheet characteristics. This is also done by Singh (1986) in an attempt to investigate the relationship between organisational performance and risk taking in organisations. Here, a high current ratio reflects a high level of short term performance. Besides, it is found that poor performance can be associated with high risk taking, and that a lack of slack is associated with risk taking. In combination with theoretical findings on entrepreneurship, a U-shape relation can be expected, as low and high

risk taking propensities influence performance negatively. Moreover, the current ratio does not only appear to a variable that predicts outcome, but can also be used to measure risk. Another way to measure the financial performance of a company is by entrepreneurial compensation and the labour expense to revenue ratio, or owners' salary (Bracker and Pearson, 1986; Murphy et al., 1996). Management compensation is empirically found to have a significant correlation with the firm performance, and can therefore be an indicator of its performance (Coughlan and Schmidt, 1985). One could also argue that management compensation is based on firm performance, and certain performance therefore results in certain compensation. Reverse causality between these variables could be present.

In accordance with the findings of new public management theorists, it can be summarized that entrepreneurial indicators can explain performance and should be included in the operational and financial dimensions. New public management prescribes financial measures when measuring in shareholders' interests, quality and flexibility for measuring customers' interests and innovation as a measure for the employee's perceived performance (Brignall and Modell, 2000). In order to measure performance in the interest of all stakeholders, proxies for these indicators will be included. In a review on the indicators of small and medium enterprise performance, Hudson et al. (2001) find that quality is one of the main operational performance indicators used in this field of research. Another operational performance indicator, according to these authors, is customer satisfaction. Of the ten papers that are reviewed, nine indicate that both quality and customer satisfaction should be included in measuring performance in an entrepreneurial environment. Both these papers present findings that are in line with the performance indicators found in healthcare literature (Grau et al, 1995; Bishop et al., 2008).

4.2.2 Entrepreneurial indicators

The entrepreneurial influences that are found to have an association with performance of health institutions will be listed here. First, general indicators of the public entrepreneurship literature will be reviewed. After that the healthcare specific entrepreneurship indicators will be elaborated on. Based on evaluation of public entrepreneurship literature; innovation, risk and creating change appear to be dominant characteristics. It is of importance for the validity of the empirical research that at least these indicators are represented in some way or form. Besides these somewhat general indicators, more specific indicators are also suggested by the literature, for example, the size of an organisation. Literature suggests that smaller

organisations are better entrepreneurial incubators, because of little bureaucracy and a structure that is suited for quick implementation of innovations (Sadler, 2000). Two other examples are the propensity to take risk and the level of specialisation. Risk is important because taking risk is inherent to implementing ideas and realizing changing innovations, but could have an ambiguous effect, as is previously found. Furthermore, specialized employees and decision makers tend to be more innovative through the extensive knowledge of their respective field (Sadler, 2000). Two indicators can be added in case of entrepreneurship in the health sector; little bureaucracy and consistent organisational goals (Rowe et al.. 2004).

In order to translate innovation into measurable units, in- and output can be evaluated. Here, investment in production means and machinery will be taken as a proxy for innovation, as R&D investments and innovation budget is rarely reported in the dataset. Kleinecht and Reijnen (1991) also consider the investment in equipment and production means as a proxy for innovation, but find that these investments are not significantly associated with R&D cooperation, an indicator of out-of –firm innovative activity. An inverted U-shape is found in the relation between slack and innovation (Nohria and Gulati, 1996). This indicates that a high and low current ratio both negatively influence the propensity to innovate. A low current ratio indicates that uncertain experiments will be discouraged due to a low level of current means and a high current ratio will cause a lack of discipline and focus on the creation of innovations. Han et al. (1998) conceptualize the relation between organizational and environmental conditions and organizational innovations, and the organizational performance it has as a consequence. In this conceptualization they state that technological turbulence in the environment has a significant facilitating effect on innovation and hence organizational performance. Investments in new technologies, for example production means and machinery could therefore have a facilitating effect on the organizational innovation and performance. I.e. a new technology is bought from the (fast moving) market, implemented, and through using it; skilled employees come up with for example process innovations.

Measuring the influence of risk that is involved in the operations on performance in the health sector will be done through examining the governance structure and the current ratio. These measures are suited for this purpose, as Zahra et al. (2000) found that a medium size enterprises' performance is related to the governance structure in place. In the Dutch healthcare context, governance can be measured through the application of the healthcare

governance code. This reflects the behaviour of the organisation, board and the board of commissioners. As the following quotes reflects: *"The introduction of market like mechanisms introduces new risks in the healthcare industry… The board of directors is responsible for the risks that are taken"* it forces healthcare organisations to analyse risks, and provides the tools and guidelines to deal with them (Zorgbrede governance code, 2010[6]). Besides, the current ratio can be used for risk measurement as is deducted from Singh (1986).

Specialization is found to be an important influence on successful entrepreneurship (Holmes and Schmitz, 1990). It is measured with product, service or industry diversity in a geographical or industry related dimension (Capello, 2002). In a healthcare context it could be measured by the target group of services. Besides, specialisation causes little bureaucracy if the environment is without turbulence (Litwak, 1961). A way to reflect this is comparing the organisational costs with costs that can be allocated to clients. This is an approach derived from Netten and Curtis (2000), where a difference is made between face-to-face contact with clients in healthcare and the indirect costs of the organisation.

When research is done on entrepreneurship in a healthcare context, consistent objectives appear to be an important measure, as well as a positive contribution to the institutions' performance (Rowe, et al., 2004). Having constant objectives is a variable that can be measured as operating with a consistent strategy and little changes in fundamental organizational values. Regarding board member compensation, theory indicates that both compensation and having multiple board positions appear to have a theoretical association with company performance. Regarding compensation, this is especially the case if equity ownership is offered, and in the case of outside positions, the externalities of the network are contributing positively to firm performance (Kosnik, 1987; Uzzi 1996). It has to be noted that this reasoning differs from Coughland and Schmidt (1985) where income is the performance measure. Regarding another board characteristic, board size, a negative correlation with profitability is found in previous research on the performance of small and medium sized enterprises (Eisenberg et al., 1998).

[6] These quotes are translated from page 7 and 19.

4.3 Hypotheses

The general hypothesis that will be tested in the empirical research is:

Entrepreneurial characteristics have a positive association with organisational and financial performance in the healthcare industry.

Because the measurement of performance is found to differ among previous papers, this hypothesis will be divided in sub-hypotheses that measure the effect of entrepreneurial characteristics on several performance measures. The sub-hypotheses can be found in table 2.

Table 2 Description of the hypotheses

Hypo-thesis	**Performance measure**	**Explanatory variables expected positive**	**Explanatory variables expected negative**
1	Revenue	Machine and mean investments, governance code, specialization, board member income, current ratio and outside positions.	Statutory changes.
2	Current ratio	Machine and mean investments, governance code, specialization, board member income and outside positions.	Statutory changes.
3	Quality	Machine and mean investments, governance code, specialization, board member income, current ratio and outside positions.	Statutory changes.
4	Board member income	Machine and mean investments, governance code, specialization, current ratio and outside positions.	Statutory changes.
5	Complaints per full time equivalent	Statutory changes.	Machine and mean investments, governance code, specialization, board member income, current ratio and outside positions.
6	Equity growth	Machine and mean investments, governance code, specialization, board member income, current ratio and outside positions.	Statutory changes.

5 Empirical analysis

In order to draw useful conclusions, empirical analysis will be performed. This will give the ability to test the hypotheses that are drawn from the theory. The results give the ability to summarize the state of the industry and provide strategic implications. In this section, an overview and clarification of the dataset, several dependent and independent variables is provided. The goal of this part is evaluating the Dutch healthcare sector on the relation between entrepreneurial indicators and performance of a health institution. In this evaluation, the target is to build a model that applies to 'cure' and 'care' which are roughly the two parts the industry consists of. That is why a data with a sector wide scope is being used for empirical analysis.

Hence, analysis will be performed on a dataset from the Dutch ministry of public health, wellbeing and sports concerning the year 2011. For the purpose of evaluating the Dutch healthcare sector on het amount of entrepreneurial behavior, the 'entrepreneurial indicators' as proposed in the theoretical framework are translated to the available sector data. Risk (Anderson et al., 2009; Philips, 2006), Innovation (Roberts, 1992; Boyett, 1988; Mack et al., 2008; Rowe at al. 2004 and Saltman and Busse, 2002) and New Public Management (Denhardt and Denhardt, 2000; Christensen and Laegreid, 2010) are identified as indicators of an entrepreneurial health institution. These characteristics can be translated to the available data through: volume and quality of service to clients, financial benefits and the possibility of gaining market share, innovative role models, little bureaucratic problems, specialized decision makers and consistent objectives (Saltman and Busse, 2002; Rowe et al., 2004)).

5.1 Data and sample

As previously stated, the data used in this research is generated by the Dutch ministry of public health, wellbeing and sports. It is a dataset that is collected through the mandatory quantitative and social justification of the operations of health institutions that receive funds from the AWBZ and health insurance fund. All health institutions provide the same data, and when necessary, an institution specific appendix. The sample therefore contains both quantitative information as well as information such as the bonuses of the board or the quality delivered by the institution. The year 2011 is used here because it represents the current state of the Dutch healthcare industry. More specifically, the data is collected through the online

application of the annual report of all health institutions that are obliged to do so. It has to be noted that these involve; care, cure and various kinds of other healthcare. The dataset is limited by the fact that these institutions are obliged to report because of their public nature; therefore there are no private institutions in this sample. This includes all institutions who receive funding from the AWBZ act and the health insurance act. Summarizing, this dataset is suitable to determine whether public entrepreneurship has a positive association with the performance of the Dutch healthcare industry. As one can see below, the 8 biggest parts of the healthcare industry are included in the dataset. These are mainly funded by the government, hence their obliged to report to the ministry of health, of public health, wellbeing and sports.

5.2 Variables

To measure the influence of indicators of organisational entrepreneurship on the performance of organisations in the healthcare industry, several variables are used. The variables are chosen based on previous economic, entrepreneurship and public health/entrepreneurship research. In this part, there will be an explanation on the characteristics of these measures.

5.2.1 Performance

The performance of a healthcare institution cannot depend on only one variable. For example, measuring the performance only in revenue or the return on investment does not give an accurate representation. This is because a semi-public sector is characterized by a complex structure of stakeholders and financing. Therefore, earnings, the current ratio, number of complaints as a percentage of the full time equivalents, quality as perceived by clients and equity are used as proxies for performance. In this way, an attempt is made to capture the financial and stakeholder aspects of performance.

Describing equity, the logarithm of the difference in equity in comparison with the previous year will be used. The logistic transformation will be applied in order to obtain a model with uniform and minimally skewed distribution. Moreover, the current ratio is defined as current assets; including stock, work-in-progress and financial deficit, divided by current liabilities, including financial surplus. Besides, revenue will be defined as the log of the sum of all earnings, relative quality as the number of complaints per full time equivalent and quality as the absolute number of quality certificates, which is distributed between 1 and 6. Table 3 provides the descriptions of the dependent variables.

Table 3 Description of dependent variables

Performance variable	Description of variable
Ln(revenue)	The natural logarithm of the total revenue of 2011.
Ln(current)	A continuous variable that reflects the log of the current assets; including stock, work-in-progress and financial deficit, divided by current liabilities, including financial surplus.
Quality	Categorical variable that can take on values between 1 and 6 and reflects the number of quality certificates.
Ln(average board member income)	A variable that reflects the natural log of the average board members' income as performance measure.
Complaints/FTE	The number of complaints divided by the full time equivalents of employees.
Ln(equity)	The log of the growth in equity in the year 2011.

5.2.2 Entrepreneurial characteristics

This measure reflects innovation budget, investment in machines and investment in production means. Therefore, innovation is a continuous variable that reflects the amount invested in potentially innovative new machinery and production means. As innovation is often claimed to being part of the phenomenon entrepreneurship (Casson, 1985), it is expected to have a positive influence on the performance of a health institution. Innovation is defined as the logarithm of investments in new production means and machines. A description of the independent variables can be found in table 4.

This is a dummy variable that reflects whether a health institution is operating according to the industry associations' set of rules with respect to governance and control (Table 4). It is expected that through applying the governance code, a health institution is managed in accordance with the rules on modern and widely proven notions about good control, supervision and accountability (Governance code healthcare, 2010). This manner of management is expected to have a positive influence on the performance of a healthcare institution. Good governance can be viewed as an indicator of effective risk management. Aside from appliance of the governance code, the current ratio represents a measure of risk. A low current ratio is theoretically found to induce negative risk on firm performance (Singh, 1986).

Saltman and Busse (2002) find that having consistent objectives is a characteristic of public entrepreneurship and has positive consequences. In this dataset, this can be interpreted as the lack statutory changes, because statutory changes are the most fundamental change in goals an organization can make. This is a dummy variable which is coded 1 in case of changes in the statutes, and 0 otherwise (Table 4). The expectation is that in accordance with the theory, making no changes in the statutes is a sign of a constant and clear goal, which is associated positively with the performance of an institution.

Dividing the patient related costs with the organizational costs provides a ratio which reflects to what degree the organization is specialized, because a high amount of costs devoted to patients in combination with a low overhead indicates substantial specialization. The expectation is that devoting a relative high percentage of the costs to the client will result in a high performance. This factor is based on the positive effects of managing a lean organization, a characteristic of new public management and is related to the level of specialization of the organization as found in the literature. Further description of this variable can be found in table 4.

Rewarding the board with a high income could have a positive effect on the performance of the health institution, and possibly vice versa, as is discussed in the literature. Therefore, the logarithm of the average income per board member is included (Table 4). Furthermore, a variable is included to review whether there is a difference in performance of health institutions of which the board members only have one job or multiple positions. The expectation is that boards with a large number of external positions, board members can exploit the positive effects of network externalities, as is suggested in the literature. This will be measured as the average number of outside positions per board.

Various size measures have an influence on organizational performance (Ruf et al., 2001). Therefore, the number of locations, number of board members, number of supervisory board members and revenue controls are included. It is expected that the number of locations and revenue have a positive influence on performance and a negative influence is expected for number of (supervisory-) board members (Eisenberg et al., 1998). Table 4 gives a representation of the way these variables are constructed.

Within the Dutch healthcare industry, different institutional specializations can be found, with different performances and degrees of incorporation of entrepreneurship (Timmermans, 2008). In order to control for the differences between these specializations, a dummy for each of them is included. A levels-specification will be adopted, where nursing, care and home care is the base case, as this is the largest group in the dataset (Table 4).

Table 4a Description of explanatory variables

Variable name	**Description of variable**
	Innovation measures
Ln(machine invest)	A nominal variable which reflects the natural logarithm of the investments in machinery and installations during the year 2011.
Ln(mean invest)	The natural log of the investments in production means and technical and administrative equipment.
	Risk measures
Ln(Current ratio)	The natural log of: current assets, including stock, work-in-progress and financial deficit, divided by current liabilities, including financial surplus.
Governance code	The answer of the question: do you operate with respect to the governance code healthcare? The value is 0 if the answer is 'no' and 1 if the answer is 'yes'.
	Consistent objectives
Statutory changes	The value is 1 if important statutory changes have been made during 2011and 0 if this is not the case.
	Specialization
Ln(Patient/overhead ratio)	The logarithm of client related costs divided by general costs.

Table 4b Description of explanatory variables (continued)

Variable name	Description of variable
	Board
Ln(average board member income)	A variable that reflects the average income per board member.
Average outside positions	The average number of board members per board with an outside position.
	Size controls
Ln(revenue t_{-1})	The logarithm of the total revenue of the year 2010.
Ln(number of locations)	Log of the number of locations.
Ln(number of board members)	Log of the number of board members.
Ln(number of supervisory board members)	Log of the number of supervisory board members.
	Sector
Health institution	Coded 1 if the health institution is a university hospital, a general hospital, is a rehabilitation center, an independent treatment center, a center for special medical procedures, a trauma center, a mental health institution, a social shelter or women's shelter, a center for disabled clients, an educational institution providing WTZ care, a health center for youth, a maternity center or is a center for youth and pedagogic help. These are compared to the reference group nursing, care and home care.

5.3 Method

The purpose of this analysis is to identify the entrepreneurial indicators that have an association with the performance of a health institution. Ordinary least squares models are used to estimate the coefficients which denote the influences of the variables on performance. When one uses ordinary least squares, one of the methods to ensure consistency and the lowest bias and variance is applying the Gauss-Markov theorem (Brooks, 2008). If this theorem is applied, the best linear unbiased estimators are produced by the estimation method.

Assumptions of this theorem are; expectation of the residuals is zero (normality and no perfect multicollinearity), homoskedasticity, no serial correlation and no correlation between the residuals and one or more explanatory variables (no endogeneity). The first assumption, $E(u) = 0$, normality and no multicollinearity is tested by summarizing the values of the residuals (Appendix, table 9). Besides, normality is shown by the histograms of the predicted residual (Appendix, figure 1). The presence of multicollinearity is tested through the variance inflation factor test (VIF). Furthermore, both homoskedasticity and serial correlation are corrected for through using the robust standard errors for estimating the equations. When testing on omitted variables, results indicate that regarding hypothesis 3, 4 and 5 the null hypothesis is not supported, which indicates potential omitted variable bias. However, an examination of the correlations between the explanatory variables and the predicted residuals indicates that all correlations are zero and 2 stage least square regressions on all hypotheses have as a result that no endogeneity is present. Besides the Gauss Markov theorem, an F-test on the joint significance of investments in production means and investments in machinery will be performed. This is done because they represent a mutual influence on performance. In this way, the effect as a whole is considered too.

In order to test for multicollinearity a variance inflation factors test will be employed if variables with high mutual dependency are included. The VIF test scales the correlation between a particular variable and the rest of the variables. It measures the inflation of a variable due to collinearity through regressing each explanatory variable as a dependent variable on all other explanatory variables. By doing this, a test value is calculated. When this value exceeds 10, multicollinearity is present (Marquardt, 1970).

In order to conclude about the hypotheses, the following equation is estimated multiple times with different performance measures:

$$\text{Performance} = \beta_0 + \beta_1\ \text{investments in innovation} + \beta_2\ \text{risk measures} + \beta_3\ \text{consistency} + \beta_4\ \text{specialization} + \beta_5\ \text{board characteristics} + \beta_6\ \text{size controls} + \beta_7\ \text{sector} + \epsilon$$

5.4 Results

5.4.1 Descriptive statistics

Table 5 (appendix) shows the results of the summarizing statistics of the data at hand. There are 355 institutions in the dataset when missing values are eliminated. All analysis will be

performed on these 355 institutions. Furthermore, no abnormalities concerning the variables are visible here, but no tests are performed either, so no conclusions can be drawn based on these statistics.

Besides a summary of the characteristics of the variables at hand, it is of importance to evaluate their mutual relationships. This is done in table 6 through deriving the correlations. Correlations are displayed if they are significant at a 5% threshold; their standard errors are Bonferroni adjusted to prevent a type 1 error that can occur in multiple hypotheses testing (Westfall, 1997). The results review an extreme positive correlation between ln(revenue) and ln(revenue t_{-1}), which is likely to cause multicollinearity problems. Despite this high level of correlation, it will be relevant to include this variable. Mainly because there is a strong theoretical motivation to include the revenue of the last period, for example it can possibly predict investments, and chances are that high revenue in period t_{-1} causes high revenue in period t_0. Besides, the correlations between investments in production means and revenue and revenue in period t_{-1} are also high enough to raise attention (Table 6: Correlations). Testing the amount of multicollinearity will therefore be important in evaluating the validity of the model.

5.4.2 Empirical results

Table 7[7] shows the results of the equation that is estimated to investigate the hypotheses and table 8 shows the conclusions concerning the hypotheses that follow from these results. In the equation estimated for hypothesis 1, performance was measured as the natural logarithm of the revenue. Both revenue of 2010 and investments in production means have a significant positive influence on the total revenue, at a 1% significance threshold, and in descending strength of the effect. Number of supervisory board members appears to be significantly negatively associated with performance. As these are all logistic variables, beta can be interpreted as a beta percent point change in x is a percent point change in y. Furthermore, investments in machines and production mean investments are jointly significant at a 1% threshold. Besides the significance of revenue of 2010, the number of board members and investments in production means, there are some sector dummies which are also of significant influence on the revenue. For example, of positive influence are the mental health institution dummy and center for disabled. This should be interpreted as; the average revenue of a mental

[7] Table 10, Appendix shows the coefficients and their standard errors.

health institution/center for disabled is significantly higher than the average revenue of a nursing, care and home care institution. General hospitals have, on average, lower revenue. However, the presence of multicollinearity should be monitored; as revenue, revenue of 2010 and investments in production means were all highly correlated with each other. When a VIF test is employed, revenue t_{-1} has a VIF value of 7,92 and the mean VIF is 2,13. These values are well below 10, so no multicollinearity problems are to be expected.

Table 7 shows the outcomes of the equation estimated in order to test hypothesis 2. The numbers of locations and investment in machines both have a significant negative effect on the current ratio, in descending order of the strength of the effect. The sector dummies with a significant positive effect on the current ratio are social- and woman shelters and general hospital (both at 10%) and youth center (at 1%). The F-test on the joint significance of production mean investments and machine investments provides a significant result at a 1% threshold. When testing for multicollinearity in this equation, the logarithm of revenues has a VIF value of 8,30 and the mean VIF value is 2,23 which indicates that multicollinearity is not present.

Again, table 7 displays the results, which are estimated in order to conclude about hypothesis 3. These results indicate that both investment in production means and machines have a negative effect on the quality measured as quality certificates. Moreover, the number of locations has a significant negative effect on quality at 1%. The current ratio and revenue appear to have a positive influence on the number of quality certificates at a 1% threshold. The dummies reflecting the different types of institutions indicate that trauma centers, general hospitals and pedagogic institutions have a significant positive effect on the amount of quality, compared to nursing care and home care institutions, and in descending order of strength of the effect. Furthermore, the independent treatment center dummy has a significant negative effect on quality. Again, the variables machine investments and production mean investments are jointly significant at 1%, and VIF values are all below 10, so multicollinearity should not be of influence on the results.

Table 7 reflects the results of testing hypothesis 4, with board income as a measure for performance. The revenue of an institution is significantly positively associated with average board member income. At a 1% rejection threshold, the number of board members is

negatively associated with performance measured as income. The sector dummy educational institution providing healthcare has a significant (at 1%) positive influence on performance measured as board income compared to nursing, care and home care institutions. The multicollinearity assumption appears not to be violated, as all VIF values are well below 10.

The result of the evaluation of hypothesis 5 can be found in table 7. Its results give insight to a couple of findings. For example, investments in machines and the number of locations are negatively associated with complaint per full time equivalent at a 10% threshold. Furthermore, social and women's shelters have significantly more complaints per FTE compared to the base-case. Centers for disabled people, independent treatment centers and rehabilitation centers have, on average, a lower amount of complaints per FTE compared to the base-case. When a test on the no multicollinearity assumption is performed, this assumption appears not to be violated as VIF values are below 10.

The result of the testing of hypothesis 6 can be found in table 7. The number of supervisory board members has a significant negative association with equity growth at a 10% rejection threshold. The dummies for independent treatment center and mental health institutions are significantly and positively related with equity growth. The dummies for maternity centers and educational centers providing care are significant and negative in the tested relation with equity growth, relative to the base case. Moreover, the dummy for maternity centers is negatively associated with equity growth at a 10% rejection level.

Concerning the amount of variance that is explained by the models, a couple of observations can be made. First of all, when explaining performance measured as revenue, an implausible high R^2 of 0.995 is denoted. This is most likely due to the collinearity of the revenue of this period and one period back. However, as stated before, there are strong theoretical motives to include both variables, so the model will be evaluated as presented. Furthermore, the indicators of entrepreneurship are able to explain; 16% of the variation in the current ratio, 35% of the variation in quality indicators and 58% of the variation in average board member income. Regarding the complaints/FTE and growth of equity, approximately 5% of the variation in the depended variable can be explained.

Table 7a linear regression results

Variable name	Revenue	Current ratio	Quality indicators	Average board income	Complaints/FTE	Growth of equity
Ln(machine invest)	0.000	-0.016*	-0.028**	-0.002	-0.055+	0.003
Ln(mean invest)	0.028**	-0.084	-0.100+	0.025	0.083	-0.102
Ln(Current)	0.000		0.112*	-0.003	-0.204	0.052
Governance code	0.028	-0.796	0.487	0.836	-0.699	-0.547
Statutory changes	-0.006	-0.031	-0.001	-0.076	-0.111	0.061
Ln(Patient/overhead ratio)	-0.001	-0.027	0.058	0.038	0.086	0.003
Ln(average board member income)	0.022	-0.019	-0.102		1.663	-0.054
Average outside positions	0.004	0.044	-0.033	-0.030	-0.27	-0.186
Ln(number of locations)	0.007	-0.115+	-0.290**	-0.018	-0.327+	0.008
Ln(number of board members)	0.027	-0.055	0.141	-0.394**	1.558	-0.058
Ln(number of supervisory board members)	-0.061*	-0.029	-0.274	0.025	-0.602	-0.447+
Revenue t_{-1}	0.941**					
Revenue		-0.111	0.433**	0.217**	-0.397	0.054

+ p<0.10, * p<0.05, ** p<0.01

Table 7b linear regression results (continued)

Variable name	Revenue	Current ratio	Quality indicators	Average board income	Complaints/FTE	Growth of equity
University hospital	-0.031	0.414	-2.185	0.286	-2.554	0.062
General hospital	-0.042*	0.318+	1.109**	0.075	0.308	0.320
Rehabilitation center	0.037	0.698	-0.261	-0.019	-1.056*	-0.406
Independent treatment center	0.017	0.043	-0.639+	-0.130	-1.018+	0.688*
Centre for special procedures	0.022	-0.292	0.614	0.143	-1.039	0.192
Trauma center	0.007	0.309	2.125**	-0.071	0.477	-0.396
Mental health institution	0.034*	0.095	-0.049	0.076	0.780	0.356*
Social- women shelter	-0.010	0.259+	-0.151	-0.006	2.170**	0.100
Center for disabled	0.035*	-0.094	-0.212+	-0.067	-0.723*	0.082
Educational institute providing care	-0.029	0.099	-0.376	0.374**	-0.497	-1.513**
Youth health center	0.042	0.511**	0.086	-0.002	1.117	0.473
Maternity center	0.004	0.032	0.287	0.133	-1.568	-1.181*
Pedagogic institution	-0.013	0.028	0.585+	-0.053	0.154	-0.107
Constant	0.485+	8.831**	-3.845**	7.155**	-9.827*	0.025
R-squared	0.995	0.16	0.353	0.576	0.052	0.05
N	355	355	355	355	355	355

+ p<0.10, * p<0.05, ** p<0.01

Table 8 Conclusions concerning the hypothesis[8] [9]

H_a	Performance measure	Variables of significant positive influence	Variables of significant negative influence	Result
1	Revenue	*Production means investments, revenue* t_{-1}, mental health institution dummy and center for disabled dummy.	*Number of supervisory board members* and general hospital dummy.	Partly supported
2	Current ratio	General hospital dummy, social- women shelter dummy and youth health center dummy.	Machine investments and number of locations.	Not supported
3	Quality	*Current ratio, revenue*, general hospital dummy, pedagogic institution and trauma center dummy.	Mean and machine investments, number of locations, in-dependent treatment center and center for disabled.	Not supported
4	Income	Educational institution.	*Number of board members*, rehabilitation, independent treatment and disabled centers.	Partly supported
5	Complaints /FTE	Social- and women shelters.	*Machine investments and number of locations*	Partly supported
6	Equity growth	Independent treatment center dummy and mental health institution.	*Number of supervisory board members*, educational center providing healthcare and maternity center.	Partly supported

[8] A hypothesis is found to be plausible when variables have the hypothesized significant influence and no significant contradicting results are noted.
[9] Italicized variables have the hypothesized influence.

6 Discussion

In this part, the results of the empirical analysis will be elaborated on and connected to the theory. The order of discussion is: innovation measures, risk measures, the influence of consistency, specialization, the influence of board characteristics, size controls and sector controls and their respective influence on the performance measures. Besides, the limitations of this paper will be presented, rendering opportunities for future research.

6.1 Entrepreneurial indicators and performance

Investments in production means and machinery are taken as a proxy for innovation, as is done in, and deducted from previous research (Kleinecht and Reijnen, 1991; Han et al., 1998). Innovation is in its turn included as it is identified as one of the most important characteristics and consequences of entrepreneurship (Schumpeter, 1934), of corporate entrepreneurship (Anderson et al., 2009) and public entrepreneurship (Roberts, 1992; Boyett, 1988; Mack et al., 2008; Rowe at al. 2004 and Saltman and Busse, 2002). In the first hypothesis performance is reflected as the logarithm of the sum of revenues (Chakravarthy, 1986; Zahra and Covin, 1995). The expectation is that innovation has a positive association with performance, as is found in previously mentioned research. Investments in machinery and production means are taken as proxies for innovation, but only investments in production means is found to be of significant positive influence on performance measured as revenue (Kleinecht and Reijnen, 1991). Although this is only a partially significant result, it reflects a part of the positive association between innovation and performance, as in line with the previous studies that are listed above. When performance is measured as the current ratio, which is also done in Zahra (1996), ambiguous results are found (hypothesis 2). Investments in machinery are found to be significantly negatively associated with the current ratio and investments in production means are insignificantly negatively associated with the current ratio. However, as the current ratio reflects the level of slack resources in an organization by dividing the current assets by the current liabilities, the ambiguity may be explainable. When investments in innovation are done with either current assets or taking on more current liabilities, the fracture of the current ratio goes down, hence the negative association that is found. This effect could be in line with the inverted U-shape relation between slack and innovation/risk (Nohria and Gulati, 1996). Future research should be done to unravel this relationship. When the influence of innovation on the number of quality indicators is tested, as is done in hypothesis 3, a significant negative

result is noted, the effect of which is stronger for investments in production means. This is a result contradictory to the theory, because previous theoretical and empirical papers find that innovation is of positive influence on performance (Drucker, 1985; Saltman et al., 2002) and find quality to be representative for measuring performance in the interests of clients (Hudson et al., 2001; Brignall and Modell, 2000; Bishop et al., 2008). It is possible that investments in production means and machinery only have long term innovation and performance effects, as previous research shows an abnormal positive long-term effect of investments in R&D (Eberhart et al., 2004). Interestingly, investing in machines has a negative effect on the number of complaints per FTE which indicates that investing in technology has a positive association with the client perceived quality (hypothesis 5). As theory indicates that the combination of investments in production means and investments in machinery is a proxy for innovation, a test on their joint significance is performed. This combination appears to be of significant influence on revenue, current ratio and quality measures.

Summarizing, innovation positively influences performance measured as revenues and negatively influences the current ratio, due to the balance sheet effects investments have. Furthermore, a negative effect of innovation investments is found on the number of quality certificates, which could be due to the long term effects investments have. Besides, the combination of investments in production means and machinery is jointly significant on several performance measures. In this dataset, innovation measures on an institutional level have an inconsistent association with performance when compared to the hypotheses.

Cantillon proposed a view where the entrepreneur is an economic agent who takes risk and generates profits from that. This is a notion that can be translated to the corporate entrepreneurship context (Anderson et al., 2009). As taking risk is identified to be one of the most important characteristics of innovation and entrepreneurship, it is relevant to measure it when identifying the effects of entrepreneurship. The need to do so also originates in the fact that previous research on entrepreneurship in the healthcare sector identified the propensity and freedom to take risks as a positive influence on healthcare entrepreneurship (Rowe et al., 2004; Saltman et al., 2002). In this paper, healthcare institutions that operate with respect to the governance code are assumed to perform above average, as it forces an organization to manage risks in the way desired by the industry organization (Healthcare sector governance code, 2010). Furthermore, there is a direct relation between the governance structure in place

and performance, which is an interesting fact with respect to the hypotheses of this paper (Zahra et al., 2000). Besides, the current ratio is included on the basis of two theoretical concepts; on the one hand, slack resources are needed for corporate entrepreneurship (Zahra, 1996) and on the other hand, the lack of slack resources appears to have a relationship with the type of high risk taking that has negative influence on performance (Singh, 1986). The empirical results in this thesis indicate a significant positive effect of the current ratio on the number of quality indicators, as is tested in hypothesis 2. Slack resources are likely to be available because a health institution is indicated to deliver quality. The opposite is also possible: a high current ratio is an indication of slack resources which are used to upgrade quality. Moreover, the effect of the current ratio is insignificant and positive on the growth of revenue and equity, and insignificant and negative for average board income and complaints per full time equivalent. One could argue that as the current ratio goes up, the compensation of the board goes down because it is paid out of current assets, hence the negative effect of the current ratio on performance measured as board income. A similar analogy can be made regarding the relationship between the current ratio and the growth of equity. As current assets represent the short term, a high current ratio for multiple years indicates an abundance of assets over liabilities which are likely to be accounted to the equity of an organization. Note that both of these effects are in fact insignificant, and these are only speculations for future research. Whether or not a healthcare organization operated with respect to the governance code that exists in this industry is the other proxy for risk. When operating under this code, entrepreneurial risks are taken responsibly, and good governance is proven to be positively associated with firm performance (Zahra et al., 2000). The empirical results do not show significant associations of appliance of the governance code on performance. The insignificant influences of the governance code are positive on: revenue growth, quality indicators and average board income and negative on the current ratio, the number of complaints per FTE and the growth of equity. The negative effect on the complaints may be attributable to increasing managerial and bureaucratic effects of the code of governance.

The measures of risk are not entirely able to explain their respective effects on performance. Having slack resources, as is measured with the current ratio, has a positive effect on the amount of quality indicators, which is partially in line with the inverted U-shape relation of slack resources and innovation on performance (Nohria and Gulati, 1996). This is evidence for the importance of short term financial resources when trying to deliver quality as a health

institution. Furthermore, it is evidence that supports the idea that a lack of slack causes unnecessary risks (Singh, 1986). Besides, applying the governance code does not have a significant effect on either financial or operational measures of performance. Therefore, no empirical reasons are found to apply it, but also no empirical reasons are found not to apply it, and concluding from this paper it appears that health institutions should be indifferent in applying this code. It has to be noted though, that applying the governance code could have non-financial and non-operational benefits such as the goodwill of stakeholders, which is an argument to implement it.

In an entrepreneurial healthcare context, Rowe et al. (2004) find a positive association between successful entrepreneurship, and the consistency of the objectives of institutions. Innovation and improvements will cause barriers and difficulties. Consistent objectives are therefore needed to stay focused and on target (Rowe et al., 2004). This paper measures the consistency of targets in the fact that statutory changes are made during the year 2011. If the statutes of an organization describe its most fundamental values, changes in statutes can be viewed as a severe inconsistency in the identity and goals. A negative relationship between changes and performance is therefore to be expected. The empirical findings present ambiguous results when measuring statutory changes. The insignificant influences on performance are; revenue, current ratio, average board income and complaints per FTE, all negatively influenced by statutory changes, and quality indicators and growth of equity which are positively influenced by statutory changes. A possible reason for these ambiguous results is the notion that statutory changes may have a long term effect rather than a short term effect. In the year of changing the statutes, results are possibly minimal, but in the future the chance of observing could increase.

Besides consistent objectives, specialization appears to have a positive influence on successful entrepreneurship, as specialized industries produce highly innovative products and services (Holmes and Schmitz, 1990). This would mean that centers for care and cure should focus on providing specific services to a specific target group to innovate. A lack of specialization creates overhead (Litwak, 1961) and specialization is measured as patient or client related costs divided by the costs of the organization. The ratio of specialization positively influences the performance measured as quality indicators, average board income, complaints per FTE and negatively influences revenue growth and current ratio. It has to be

noted that these results are insignificant. Although insignificant, a positive influence of specialization with respect to performance is in line with the findings in the literature (Holmes and Schmitz, 1990; Capello, 2002). The effects indicate a negative influence of specialization on organizational performance, measured at a short term organizational level.

The influence of changing the statutes of an organisation is likely to have a long term effect, because it is theoretically found to be negatively associated with performance, but no significant effect is noticed in this dataset. In addition, the effect of specialization appears to have no significant influence on performance, although specialisation is theoretically found to do so.

The effects of board member compensation are twofold in this paper, as it is twofold in entrepreneurship- and other economic theory. On the one hand it is used to explain company performance, for example, a high compensation creates an incentive to accomplish high firm performance, and hence management can be controlled with it (Coughlan and Schmidt, 1985; Kosnik, 1987). On the other hand, compensation could be the consequence of firm performance and not the predictor (Bracker and Pearson, 1986; Murphy et al., 1996). In the first case, managers are paid to let the organisation perform, in the second case managers are paid because the organisation performs. In this paper no significant or unambiguous association of income on performance is found. This is a phenomenon that Barkema and Gomez (1998) elaborate on, as researchers find numerous strengths in the pay for performance relationship. In this thesis, the logarithm of the average board income is found to be insignificantly positively related to revenue growth and complaints per FTE. Moreover, income is found to be insignificantly negatively associated with the current ratio, quality indicators and equity growth. These are questionable results, as only the income and revenue relation has the expected sign. Regarding the board of a healthcare organisation, another characteristic is also reviewed; the outside positions. It is hypothesized that having outside board or other positions has a positive effect on organisation performance, through the positive network externalities that come from these positions (Uzzi, 1996). The empirics of this paper do not show similar results. An insignificant positive relation is found between the average outside positions and performance measured as revenue and current ratio, and an insignificant negative relation between outside positions and quality, compensation, complaints/FTE and growth of equity. It could be interesting to evaluate the relation between

outside positions and income, as theory claims positive network externalities (Kosnik, 1987; Uzzi, 1996), and empirics indicate a possible negative relation with income. This would indicate that management is negatively rewarded for the positive effects they generate through their outside positions.

Although no significant effects of income on performance can be found, the relation between income and outside positions, and income and performance in general remains interesting to review, as it is much debated in the literature. In the Dutch healthcare industry however, board member income cannot significantly explain performance. The contradictory can be concluded regarding the R^2 of average board member income as a performance measure, over half the variation in the residuals can be explained by entrepreneurial indicators and control variables.

The first group of control variables can be characterized as size indicators. These are included as: "*prior studies indicate that financial performance varies by industry and firm size"* (Ruf et al., 2001, p.147). The inclusion of revenue when explaining performance is done because revenue is theoretically found to be significantly correlated with numerous financial measures used in this paper. This is because revenue globally summarizes the financial household position of an organisation. Besides revenue, revenue of one period back is also included as it can hold a lot of information on for example the current revenue and the propensity to invest (Ruf et al., 2001). Furthermore, smaller organisations are better incubators of innovations (Sadler, 2000). Revenue of the previous period is in this paper found to have a significant positive effect on revenue in the current period. This can be attributed to continuity of successfully managed firms. Furthermore, revenue is significantly positively associated with quality indicators and average board member income. The first indicates the need for a large or successful institution to accomplish quality. The latter indicates that board member income is a consequence of the revenue (in line with Murhphy et al., 1996 and Bracker and Pearson, 1986). In this thesis, the included performance measures can be sensitive to size, so it is important to control for this effect. The results the first control variable, number of locations, indicate a significant negative association with the current ratio and quality indicators (hypothesis 2 and 3). This indicates that the number of locations within the organisation negatively affects the current assets or increases current liabilities when reviewing the effect on the current ratio. Besides, a negative effect on the number of quality indicators is noted,

which can indicate difficulties in delivering quality when operating multiple locations within one organisation. Size measured as the number of locations appears to have a significant positive influence on the number of complaints per FTE, indicating that a larger institution is less able to provide client perceived quality (hypothesis 5). Insignificant results concerning the number of locations are revenue (positive), average board income, and equity growth (all negative). The second size control variable, number of board members, only notes a significant negative effect on average board income. This is a finding which is encouraged in New Public Management, as small boards perform better, the incentive for a small board can be an indication of the implementation of this phenomenon (Eisenberg et al., 1998). The third control variable for size is the number of supervisory board members. Testing this variable on the performance measures provide some significant and some inconclusive results. A significant negative effect on the revenue is found, which may indicate that inference as a consequence of the number of supervisory board members is possibly limiting the organisation in the propensity to generate revenues. Similar argumentation can be applied to the significant negative effect on equity growth that is shown in the empirical results. The number of supervisory board members is of positive insignificant influence on the average board income and negative insignificant influence on the current ratio, quality indicators and complaints per full time equivalent.

The overall moderate interpretation of the entrepreneurship role in this thesis is a finding that is in line with Timmermans (2008). Besides, reviewing the theory found on nursing, it can be concluded that qualitative and quantitative interaction provides quality in the sector nursing, care and home care (Grau et al., 1995). Combined this is the largest group available in the dataset. Furthermore, it is hypothesized that academic and non-academic and the different sectors have different performances (Jha et al., 2005). Since these two main parts of healthcare providing appear to differ, the empirical results are likely to reflect differences per sub sector. When comparing a university hospital to the base case of nursing homes and home care, the results indicate that no significant differences between these institutions can be found concerning performance. This could be due to the low number of university hospitals present in the sample. The dummy for a general hospital indicates that a significant negative association can be found concerning the general hospital and the revenue growth, compared to the base case nursing and home care. Furthermore, a significant and positive influence is found of the general hospital dummy and the number of quality indicators, when comparing a

general hospital to a nursing home. General hospitals are on average found to have less revenue, a higher current ratio and more quality indicators compared to nursing homes. The number of quality indicators could be explained by the higher complexity that can be found in general hospitals. However, this effect cannot be found when reviewing the university hospitals, which is an institution of the same nature. This is a result that is in line with the literature, as a significant difference in performance between academic and non-academic hospitals was found (Jha et al., 2005). Of the sub-sectors in which entrepreneurship is previously found to flourish (Timmermans, 2008), only the social service centers (social/women shelters, youth health centers and pedagogic institutions) appear to perform the same or better than the base-case with respect to 4 of the 6 performance measures. Moreover, nursing homes, disabled care centres and hospitals are previously found to be not as entrepreneurial as other sub-sectors. In this dataset, a resemblance to this finding is presented, as centres for disabled perform significantly worse or the same as the base-case on 4 performance indicators and significantly better on only 2 performance indicators. Sub-sectors that are previously found to have a significantly better or worse entrepreneurial performance, but are in this paper not found to differ from the base case, remain unaddressed.

Generally, corporate entrepreneurship does not seem to be positively associated with performance in the Dutch healthcare industry. This is a finding which is contradicting with the claim of several authors (Covin and Slevin, 2009; Zahra and Covin, 1995; Peterson and Berger, 1971), who associate corporate entrepreneurship positively with performance. It has to be noted that some authors plea for an adoption of entrepreneurialism as long term strategy, not to boost short term performance. Moreover, the findings are in line with the previously found moderate entrepreneurial environment in the Dutch healthcare industry (Timmermans, 2008).

6.2 Limitations

In this part of the thesis, the limitations of this thesis will be presented. With the limitations being clearly stated, the value of this paper could be easily identified, and the opportunities for future research are presented.

The first limitation that should be noticed in this thesis is of a data related nature. When assembling the dataset that is used, missing values where dropped in order to use the exact

same data for each model. By doing this, the comparability is guaranteed. If an institution displayed one missing value in the range of explanatory variables, it was dropped from the dataset. An action that can have a serious effect, as the institutions who are not able, willing or entitled to report a certain variable, may have a different performance compared to institutions who reported all desired variables. As an effect results could be biased, the organizations with all variables available could be the ones with a better or worse performance.

The second limitation that is considered in this paper is the way certain variables are measured. For example, the dataset provided virtually no (7 institutions) data on innovation budget. Hence investments in production means and machinery are used, hypothesizing that the implementation of innovations and the usage of new technologies and products in itself renders innovation effects (Han et al., 1998). It is clear that the measure for innovation could be more accurate, but it has to be noted that an accurate proxy may not exists as the latter part of the health institutions lacks a research and development department. Innovations are, in this sector, more likely to be created in the field and by the producers of production means and machinery. Besides innovation, risk appeared to be a phenomenon that is difficult to measure in this data. With the information at hand, a measure that displays the balance between the positive and negative effects of risk taking was hard to find. Besides the innovation and risk measures, revenue and revenue t_{-1} provided a problem, as their correlation indicated that multicolinearity could be observed. Because of that, multicolinearity is monitored and found to not present in the models. Besides, these variables remained included because there are strong theoretical reasons to do so.

The third limitation is the fact that panel data was not available for this paper. By analyzing the relationship between entrepreneurship indicators and performance over time, variations in this dimension could also be measured. This could provide scientific value as some reviewed variables, for example; innovation, revenues, investments and risk, are theoretically strongly interconnected. Hence, the relationship between indicators of entrepreneurship and performance could be established with more precision when measured over time.

In this paper it is established that entrepreneurship as a whole does not influence performance in Dutch healthcare institutions. Suggestions on how to make such an application work are

given by the literature, but apparently not used in practice yet. Mechanisms for implementation should be developed by scholars, because entrepreneurship theoretically renders positive effects. Furthermore, this paper could be extended by the use of time-series data and a further integration of sub-sector differences and regulation. Time series would give a detailed view on the behavior of variables over time, and the integration of sub-sector differences and regulation would give even more practical implications. Also, it would be interesting to review the differences within Europe concerning the characteristics reviewed in this paper.

7 Conclusion

Literature on healthcare entrepreneurship is unambiguous about its positive consequences. It is proposed to be a process variable with a positive influence on the performance of healthcare organizations. This is a view that is adopted in the healthcare policy of the Dutch government, in an attempt to decrease costs while maintaining or improving quality and efficiency. With respect to the quality standards and ethics that are in place in the Netherlands, an entrepreneurial management, finance and strategy style is attempted to be implemented. This thesis reviewed the degree in which entrepreneurship has a positive effect on performance, measured in the interest of several stakeholders. The conclusion of this thesis is valuable information for policy makers and individual health institutions.

Generally, the hypotheses that are proposed are not supported as a whole. The performance consequences of organizational entrepreneurship do not exist in the Dutch healthcare industry, or are more complex than the effects that are accounted for in this paper. It should be noted that Zahra and Covin (1995) argue that an entrepreneurial strategy should be adopted in the long-term instead of boosting short term performance. That being concluded, some useful insights are given by the empirical analysis. First of all, the positive influence of investments in production means on performance measured as revenue is in line with the idea that new technologies can render innovation effects themselves (Han et al., 1998). Moreover, the need to have slack resources to deliver quality is partially in line with the idea that slack resources are needed to innovate and that slack resources causes unnecessary negative risks (Nohria and Gulati, 1996; Singh, 1986). Healthcare institutions should balance their short term assets and short term liabilities in such a way that no high risks are taken, in case of a low current ratio, but innovating does get stimulated (U-shape relation). In addition to that, the empirical analysis shows that health institutions should be indifferent in applying the governance code unless it renders positive effects such as stakeholder goodwill. The revenue of an institution is found to be a relevant influence on two performance measures. It has a significant positive influence on the number of quality indications and the average board members income. An indication of the fact that revenue has to be generated in order to implement quality and average board member income is a consequence of generating revenues in the Dutch healthcare industry (Murphy et al., 1996). Additionally, size controls prove that organizations with multiple locations in the healthcare industry on average have difficulties in managing

their short-term financials and quality. However, institutions with more locations have fewer complaints per FTE. Besides, board size negatively influences income and supervisory board size limits revenue and equity growth. Similar results to Timmermans (2008) are found concerning some healthcare industry sub-sectors. Where the previously mentioned paper describes an above average interpretation of the entrepreneurial role in the social healthcare services, this paper finds that social/women shelters, youth health centers and pedagogic institutions have an average or higher performance score on 4 out of 6 performance indicators. Furthermore, of the below average entrepreneurial sub-sectors, disabled centers are found to perform in accordance with the findings of Timmermans.

Two questions are posed in the introduction; does performance of a health institution depend on characteristics of an entrepreneurial organisation and what strategic advice can be given based on these characteristics, on a national and institutional level. The answer is that some characteristics of entrepreneurship have the hypothesized influence on performance, but mainly, performance appears to be independent of organisational characteristics of entrepreneurship. Theory on healthcare entrepreneurship and policy makers in the Netherlands believe in the value of entrepreneurship, the only thing that lasts is the implementation. First of all, within a healthcare organization, entrepreneurship has to be regarded as a process variable (Peterson and Berger, 1971). For example, through training the employees to think as an entrepreneur and design the processes in a way that opportunities can be easily exploited. Furthermore, a healthcare organization increases performance by implementing organizational entrepreneurship through; focus on encouraging initiative, identifying opportunities, developing appropriate alliances (Phillips, 2006), innovative role models, little bureaucracy, specialized decision makers and consistent objectives (Sadler, 2000; Rowe et al., 2004), these are objectives that could also be stimulated by the government. Secondly, management should learn to behave as a public entrepreneur, or hire an individual who is recognized as public entrepreneur or innovative role model. This has a positive influence on performance as Mack et al. (2008) find that the public entrepreneur is perceived to cause innovative change in a public entity. A small board is a characteristic that is found to be of positive influence on performance, within this paper and in previous literature (Eisenberg et al., 1998). Governmental stimulation and institutional initiatives should focus on incorporation of entrepreneurship as elaborated on above. In this way, healthcare in the Netherlands will improve, which is of interest to the whole population.

8 References

Amabile, T.M (1996). *Creativity and innovation in organizations*. Boston: Harvard Business School Publishing.

Anderson, B.S., Covin, J.G., Slevin, D.P. (2009). Understanding the relationship between entrepreneurial orientation and strategic learning capability: an empirical investigation. *Strategic Entrepreneurship Journal*. 3 (3), p.218-240.

Antonic, B., Hisrich R.D. (2003). Clarifying the intrapreneurship concept. *Journal of Small*. 10 (1), p.7-24.

Arrow, K.J. (1962). The Economic Implications of Learning by Doing. *Review of Economic studies*. 29 (1), p.115-173.

Barkema, H.G., Gomez-Mejia, L.R. (1998). Managerial Compensation and Firm Performance: A General Research Framework. *The Academy of Management Journal*. 41 (2), p.135-156.

Baumol, W.J. (1990). Entrepreneurship: Productive, Unproductive, and Destructive. *Journal of Political Economy*. 98 (5), p.893-921.

Bellone, C. J., Goerl, G. F. (1993). In defense of civic-regarding entrepreneurship or helping wolves to. *Public Administration Review*. 53 (1), p.396-398.

Bishop, C.E., Weinberg, D.B., Leutz, W., Dossa, A., Pfefferle, S.G., Zincavage, R.M. (2008). Nursing Assistants' Job Commitment: Effect of Nursing Home Organizational Factors and Impact on Resident Well-Being. *The Gerontologist*. 48 (1), p.36-45.

Boyett, I. (1996). The public sector entrepreneur - a definition. International Journal of *Public Sector Management*. 9 (2), p.36-51.

Brancheorganisaties zorg (BoZ). (2009). Zorgbrede governance code. p.1-64.

Brignall, S., Modell, S. (2000). An institutional perspective on performance measurement and management in the 'new public sector'. *Management Accounting Research*. 11 (3), p.281-306.

Brooks, C. (2008). *Introductory Econometrics for Finance*. 2nd ed. Cambridge: Cambridge University Press. Chapter 3.

Bruyat, C.; Julien, P.A. (2001). Defining the field of research in entrepreneurship. *Journal of Business Venturing*. 16 (2), p.165-180.

Capello, R. (2002). Entrepreneurship and spatial externalities: Theory and measurement. *The Annals of Regional Science*. 36 (36), p.347-402.

Casson, M. (1982). *The entrepreneur: An economic theory*. Totowa, NJ: Barnes & Noble Books.

CBS. (2012). Zorguitgaven per sector, € miljard, 2000-2011. *CBS Statline*.

Cervera, A., Molla, A., Sanchez, M. (2001). Antecedents and consequences of market orientation in public organizations. *European Journal of Marketing*. 35 (11/12), p.1259-1287.

Chakravarthy, B.S. (1986). Measuring strategic performance. *Strategic Management Journal*. 7 (5), p.437-458.

Christensen, T. & Lægreid, P. (2010). Increased complexity in public organizations – the challenges of combining NPM and post-NPM features, *In*: Lægreid, P. & Verhoest, K. (eds.) Governance of Public Sector Organizations. Proliferation, autonomy and performance, London, Palgrave Macmillan.

Cleary, P.D., Edgeman-Levitan, S., Roberts, M., Moloney, T.W., Walker, J.D., Delbanco, T.L. (1991). Patients Evaluate Their Hospital Care: A National Survey. *Health Affairs*. 10 (4), p.254-267.

Cools, K. (2008). *Ondernemerschap in de zorg: Wenselijkheid en opzet van een winstexperiment*. Utrecht: Nederlandse Zorgautoriteit.

Coughlan, A.T., Schmidt, R.M. (1985). Executive compensation, management turnover, and firm performance: An empirical investigation. *Journal of Accounting and Economics*. 7 (1-3), p.43-66.

Curtis, C., Netten, A (2005). *Unit Costs of Health and Social Healthcare*. Canterbury: PSSRU University of Kent.

Dees, J.G. (1998). The meaning of social entrepreneurship. *Kauffman Center for Entrepreneurial Leadership*, p.1-6.

Denhardt, R.B.; Denhardt J.V. (2000). The New Public Service: Serving Rather than Steering. *Public Administration Review*. 60 (6), p.549-559

Drucker, P. F. (1985). Innovation and entrepreneurship: Practice and principles. *Harper and Row*. (New York).

Eberhart, A.C., Maxwell, W.F., Siddique, A.R. (2004). An Examination of Long-Term Abnormal Stock Returns and Operating Performance Following R&D Increases. *The Journal of Finance*. 59 (2), p.623-650.

Exter, den A. (2010). Health System Reforms in The Netherlands: *European Journal of Health Law*. 17 (1), p.223-233.

Genschel, P. (1997). The Dynamics of Inertia: Institutional Persistence and Institutional Change in Telecommunications and Health Care. *Governance*. 10 (1), p.43-66.

Grau, L., Chandler, B., Saunders, C. (1995). Nursing home residents' perceptions of the quality of their care. *Journal of Psychosocial Nursing*. 33 (1), p.34-41.

Gray, B.H. (1985). The new entrepreneurialism in health care. Overview: origins and trends. *Bulletin of the New York Academy of Medicine.*. 61 (1), p.7-22.

Grossman, P.J. (1988). Government and Economic Growth: A Non-Linear Relationship. *Public Choice.* 56 (2), p.193-200.

Han, J.K., Kim, N., Srivastava, R.K. (1998). Market Orientation and Organizational Performance: Is Innovation a Missing Link? *Journal of Marketing*. 62 (4), p.30-45.

Helderman, J.K., Schut, F.T., van Grinten, T.E.D., van de Ven, W.P.M.M. (2005). Market-Oriented Health Care Reforms and Policy Learning in the Netherlands. *Journal of Health Politics, Policy and Law*. 30 (1), p.189-210.

Hemerijck, A. (1993), *The historical contingencies of Dutch corporatism*. Oxford.

Holmes, T.J., Schmitz, J.A. (1990). A Theory of Entrepreneurship and Its Application to the Study of Business Transfers. *Journal of Political Economy*. 98 (2), p.265-294.

Hudson, M., Smart, A., Bourne, M. (2001). Theory and practice in SME performance measurement systems. *International Journal of Operations & Production Management*. 21 (8), p.1096-1115.

Jha, A.K., Zhonghe Li, M.P.H., Orav, J.E., Epstein, A.M. (2005). Care in U.S. Hospitals — The Hospital Quality Alliance Program. *The New England Journal of Medicine*. 353 (1), p.265-274.

Katz, J.A. (2003). The chronology and intellectual trajectory of American entrepreneurship education: 1876–1999. *Journal of Business Venturing*. 18 (2), p.283-300.

Kirzner, I. (1997). Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature*. 35 (1), p.60-85.

Klink, A. (2007). Kenmerk MC-U-2783995. *ministerie van volksgezondheid, welzijn en sport*.

Kosnik, R.D. (1987). Greenmail: A Study of Board Performance in Corporate Governance. Administrative Science Quarterly. 32 (2), p.163-185.

Lapsley, I. (2008). The NPM Agenda: Back to the Future. *Financial Accountability and Management*. 24 (1).

Litwak, E. (1961). Models of Bureaucracy Which Permit Conflict. *American Journal of Sociology*. 67 (2), p.177-184.

Loghum, van B. (2011). *Zorg en Financiering.* 10 (4), p.78-79.

Lumpkin, G.T., Des, G.G. (1996). Clarifying the Entrepreneurial Orientation Construct and Linking It to Performance. *Academy of Management Review*. 97 (1), p.135-172.

Mack, W.R.; Green, D. & Vedlitz, A.. (2008). Innovation and implementation in the public sector: An examination of public entrepreneurship. *Review of Policy Research*. 25 (3), p.233-252.

Mariner, W.K. (1995). Business vs. medical ethics: Conflicting standards for managed care. *The Journal of Law, Medicine & Ethics*. 23 (3), p.236-246.

Marquardt, D.W. (1970). Generalized Inverses, Ridge Regression, Biased Linear Estimation, and Nonlinear Estimation. *Technometrics* . 12 (3), p.591-612.

Meerding, W.J., Bonneux, L., Polder, J.J., Koopmanschap, M.A., Maas, van der P.J. (1998). Demographic and epidemiological determinants of healthcare costs in Netherlands: cost of illness study. *BMJ*. 317 (1), p.111-116.

Murphy, B., Trailer, J.W., Hill, R.C. (1996). Measuring performance in entrepreneurship research. *Journal of Business Research*. 36 (1), p.15-23.

Murphy, K.M., Topel, R.H. (2003). *The economic value of medical research*. Chicago: University of Chicago Press. p.41-74.

Murray, C.J.L., Frenk, J. (2000). A framework for assessing the performance of health systems. *Bull World Health Organ*. 78 (6), p.717-731.

Nohria, N., Gulati, R. (1996). Is Slack Good or Bad for Innovation?. *The Academy of Management Journal.* 39 (5), p.1245-1264.

Osborne, D., Gaebler, T. (1992). Reinventing Government. *Addison-Wesley*. p.20.

Peeters, J.M.; Francke, A.L. (2007). Indicatiestelling voor AWBZ-zorg, sector Verpleging, Verzorging en Thuiszorg. *Nivel*. 1 (1), 1.

Peterson, R. A., Berger, D. G. (1971). Entrepreneurship in organizations: Evidence from the popular music industry. *Administrative Science Quarterly*. 16 (1), p.97-107.

Phillips, F.S.; Garman, A.N. (2006). Barriers to entrepreneurship in healthcare organizations. *Journal of Health and Human Services Administration*. 28 (4), p.472-484.

Poortvliet, P., Zeijden, P., de Kleijn, M. (2012). Nieuwe toetreders en de betaalbaarheid van de zorg. *Eindrapportage EIM in opdracht van ZonMw*.

Prince, Y.M., Bruins, A., Zeijden, van der P.T. (2005). Ondernemen in de zorg. *EIM*.

Putters, K. (1998). Maatschappelijk ondernemen in de zorg. *Achtergrondnota geschreven in opdracht van de Raad voor de Volksgezondheid en Zorg bij het RVZ-advies*. p.1-120.

Ribbe, M.W. (1993). Care for the elderly: the role of the nursing home in the Dutch health care system. *International Psychogeriatrics*. 5 (2), p.213-222.

Roberts, N.C. (1992). Public Entrepreneurship and Innovation. *Policy Studies Review*. 11 (1), p.55-74.

Rowe, P.A.; Boyce, R.A.; Boyle, M.V.; O'Reilly, K. (2004). A comparative analysis of entrepreneurial approaches within public healthcare organisations. *Australian Journal of Public Administration*. 63 (2), p.16-30.

Ruf, B.M., Muralidhar, K., Brown, R.M., Janney, J.J., Paul, K. (2001). An Empirical Investigation of the Relationship between Change in Corporate Social Performance and Financial Performance: A Stakeholder Theory Perspective. *Journal of Business Ethics.* 32 (2), p.143-156.

Sadler, R.J. (2000). Corporate entrepreneurship in the. *Acedemic Journal of Public Administration*. 9 (2), p.25-43.

Sahlman, S.A. (1990). The structure and governance of venture-capital organizations. *Journal of Financial Economics*. 27 (2), p.473-521.

Saltman, R.B; Busse, R. (2002). Balancing regulation and entrepreneurialism in Europe's health sector: theory and practice. *European Observatory on Healthcare Systems*. 1 (1), p.1-223.

Schumpeter, J. 1934 (1934). *Capitalism, socialism, and democracy*. New York: Harper & Row.

Schut, F., Van de Ven, W. (2005). Rationing and competition in the Dutch healthcare system. *Health Economics*. 14 (1), p.59-74.

Shane, S.; Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *The Academy of Management Review*. 25 (1), p.217-226.

Singh, J.V. (1986). Performance, Slack, and Risk Taking in Organizational Decision Making. *The Academy of Management Journal*. 29 (3), p.562-585.

Timmermans, N.G.L., Meijaard, J., Statema, H. (2008). Ondernemerschap in de zorg. *EIM*.

Uzzi, B. (1996). The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect. *American Sociological Review* . 61 (4), p.67698.

Veer, de J.E.; Kerkstra, A. . (2001). Feeling at home in nursing homes. *Journal of Advanced Nursing*. 35 (3), p.427-434.

Venkatraman, N., Ramanujam, V. (1986). Measurement of Business Performance in Strategy Research: A Comparison of Approaches. *The Academy of Management Review* . 11 (4), p.801-814.

Wennekers, S., Thurik, R. (1999). Linking Entrepreneurship and Economic Growth. *Small Business Economics*. 13 (1), p.27-56.

West, M.A. (2002). Sparkling Fountains or Stagnant Ponds: An Integrative Model of Creativity and Innovation Implementation in Work Groups. *Applied Psychology*. 51 (3), p.355-387.

Westfall, P.H., Johnson, O., Utts, J.M. (1997). A Bayesian Perspective on the Bonferroni Adjustment. *Biometrika*. 84 (2), p.419-427.

Woodman, R.W.; Sawyer, J.E.; Griffin, R.W. (1993). Toward a theory of organizational creativity. *The Academy of Management Review*. 18 (2), p293-321.

Zahra S.A. (1996). Governance, ownership, and corporate. *Acedemy of Management Journal*. 39 (6), p.1713-1735.

Zahra, S.A., Covin, J.G. (1995). Contextual influences on the corporate entrepreneurship-performance relationship: A longitudinal analysis. *Journal of Business Venturing*. 10 (1), p.43-58.

Zahra, S.A., Neubaum, D.O., Huse, M. (2000). Entrepreneurship in Medium-Size Companies: Exploring the Effects of Ownership and Governance Systems. *Journal of Management*. 26 (5), p.947-976.

9 Appendix

Table 5 Summarizing statistics dependent and independent variables

Name of variable	**Mean**	**Std. Dev.**	**Min**	**Max**
Ln(revenue)	17.263	1.411	13.062	20.549
Ln(equity)	-2.113	1.176	-7.397	1.856
Ln(revenue t_{-1})	17.212	1.442	13.089	20.482
Ln(Current ratio)	4.717	0.889	-0.446	8.351
Quality	1.485	1.224	1.000	6.000
Complaints/FTE	1.326	3.316	0.000	36.000
Ln(machine invest)	6.913	6.491	0.000	18.274
Ln(mean invest)	13.059	1.867	6.619	17.765
Governance code	0.992	0.092	0.000	1.000
Statutory changes	0.116	0.320	0.000	1.000
Ln(Patient/overhead ratio)	-0.839	1.319	-5.732	4.180
Ln(average board member income)	11.889	0.470	8.424	12.809
Average outside positions	0.639	0.463	0.000	1.000
Ln(number of locations)	0.333	0.762	0.000	2.890
Ln(number of board members)	0.380	0.447	0.000	1.609
Ln(number of supervisory board members)	1.775	0.298	0.693	2.485
University hospital	0.009	0.092	0.000	1.000
General hospital	0.147	0.354	0.000	1.000
Rehabilitation center	0.020	0.139	0.000	1.000
Independent treatment center	0.023	0.149	0.000	1.000
Center for special medical procedures	0.039	0.195	0.000	1.000
Trauma center	0.014	0.118	0.000	1.000
Mental health institution	0.197	0.398	0.000	1.000
Social shelter	0.042	0.202	0.000	1.000
Center for disabled	0.194	0.396	0.000	1.000
Educational institution providing care	0.011	0.106	0.000	1.000
Nursing, care and care at home	0.513	0.501	0.000	1.000
Health center for youth	0.028	0.166	0.000	1.000
Maternity center	0.028	0.166	0.000	1.000
Pedagogic help	0.028	0.166	0.000	1.000

Table 9 Expected values of the residuals

Variable	Mean	Std. Dev.	Min	Max
Residuals hypothesis 1	1.01e-10	0.0919	-0.77468	0.573569
Residuals hypothesis 2	-8.40e-11	0.0919	-0.77468	0.573569
Residuals hypothesis 3	2.10e-09	0.9493	-2.42591	4.80745
Residuals hypothesis 4	-1.12e-10	0.2957	-1.54087	0.930019
Residuals hypothesis 5	4.34e-09	3.1120	-4.51939	30.3678
Residuals hypothesis 6	1.14e-10	1.1045	-5.08831	3.75054

Table 10c Linear regression results (standard errors included)

Variable name	Revenue	Current ratio	Quality indicators	Average board income	Complaints/FTE	Growth of equity
Revenue t_{-1}	0.941**					
	(0.022)					
Revenue		-0.111	0.433**	0.217**	-0.397	0.054
		(0.108)	(0.091)	(0.029)	(0.589)	(0.117)
Constant	0.485+	8.831**	-3.845**	7.155**	-9.827*	0.025
	(0.271)	(1.363)	(1.429)	(0.718)	(4.382)	(2.274)
R-squared	0.995	0.16	0.353	0.576	0.052	0.05
N	355	355	355	355	355	355

+ p<0.10, * p<0.05, ** p<0.01, standard errors in brackets

Table 6 Correlations[11] dependent and independent

Variable name[10]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Ln(revenue)	1															
2. Ln(equity)		1														
3. Ln(revenue t_{-1})	0.9975	-0.1928	1													
4. Ln(Current ratio)	-0.3779		-0.3771	1												
5. Quality	0.3498		0.3507		1											
6. Complaints/FTE						1										
7. Ln(machine invest)	0.4973		0.4967	-0.2777			1									
8. Ln(mean invest)	0.8874	-0.1874	0.8832	-0.3641	0.3325		0.4154	1								
9. Governance code									1							
10. Statutory changes										1						
11. Ln(Patient/overhead ratio)	0.3779		0.3769		0.3471			0.4696			1					
12. Ln(average board member income)	0.6664		0.6672	-0.2613	0.2536		0.2954	0.6287	0.205		0.3203	1				
13. Average outside positions	0.2062		0.2044					0.1887					1			
14. Ln(number of locations)	0.2586		0.258	-0.1983				0.2052						1		
15. Ln(number of board members)	0.4339		0.426		0.243		0.2535	0.3755			0.2827				1	
16. Ln(number of supervisory board members)	0.4955		0.5074	-0.2103			0.2711	0.4397				0.4052				1

[10] The variables are numbered; the numbers in the rows correspond to the numbers in the columns.
[11] Correlations significant a 5% threshold are displayed

Table 10a linear regression results (standard errors included)

Variable name	Revenue	Current ratio	Quality indicators	Average board income	Complaints/FTE	Growth of equity
Ln(machine invest)	0.000	-0.016*	-0.028**	-0.002	-0.055+	0.003
	(0.001)	(0.008)	(0.010)	(0.002)	(0.033)	(0.012)
Ln(mean invest)	0.028**	-0.084	-0.100+	0.025	0.083	-0.102
	(0.010)	(0.078)	(0.054)	(0.024)	(0.167)	(0.077)
Ln(Current)	0.000		0.112*	-0.003	-0.204	0.052
	(0.006)		(0.048)	(0.021)	(0.222)	(0.074)
Governance code	0.028	-0.796	0.487	0.836	-0.699	-0.547
	(0.041)	(0.531)	(0.665)	(0.629)	(1.229)	(0.652)
Statutory changes	-0.006	-0.031	-0.001	-0.076	-0.111	0.061
	(0.020)	(0.127)	(0.206)	(0.059)	(0.407)	(0.214)
Ln(Patient/overhead ratio)	-0.001	-0.027	0.058	0.038	0.086	0.003
	(0.007)	(0.038)	(0.048)	(0.024)	(0.127)	(0.070)
Ln(average board member income)	0.022	-0.019	-0.102		1.663	-0.054
	(0.040)	(0.151)	(0.133)		(1.044)	(0.227)
Average outside positions	0.004	0.044	-0.033	-0.030	-0.27	-0.186
	(0.011)	(0.102)	(0.113)	(0.035)	(0.379)	(0.147)
Ln(number of locations)	0.007	-0.115+	-0.290**	-0.018	-0.327+	0.008
	(0.005)	(0.068)	(0.066)	(0.018)	(0.194)	(0.082)
Ln(number of board members)	0.027	-0.055	0.141	-0.394**	1.558	-0.058
	(0.021)	(0.151)	(0.159)	(0.058)	(1.317)	(0.164)
Ln(number of supervisory board members)	-0.061*	-0.029	-0.274	0.025	-0.602	-0.447+
	(0.025)	(0.158)	(0.197)	(0.087)	(0.570)	(0.260)

Table 10b linear regression results (standard errors included)

Variable name	Revenue	Current ratio	Quality indicators	Average board income	Complaints/FTE	Growth of equity
University hospital	-0.031	0.414	-2.185	0.286	-2.554	0.062
	(0.039)	(0.510)	(1.377)	(0.386)	(2.527)	(0.920)
General hospital	-0.042*	0.318+	1.109**	0.075	0.308	0.32
	(0.017)	(0.169)	(0.286)	(0.063)	(0.733)	(0.273)
Rehabilitation center	0.037	0.698	-0.261	-0.019	-1.056*	-0.406
	(0.034)	(0.515)	(0.400)	(0.062)	(0.476)	(0.357)
Independent treatment center	0.017	0.043	-0.639+	-0.13	-1.018+	0.688*
	(0.023)	(0.188)	(0.381)	(0.190)	(0.616)	(0.278)
Centre for special procedures	0.022	-0.292	0.614	0.143	-1.039	0.192
	(0.017)	(0.309)	(0.647)	(0.098)	(0.779)	(0.270)
Trauma center	0.007	0.309	2.125**	-0.071	0.477	-0.396
	(0.028)	(0.486)	(0.661)	(0.100)	(2.409)	(0.742)
Mental health institution	0.034*	0.095	-0.049	0.076	0.78	0.356*
	(0.016)	(0.145)	(0.146)	(0.053)	(0.484)	(0.164)
Social- women shelter	-0.01	0.259+	-0.151	-0.006	2.170**	0.1
	(0.020)	(0.151)	(0.154)	(0.059)	(0.759)	(0.269)
Center for disabled	0.035*	-0.094	-0.212+	-0.067	-0.723*	0.082
	(0.014)	(0.109)	(0.110)	(0.047)	(0.324)	(0.204)
Educational institute providing care	-0.029	0.099	-0.376	0.374**	-0.497	-1.513**
	(0.021)	(0.395)	(0.308)	(0.114)	(0.850)	(0.520)
Youth health centre	0.042	0.511**	0.086	-0.002	1.117	0.473
	(0.035)	(0.184)	(0.440)	(0.072)	(1.091)	(0.369)
Maternity center	0.004	0.032	0.287	0.133	-1.568	-1.181*
	(0.032)	(0.178)	(0.531)	(0.091)	(0.960)	(0.475)
Pedagogic institution	-0.013	0.028	0.585+	-0.053	0.154	-0.107
	(0.019)	(0.162)	(0.324)	(0.081)	(0.587)	(0.538)

Figure 1 Distribution of the residuals