TAMPEREEN TEKNILLINEN YLIOPISTO
TAMPERE UNIVERSITY OF TECHNOLOGY

JAAKKO KURONEN

CUSTOMER JOURNEYS AND PATIENT PATHWAYS IN HEALTHCARE

Bachelor of Science Thesis

Examiner:
Tuomas Korhonen,

ABSTRACT

JAAKKO KURONEN: Customer Journeys and Patient Pathways in Healthcare
Tampere University of Technology
Bachelor of Science Thesis, 22 pages, 2 Appendix pages
May 2018
Bachelor's Degree Programme in Industrial Engineering and Management
Major: Industrial Business
Examiner: Tuomas Korhonen, Postdoctoral Researcher
Keywords: customer journey, patient flow, patient pathway, treatment process

This research project was implemented as a literature review dealing with customer journeys and patient pathways in hospitals and other healthcare systems. The research is multidisciplinary and examines customer journeys and patient pathways from viewpoints of three different scientific scopes:

1. Business & Service Management
2. Operations Management
3. Medical sciences.

The aim is to examine and compare the different approaches to healthcare processes of these scopes. The exact research questions of this Bachelor's thesis are:

1. In the viewpoints of three scientific scopes, what is typical to each scope regarding customer journeys and patient pathways in healthcare?
2. What are the differences and similarities in these three viewpoints concerning process management?

This research is closely related to TEKES- funded LAPSUS-project which aims to examine and improve the customer journeys especially in the New Children's Hospital which is located in Meilahti, Helsinki.

TIIVISTELMÄ

JAAKKO KURONEN: Potilaan palvelupolut terveydenhuollossa
Tampereen teknillinen yliopisto
Kandidaatintyö, 22 sivua, 2 liitesivua
Toukokuu 2018
Tuotantotalouden kandidaatin tutkinto-ohjelma
Pääaine: Tuotantotalous
Tarkastaja: Tuomas Korhonen, tutkijatohtori
Avainsanat: potilaan palvelupolku, hoitoprosessi, hoitopolku, potilasvirta

Tämä kandidaatintyö toteutettiin kirjallisuuskatsauksena, jonka aiheena oli potilaan palvelupolkuihin liittyvät terveydenhuollon prosessit. Tutkimuksessa vertailtiin potilaskokemuksiin ja sairaaloiden potilasvirtojen hallintaan liittyviä, eri tieteenalojen, julkaisuja ja tutkittiin niiden välisiä yhtäläisyyksiä ja eroja. Tutkimukseen sisältyvät kolme tieteenalaa ovat:

1. Kauppatieteet ja palvelujohtaminen
2. Tuotantotalous
3. Lääketiede.

Kandidaatintyön tutkimuskysymykset ovat:

1. Mikä on kullekin teoreettisen tulokulmalle tyypillistä palvelupolun kannalta: mihin huomio kohdistuu?
2. Vertailu; mitä yhteistä tai eroa on tulokulmissa, esim. prosessitutkimuksen osalta?

Yksi tutkimuksen tarkoituksista on tutkia eri tieteenalojen erityiskielen, käyttökielen ja nomenklatuurien yhtäläisyyksiä ja eroja. Tarkoituksena on myös tarkastella ja vertailla kuinka eri tieteenalat tarkastelevat ja kuvaavat hoitopolun prosesseja ja niiden vaiheita.

Hanke liittyy läheisesti lapsiperheiden uudistuva sairaala-tutkimushankkeeseen (LAPSUS-hankkeeseen). Hankkeen tavoitteena on tutkia ja kehittää potilaiden palvelukokemuksia terveydenhuollossa, erityisesti Helsingin uudessa lastensairaalassa.

PREFACE

Writing this Bachelor's thesis was exceptionally important to me. On one hand, it concretized the ending of my studies at TUT, but on the other hand, it gave me great knowledge and drive to continue recently started medical studies at University of Tampere. I think that the diversity in scientific backgrounds is an asset in research teams and organizations as well as in business context. On the edge of the merging of the two large universities in Tampere, I am in an interesting position, since I have been a student of both universities before the combining. I hope that the cultures and histories of both institutes will not be forgotten, and the new University of Tampere is going to grow stronger than its two campuses could ever be separately.

Customer journeys and patient pathways in healthcare context was a perfect match for me as a topic of Bachelor's thesis. It allowed me to use my knowledge from industrial engineering and management studies, as well as learn new things about healthcare systems. I want to express sincere thanks to Leena Aarikka-Stenroos, Tuomas Korhonen and Lauri Litovuo for their many wise advices and thoughts during the writing process. I also want to thank Soila Kolari who informed me about LAPSUS-project and the ongoing research of Leena Aarikka-Stenroos.

In Tampere, Finland on 13th of May 2018.

Jaakko Antti Elias Kuronen

CONTENTS

LIST OF ABBREVIATIONS

ED	Emergency department
IT	Information system
LOS	Length of stay
OS	Organizational semiotics
PA	Process analytics
SkaS	Swedish Skaraborg Hospital Group
SWB	Subjective well-being

1. INTRODUCTION – CUSTOMER JOURNEYS AND PATIENT PATHWAYS IN HEALTHCARE

In recent years it has become increasingly important to study and understand the customer journeys and patient pathways in the healthcare industry. Customer journeys and patient pathways are very similar concepts, but customer journey is more comprehensive and also includes the emotions of the customer during the caretaking. Patient pathway in turn, can be defined as all the different steps of the medical treatment the patient experiences during his or her caretaking (Lismont et al. 2016). The global trend is to improve and optimize these customer journeys and patient pathways.

Another important concept in this study is patient flow. Patient flow can be defined as the map of the processes that the patient goes through during the delivery of their caretaking. In other words, efficient patient flow is high-volume throughput of patients, short waiting times and low total stay times. (Hall R.W. 2006, p. 215) Improving customer journeys and patient flow through hospitals is of interest because they are beneficial not only by improving the safety and the quality of treatment but also increasing efficiency and making hospitals financially more profitable (Griffin et al. 2016, p. 69-74).

Modern healthcare service providers stand at a point where the demand for high-quality services has increased due to growing and aging population. The quality of healthcare services can be improved in many ways, for example by uniform measuring, decreasing variability, better leadership and resourcing, process and stakeholder mapping, reduction of bureaucracy etc. If any of these occurred problems are investigated, the reason is rarely in individual failings, but more often in systemic failures or problems in the processes (Lemer et al. 2018). That is why it is more efficient to focus on the developing the processes of healthcare organizations instead of ruling out individual defects.

Development work is challenging. The hypothesis of this study is that different scopes of sciences have at least partially different nomenclature and terms for the same phenomenon. In the best scenario, developing patient pathways and customer journeys in healthcare is led by multidisciplinary teams, but the variance of their professional language is a potential barrier to fluent communication in these teams. The language can also be assumed to vary within the same discipline and its professionals.

1.1 Purpose and Research Questions

This study provides an exciting opportunity to advance our knowledge of patient pathways by introducing different viewpoints of various scientific disciplines. The main challenges in this research come from the scattered information. The research is

multidisciplinary and deals with viewpoints of three different scientific fields. It is highly probable that the approaches to customer journeys and patient pathways are not in line with each other. That is why it is so important to review all three scientific scopes and analyze their individual approaches to the phenomenon, as well as to compare and synthesize the information from the different disciplines.

This study is implemented as a literature review dealing with customer journeys and patient pathways in healthcare systems. Three chosen viewpoints to customer journeys and patient pathways are:

1. Business & Service Management,
2. Engineering Sciences (including Operations Management)
3. Medical Sciences.

This study aims to examine and compare the differences and similarities in professional language and the viewpoints of these scopes. The viewpoint of each scientific scope arises from the intentions, methods, history and culture of the scientific community and one can say that it answers the question: Why is this study carried out and why has it been done like this? The research questions of this Bachelor's thesis are:

1. Regarding the viewpoints of three scientific scopes, what is typical to each scope regarding customer journey and patient pathway in healthcare?
2. What are the differences or similarities in these three viewpoints concerning process management?

This literature review is also closely related to the TEKES- funded LAPSUS-project which aims to examine and improve the customer journeys especially in the New Children's Hospital which is located in Meilahti, Helsinki. In the same spirit as is in the agenda of the LAPSUS-project, this research also aims to produce valuable and scientifically cross-sectional information of the nomenclature and viewpoints in order to develop healthcare systems and patient pathways. (TEKES 2017, HUS 2018)

1.2 Research Methodology

In this research, the terms and professional language of different scientific scopes are assessed by the means of *terminology*. Terminology is its own branch of science, and any terminological work is to collect, analyze, change, compare and find terms and *nomenclature*. The outcome of terminological work is a nomenclature which means a set of terms and phrases related to specific field of interest (Nykänen & Kalliokuusi 1999, p. 170-173). In this study, customer journey-, patient flow- and patient pathway -related nomenclatures of business and service management, operations management and medical sciences will be compared and analyzed.

A study in Finnish Medical Journal is one example of a publication which collates terms used in healthcare processes (Norback Isto et al. 2010). The material for that publication

was collected from various professional dictionaries.

The project group behind the mentioned publication listed terms which appeared frequently in the development process and listed the most crucial nomenclature (Norback Isto et al. 2010). Norback's article supports the scientific objective of this research because it highlights the importance of nomenclature and dictionaries when organizing information and creating more efficient and easy-to-use information systems.

One research method which was used with limitations in this literature review is *meta-synthesis*. Meta-synthesis is a form of research in which the aim is to assemble the knowledge of a scientific field or different scientific fields into full understanding of the phenomena (Hunter et al. 1982; Rousseau et al. 2008 in Hoon 2013). Meta-synthesis is based on a constructivist theory, where reality is assumed to exist in the mental constructions of different actors. (Gephart, 2004; Guba & Lincoln, 1994, 2005 in Hoon 2013). The reality formed by these individual mental constructions can be compared to the three scientific viewpoints of this Bachelor's thesis. By finding the mental constructions or the key-elements of the *customer journey in healthcare* in the different scientific disciplines and integrating them, it is possible to form more comprehensive understanding of the phenomena.

1.3 Research Material

This research was implemented as a literature review in which the information was collected from economical, engineering and medical publication databases, for example from Emerald, EBSCOhost, PubMed, Cochrane, ScienceDirect, ProQuest and Scopus. In the search and collection of the suitable publications search engines ANDOR (Tampere University of Technology) and ANDOR (University of Tampere) were used. The most important keywords of this phenomenon are:

- Patient pathway,
- Healthcare management
- Customer pathway
- Customer journey
- Touchpoints of journey
- Continuum of care
- Patient flow
- System dynamic review
- Healthcare process
- Lean Healthcare
- Clinical pathway.

These keywords were used in the search for suitable publications. All used keywords can be found in the attachment of this Bachelor's thesis.

In order to be acceptable, a publication needs to be fully available in the database, to have scientifically a broad-spectrum and be objective. Only publications in English and Finnish languages are included in this literature review. The publication grading system of Publication Forum was used to evaluate the quality of different journals, books and conference articles. Figure 1 demonstrates the phases of collection and search for suitable publications.

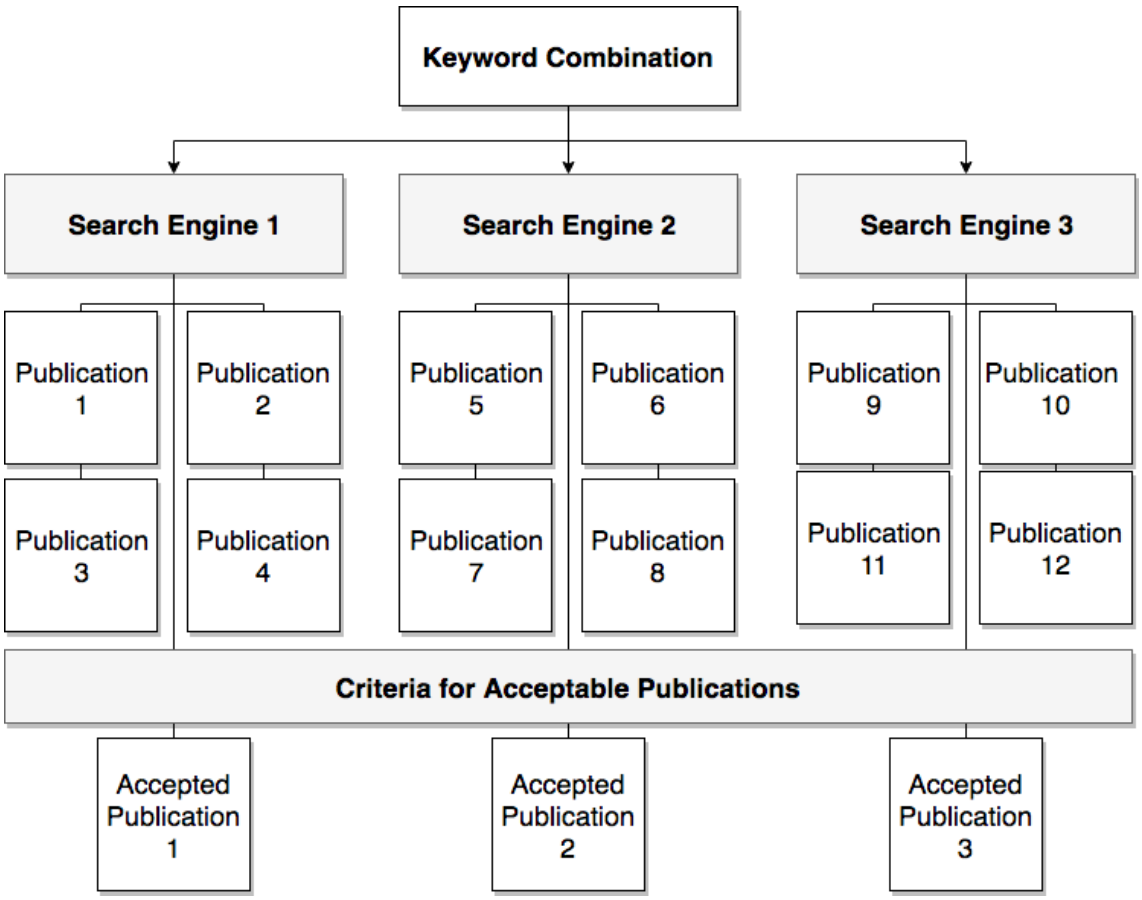

Figure 1. *Search and selection of suitable publications.*

The objective was to select publications from journals that have been given grades 2 or 3 in the Publication Forum-service. Also, journals graded as class 1, were accepted if the publications were otherwise valid and of high quality. Although this study compares the publications of different scientific scopes, the intention was not to emphasize a medical viewpoint. Instead, the crucial phenomena in this study are processes, quality and providing services in healthcare industry. This study can be still called multidisciplinary since the selected publications arose from streams of different scientific disciplines.

2. PROCESS FRAMEWORK FOR EXAMINATION OF THE THREE SCIENTIFIC APPROACHES

The purpose of this chapter is to present a process framework for the examination of the three approaches of this study. The publications from these three different approaches are dealt later in the chapters three, four and five and the framework is presented in the table 1.

Table 1. Framework for the examination of three approaches.

	Process aspect to customer journeys and patient pathways			
Scientific scope	**A. Perspective to customer journeys and patient pathways as processes**	**B. Management of customer journey and patient pathway processes**	**C. Improvement of processes**	
1. Business and Service management	• • •	• • •	• • •	**TOT. 1.**
2. Engineering and Operations management	• • •	• • •	• • •	**TOT. 2.**
3. Medical sciences	• • •	• • •	• • •	**TOT. 3.**
	TOT. A.	**TOT. B.**	**TOT. C.**	

The presented framework is a tool which helps one to map and recognize the approaches of the tree viewpoints to customer journeys and patient pathways. Customer journeys and patient pathways can be seen as processes. In the framework, three aspects of the processes were assessed:

A. Perspective to customer journeys and patient pathways as processes
B. Management of customer journey and patient pathway processes
C. Improvement of processes

Perspective to customer journeys and patient pathways is the first aspect, and it helps one to understand the intentions of each scientific scope. The second aspect is management. In all three scientific viewpoints the patient pathways are managed as processes and the purpose of the column B is to collect insights into how the customer journeys and patient pathways are managed in each three streams. The last aspect in the column C is process improvement. Improving processes in healthcare industry is of interest in this study and the purpose of this aspect is to collect and compare how do each of these three scientific scopes approach to improving customer journey and patient pathway processes.

The framework was created because it helps one to make findings and comparison those finding from the chosen publications of the three disciplines. Table as a form of presenting information was found to be suitable for this kind of framework. The framework was able to crush information and findings out of publications that differed significantly. The comparison and evaluation of findings could be assessed because of the framework enables one to review total findings of either *scientific scope* rows or *process aspect* columns.

3. BUSINESS AND SERVICE MANAGEMENT APPROACH TO CUSTOMER JOURNEYS AND PATIENT PATHWAYS

In this chapter the chosen publications from business and service management streams are assessed. The aim is to collate the key-elements of the chosen studies and compare the findings. This study assumed that the intentions of these publications were in developing the services and business to more profitable and focused on the customers point of view to healthcare processes. This is why the researches dealt with in this chapter may vary from, for example, business and service management to the research of medical sciences where the intentions and interests are in the enhancing the results of clinical activities.

3.1 Patient Emotions in Healthcare

Recently the management and research of customer emotions in healthcare services has roused more interest. Healthcare industry has constant touchpoints to strong emotions which arise from a wide range of minor illnesses to death-dangering acute situations (Faulkner 2001 in McColl-Kennedy et al. 2017a). The purpose of the research done by McColl-Kennedy et al. was to examine disparate theories of emotions which could then lead to building a conceptual framework for analyzing the emotions in customer journeys in healthcare. The research focused on the patients and their family members feelings by analyzing the *key emotions* in the healthcare services, the processes from which these key emotions arise and how do the emotions inflict the delivery of healthcare services (McColl-Kennedy et al. 2017a).

The conceptual framework that describes the elicitation of customer emotions in healthcare services is presented in the Figure 2. It explains the arising emotions via *trigger events* and *sub-events*, where trigger event has a major significance to the patient and the trigger-event leads to the unfolding of series of sub-events. These events trigger emotions in the patients and their family members, and the quality of emotions are depending on the significance of the events and vary significantly between patients individually. (McColl-Kennedy et al. 2017a)

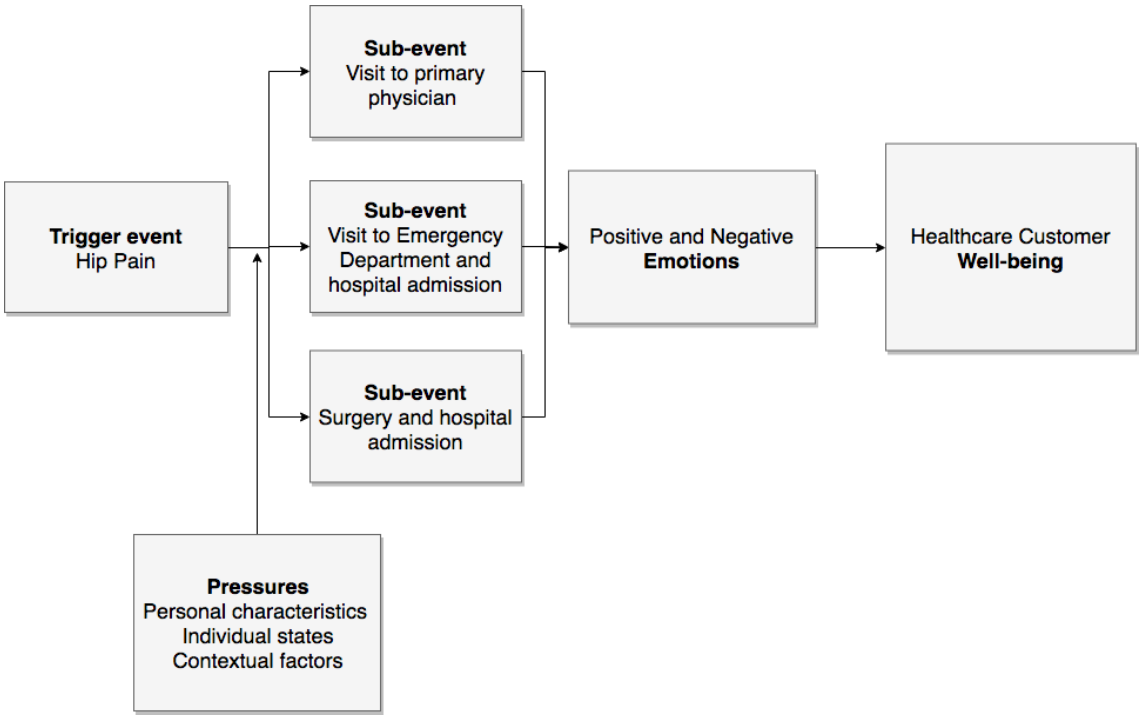

Figure 2. *Conceptual framework: elicitation of emotions in healthcare service experiences. (Adapted from McColl-Kennedy et al. 2017a)*

Strong emotions can lead the patient to neglect the treatment process and to refuse professional advice. This phenomenon leads not only to the stress of family members but also means increased stress to the frontline employees in the service. (Grandey et al. 2004; Rupp & Spencer 2006 in McColl-Kennedy et al. 2017a) It is important to understand and acknowledge that emotions such as anxiety and fear affect physically through loss of sleep, energy, appetite and eventually loss of well-being. According to McColl-Kennedy et al. (2017a), improvements in the patient's well-being are achievable by improving the well-being of the staff. Positive emotions from staff are transferred to the patients by contagion. The well-being of staff can be increased for example by regularly held staff meetings.

3.2 Measurement of Quality in Healthcare

Quality is an essential part of a successful healthcare process, and measuring the quality is critical in order to enhance it. Although the healthcare industry acknowledges the importance of quality measurements, it lacks a clear consensus of how to execute the measurements. (Lee et al. 2013) One reason why the measurement is problematic, is that quality can be defined differently by different stakeholders in the healthcare process. The conclusion of a study by Lee et al. (2013) was that the existing quality metrics do not coherently measure the overall subjective well-being (SWB) of the patient. According to the study, the measurement of the overall effect of the health interventions on the patients life is the best indicator of the quality of treatment and patient experience. That is why it should be also added to healthcare quality metrics more often. Lee et al. (2013) present a temporal model of patient experience where the SBW of the patient is measured in three

phases: pre-treatment experience which is the time before healthcare, treatment experience and post-treatment experience. Temporal model of patient experience is presented in the Figure 3.

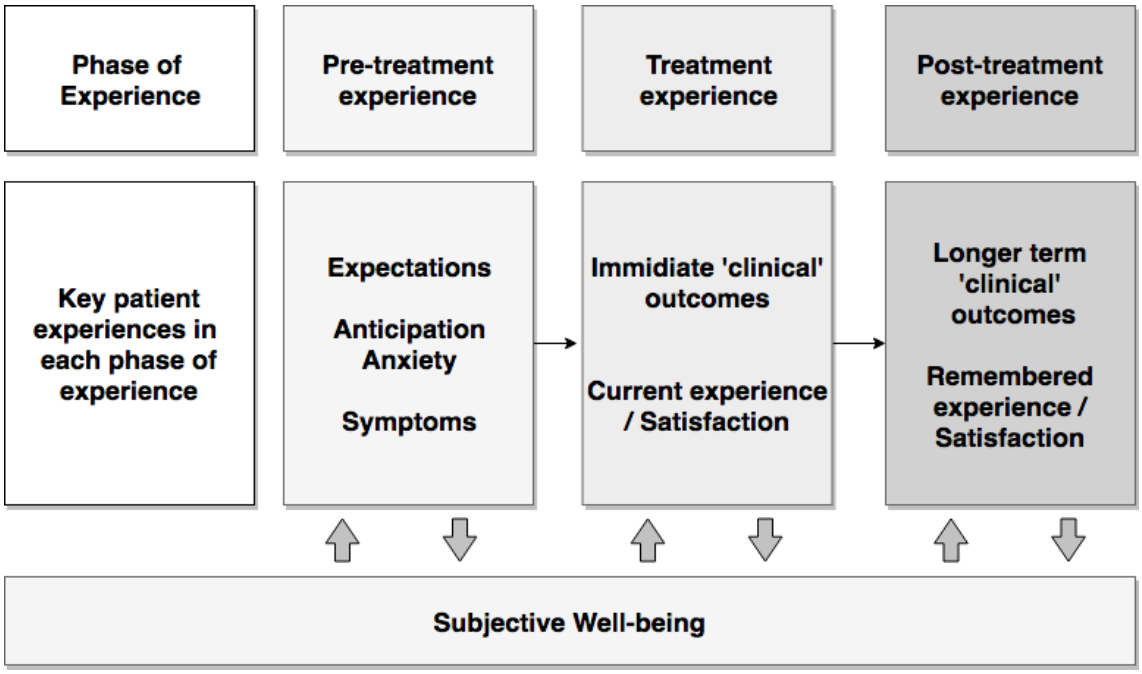

Figure 3. *The temporal model of patient experience. (Adapted from Lee et al. 2013)*

The study by McColl-Kennedy et al. highlights the importance of combining research from healthcare and service disciplines. Better quality of treatment and enhancement of customer experience by when the processes are built to support the active role of a patient instead of viewing healthcare as a transaction between a professional and passive customer.(McColl-Kennedy et al. 2017b)

3.3 Findings

Building a conceptual framework is a challenging task and a tough objective to achieve. McColl-Kennedy et al. (2017a) were still able to examine and clarify the definition and impact mechanism of elicitation of emotions in healthcare experiences well. The illustrations of the emotions that customers experience during healthcare were consistent and understandable. McColl-Kennedy et al. (2017a) underline that, although the importance of *customer experience* through a health services is understood, there is still too little research on how customers' multiple emotion events behave over time, and the research lacks a profound theoretical framework for analysis. One challenge is the complexity of healthcare services. There are several actors that define the outcome of the customer experience and customer also has an active role in the process. (McColl-Kennedy et al. 2017a)

Lee et al. (2013) presented the temporal model of patient experience. The phases of experiences, pre-treatment, treatment, and post-treatment are analogical to the phases of

patient admission, hospitalization and discharge presented in chapter 2.1. It is still uncertain if the terms are comparable because of the possible differences in the terminology. Where hospitalization refers to the time that patient is physically in the hospital facility, treatment experience in Lee et al. (2013) temporal model refers broadly to the time that patients care-taking (eg. therapy, surgical procedures, medical or pharmacological treatment etc.) is active. (Griffin et al. 2016, p. 69-74, Lee et al. 2013)

If McColl-Kennedy et al. and Lee et al. frameworks are compared the McColl-Kennedys conceptual framework is more comprehensive than Lee et al. temporal model, but also the meaning of those models is different. McColl-Kennedys frameworks intention is in the understanding the elicitation and effect of emotions in healthcare and Lee et al. temporal model intention is to improve quality of the treatment by measuring the subjective well-being of the patient. Both models are keen in the experiences of the healthcare customers. The findings of the examined business and service management publications were collected to the framework and are presented in the table 2.

Table 2. Process framework findings: Business and Service Management.

	Process aspect to customer journeys and patient pathways		
Scientific scope	**A. Perspective to customer journeys and patient pathways as processes**	**B. Management of customer journey and patient pathway processes**	**C. Improvement of processes**
1. Business / Service management	• Customer journey is the sum of experiences of the patient • Quality of experience is important to this scope	• Mapping the experiences and events which affect to customer journey in health care	• Suggestion of using the subjective well-being as a meter of quality • Building conceptual frameworks for understanding how emotions affect the customer journeys

The combined findings of all the three scientific scopes can be found from chapter six - synthesis.

4. ENGINEERING SCIENCES APPROACH TO CUSTOMER JOURNEYS AND PATIENT PATHWAYS

In this chapter the customer journeys and patient pathways are approached from the viewpoint of engineering and operations management. In comparison to business research engineering and operations management as fields of sciences are "straightforward" and process-centered. Engineering and operations management are also fields of sciences that are developed in continuous and close relationship with manufacturing industry. Bringing knowledge from manufacturing to healthcare industry is an interesting opportunity to increase the quality of treatment and performance of hospitals in healthcare.

4.1 Clinical Pathway Management

Clinical pathways or integrated pathways in healthcare are defined as task-orientated care plans which the patient is guided in in order to treat the specific clinical problem of the patient (Coffey et al. 1992; Kitchiner & Bundred 1996 in Li et al. 2014). Clinical pathways can be seen as a structured course towards well-being and recovery of the patient. The use of clinical pathways in healthcare offer an evidence based and organized way to develop protocols of care (Li et al. 2014). In practical treatment processes the quality of the medical services can be endangered by defiency of knowledge sharing and weak performance of paper-based clinical pathway control. Utilizing hospital information systems to clinical pathway management can significantly improve the quality of treatment in hospitals. (Li et al. 2014)

According to Li et al. is important to distinguish between clinical pathways and clinical guidelines: clinical pathways are a combination of practical treatment processes which include clinical guidelines and non-clinical activities. Clinical pathways of the patient are monitored and executed in multi-disciplinary teams including for example medical doctors, nurses, nutritionists and interns.

The case study by Li et al. points out that the implementation of integrated clinical pathway management system reduced the amount of various medical errors by 70.9% compared to the errors in time of pre-implementation. The amount of pathway cases in pre-implementation period was 168 patients, and in the post-implementation period a total of 174 patients. Also, the average length of the stay was reduced after the implementation. The integrated system design is based on organizational semiotics (OS) which means that organizations are treated as information systems. This viewpoint gives an opportunity to integrate IT systems and business processes by the means of co-design. (Li et al. 2014)

4.2 Healthcare and Process Management

Organizations in the healthcare industry are facing demands in improving of operations and evidence of the quality and efficiency of their organizations and services. Institute of Medicine (IOM) has suggested that in the year 2000 and 2001, 58 per cent of deaths occurred in hospitals could have been prevented. (Kujala et al. 2016 in Hellström et al. 2010)

Empirical study by Hellström et al. was conducted in collaboration with SkaS, Swedish Skaraborg Hospital Group in order to study the possible problems of process management implementation in the organization. SkaS healthcare services are used by a population of 260 000 and the group consist four hospitals with approximately 800 beds and 4700 employees. Two notable findings of the study were that the organization itself can become an obstacle to make changes to existing ways of management and the absence of criticism towards manufacturing heritage of process management and the controversies in the nomenclature in its context. (Hellström et al. 2010)

Process management has been a widely used term in manufacturing organizations for years, but healthcare practitioners have not accepted these new organizational improvement methods with open arms. One repeatedly mentioned factor that differs from manufacturing organizations is that healthcare organizations are *professional organizations* which means organizations where the used methods and procedures are decided independently (Freidson and Waks 2009 in Hellström et al. 2010). In these professional organizations, process management can be seen as an obstacle that could potentially disturb the self-governed working customs (Hellström et al. 2010) .

In many ways the knowledge transfer from manufacturing to healthcare industry is problematic. When healthcare organizations have tried to transfer manufacturing methods to healthcare, the adopted techniques are implemented in partial fractures and they do not give the anticipated results to the organizational performance. (Yasin et al. 2002 in Hellström et al. 2010)

4.3 Lean and Healthcare

According to Daniel T. Jones from book “The Routledge companion to Lean management, Lean Healthcare” modern healthcare providers face two problems in advanced economies:

1. Healthcare service quality is not as high as other products and services
2. Increasing healthcare costs conducting from the aging population

Lean-processes have been a key-element in the development of a very successful system which controls all the operations from manufacturing to product development (Suneja &

Suneja 2010). Lean process is a method created by Toyota in the past fifty years but the first implementations and exploration of Lean in hospital-environment occurred after the year 2000 in USA, Europe and Australia. After these pioneer implementations the interest and literature of Lean in healthcare has grown. (Jones 2016, p. 261-270). It seems that one problem in the knowledge transfer from manufacturing to healthcare industry is the fundamental paradigm in healthcare personnel that Lean has been developed for increasing the performance in producing cars, how could it possibly be suitable for such as complex situations as healthcare?

Healthcare organizations have actively and in increased numbers executed Lean-implementations but in many cases with poor results. The literature of healthcare process development implementations often covers techniques that do not process the behavior of key-actor; *medical doctors*. Suneja & Suneja estimates the reasons for exclusion of medical doctors are; high education and professional expertise; organizational hierarchy where doctors have different superiors than other employees (this increases the difficulty of changes applied to all personnel); and the authority affiliated with the doctor-title which creates a gap between doctors and other personnel. (Suneja & Suneja 2010)

Lean offers a way by which the frustration of patients and medical doctors can be removed from healthcare systems (Suneja & Suneja 2010). Lean differs from other process improvement approaches by focusing on the front-line teams including medical doctors, nurses and support staff. The improvement is achieved by continuous problem solving in teams. As these teams are learning and increasing their skills it is important to combine the improvement of different teams together to deliver better hospital performance from admission to discharge. (Jones 2016, p. 261-270)

As was earlier stated in this research, the improved process and flow have become even more important factors in improving healthcare activities. In this context, Lean is fast becoming a key instrument in approaching these improvements or identifying the reasons for the lack of performance. (Roemeling et al. 2016)

Roemeling et al. conducted in year 2016 a longitudinal field research combined with an exploratory field-quasi-experiment concerning Lean improvement projects in healthcare. In the study by Roemeling et al. the case healthcare organization lacked the knowledge related to buffers and variability which holds the organizations back from adopting comprehensive Lean approach and instead the focus was more in reducing waste.

4.4 Patient Pathways and Process Analytics

Recent trends in submitting and storing of electronic healthcare records have led to a proliferation of data which can provide us with interesting opportunities to discover new insights into patient pathways, healthcare processes, comparing pathways of different medical patient groups and analyzing bottlenecks in the processes (Lismont et al. 2016).

Process analytics open an interesting channel to obtain new insights into patient pathways or patients care journeys as they are referred in Lismont et al. study. The study presents a six-step methodology towards applying PA in healthcare context. The steps can be viewed in Figure 3.

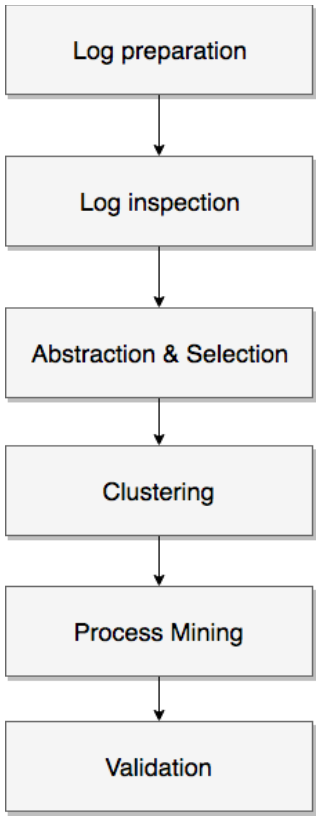

Figure 4. *Six-step methodology towards PA application in healthcare (Adapted from Lismont et al. 2016)*

Process analytics as a field of research is quite new but the results of its applications in the healthcare environment are promising. The results of the study show that some services that are a part of the recommended treatment plan are not used by the recommendations.

4.5 Findings

Paper-based clinical pathway management was seen as a risk and should be changed in to information systems- based clinical pathway management in order to increase the performance of the quality of treatment. The used professional language in the examined publications consists “patient’s care journey” which in this case means the different steps, treatments and drugs the patient takes during his treatment. All the findings of the examined engineering sciences and operations management publications were collected to the framework and are presented in the table 2.

Table 3. Process framework findings: Engineering sciences and operations management.

	Process aspect to customer journeys and patient pathways		
Scientific scope	**A. Perspective to customer journeys and patient pathways as processes**	**B. Management of customer journey and patient pathway processes**	**C. Improvement of processes**
2. Engineering and Operations management	• Technical approach to customer journeys and patient pathways • Information system and process thinking -centered thinking	• Management of the data from electronic healthcare records • Management of information systems processes combined to management of business processes	• By using information systems and process mapping it is able to increase the performance of the patient pathways and decrease unwanted phenomena such as ED crowding and occupancy • Lean

The combined findings of all the three scientific scopes can be found from chapter six - synthesis.

5. MEDICAL APPROACH TO CUSTOMER JOURNEYS AND PATIENT PATHWAYS

In this chapter the medical approach to customer journeys and patient pathways are assessed. The history of bedside medicine reaches to the times of Hippocrates (c. 460-370 BCE) and despite the hospital medicine has roots in much more recent times (years 1781-1826) the heritage to modern medicine is significant (Bynum 2008, p. 2). In medicine the treatment of the patient is central and the approach to customer journeys and patient pathways can be assumed to differ in many ways compared to business & service management or engineering and operations management approach.

5.1 Hospital Occupancy and Discharge

Patient flow in a hospital is a complex multiphase process and hospitals can be seen as a limited capacity system. The occupancy of hospital refers to how much of the capacity of the hospital is in use. One important factor of the occupancy is the discharge-timing of the patients. Delayed discharge refers to cases where the medical state of the patient would allow them to be discharged in which the patient could be discharged, but the discharge is hindered due to organizational reasons. (Qin et al. 2017)

A simulation-based study by Qin et al. (2017) shows that the early-as-possible discharge of long-stay patients affects the occupancy of hospitals considerably. This means that the delayed *length of stay* of long-stay patients has more weight in the occupancy compared to delayed LOS of patients that are discharged quickly after admission.

5.2 Understanding Healthcare Processes

A study by Lemer et al. (2015) identifies techniques that can improve the quality of the treatments and the techniques are originated beyond healthcare industry. The correspondent writer of the study is Dr. Claire Lemer from Evelina London Children's Hospital. The study consists of two main issues which are exploration of efficiency improvement methods in other industries and examination of how these methods could be used in customer journeys. (Lemer et al. 2015)

Delays in the hospital admission and discharge are unfortunately common and frustrating to the patients, their families and hospital staff. When the reasons to these delays in patient flow are studied, the implications refer to problems in the organization instead of individual failures. Solutions and tools to these problems are developed, such as offering online booking and self-check-in services to healthcare customers. Lemer et al. (2015)

present two main actions to improve the processes of healthcare in the context of Lean namely process mapping and stakeholder mapping. (Lemer et al. 2015)

5.3 Triage-methods

In emergency healthcare the flow rate of patients can not be planned, and it is possible that the available resources are used beyond their capacity. This leads to ED *crowding.* In ED, triage is a method that is used to evaluate, control and standardize the patient's treatment plan and offer care and resources to patients that are the most severely ill. The five-level triage systems are more valid and reliable methods for controlling the ED patient flow compared to three-level triage systems. (Christ et al. 2010)

5.4 Findings

The findings of the examined medical science publications were collected to the framework and are presented in the table 2.

Table 4. Process framework findings: Medical sciences.

	Process aspect to customer journeys and patient pathways		
Scientific scope	**A. Perspective to customer journeys and patient pathways as processes**	**B. Management of customer journey and patient pathway processes**	**C. Improvement of processes**
3. Medical sciences	• Clinical perspective: treating the illness is central • Patient-centric	• Triage-methods for patient pathway management in ED	• Technical solutions such as online booking and self-check in • Improving patient admission and discharge strategies • Lean-thinking

The combined findings of all the three scientific scopes can be found from chapter six - synthesis.

6. SYNTHESIS OF THE SCIENTIFIC SCOPES

In this chapter the findings of chapters three, four and five are collated and presented. The findings of the three scientific scopes were combined using the process framework for examination of the three approaches and the results are presented in Table 5.

Table 5. Synthesis of the scientific scopes.

	Process aspect to customer journeys and patient pathways			
Scientific scope	**A. Perspective to customer journeys and patient pathways as processes**	**B. Management of customer journey and patient pathway processes**	**C. Improvement of processes**	
1. Business and Service management	• Customer journey is the sum of experiences of the patient • The quality of experience is important to this scope	• Mapping the experiences and events which affect to customer journey in healthcare	• Using more uniform measuring of quality such as the SWB • Building conceptual frameworks for understanding how emotions affect customer journey	**TOT. 1.**
2. Engineering and Operations management	• Technical approach to customer journeys and patient pathways • Information system and process thinking -centered thinking	• Management of the data from electronic healthcare records • Management of information systems processes combined to management of business processes	• By using information systems and process mapping it is able to increase the performance of the patient pathways and decrease unwanted phenomena such as ED crowding and occupancy • Lean	**TOT. 2.**
3. Medical sciences	• Clinical perspective: treating the illness is central • Patients seen as individuals is central	• Triage-methods for patient pathway management in ED	• Technical solutions such as online booking and self-check in • Improving patient admission and discharge strategies • Lean	**TOT. 3.**
	TOT. A.	**TOT. B.**	**TOT. C.**	

This framework can be analyzed by the scientific scope or process aspect. The results and conclusions of this framework are assessed in the chapter 7 – conclusions.

7. CONCLUSIONS

In this chapter, the final conclusions of this Bachelor's thesis are presented. The conclusions came up from the main chapters 3,4 & 5 and the table 5 – Synthesis of the disciplines. First, the conclusions of approach and perspective to customer journeys and patient pathways is assessed, after that the conclusions of management and improvement of the patient pathway and customer journey processes are examined.

Comparing the findings from the table 5 brings forth the differences of how the different scientific scopes see the object of treatment services - patient or customer. In business and service management the patient is referred frequently as customer. In studies from medical and engineering sciences, patient is mainly the word that is used from the object of the care taking in healthcare context. The overall approach of the publications from business and service management was centered in the experiences, emotions and feelings of the healthcare customer. This was different compared to engineering & operations management and medical sciences approach where the approach was more centered in the amount of the patients and available resources, clinical efficacy of the treatment and technical matters.

One hypothesis of this research was that the publications from medical scope are more concerned about the clinical factors than the operational or economic factors. It was interesting to see that in the examined publications of this Bachelor's thesis, the studies from the scope of medical sciences did not overemphasize the clinical factors. It was found out that the reason, why healthcare organizations have not widely accepted the managerial methods such as lean could be because professionals in healthcare experience their processes so unique (Yasin et al. 2002 in Hellström et al. 2010). This can not be argued with the findings of table 5. In fact, one of the publications from medical journals dealt with the transfer of manufacturing processes into healthcare industry (Lemer et al. 2015). Another thing that raised questions was the lack of implications to interest in the costs and improvement of cost efficacy in the context of customer journeys and patient pathways. This can be partly explained by the low numbers of total publications examined in this Bachelor's thesis.

It seems that in healthcare organizations, the biggest effort is in the starting the implementation of process management methods, such as Lean. After the start of the implementation, the second problem lays in the too straightforward adaptation from manufacturing industries to healthcare. On one hand, streamlining separate processes does not give wanted results to the organizations and the development work loses its momentum. On the other hand, too straightforward adaptation leads into using unfit nomenclature and terms for healthcare context.

One observation was that the information systems of healthcare organizations create a vast amount of patient data (Lismont et al. 2016). It is highly possible that a great part of this data is not used. This is an implication that either the data should be used, or the collection of the data should be decreased since in this way, the collection is can be seen as waste of resources. Other found ways to improve the processes were improving the measurement of quality, bringing solutions from other industries to solve problems in healthcare, continue research in order to achieve better knowledge of the customer journey and improving patient admission and discharge strategies.

Limitations

Due to limitations in the scope of this study, only three publications are assessed in chapter three and McColl-Kennedy has been the author in two of these publications. This can be seen as a weakness of this literature review. In defense it must be said that McColl-Kennedy's publications are in the core of customer journey in healthcare and suit the purpose and core questions of this study well.

Another limitation in this Bachelor's thesis work is the amount of examined publications. Due to the maximum length of the thesis, it was not possible to examine as much publications as it would have been necessary in order to enable the full saturation of information in main chapters (chapters 3, 4 & 5).

Implications for Future Research

In the future the research should continue from the same topic, but the research could expand the examined process aspects in the framework of chapter 2. New aspects could be for example process architecture, costs & patient pathway or technology and customer journey. Future research from this topic could also benefit from deeper basic theory of process research.

8. REFERENCES

Bynum, W. (2008). History Of Medicine: A Very Short Introduction, Oxford: Oxford University Press, eBook Collection (EBSCOhost), EBSCO*host*, viewed 4 May 2018.

Christ, M., Grossman, F., Winter, D., Bingisser, R. & Platz, E. (2010). Modern Triage in the Emergency Department, Deutches Ärtzeblatt International, Vol 107(50), pp. 892-1002.

Devaraj, S., Ow, T. & Kohli, R. (2013). Examining the impact of information technology and patient flow on healthcare performance: A Theory of Swift and Even Flow (TSEF) perspective, Journal of Operations Management, Vol. 31(4), pp. 181-192.

Griffin, P, Nembhard, H., DeFlitch, C., Bastian, N., Kang, H. & Muñoz, D. (2016). Healthcare systems engineering, John Wiley & Sons, Inc, Hoboken, New Jersey, pp. 69-74.

Hall, R. (2006). Patient Flow: Reducing Delay in Healthcare Delivery. Boston, MA: Springer Science & Business Media, LLC, pp. 215.

Hellström, A. Lifvegren, S. & Quist, J. (2010). Process management in healthcare: investigating why it's easier said than done, Journal of Manufacturing Technology Management Vol. 21, pp. 499-511.

Hoon, C. (2013). Meta-Synthesis of Qualitative Case Studies: An Approach to Theory Building, Organizational Research Methods, Vol 16(4), pp. 522-556.

HUS. (2018), New Children's Hospital. Available: http://www.hus.fi/en/about-hus/Construction%20projects/New%20Childrens%20Hospital/Pages/default.aspx. [Accessed: 18th of April 2018]

Jones, D., Netland, T & Powell, D. (2016). The Routledge companion to lean management. New York: Routledge, Taylor & Francis Group, pp. 261-270.

Lee, H., Vlaev, I., King, D., Mayer, E., Darzi, A. & Dolan, P. (2013). Subjective well-being and the measurement of quality in healthcare (2013). in: Social Science & Medicine, pp. 27-34.

Lemer, C., Cheung, R., Klaber, R. & Hibbs, N. (2018). Understanding healthcare processes: how marginal gains can improve quality and value for children and families, Arch Dis Child Educ Pract Ed 2016, vol. 101, pp. 31-37.

Li, W. Liu, K. Yang, H. & Yu, C. (2014). European Journal of Information Systems, Vol. 23, pp. 400-417.

Lismont, J., Janssens, A., Odnoletkova, I., vanden Broucke, S., Caron, F. & Vanthienen, J. (2016). A guide for the application of analytics on healthcare processes: a dynamic view on patient pathways, Computers in Biology and Medicine, vol 77 (2016), pp. 125-134.

McColl-Kennedy, J., Danaher, T., Gallan, A., Orsingher, C., Lervik-Olsen, L. & Verma, R. (2017a). How do you feel today? Managing patient emotions during health care experiences to enhance well-being, Journal of Business Research, Vol. 79, pp. 247-259.

McColl-Kennedy, J., Snyder, H., Elg, M., Witell, L., Helkkula, A., Hogan, S. & Anderson, L.(2017b). The changing role of the health care customer: review, synthesis and research agenda, Journal of Service Management, Vol. 28(1), pp. 2-33.

Norback, I., Salo, M., Holmberg--Marttila, D., Päivä, H., Liimatainen, T., Porkkala, T. & Kaila, M. (2010). Kehittämistyössä tarvitaan täsmällisiä termejä, Suomen Lääkärilehti, (17), pp. 1549-1551

Nykänen, O. & Kalliokuusi, V. (1999). Toimikunnista termitalkoisiin: 25 vuotta sanastotyön asiantuntemusta – Sanastotyön sanastoa, Tekniikan sanastokeskus, Helsinki, pp. 170-173.

Qin, S., Thompson, C., Bogomolov, T., Ward, D. & Hakendorf, P. (2017). Hospital occupancy and discharge strategies: a simulation-based study, Internal Medicine Journal, Vol 47 (2017), pp. 894-899.

Roemeling, O., Land, M. & Ahaus, K. (2016). Does lean cure variability in health care?, International Journal of Operations & Production Management, Vol. 37 No. 9, 2017, pp. 1229-1245.

Suneja, A., Suneja, C. & American Society for Quality Staff (2010). Lean Doctors, Asq - American Society for Quality, US,

TEKES. (2017), Lapsus: Lapsiperheiden uudistuva sairaala - Potilaskokemus palvelupolkujen arvon kehittäjänä. Available: https://extranet.tekes.fi/ibi_apps/WFServlet?IBIF_webapp=/ibi_apps&IBIC_server=EDASERVE&IBIWF_msgviewer=OFF&IBIF_ex=O_PROJEKTI_RAP1&CLICKED_ON=&YPROJEKTI=11971219&YTARKASTELU=Z&YKIELI=S&YHANKETYYPPI=11&IBIAPP_app=opendata&YMUOTO=HTML. [Accessed: 18th of April 2018].

APPENDIX A: PUBLICATION SEARCH LOG

	Authors	Year of Publication	Title	Publisher/Vol/No/PP.	Research method	Insights regarding the research questions of the Bachelor's thesis	Alignment to other publications	Limited access to publication	Search engine	Publication Forum grade	Keyword combination
1.	Christ, M; Grossmann, F; Winter, D; Bingisser, R; Platz, E	2010	Modern Triage in the Emergency Department	DEUTSCHES ARZTEBLATT INTERNATIONAL, 2010; 107(50): 892-8	Literature review	Gives insights into triage-methods used in the emergency departments	In align with other studies of Triage, used in this Bachelor's thesis. Compared to other studies, this literature review is more comprehensive	https://www.aerzteblatt.de/int/archive/article?id=79788	ANDOR UTA	1	"Triage"
2.	Griffin, P.M., Nembhard, H.B., DeFlitch, C., Bastian, N.D., Kang, H. & Muñoz, D.A.	2016	Healthcare systems engineering, Chapter 3.2	John Wiley & Sons, Inc, Hoboken, New Jersey,	Book	Gives insights into basic processes of hospital environment	In align with other similar literature	https://ebookcentral.proquest.com/lib/tampere/reader.action?docID=4427253	ANDOR TUT	N/A	N/A
3.	Hellström, A., Lifvergren, S., Quist, J.	2010	Process management in healthcare: investigating why it's easier said than done	Journal of Manufacturing Technology Management Vol. 21 No. 4, 2010 pp. 499-511	Collaborative management research approach	Gives information of how to implement knowledge transfer from manufacturing to healthcare industry	Compared to other studies in this Bachelor's thesis, this study pointed out that organization itself is an obstacle to improving process management	https://search-proquest-com.libproxy.tut.fi/docview/2081887112?pq-origsite=summon& https://search.proquest.com/business/advanced?	ANDOR TUT	1	"Process management " AND "Healthcare"
4.	Hoon, C.	2013	Meta-Synthesis of Qualitative Case Studies: An Approach to Theory Building	Organizational Research Methods 16(4) pp. 522-556	Literature review, Case study	Gives insights of what is meta-synthesis and how to do one	N/A	http://journals.sagepub.com.libproxy.tut.fi/doi/full/10.1177/1094428113484969	ANDOR TUT	2	N/A
5.	Lee, H., Vlaev, I., King, D., Mayer, E., Darzi, A., Dolan, P.	2013	Subjective well-being and the measurement of quality in healthcare	Social Science & Medicine vol. 99 (2013) 27-34	Literature review, Theory building	Gives valuable insights of service management perspective to healthcare processes. Presents a temporal model of patient experience	This study differs from other studies used in this Bachelor's thesis by its focus on studying the subjective-well-being of the patients	https://ac.els-cdn.com/S0277953613005480/1-s2.0-S0277953613005480-main.pdf?_tid=56b9a8a0-074c-11e8-a10a-00000aab0f27&acdnat=1517488697_c618764508666624 7a21d9ecf903410a	ANDOR TUT	3	N/A
7.	Lemer, C., Cheung, R., Klaber, R., Hibbs, N.	2015	Understanding healthcare processes: how marginal gains can improve quality and value for children and families	Arch Dis Child Educ Pract Ed 2016;101:32-37	Case study	Gives insights into ideas how to bring tools for performance imporvements into healthcare industry	This study is in alignment with other studies regarding manufacturing knowledge transfer to healthcare	http://ep.bmj.com.helios.uta.fi/content/101/1/31	ANDOR UTA	1	"Healthcare" AND "Process"
8.	Li, W., Liu, K., Yang, H., and Yu, C.	2014	Integrated clinical pathway management for medical quality improvement – based on a semiotically inspired systems architecture	European Journal of Information Systems (2014) 23, 400–417	Empirical study	Gives insights to combinations of IT-systems and clinical activities in healthcare context	Compared to other studies in this Bachelor's thesis, this study presents the co-design of clinical processes to business processes	https://search-proquest-com.libproxy.tut.fi/docview/1543373668?pq-origsite=summon& http://search.proquest.com/business/advanced?	ANDOR TUT	3	"Healthcare" AND "patient pathway" AND "treatment process"
9.	Lismont, J., Janssens, A., Odnoletkova, I., vanden Broucke, S., Caron, F., Vanthienen, J.	2016	A guide for the application of analytics on healthcare processes: A dynamic view on patient pathways	Computers in Biology and Medicine 77 (2016) 125–134	Case study of the type 2 diabetes mellitus	Gives insights into who improve patient flows trough prosess analytics	The perspective of this study is centered in quite deep level of process analytics in comparison to other studies in this Bachelor's thesis	https://ac-els-cdn-com.helios.uta.fi/S0010482516301986/1-s2.0-S0010482516301986-main.pdf?_tid=06210c14-17a3-11e8-832a-00000aab0f01&acdnat=1519285139_5be270c93ed480475f907c287da48551	ANDOR UTA	1	"Patient pathway*" AND "Improving"

	Authors	Year of Publication	Title	Publisher/Vol/No/PP.	Research method	Insights regarding the research questions of the Bachelor's thesis	Alignment to other publications	Limited access to publication	Search engine	Publication Forum grade	Keyword combination
10.	McColl-Kennedy, J., Danaher, T., Gallan, A., Orsingher, C., Lervik-Olsen, L., Verma, R.	2017	How do you feel today? Managing patient emotions during health care experiences to enhance well-being	Journal of Business Research vol 79 (2017) 247–259	Literature review	Gives important basic insights into customer journey in healthcare to this Bachelor's thesis	This study highlights the importance of emotions in healthcare customer experience	https://www.sciencedirect.com/science/article/pii/S0148296317301108	ANDOR TUT	N/A	N/A
12.	McColl-Kennedy, JR; Snyder, H; Elg, M; Witell, L; Helkkula, A; Hogan, SJ; Anderson, L	2017	The changing role of the health care customer: review, synthesis and research agenda	Journal of Service Management		Highlights the importance of continuing service management research in healthcare	Similar conclusions compared to other research	https://www-emeraldinsight-com.helios.uta.fi/doi/full/10.1108/JOSM-01-2016-0018	ANDOR UTA	2	"Customer journey" AND "Health care" AND "Patient"
13.	Nordback I.,Salo M., Holmberg-Marttila, D., Päivä, H., Liimatainen, T., Porkkala, T., Kaila, M.	2010	Kehittämistyössä tarvitaan täsmällisiä termejä	Suomen Lääkärilehti 17/2010	Literature review, Case study	Present a suitable and updated finnish nomenclature for healthcare systems development work	N/A	https://www.laakarilehti.fi/tieteessa/terveydenhuoltoartikkelit/kehittamistyossa-tarvitaan-tasmallisia-termeja/	Suomen Lääkärilehti	1	N/A
14.	Nykänen, O., Kalliokuusi, V.	1999	Toimikunnista termitalkoisiin : 25 vuotta sanastotyön asiantuntemusta – Sanastotyön sanastoa	Tekniikan sanastokeskus, Helsinki, pp. 170-173.	Book	Definition of terminological work	N/A	N/A	N/A	N/A	N/A
15.	Qin, S., Thompson, C.,Bogomolov, T., Ward, D., Hakendorf, P.	2017	Hospital occupancy and discharge strategies: a simulation- based study	Internal Medicine Journal 47 (2017) 894–899	Simulation study	Gives insights into how medical field manages overcrowding and smoothens patient flows through hospitals	Points out that simple strategies such as 24/7 discharge of patients can significantly decrease overcrowding	https://onlinelibrary-wiley-com.helios.uta.fi/doi/abs/10.1111/imj.13485	ANDOR UTA	1	N/A
16.	Roemeling, O., Land, M., Ahaus, K.	2017	Does lean cure variability in health care?	International Journal of Operations & Production Management, Vol. 37 Issue: 9, pp.1229-1245	Longitudinal field research	Gives insights into how employee-initiated Lean-improvements projects function in healthcare environment	Shows that in most of the Lean implementations the focus is in reducing direct waste and too little efforts are put in to reducing variability and buffers	https://www-emeraldinsight-com.helios.uta.fi/doi/full/10.1108/IJOPM-07-2015-0452	ANDOR UTA	2	Operations management AND "Healthcare process"
17.	Suneja, A., Suneja, C.	2010	Lean Doctors	Asq - American Society For Quality, US	Book	This book gives insights of common problems in healthcare lean implementations	In alignment with other similar literature of Lean in healthcare, but this is not a scientific publication but more like a helping handbook	https://ebookcentral.proquest.com/lib/tampere/detail.action?docID=3002580	ANDOR UTA	N/A	N/A
18.	Torbjørn H Netland, Daryl J Powell, Daniel T. Jones	2016	The Routledge companion to lean management	New York: Routledge, Taylor & Francis Group.	Book	This books chapter "Lean Healthcare" gives good insights and structure to Lean-aspect of the Bachelor's thesis	In alignment with other similar literature of Lean in healthcare	https://libproxy.tut.fi/login?url=https://www.taylorfrancis.com/books/9781317416517	ANDOR UTA	N/A	"The Routledge Companion to Lean Management"