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Hierarchy systems of quality improvement programs at Canadian hospitals

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Abstract

The aim of this study is to investigate quality improvement programs at Canadian hospitals. Currently healthcare facilities are implementing a variety of programs but are still suffering from waste, inefficiency, and unmet healthcare expectations, such as long waiting time and patients receiving the wrong care. At the same time expenditures in Canadian healthcare have been growing for twelve consecutive years (2008). In order to find a solution the aim is to find an underlying theme, and a hierarchy of difficulty, between the different programs. The result findings and conclusion aim to serve as a management tool when choosing which program to implement at hospitals.

Data was collected from 110 Canadian hospitals through an online survey. The data was run against a latent trait model called the Rasch model, seeking a hierarchy of difficulty between the programs.

The findings showed that there is an underlying relationship between the investigated programs and that they can be arranged in a hierarchy. The hospitals showed of varying ability when it came to implementing the programs.

It has been concluded that the quality programs are applicable in the healthcare setting. Programs with a process focus; including the entire organization and demanding full involvement from management are harder to carry out for the hospitals. Many of the least difficult programs are better adapted after the healthcare setting, and also provide framework that enables the more difficult programs.

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Word list

SLA	System Level Scorecards
SCM	Supply Chain Management
SPC	Statistical Process Control
HOE	Healthcare Operational Effectiveness
CRM	Customer Relationship Management
GDP	Gross Domestic Product

1. Introduction

1.1 Background - Problems in healthcare

Currently, more and more healthcare facilities are implementing a variety of programs to improve the different dimensions of organizational performance; such as reducing costs, improving safety and improving clinical activities. The costs raised to such implementations are high but the loss of efficiency and waste are even higher. At the same time many Canadian hospitals are suffering from long patient queues, where waiting for an operation could be months of time. These two factors indicate that efficiency must be improved. (Olson, Belohlay, Cook, Hays, 2008)

The report aims to give directions in management questions, such as deciding which quality improvement programs to implement in healthcare facilities. Presently the number of healthcare facilities that are implementing a variety of programs to improve the different dimensions of organizational performance is increasing. Three aspects of performance could be mentioned; reducing costs, improving safety and improving clinical activities. The study aims to conclude if there is a hierarchy system in the adoption of improvement programs. The hierarchy theory builds on finding an underlying relationship between the variables, in this case the improvement programs. The overall aim is to examine if one improvement program is easier implemented if another program is first implemented. In that way a scale is aimed to be distinguished, sorting all of the examined programs in different levels after how difficult they are to implement and after the hospitals' capability to implement them. The hierarchy can be arranged after the Rasch model, please see the methodology section for further explanation. The process of choosing a quality program for a hospital should start with an evaluation; which programs are the hospital able to carry out? Based on the hospital's location on the scale it can further be decided which programs would be easier to implement successfully, based after that hospital's specific condition. For example choosing to implement a program high on the scale, without having launched lower programs, indicates that maybe another program should be implemented as a first step or instead of the firstly considered program. Or, it could indicate that extras measure and actions need to be taken, in order for the program to be successfully carried out. (Olson et al., 2008)

Quality management questions are important for decisions makers. Four elements have been distinguished that managers can focus on; the Leaders, the Organizations, Performance within the organization and Operating concerns. The four elements will be further explained in this report.

As mentioned, the study is interesting to hospital managers when choosing which quality programs to invest in. But the study is also interesting to other stakeholder since the Canadian healthcare is publically founded. Canada differs from many other countries in that their healthcare is publically founded, however this system is also found in Sweden. The costs are shared by the provincial and federal government and administrated by the provincial and territorial governments, while the healthcare is provided privately. (Olsen, 1994) Other stakeholders such as tax payers, care takers and political decision makers, would also gain from a more effective healthcare why the findings of this study is also an interesting issue for them.

1.6 Problematic:

1.6.1 Previous studies

The study made in Canada seems to be the first of its kind. A similar study was done in the US where hospitals in Minnesota was examined. (Olson, Belohlav, Cook & Hays, 2008). In the US study it is claimed that the costs of American healthcare reaches over \$2 trillion (2006), which is the largest per capita spending in the world. At the same time deaths caused by errors are estimated to between 44000 and 98000. (Olson et al., 2008 see Corrigan et al., 2000) This has lead to that policy makers started to question the US health system and the way it is designed. At Canadian hospitals, a range of different quality programs is being implemented with varying results. That is why the researcher asks why some programs succeed and some fail. (Olson et al., 2008)

1.6.2 Accessibility in Canadian healthcare

Generally, access to healthcare is an essential factor for caretakers. Access comprises the appropriateness of the received care, the scheduled time that the care is provided within and by the skills of the doctors. Specifically in Canada, with its health insurance system,

waiting time, and the unavailability of doctors and nurses, an i.e. health professionals are the biggest concern. The accessibility of the care is insufficient; in 2008 1.7 million Canadians searched for a doctor but was not able to find one and get the care they needed. (Canadian institute of health information (CIHI) 2008) Varying from the different regions a range between seven to thirteen percent claimed that their healthcare needs were unmet. (Leatherman & Sutherland, 2010). The mentioned figures refers to primary care. The waits for routine primary care is even higher, and range from about six to 28 percent of patients having to wait longer than three weeks.

Alavi (2008) discuss whether quality improvement programs are applicable in a healthcare setting. It has been found that quality improvement programs are lagging behind in service sectors compared to the manufacturing sector. This might be explained with the difficulty of implementing the programs in a service operational setting. (Alavi et al., 2008 see Lemak et al., 2000) However Alavi et al. (2008) found the opposite in their research about the applicability of quality improvement programs in hospital settings. They found that the hospitals are facing challenges that are environmental, strategical and operational. They found the outcome of the implemented programs to be successful in most organization and having beneficial effects on operational and strategic processes. (Alavi et al. 2008 see Yasin et al 2002)

1.6.3 Expenditure/costs

Total spending on healthcare have been calculated to 172 billions in 2008, which is an increase of 3.4% from the previous year, 2007. The trend has been rising the last 12 consecutive years. An increase compared to the GDP can also be seen and measured to 0.2%. These expenditures compared to Canada's total expenditures, their GDP, is one tenth of the total. (CIHI, 2008)

1.6.4 Canadian Health organizations

Alberta has the most complex structure with a centralized management into an authority called Alberta Health Services. The organization cooperates with the University of Calgary and the University of Alberta concerning issues of research studies.

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Ontario is the largest province and has created the Local Health Integrated Networks where the hospitals relay. Manitoba, New Foundland, Nova Scotia, British Columbia, Saskatchewan, and Northwest Territories have a centralized structure.

1.2 Aim

The aim of the research is to study the relationship between different quality improvement programs of healthcare facilities across Canada.

Currently, more and more healthcare facilities are implementing a variety of programs to improve the different dimensions of organizational performance such as reducing costs, improving safety and improving clinical activities. The objective of the thesis is to determine whether there is a hierarchy in the adoption of these programs and examine if there is an underlying relationship.

1.3 Question:

The main question that this thesis will try to answer is:

Do the quality programs share a common theme, an underlying relationship within the organization and by the program capability?

In order to answer the main question the following questions will be answered:

Can the quality programs be arranged in a hierarchy after how difficult they are to implement?

How difficult is each program, compared to other programs?

How capable is each hospital of implementing improvement programs?

What makes a program difficult to implement? / What do the more difficult programs have in common?

1.4 Scope

The data for the analysis is gathered from 110 respondents, 95 of them where sufficient and could be used. The searched underlying assumption will therefore apply for the hospitals in question.

1.7 Summary of introduction

In conclusion the healthcare in Canada is having problems with large expenditures and low quality in performance. Currently a wide range of programs is being used in order to improve quality and processes.

An efficient healthcare is important to many stakeholders. Healthcare in Canada is funded with tax money. This makes healthcare questions an interesting issue for tax-payers, care takers, hospital managers, politicians. A main goal is to have an efficient healthcare with high quality. Quality programs have been proven to deliver this. However some hospitals are not implementing the programs successfully. The aim of the study is therefore to find a hierarchy between the programs to distinguish, which program that, should be implemented. This hierarchy would help decisions makers. The main question for this thesis is therefore; can the quality programs be arranged in a hierarchy after how difficult they are to implement? The Rasch model will be used to answer this. Previous studies have shown that the programs can be arranged in this hierarchy.

2. Theory:

This chapter will explain the relevant theories of healthcare and quality programs. It will investigate the definition of quality for different stakeholders. Further, the managerial core values in hospital will be explained. This is followed by a section about performance drivers within the hospital setting. Lastly, the concept of different quality programs will be presented.

2.1 Definition of quality in healthcare for different stakeholders

Quality in hospitals has three dimensions, *structure*, *process* and *outcome*. Structure includes having the right resources to conduct a task. This implicates to deliver the care, facilities, physical resources, organization and standards policies. Process aspire the current performance of a task while outcome is a product or result. From the patient's point of view, quality can be defined as how well their expectations of and needs for the care are fulfilled. For the provider, the hospitals, it comprises clinical effectiveness as correctness of the diagnoses and the accuracy and efficacy of the treatment and the provided care. From a system perspective, quality means; cost effectiveness, resources management and efficiency of the service. At last, to society quality is referred to value of money and benefits to the community at large. (Harrigan, 2000)

2.2 Managerial core values in Hospitals

Core values within hospitals are fundamental within the Baldrige National Quality program. These core values represent believes and behaviours that are underlying the performance of an organization. Together they make the base in key business standards that lead to high performance. They core values can be divided into four elements, the leader, the organization, performance and operating concerns. The following sections will explain them further and discuss what they could mean to hospitals. (Belohlav & Cook, 2008)

2.2.1 Leaders

What effects can be traced from having leaders who set clear expectations for their employees, and who encourage their employees to contribute to the success of the

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organization? In some organizations, leaders inspire their employees, serve as role models and encourage employees to be innovative. It could be that they take decisions based on actual results and develop strategies with the customers or patients in focus. How does that effect the organization? (Belohlav & Cook, 2008)

2.2.2 The organization

Addressed issues are: does the organization provide employees with opportunities for personal learning through education and training and is it based on the needs and priorities of the organization? Are opportunities for personal development provided while also empowering the employees? They can also be differences when it comes to the sharing of knowledge throughout the organization. What distinguish an organization where employees get recognition beyond traditional compensation or where the pay is based upon an individual's knowledge and skills?

Some organizations aim to measure influences of the organization and weather they strive to improve their products or service. It also differs how complaints are resolved, for example by making things rights for the customer and the patient. It is weather an organization goes beyond meeting local state and federal laws and regulatory requirements. If they utilize measures that provide useful results and that aims to simplify work and processes.

One focus could be to reduce the time it takes to receive a product or service for a customer or patient. Furthermore, processes could be organized in cross-functional learning such as job rotations. Another focus could be on innovation and ways to improve the performances of the employees. To emphasizes market leadership is another aim that could be implemented. Finally, it is measured if participation in benchmarking programs that compare the practices and performances with other organizations. The organization focuses on managed levels of growth or weather it adapt a strong future orientation. (Belohlav & Cook, 2008)

2.2.3 Performance

Improved performance within the organization could improve the resulting products, services and operations. Good performance in hospitals could be managing patients and reducing waiting time, resulting in a higher quality on the provided service. Another focus of performance could be to reduce time in order to enhance quality and/or cost. Some organizations apply competitive comparison to improve their operations. This can be measured in a way that allows changes in the operations before adverse impact becomes visible. Moreover it could be balancing costs and revenues and allocating resources based upon changes in competition or technology. Performance implicates anticipating changes in the market and differentiating the products and services from competitors. It could also be defined as an issue of balancing the needs of stakeholders such as customers, patients, employees, suppliers, the public and the community. Some organizations develop external partnerships with customers, patients or suppliers. They try to improve existing measures to better meet organizational goals. It is also an issue of non-managerial workers being involved in regularly scheduled meetings to discuss work-related problems. (Belohlav & Cook, 2008)

2.2.4 Operating concerns

Operating concerns' developing awareness of technology and competitor offerings. It can differ in how well the operation adjusts to rapid changes and how flexible it is. It addresses issues of conservation of environmental resources and waste reduction and anticipating the adverse environmental and social impacts. Within some organizations, "best practices" can be incorporated while other have activities that focus on improving the organization as a whole.

Operating concerns includes whether an organization actively makes information available to the public, organizational ethics, public health, safety and the environment. In addition measuring key organizational processes or aligning resources for faster response to customers or patients are factors taken into consideration. Focus can also be put on developing a long-term commitment to, and eliminating adverse impacts on stakeholders, as is obtaining an ethical behaviour when dealing with stakeholders. Customer or patient satisfaction and retention are important as receiving service within

waiting time benchmarks. (Belohlav & Cook, 2008)

2.3 What improves performance in the hospital setting?

2.3.1 Assessing operational effectiveness

The healthcare industry has developed specific models for measuring performance that intend to evaluate certain aspects of the operational performance. They concern hospital bed allocations, predicting waiting time and managing schedules for surgery. The use of such models are not systematic integrated, they tend to stand for themselves. (Carlos et al. 2008 see Lohman et al 2004, see Testi et al 2007, see Cipriano et al. 2007 see Kim et al 2000, see Kim et al 2002.) There are different measuring platforms. One of them is training and development of employees, imposing responsibility and accountability of the employees as the key to improve performance. Furthermore, improvement can be driven by investment in operational efficiency and productivity of employees if integrated. An organization-wide perspective, focusing on strategy, motivates another platform. The measures should be designed to gage competitiveness of the organization. The focus of this platform is to create an effective flow and to deliver services throughout the organization something that requires the involvement of higher management. Monitoring of the healthcare operational effectiveness (HOE) approach is important to maintain the motivation and for the improvement opportunities. If the implementation would be inefficient it would encourage dysfunctional behaviour. (Almgren, 1999) The reasons for further success of HOE implementation, is dependent of the information at hand being sufficient or not. (Carlos et al., 2010)

2.3.2.1 Accreditation systems

Improving quality and safety within healthcare organizations is done through accreditation. Accreditation itself includes a severe evaluation of the self-assessment processes measured against a set of standards. A measurement is conducted through an onset survey, results presented in a report that could contain recommendations. After going through the process, hospitals can either be awarded or refused the accreditation status. In 2010 a study seeking to evaluate the accreditation process on introducing organizational changes that improve quality and safety of care was done presented in

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“Does accreditation stimulate change? A study of the impact of the accreditation process on Canadian healthcare organizations.” Through the using of multiple case studies, interviewing top managers, developing focus groups with staff directory and by analysing self-assessment reports, accreditation reports and case-related documents; it was found that the environment where the accreditation was conducted had an effect on the outcome. It was also found that accreditation was not itself necessarily an influential factor for change but instead for simplifying the inspiration, integration and a spirit of cooperation in health organizations, newly underlying a merger. Furthermore, it was found to help implementing continuous quality improvement programs to newly accredited organizations. It also helped to create leadership for improvement initiatives, by helping and providing the opportunity for the staff. Other positive outcomes were that it prompted the links between the stakeholders of the health organization such as customers, patients, employees, suppliers, the public and the community and the organization itself. On the contrary, it was also found that the motivation among the health organizations to implement accreditation programs decreased over time. (Pomey, 2010)

Healthcare organizations’ struggles can be defined as a paradox. The most conceal multiple goals concerns teaching students and carrying for patients. At the same time they also must allow doctors the freedom to exercise their clinical judgment while promoting standardization of practices. They must be innovative at the same time as they meet expectations. They must be coordinated with community players while acting autonomously. (Pomey, 2010)

It was found that the way accreditation is used depends on the context of where it takes place. For some hospitals the accreditation process means comparing their performance with other hospitals in relation to its geographical situation. Where it in other hospitals when implemented, meant an obligation for accreditation status. Further it can lead to importune financial support or as a management tool. (Pomey, 2010)

2.3.2.2 Accreditation in Quebec hospitals

The effects of the accreditation process as an organization and quality control tool were

Matilda Västernäs examined at two Quebec healthcare organizations. For that, an analytical model was used to measure the effects of the accreditation process on the exercised organizational control and the implemented quality management practices. It was found that the accreditation process had encouraged and improved the consultation process in self-assessment teams. The prime objective is the assessment of client satisfaction including the value that was conveyed in the organization. Furthermore, it was found that the employees who were not involved in the accreditation process did not perceive the effect. When only part of the staff is directly involved, the basis for accreditation and the result appears to remain constant, and only a bureaucratic instrument for control. (Paccioni, Sicotte & Champagne, 2007)

The impacts coming from the implementation of the accreditation process are that the employees developed a better understanding for the organization and its structure throughout the process. Employees also stated that they learned about the organization and its values. A better organizational climate between departments and professional groups was also developed. (Paccioni et al., 2007)

The effect of the accreditation process in organizations where decision-making power had become concentrated created bureaucratic instrumentation, where in some organization the merged effect was socialization within the directly involved teams. In some case the adoption of bureaucratic control was the resulting outcome. While in other cases the implementation of consultation mechanism in the concerned teams and reinforcement of participation from the different boards. It also simplified the optimal distribution of tasks among technical employees and the nursing staff. (Paccioni et al., 2007)

2.3.3 Technical innovations in healthcare

Unlike in many other sectors, technological innovation is not recognized as an important driver of performance in hospitals. The correlation for such relationship is dispersing. (Figueiredo & Eiriz, 2009) However, information and communication systems have for long been implemented at pharmacies and laboratories. The utilization rate has lately increased among hospitals which have had large implications on the organization. The

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2.4 Quality programs - concepts

The supply of quality improvement programs is many. The choices that are provided vary in its fundamentals. In the following section the concept of the programs implemented in Canadian hospitals will be explained.

2.4.1 Iso/TS certified

ISO/ TS certified is a system or framework for integrating and optimizing the effectiveness of quality in an organization set by the International Standard Organization. This program is a quality system providing guidelines of how tasks should be performed. This means standardization within an industry. A technical committee carries out the standard development. Quality assurance is a central focus when trying to provide an output that meets the requests of the end user, in this case the care taker. Quality control comprise observing, reduces variation, elimination of errors and aiming to obtain economical effectiveness.

The program demands involvement from management and it involves the entire organization and entire processes from planning activities and aligning resources. The success of the program depends on communication within processes, recordkeeping and the awareness of employees. If managed correctly it could lead to lean processes and an organization sensitive to customer needs. (Johnson, 1996)

2.4.2 Six sigma

Six sigma is a process focused quality program, where the processes are constantly measured and evaluated on how they are performed. To maintain good quality the aim is to eliminate defects and decrease variations. Defects are defined as anything outside the specifications of the customer. The variation is allowed to six standard deviations

Matilda Västernäs compared to the mean, which have given the program its name. *Six sigma* can either be used for existing processes or to develop new processes. Success for this quality program demands an active management and an established organizational infrastructure. The key roles of the infrastructure are; drive, focus, commitment, involvement, competency, progression, contribution and facilitation. Depending on its complexity the *Six sigma* implementation has different levels, named Green belt, black belt, master black belt/mentors and Champion. The project needs to be continuous, focusing on bottom line opportunities and results. The teams involved need to be trained in structured approaches and methodology in order for the program to be successful. (Truscott, 2003)

2.4.4 Cross-functional teams

Diversified functional units, consisting of employees from different departments with different functional experiences and knowledge or different personalities. The group work together towards a common goal. Its crucial that al functions work toward the goal of valuing both customers and the suppliers. It is often expected that Cross-functional teams will reduce lead-time, have more knowledge distribute learning within the organization. (Denison, 1996) Group collaboration is essential to gain the advantages of flexibility, control and effectiveness. (Cheverton, 1959)

2.4.5 Balanced scorecards

Balanced scorecards gives accountability for performance throughout the company in healthcare settings. This comes from the following facts; Balance scorecards aligns the organization strategy to be more market oriented and customer focused. In implementing plans or projects it assesses, monitors and facilitate the process. Further more it gives directions and guidelines to management where to adjust feedback and gives ide of where to adjust toward the market.

The origin of balanced scorecards comes from the findings that financial measures were insufficient indicators for successful management. In changing market environments, rising demand for customer focus combined with the erg to benefit from intellectual

capital and knowledge-based assets was insufficient. This led to the development of Balanced scorecards, to control and manage 1990.

The scorecard is developed by translating an organization's strategy and mission into performance applicable measures and initiatives around four perspectives. These frameworks are the following; financial, customer, internal processes and learning and growth. An important factor is that the scorecards balance the wanted outcomes of the organization, specifically in a financial and customer perspective. Meanwhile, the drivers for the mentioned outcome are internal processes, learning and growth. (Inamadar, Kaplan & Reynolds, 2002)

System wide and hospitals-specific performance measurement tools comparisons showed that balance scorecards help managers to manage their healthcare system by linking organizational strategies with performance data. (Yap, Siu, Baker & Brown, 2005)

The System level scorecard is a framework, developed from the original balanced scorecard, which includes four dimensions. These are management innovation such as learning and growth, system integration, patient satisfaction and clinical utilization and outcomes including internal processes. Further, it was found that the majority of the participating hospitals were using the framework but also that all of them required data collection and analysis beyond the SLS framework. Based on the results findings, the authors suggest that SLS may help hospitals in developing balance scorecards specific for their institutions and by that meet the needs of a variety of hospitals. The SLS specially conducted for hospitals was first used and found successful in 1997, however, they were adapted to the reality of the different hospitals in order to have a more efficient system and service.

2.4.6 Employee recognition programs

Employee recognition can be performed in a range of different ways. Independent of the initiative coming from higher management positions, from employees or from a team leader, it has proven to be successful. The quality program comprises employees being

Matilda Västernäs recognized for achievement and getting acknowledge for their work. Furthermore, the incentives are to stimulate employees to professional growth, and make development visible. It has been shown that this have impact on the commitment level and satisfaction of the employees. An *Employee recognition program* is most effective when it takes place on a regular basis and in different forms. Recognition can comprise informal recognition, formal recognition, department or company honours and awards. A recognition can be anything from posting a thank you note on an employees door, to give special assignments to people who show initiatives. Further, is can involve swapping work tasks with another employee or including staff in an important meeting. To give special recognition to employees at meetings where higher management are presents. (Armstrong, 2007)

2.4.8 Pay bonus plans

Pay bonus plans concerns to improve processes and quality by giving employees incentive. This program tries to make people collaborate because they want to, and not because they have to in order to improve performance. The aim is to create necessary conditions within the company to stimulate the staff. The organizations can use reward systems to compensate the individuals in order to accomplish this. In order for a program to be successful it is necessary to define exactly what the staff should do to contribute to the success of the company. Also a clear line between what is desired and what needs to be done to achieve these tasks is relevant for the success of the program. Furthermore, the goals needs to be achievable and within the control of the employee. The reinforcement need to be provided as close after the achievement is performed as possible. The goal also needs to be perceived as meaningful from an employee's point of view. Different kinds of bonus pay plans can be profit sharing plan, management bonus plans, sales incentives plans, team incentives plans.

Another aspect, besides giving incentives to employees, is to shift fixed costs to variables costs. When employees are performing well, larger gains will be matched with larger costs in bonus pay plans to the employees and reverse. (Wilson, 1995)

2.4.7 Employees' suggestion system

Employees' suggestion system builds on how to use employees' creativity effectively for the benefit of the company. Employees are encouraged to share their ideas for improvement and change. The general idea being that improved processes reduce waste, and increase customer value based on ideas from the employees. Many times these ideas are simple, easy to apply, and at relatively low-cost. Combined these features can improve entire processes.

The advantage is the employees' ability to see problems and solutions, that higher management can't see since they are dealing with customers everyday. Regardless of financial and operational goals that managers set up, some improvements can only be detected by the people working at the workplace. In the long run small ideas can lead to high efficiency and reduce waste. Furthermore, small ideas are often easier to implement, creates less resistance within the organization and can in the long run be developed into large ideas. (Wilson, 2003)

2.4.9 Customer relationship management

The concept of *Customer relationship management* depends on at which level it is performed. It can either be functional, customer facing or companywide. The general concept is to build a single view of the customer throughout all channels within the company, one of its goals being to manage the different stages of the relationship with the customers proactively and systematically. In that way it becomes possible to coordinate information. (Reinartz, Krafft & Wayne, 2004)

Customer relationship management applied to the hospital setting has an important role in all customer interactions through; call centres, physicians offices, billing department. Data mining is used to determine preferences, usage patterns, needs of the patient and to improve their satisfaction. The technology can be used to foresee which health services that a patient could be in need of, or which medication is needed judging by the previous care.

Furthermore, data mining can be used to examine expectations of waiting time, give ideas of how to improve services, and to gain knowledge of customer preferences. It is further suggested that it can foster disease education and precaution health services. (Koh & Tan see Hallick).

2.4.11 Lean organization

The *Lean organization program's* goal is to reach optimal efficiency, speed and quality. (Holweg, 2007) The basic idea is to remove non-value adding steps and in that way reduce waste in the processes. Waste in healthcare is considered to be when a member of the staff has to walk to another end of a ward to pick up notes, or when the equipment is stored centrally instead of where it is being used. Inventory wise, waste means keeping excess stock, and having patients waiting for care. Waiting regards patients, staff, results, prescriptions and medicine, and discharging of patients. Overproduction in a healthcare setting is duplication of information, in retrieving information from patients about their health. Corrections of default in the healthcare setting are among other the need to repeat test takings because of not being able to distract the correct information. Furthermore, it is the need to recapture drugs because of reverse reactions our failing discharges. (Robinson, Radnor, Burgess & Worthington, 2012 see NHSI 2007)

2.4.12 Supply chain management

The Supply chain is the different steps of the process that services and goods flow from the first supplier to the end consumer. A broadening of the concept is also taking reverse logistics into consideration, which is the flow of goods in the opposite direction. Supply chain management is the relationship and structure between different parties in the production.

Supply chain management is the integration of the key business processes from the end user through original suppliers of products, services, and information that add value for customers and other stake holders (Lamert et al., 1998). It is further claimed that SCM can be beneficial in reducing cost, boosting revenues, increased customer satisfaction, improvement in delivery and products or service quality. The author explains this by enhanced information sharing and interaction between firms. Resulting factors are

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decreased lead times and reduced inventory levels which leads to reduced over all costs. Consequently, since the market is easier observed, customer needs and demands are easier distinguished attained and satisfied. (Tuncdan, Erhan, Meliked, Kaplan, Oznuryrt & Kapla)

2.4.13 Voice of the customer

Information from the customer is used as an input in stages for how to design the product or service. It can be divided into the following two dimensions: product/service design and manufacturing process design. This information is used throughout the entire chain, affecting the systems, down to component level. The aim is to learn the key customer value factors and use this to produce what is asked for from the beginning, believing that a good product development process can be established through considering what the customer wants. The information is used for decision making, as a support on a managerial level. It is further claimed that only through the *Voice of the customer* can information on the customer value of a product or service be traced. In order for this program to be carried out successfully it is important to collect a sufficient amount of data. This also able benchmarking parameters to competitors. The needed data can be collected through interviews, surveys, focus groups, ethnographical studies etc. (Yang, 2008)

2.4.14 Benchmarking

Benchmarking is, as many improvement programs, driven by the fact of an organization finding themselves in a current state and aiming for a more desirable state of affairs. Benchmarking itself contributes to the transition process that leads to development, i.e. improvement. In other words benchmarking contributes to organizational success. The principal process is organizational adaption, and by something being better performed elsewhere.

In corporations this comprises searching for an industry's best practices that can lead to superior performance. Benchmarking can be internal (with in the company or sector) or competitive (between companies). Generic benchmarking is when business practices are compared to other organizations who have admitted superiority. The practices that

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an organization wishes to benchmark could concern just-in-time production management or zero-waste environmental practices. Likewise, it could also concern dispositional factors such as quality, timeline, knowledge analysis, success (financial results) or leadership.

Improving organizational welfare: survival of organizations is a purposeful pursuit that preserve or enhances welfare for its stakeholders.

(Moriarty, 2011)

2.4.15 Statistical process control

Statistical process control is a program about competitiveness, not only about quality but also delivery and price. The program is process focused measuring the performance of the processes, by defining and reviewing them. The main goal is to reduce variation. Not only the outcome but also how well the service or product is designed to fulfil its purpose. Feedback on the performance is required for corrective response. When this is attained, the process is within control and capable of meeting the required needs according to the theory. The effect of the program is improved consistency of quality, decreased rework, waste and low value related costs.

In order for the program to be successful, top management need to understand variation and the importance of the Statistical quality control- technique. The involved people must understand what they are supposed to do and why it is important. Thirdly, written instructions of the procedure need to be available. (Oakland, 2003)

2.4.16 Safer healthcare campaign

The Canadian patient safety institute has created the *Safer healthcare campaign* in order to reduce adverse events and deaths in Canadian healthcare. Its being carried out by implementing evidence based interventions in patient care.

They found that improvement programs, if the appropriate one is used, lead to reduced mortality in many organizations, but many hospitals have problems implementing the different strategies. Therefore they developed tools and resources to assist healthcare

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(Canadian Patient Safety Institute 2011)

2.4.3 Award programs

A quality award program encourage total quality management and performance through honouring and encouragement. The award can take many forms. It can be internal (within the company) or external (between companies). For the internal quality award only units within a company can apply while an external is between organizations. There is also national quality awards programs.

Independent of the extent of the program the organization or the unit within the organization is measured or evaluated against, different parameters or criteria conducted by the award initiator. Theses parameters can be in a specific skill or more crosscutting organizational. (Eriksson, 2003) *Team quality award* is an award program conducted for managers within healthcare. The aim is to recognize managers within Healthcare information management who have carried out sustainable, recognizable and transferable quality improvements within their organizations. The program started 2009 by Canadian Health information management association. 2011 was decided to be the last year, to continue in other forms. Each of the three year that the award was given submissions where graded by a jury based on a list of criteria. (Canada Health Information Management Association)

2.5 Hierarchy theory of quality programs at hospitals.

In 1996, a theory was presented describing the development in manufacturing companies as a cumulative process called The Competitive Progression Theory by Ferdows and DeMeyer. A relationship was found where lower stages made upper stages in quality improvement processes possible. In 2000 it was found that it could also be accredited to hospitals. "Their study found that hospitals operating priorities include

quality, cost, flexibility and delivering. In particular they found that interrelationships among these four areas, which implies that the concept of a cumulative capability development process may be relevant to the healthcare setting.” (Olson et al., 2008 p. 1789)

The higher levels provide a crosscutting framework with multiple functions, sometimes integrating the whole organization considering a larger scale initiative. Meanwhile the lower levels consist of total quality programs, supporting work processes and services. It has been identified that once a hospital is able to implement a higher level of quality improvement program the lower level programs gets more effective because the most beneficial parts of the organization can be traced. (Olson et al., 2008)

The number of implemented programs that is used correlates with the quality of the hospitals performance. (Corbet and Whybark 2001 see Olson et al. 2008)

Improvements programs adopted by hospitals are hierarchical in nature. It is easier to implement a high level program when an easier program is already installed in the organization. This knowledge can be used by the hospitals for successful implementation of quality improvement programs. (Olson et al. 2008)

In the study “Examining Quality Improvement Programs: The case of Minnesota Hospitals by John R. Olson, James A. Belohlay, Lori S. Cook, and Julie M. Hays”, it was found that the order of which improvement programs is consistent with the stages presented in the Competitive Progression Theory. According to their report it was more commonly found with implication of the lower level programs then the higher ones, explained by the complexity of the higher-level difficulty.

2.6 Summary

Its been discussed that quality in healthcare is different for different stakeholder and it has tree dimensions, structure, process and outcome. When measuring performance at hospitals its been looked at bed allocation, predicting waiting time and managing schedules for surgery. Accreditation is one way to improve the performance. If meeting

specified requirements a hospital can be accredited. Information technology has lately increased at hospitals, and there is a large potential to improve the continuity in healthcare.

There is a range of different programs that can be implemented at hospitals. Some of them have a focus on giving incentives to the employees, some focus on reducing waste and improve processes. While some focuses on how to perform different task. The following programs have been explained; ISO/TS Certified, Six Sigma, Cross functional teams, Balanced scorecards, Employee recognition programs, Pay bonus plans, Employee suggestion system, Customer relationship management, Lean organization, Supply chain management, Voice of the customer, Benchmarking, Statistical process control, Safer healthcare campaign and award programs.

Lastly the hierarchy theory at hospitals was explained. There is a relationship found at organizations, where lower stage programs made upper stages programs possible to carry out. It's been found that the higher ranked programs have certain features and that the lower stages program has common features. The number of implemented programs correlates with the overall quality at the hospital. The hierarchy theory also comply that the lower stage programs enable the higher stage programs.

3. Methodology

The author of this report is a student of the University of Gothenburg. This report is a bachelor thesis as a part of the authors bachelor's degree. When referring to us, our or we, the project group conducting the initial research is considered.

3.1 Secondary data

The data collection has been made during the authors exchange semester at HEC Montreal, University of Montreal together with a research team at the department of Operations management. Contact details to the Canadian hospitals was initially collected from Scottsinfo, a database of Canadian business contact information. The data was found to be insufficient due to the voluntary basis of the hospitals participation. After evaluating the data and the information in the database, new approaches were applied. The library of HEC Montreal was searched which later incurred us to contact the Canadian Health Association. A new database was provided, containing information from different facilities, regional authorities, administrative offices and others. The database is from 2009-2010 and was the most complete proxy that provided required information. However this database lacked the source of information required for the project which lead to that the list had to be complemented by research. Firstly it was considered to contact each hospital manually and collect the missing information that was missing. Samples where taken from the different provinces by telephone contact to understand the viability of responses. It was found that the organization and autonomy of the province varies.

Due to the different systems in the different regions in Canada, the hospitals have been approached province by province. After clarifying which different procedures that had to be obtained in the different regions the hospitals or the governing organization where approached by phone calls.

Quebec has the most autonomous structure of the health organization compared to the other provinces of Canada, even though an authorization of regional authorities or Ethics Boards is required. Most of the other provinces depend on regional health

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authorities and their autonomy for this kind of research is very limited. Therefore it was decided to go through the regional authorities when contacting the different hospitals.

3.2 Primary data

An online survey has been used for collecting the data. The survey consists of four different elements. “Our leaders”, “My organization”, “Performance in my organization focuses on” and Operating Concerns in my organization emphasize”. The questionnaire takes 20- 30 minutes to complete. The objective is to collect information from at least 200 healthcare facilities across Canada. The format of the questions is a likers scale, with 5 levels.

Manitoba, New Foundland, New Scotia, British Columbia, Saskatchewan, and Northern Territories have as mentioned a centralized structure. Therefore contact was first made with the individual hospitals, but later by region. The Northern Territories was excluded from the sample due to the fact that there is an economic cost for applying for an authorization for their participation.

3.3 Participants

The survey is conducted anonymously and answers have been requested from the following positions at the hospitals. The managers of Finance, Quality, Human Resources, Operations, Research and Information Office.

The data was collected from 110 hospitals. The respondent range over the different regions as follows:

Alberta	4%
British Columbia	1%
Manitoba	5%
Newfoundland and Labrador	4%
Northwest Territories	0%
Nova Scotia	1%
Nunavut	0%

Ontario	5%
Prince Edward Island	0%
Québec	62%
Saskatchewan	2%
Yukon	0%
Missing	17%

3.4 Ethic approval

An approval has been admitted from the “Comité d'éthique de la recherche” at HEC Montreal, University of Montreal. This approval reassures that the project has been evaluated and meets the standards and norms of the HEC Montreal. Secondly approval had to be attained from the different hospitals in the different provinces. The hospitals have been managed by region manually. The process of attaining an authorization from the regional authority consists of filling out forms that should be evaluated by the Ethics Board of the institution in question.

The basic information requires the related nature, benefit, and impact on the community of the study to get the authorization. Furthermore information concerning additional costs and implications for the participant organizations is requested.

3.5 Analysing the data

3.5.1 What model was used for the analysis?

The data was run against a latent trait model called the Rasch model. This model builds on finding an underlying relationship coming from a hidden trait. It was aimed to find the trait of the program capability and hospital capability. This trait will distinguish the programs into a hierarchy of scores. The score is a measure of the difficulty for a hospital in implementing the program. The measure is in logits, which means that a program that is one logit higher compared to a certain hospital is twice as difficult to implement successfully than a program at the hospitals level. Further, a program two

steps higher is three times more difficult, while a hospital three steps higher is four times more difficult.

Winstep was used to find if the collected data had a fit to the Rasch model through the following steps:

1. Validity of the Rasch model

The data was run in two steps to check for validity and reliability towards the Rasch model. Firstly the model as a whole was tested and, secondly, each program's fit was tested toward the model. Programs which did not meet the criteria was excluded from further analysis. In the first step correlations that are negative, zero and close to zero was excluded.

Secondly, looking at infit and outfit scores investigated each variable's contribution to the overall model. Outfit scores is sensitive to outliers. When looking at outfit scores a measure that is far from the previous responses can be traced. Controversy infit scores are sensitive to inliers. Sensitivity to responses that might be targeted a specific to items or person. Scores between 0,5-1,5 is accepted. Z-scores, a measure of standard variation of how the sample varies in relation to the mean, are also taken into consideration for the second stage of the analysis. Z-scores higher than two standard deviations, were taken out of the test to allow a 95% confidence interval. The confidence interval or significance level was set for each test. It gave us a level of which measures we can accept.

Finally, to eliminate that there is a competing model besides the Rasch model further analysis was needed. Consistent with the Linacre's theory the explained variance needs to be over 60% and the second best explanation can not have an explanation stronger than 5%. (Olson 2008)

2. Reliability of the model:

Further, the reliability of the model needs to be examined indicating if this results findings would be found twice. According to the Rasch modelling theory a score of 0.6-

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0.7 of Person reliability coefficient is needed. This score can also be translated into KR, Kuder-Ricardson Formula 20 which is a more commonly used format of reliability.

4.Results:

It was found that there is a latent trait underlying the data that gives it a relationship. It shows in *Table 1* that the variance is explained by 63,7% by the Rasch model. The second best explanation is explained by 4.8% by the variance, which makes the model valid.

Table 1. Model explanation –Pearson reliability

Model	Person reliability
Rasch model explained	63,7%
Second model explained	4.8%

A high significance among the collected data was found for the Rasch model, a score of 0.67 why a hierarchy can be arranged for the program (See Figure 1). All data passed for validity and reliability (see *Appendix 2* for full table). One variable was excluded for having a score over 1,5 in the infit and outfit analysis and a z-score over 2. Another parameter was not achieved by any of the hospital why it was also removed from the model; these where *Customer Relationship Management* and *Supplier or other external quality*.

The data gave a reliability of 0.94 in programs and 0.63 in hospitals. If expressed in KR, (Kuder-Ricardson Formula 20) these figures corresponds to 0.75, which is quite low but considered sufficient why they where accepted in our analysis.

Further we can see in table 2 that the easiest program to implement is *Employee recognition program* (-3.51). The next easiest program is *Benchmarking* (-1.6). Followed by *Safer healthcare now* (-0.74) and *Cross-functional teams* (-0.61). It was found that *Team quality award* (- 0.26) is even higher. Further *Employee suggestion system* (-0.12). Of the collected data it is further concluded that *Internal quality award program* (0.2) ranks higher than the already mentioned programs, followed by *Statistical process control* (0.46) that is more difficult to carry out. Higher in the rank *Voice of the customer* (0.55) and *Lean organization* (0.55) is found. These are followed by *Balanced score cards* 0.65, *Pay Bonus plans* 0.98. *Supply chain management* (1.10), *ISO/ TS Certified* (1.10).

Lastly the most difficult program to carry out among the examined programs according to the collected data was *Six sigma* (1.23). The relationship between the programs is also seen in *Figure 1*.

Tabel 2. Quality programs measures

Healthcare Improvement Programs	Item Difficulty (in logits)	Standard Error (SE)
Six Sigma	1.23	0.37
ISO/TS certified	1.10	0.36
Supply Chain Management	1.10	0.36
Pay Bonus Plans	0.98	0.34
Balanced Scorecard	0.65	0.32
Lean Organization	0.55	0.31
Voice of the Customer	0.55	0.31
Statistical Process Control (SPC)	0.46	0.30
Internal Quality Award Program	0.2	0.29
Employee Suggestion system	-0.12	0.27
Team Quality Award	-0.26	0.27
Cross-functional Teams	-0.61	0.26
Safer Healthcare Campaign	-0,74	0.25
Benchmarking	-1.6	0.25
Employee Recognition Programs	-3.51	0.31
Excluded Healthcare Improvement Programs	Item Difficulty (in logits)	Standard Error (SE)
Customer Relationship	0.42	0.30
Supplier or other external quality	5.13	1.84

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difficulty gets two times more difficult. When increasing two numbers, the difficulty increases three times and so on. Each X represent an individual hospitals. It's positions shows the hospital's capability to carry out the program. Hospitals that have a high ranking have a greater ability to implement improvement programs than the ones that are lower ranked.

Summary of the results:

Finally it is shown that there is a latent trait underlying the relationship between the quality programs in the healthcare setting. The hierarchy range from *Six sigma* which is the most difficult of the examined programs to *Employee recognition program* which is the easiest program. It was also shown that the hospitals capability vary. A few are able to implement more difficult programs, and many hospitals are able to implement a number of programs.

5. Discussion

The fact that a few hospitals did not even reach the level of the first improvement programs could indicate that the quality programs are not applicable to hospitals. Furthermore, only a few hospitals are represented in the top of the chart, thus being able to carry out the more difficult programs. (see figure 1) As discussed earlier in the theory part, the usage of quality programs has been lagging behind, which means that hospitals, and other industries in the service sector have been facing problem in implementing quality programs. (Alavi et al. 2008 in Lemak et al. 2000) This could be an indication of that the applicability of quality programs for hospitals is bad. Some authors are even discussing the applicability of quality programs in service sectors such as healthcare. However the report findings show that a majority of the hospitals can carry out many of the programs while some are too difficult. This lead to an opposite conclusion: that quality programs are applicable in the hospital setting. The findings and the conclusion of this report correspond well with an earlier study of the Minnesota hospitals. (Olson, 2008) Having this concluded, further analysis can be made.

5.1 How difficult is each program, compared to other programs? What makes a program difficult to implement i.e. what do the different programs have in common?

As an answer to the research question, the research findings show that there is a varying difficulty between the different programs in their adoption at the hospitals.

Higher ranked programs

The most difficult programs are *Six sigma* followed by *Supply Chain Management* and *ISO certified*. Looking at *Six sigma* and *Supply chain management* together with *Statistical process control*, another program ranked high in the hierarchy, common features can be seen. One example is the fact that the program engages the entire organization, or at least larger parts. *Six sigma* and *Statistical process control* demand the ability to constantly measure the outcome of each step in the process. They rely on having an organizational infrastructure within the company. Further, the programs demands full commitment from the management. *Supply chain management* looks at the production flow (Tuncdan et al., 2007), also *Six Sigma* and *Statistical process control* focus on the processes (Truscott, 2003)(Oakland J. 2003). In conclusion, all of the high ranked

programs have a process focus where they want to eliminate waste and instead add value.

Another common factor for both *Statistical Process Control* and *Six sigma* is the aim to reduce the variation and instead create identical products or services. The processes and outcomes are constantly being measured to enable this and control the variation. (Truscott, 2003)(Oakland, 2003). This seems hard to apply on services such as health care; due to the diversification of the service i.e. coming from different needs of different patients. Seen in the literature it is also described as a paradox; doctors must be allowed the freedom of clinical judgement and the implementation of standardization of practices. (Pomey, 2010). This gives reason to conclude that standardization is hard to implement in healthcare, and this becomes a problem when implementing a quality program with this goal. Further, quality programs (who demand constant following up) must also be difficult to apply to healthcare service since it might be hard to measure and collect the data. The variation would be in the quality and this is as discussed in the theory chapter, different for different stakeholders. (Harrigans, 2000) For the patient as a stakeholder, one outcome might be the right one while another outcome might be the right one for the employees/health service providers. The combination of the two mentioned factors could be the explanation for the high difficulty of these programs found in this study.

As discussed in the theory chapter about accessing operational effectiveness, improvement can be driven by investing in operational efficiency. For effective flow in processes it is important with sufficient information and it require involvement from higher management. (Carlos et al., 2010) These requirements are also found in *Six sigma*, *Statistical process control* and *Supply chain management*, all three programs found high in the hierarchy. That the programs require a lot of information might be one reason to why they are hard to achieve for hospitals due to the diversification of the services.

(Figueiredo, 2009) claims that informational technology is not recognized as an important driver for performance in healthcare. However many of the higher ranked program demands a constant flow of collected data. Taken both these facts into

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consideration, it would seem like information technology would be a drive for performance, that it would share an underlying relationship and enable the highest ranked programs. However, due to the fact that information technology integrates the different clinical tasks, which makes it possible to following patients, it should probably play an essential role for many programs. A reason for the Figueiredo findings might be that the programs demanding a large amount of information are the hardest ones, and most often hardest to implement. An explanation might be that many hospitals have not managed to implement the information technology-demanding programs, which has lead to that information technology has proven not to be sufficient. Our findings is therefore more inline with the findings of Paré & Sicotte (2007) who found that the information technology enable the integration of clinical tasks.

Lower ranked programs

Looking at the programs that are in the lower part of the hierarchy, *Employee recognition* is the easiest. The extent of *Employee recognition* can vary from within a work team or within the entire organization. An important factor in the analysis is that this program does not have to involve higher management, which is a factor seen in the programs with a high difficulty. By recognizing employees for good efforts and results, incentives are created to work hard and contribute to performance and improvement. (Armstrong, 2007) It seems like this can be easily adopted to the healthcare setting. *Employee recognition* is the easiest, and does not demand the involvement of the entire organization, but can be implemented in smaller work groups independently of other parts of the organization. It seems like this makes the program more easy to monitor, and measure. Further, more intangible factors can be measured. Such as employees individual contribution to the group; to the teamwork and to the cohesion of the group. *Benchmarking*, as explained in the theoretical section is considering comparison with other healthcare facilities. (Moriarty, 2011). *Safer healthcare* is specifically developed for healthcare facilities. (Canadian Patient Safety institute 2011) To conclude, the lower level programs are well adapted to, or created specifically for healthcare.

Middle ranked programs

The midsection, containing *Safer healthcare campaign*, *Cross functional work teams*, *Employee suggestion*, *Team quality award*, of the hierarchy is also adjustable for hospitals.

According to the Rasch model the lower programs are the higher ranked programs. If a hospital already has a lower ranked program implemented it is easier to implement a higher program after. Can the theory of each individual program explain the underlying relationship?

The *Employee recognition program*, (Armstrong, 2007) gives incentives for the employees to perform better. This mind-set or motivation would presumably make the employees engage more in their work, which would likely also make them more committed to their work, and presumably see more things that could be improved, which is a goal in Employee suggestion program. (Wilson, 2003)

Benchmarking similar to accreditation (Pompey, 2010) is, as mentioned in the theoretical framework, not always a factor for change but instead works as simplifying, inspirational and integrational in healthcare, and prompts the relationship between the different stakeholders (Pompey, 2010) This can be interpreted as creating structure and infrastructure within the company something that is necessary for the success of *Six sigma*. (Truscott, 2003) Therefore, it could be assumed that the lower program makes the implementation of higher ranked programs easier which could explain the underlying theme and hierarchy.

Further impacts from accreditation, again, similar to *benchmarking* is that employees develop better understanding for the organization. (Paccioni et al., 2007). It is reasonable to assume that better understanding of the organization should lead to more valuable suggestions from the employees for actual improvement, which is the aim in the *Employee suggestion program*. That is, there is an underlying theme here, since benchmarking is lower in the hierarchy than the *Employee suggestion program*.

5.2 How capable is each hospital in implementing improvement programs?

The hospital's ability to implement the different programs successfully varies. Due to the anonymity of the survey it is not possible to distinguish the ability of a specific hospital. But by considering the programs that are implemented and the outcomes at a hospital it should be possible to get an idea of a hospital's ability.

This conclusion makes one wonder whether quality programs are applicable in a healthcare setting. Looking at our results the applicability for quality program at hospitals or at least our sample can be concluded. Since many hospitals are able to carry out the programs, it is something that management should invest in. However drawing this conclusion I have not taken any consideration to the cost of the program, a fact I think should be considered before one could answer this question. Maybe more effort should be put into developing and adjusting the programs in order to make them successful. One way would be to study the environment characteristics at hospitals where the programs are carried out successfully.

So we have now concluded that the programs are of varying difficulty for the hospitals. An interesting aspect, is what makes the programs difficult to apply, which will be discussed in the next section.

5.3 Can the quality programs be arranged in a hierarchy after how difficult they are to implement?

The study's finding is the same as in the study of the Minnesota hospital's. Where the researchers found the results to be profound and the Rasch model to be valid. It is however interesting to compare the studies to each other. As in the results of this report, *Employee recognition program* and *Benchmarking* is the easiest accomplished programs. In both studies it is the same programs that are found in the higher parts of the hierarchy but they vary in their position. While *Six sigma* is the most difficult program among our examined programs the Minnesota study conclude *Statistical process control* to be the most difficult, when only considering the programs that were examined in both studies. In the Minnesota study however both *Voice of the customer* and *Six sigma* is just beyond (slightly less difficult) in the hierarchy. When looking at the easiest

Matilda Västernäs programs, *the Employee recognition* and *Benchmarking* is found in the lower part of the map in both studies. (See Appendix 1 for the full map of the Minnesota study) So when comparing the two studies, it becomes clear that there is a large resemblance that the exact position could vary. This is a fact that should be considered when using the reports finding in other countries.

5.4 Do the quality programs share a common theme, an underlying assumption within the organization and by the program capability?

By answering the sub questions we have now concluded that the quality programs vary in difficulty, and that there are some common features that make the programs easy or difficult for a hospital to carry out. They can be arranged in a hierarchy after their difficulty. The success of a program also depends on the capability of the individual hospital. The researched hospitals all differ in how capable they are to implement quality programs. A few features makes the implementation difficult, and a few make them easy. Considering this, the main question can finally be answered.

The theoretical framework, presented earlier in this report, concludes that the quality programs share a common theme. Similar studies within the manufacturing sector and the hospital setting have indicated this result. (Olson, 2008). The findings of this report support the findings of the Minnesota study; the programs share a common theme.

Looking at our study only two programs, *Customer Relationship Management* and *Supplier or other external quality* did not share this theme. The variance explanation of the model data (63,7%) could be higher, but is still sufficient to make the model valid.

The reason for the variance explanation being quite low, might be due to the size of the sample data (95 valid results). In addition, a competitive model is only explained by less than five percent. To conclude, the findings of previous studies, combined with the results of, this report gives reason to believe that the quality programs within the model share a common theme, and an underlying assumption.

Customer Relationship Management and *Supplier or other external quality* were excluded from the model, since the relation between the programs and the model was not strong enough, and since they did not make a significant contribution to the model. This is a

Matilda Västernäs quite interesting aspect due to the similarities that these programs have with other programs within the model. For example, one of the waste within healthcare is the situations where a patient does not get the care they need or that they get to meet different doctors, within different fields before receiving the right care, (CHICI, 2008) The idea in *Customer relationship management* program is to build a single view of the patient through all channels within the company to be able to manage the different stages of the relationship with the patients. (Reinartz et al., 2004). CRM at hospitals, as discussed in the theoretical chapter is being used to foresee which health services a patient could be in need of. (Koh & Tan, 2005) Considering this it would seem like CRM would be useful when implementing other programs, with process focus and where the aim is to decrease waste, which is found in the following programs; *Six sigma* (Truscott, 2003) *Lean* (Robinson et al., 2007 in NHSI 2007) *Supply chain management* (Tuncdan et al. 2007) *Statistical process control* (Oakland, 2003). It would seem like the mentioned facts would give them an underlying relationship, but in our findings the Rasch model can not explain this relationship.

6. Conclusions

From the discussion above the following conclusions can be drawn:

- Conclusion: Quality programs are applicable in the hospital setting.
- Conclusion: Programs that involve the entire organization is more difficult to implement, due to the diversification of healthcare services, and that most of these programs are not originally developed for healthcare.
- Conclusions: Quality programs in the lower parts of the hierarchy is easier to implement, due to the fact that they are adapted to the healthcare setting.
- Conclusion: The programs found low in the hierarchy facilitates the implementation of a higher program why investments in quality programs is a solution to handle the seen rising cost within healthcare.

6.2 Purpose and use of this findings

The findings of this study are important for each individual hospital dealing with operations management. It is important when trying to handle the rising expenditures in Canadian healthcare seen the last years, (CIHI, 2008) and the unmet healthcare expectations. (Letherman & Sutherland, 2010) With the result findings at hand they will be able to make more informed choices which quality program to implement. This will result in improved quality of the hospitals processes, which can be defined as reducing cost, improving safety and improving clinical activities (Olson et al., 2008). It will lead to more satisfied patients –better provided care, reduced costs and happier employees. Many hospitals implement a variety of programs, and suffer from the high cost of this. (Olson, 2008) The growth of costs within healthcare which have been rising during twelve years could be managed by introducing the right program. (CIHI, 2008). By using these findings an appropriate program can be chosen by the hospitals which will save money and improve quality. It should also be used in an early stage since when implementing programs in the wrong sequence it can lead to increased costs and outride failure. (Olson, 2008)

These choices must of course be compared to the costs of implementation the programs (something that have been neglected, in this study), but the hierarchy can still be useful when it comes to clarifying which program will be the most easiest to implement.

As mentioned, the hospital's capability, can not be distinguished or related to each specific hospital since the survey was conducted anonymously. However, they can use the scale and see where they are situated and, by that, see which programs should be easiest implemented.

Considering that the Canadian healthcare is similar to the Swedish healthcare these findings could also be interesting, applicable and useful to Swedish hospitals who find themselves similar to Canadian hospitals. Swedish healthcare is like the Canadian healthcare founded by the tax payers. The care is decentralized to the County councils. Many problems like having long queues when waiting for care, are also comparable. However the hierarchy theory has as far as we know, so far not been researched regarding Swedish hospitals. The finding of this report, due to the many similarities,

Matilda Västernäs could however be used as a discussion point when making managerial operating decisions instead of a decisive factor when taking decisions regarding Swedish healthcare.

6.3 Future research

In the future it could be interesting to investigate each individual programs' effect on the performance using some kind of performance measure. According to the current scale, some of the programs are at the same level and it would be interesting to know which ones that give the most effect on performance.

Future research could focus on what in the environmental characteristics of Canadian hospitals compared to American hospitals give results in this difference between the hierarchy in the two countries. At this state I can not make explicit conclusions since I have not studied the differences between American and Canadian hospitals. The comparison between these two studies is interesting due to the fact that they are conducted in the same way. Using the same questionnaire, interviewing the same managements posts. If the environment differs significantly then it would be interesting to learn, and use this in order to make the changes needed to implicate the programs successfully.

One of the reasons for the higher-level programs being difficult to implement is that they are not well adopted to the hospitals. Therefore, it would be interesting to study how the higher-level programs can be adopted.

6.4 Summary

The findings of this report show that there is reliability to the Rasch model. This lead to the conclusion that there is an underlying relationship between the programs and that the programs share a common theme. In order to handle the problem faced in Canadian healthcare the hierarchy map combined with, the result findings of this study can be useful tools. Making good operational management decisions is essential in order to accomplish a better provided healthcare.

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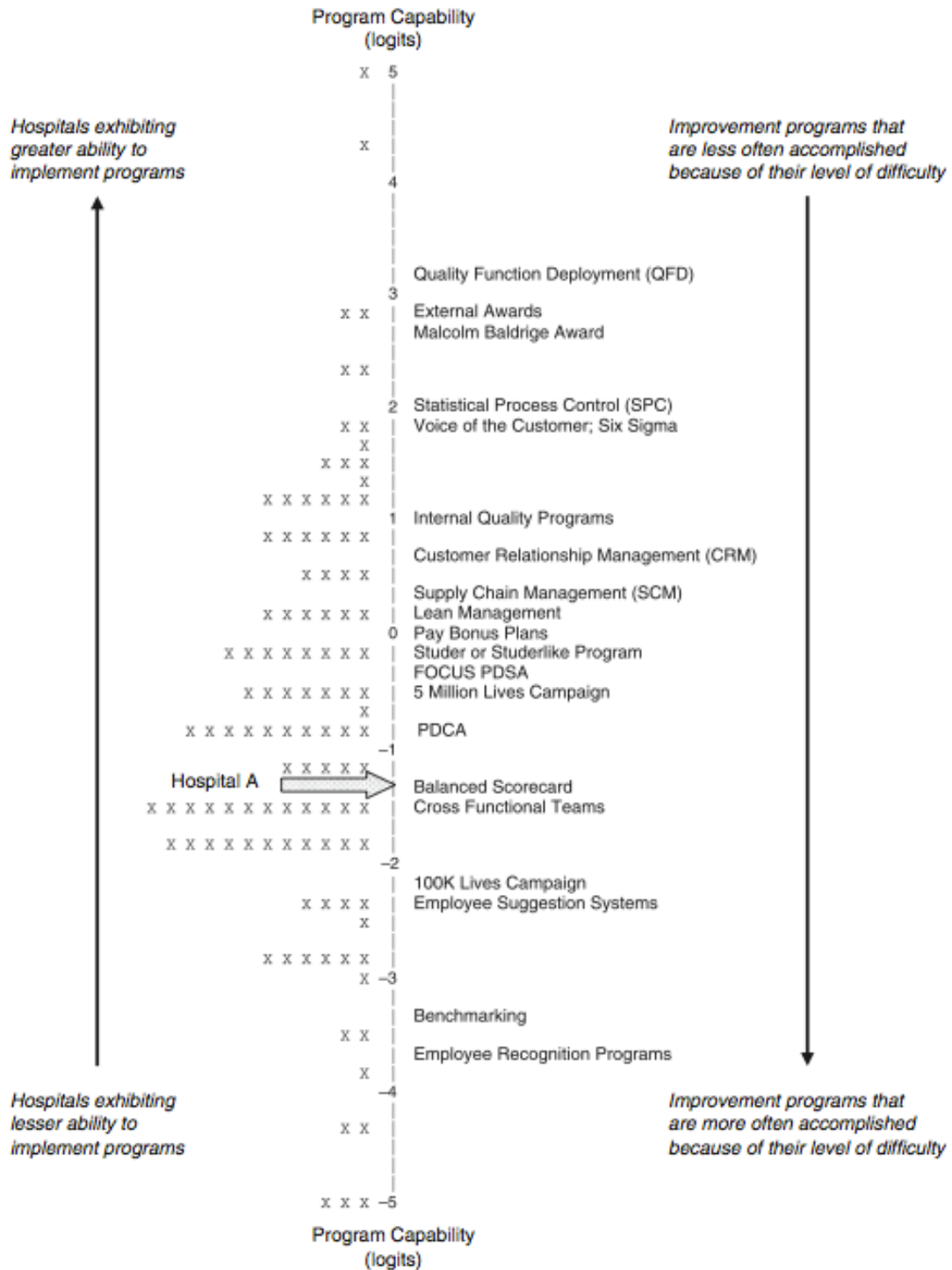
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Appendix 1:

Result findings of the Minnesota study. Hierarchy map:



(Olson et al 2008)

Appendix 2:

Healthcare Improvement Programs	Item Difficulty (in logits)	Standard Error (SE)	Infit MNSQ	Infit ZSTD	Outfit MNSQ	Outfit ZSTD	r_{pm}	
Six Sigma	1.23	0.37	0.7	-1.3	0.7	-0.4	10	
ISO/TS certified	1.10	0.36	1.19	0.8	1.32	0.7	11	
Supply Chain Management	1.10	0.36	0.94	-0.2	0.55	-0.8	11	
Pay Bonus Plans	0.98	0.34	1.08	0.4	0.79	-0.3	12	
Balanced Scorecard	0.65	0.32	0.94	-0.2	0.66	-0.8	15	
Lean Organization	0.55	0.31	0.77	-1.3	0.54	-1.3	16	
Voice of the Customer	0.55	0.31	0.86	-0.8	1.16	0.5	16	
Statistical Process Control (SPC)	0.46	0.30	0.98	-0.1	0.77	-0.5	17	
Internal Quality Award Program	0.2	0.29	1.25	1.5	1.26	0.9	20	
Employee Suggestion system	-0.12	0.27	0.94	-0.4	0.72	-1.1	24	
Team Quality Award	-0.26	0.27	1.08	0.6	0.97	-0.1	26	
Cross-functional Teams	-0.61	0.26	1.04	0.4	1.21	1.0	31	
Safer Healthcare Campaign	-0.74	0.25	1.12	1.1	1.13	0.7	33	
Benchmarking	-1.6	0.25	1.06	0.6	1.08	0.5	47	
Employee Recognition Programs	-3.51	0.31	1.01	0.1	1.09	0.3	74	
Excluded Healthcare Improvement Programs	Item Difficulty (in logits)	Standard Error (SE)	Infit MNSQ	ZSTD	Outfit MNSQ	ZSTD	r_{pm}	
Customer Relationship	0.42	0.30	1.39	2.1	1.90	2.2	0.15	
Supplier or other external quality	5.13	1.84	MAXIMUM ESTIMATED MEASURE					