Department of Real Estate, Planning and Geoinformatics

ARVO - Value creation models in real estate business

Tuuli Jylhä and Seppo Junnila

Aalto University
SCIENCE + TECHNOLOGY
RESEARCH REPORT

Aalto University publication series
SCIENCE + **TECHNOLOGY** 16/2012

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Aalto University publication series
SCIENCE + **TECHNOLOGY** 16/2012

ISBN 978-952-60-4756-0 (printed)
ISBN 978-952-60-4755-3 (pdf)
ISSN-L 1799-4896
ISSN 1799-4896 (printed)
ISSN 1799-490X (pdf)
http://urn.fi/URN:ISBN:978-952-60-4755-3

Unigrafia Oy
Helsinki 2012

Finland

441 697
Printed matter

Author
Tuuli Jylhä and Seppo Junnila

Name of the publication
ARVO - Value creation models in real estate business

Publisher School of Engineering

Unit Department of Real Estate, Planning and Geoinformatics

Series Aalto University publication series SCIENCE + TECHNOLOGY 16/2012

Field of research Real estate business

Abstract

The ARVO research project introduces the lean thinking into the field of real estate business (REB). Lean management has been successfully used in other industries, such as in car industry, health care, and construction, but its utilisation in the REB sector is limited. Lean management offers a new approach to create customer value and to improve the value creation processes through waste thinking.

The research project aimed (1) to develop customer value assessment methods in real estate business, (2) to evaluate the value creation of service processes in real estate business organisations from customer value perspective, and (3) to develop a leanREB model to support the value creation in real estate business.

The research project included three case studies. In each case study customer value, the current value creation processes and practices, and the potential improvements were identified related to the selected service process. The analysis presented in this report is based on approx.100 interviews and workshops.

In the customer value identification, the Kano model was concluded to be a useful tool to better understand customer value: what should be offered, what is enough, and what should be avoided. In the future the suitability of the model should be tested more.

The value creation identification shows that the value creation is heavily disturbed in the REB sector. Currently, there are six waste factors that are blocking the value creation. Waste factors briefly explained:

(1) Sub-process focus: The sub-processes are optimised, not the entire value creation process.
(2) Price minimisation: Instead of true cost minimisation, merely prices are minimised.
(3) Unmanaged information flows: The unmanaged information causes potential losses.
(4) Uncaptured true customer value: The customer value is rarely often captured.
(5) The unlevelled workload of employees: The employees have a constant overload of work.
(6) The challenge to realise improvements: The power of continuous improvements is missed.

Three of the waste factors are deeply rooted into the practices of the REB organisations (factors 1-3) and they have a significant impact on the three other identified waste factors that are called outcome waste factors. The relations between the rooted waste factors and outcome waste factors are explained in the leanREB model (version 1.0) through the key components of lean management – customer value, waste and flow, and continuous improvements. However, the leanREB model does not include the case-specific waste types, but merely the most common and significant ones. Therefore, the model should be constantly re-developed.

The results of the ARVO project indicate that there is huge improvement potentials in the REB service processes. The benefits of using lean management can be enormous but it requires a long-term commitment and openness to change the way we think and act.

Keywords lean management, value creation, customer value, leanREB

ISBN (printed) 978-952-60-4756-0 **ISBN (pdf)** 978-952-60-4755-3

ISSN-L 1799-4896 **ISSN (printed)** 1799-4896 **ISSN (pdf)** 1799-490X

Location of publisher Espoo **Location of printing** **Year** 2012

Pages **urn** http://urn.fi/URN:ISBN:978-952-60-4755-3

Tekijä
Tuuli Jylhä and Seppo Junnila

Julkaisun nimi
ARVO - Kiinteistöliiketoiminnan asiakasarvon mittaaminen ja johtaminen

Julkaisija Insinööritieteiden korkeakoulu

Yksikkö Maankäyttötieteiden laitos

Sarja Aalto University publication series SCIENCE + TECHNOLOGY 16/2012

Tutkimusala Kiinteistöliiketoiminta

Tiivistelmä

ARVO-tutkimusprojekti esittelee kiinteistöliiketoiminnan (real estate business, REB) kentälle uuden toimintamallin, lean-johtamisen. Lean-teorian oppeja on sovellettu monella muulla alalla, kuten autoteollisuudessa, terveydenhoidossa ja rakentamisessa, mutta kiinteistöliiketoiminnassa lean-ajatusten soveltaminen on ollut melko rajallista. Lean-teoria lähtökohtana on asiakasarvon luominen asiakkaalle ja samalla prosessien tehostaminen ns. hukka-ajattelun avulla.

ARVO-projektin tavoitteena oli (1) kehittää kiinteistöliiketoiminnan palveluiden asiakasarvon arviointisystematiikkaa, (2) parantaa palveluprosessien tuottavuutta asiakasarvon näkökulmasta sekä (3) kehittää ns. leanREB-johtamismalli.

Tutkimusprojektin aikana tehtiin kolme tapaustutkimusta. Jokaisessa tapaustutkimuksessa analysoitiin valitun palveluprosessin asiakasarvo, nykyinen arvontuotantotapa sekä mahdollisia keinoja parantaa arvontuotantoa. Analyysia varten tehtiin yhteensä n. 100 haastattelua ja työpajaa.

Asiakasarvon määrittelyssä Kano-malli osoittautui hyödylliseksi tavaksi lähestyä asiakasarvokäsitettä. Mallin avulla pystyttiin tunnistamaan, mitä pitäisi tarjota, mitä ei tarvitse tarjota enempää ja mitä kannattaa välttää. Kano-mallin käytettävyyttä tulisi testata tulevaisuudessa enemmän.

Nykyisen arvontuotantotavan analyysi paljastaa kuusi suurta häiriötekijää, jotka hidastavat, haittaavat ja estävät arvonluontia kiinteistöliiketoiminnassa. Häiriötekijät lyhyesti kuvailtuna:

(1) Keskittyminen osaprosesseihin: Osaprosessit on optimoitu, ei koko arvonluomisprosessi.
(2) Hintojen minimointi: Minimoidaan hintoja, ei kuluja.
(3) Johtamaton tieto: Tietotulva ja tiedon puute aiheuttavat potentiaalin menetyksiä.
(4) Saavuttamaton asiakasarvo: Ei tuoteta oikeaa asiakasarvoa.
(5) Työntekijöiden iso työkuorma: Työntekijöillä on jatkuva ylikuorma työstä.
(6) Haasteena parannusten toteuttaminen: Jatkuvaa parantamista ei hyödynnetä.

Kolme ensimmäistä edellä mainituista häiriötekijöistä (1-3) ovat juurtuneet syvälle organisaatioiden käytäntöihin ja nämä juurtuneet häiriötekijät vaikuttavat kolmen jälkimmäisen häiriötekijän (4-6) laajuuteen merkittävästi. Eri häiriötekijöiden suhteita on kuvattu ns. leanREB-mallissa (versio 1.0) leanin kolmen pääkonseptin avulla, jotka ovat asiakasarvo, hukka ja arvovirtaus sekä jatkuva parantaminen.

ARVO-projektin tulokset viittaavat suureen parannuspotentiaaliin, joka sijaitsee kiinteistöliiketoiminnan palveluprosesseissa. Täten lean-teorian käyttö voi tuoda kiinteistöliiketoiminnan organisaatioille merkittäviä hyötyjä, mutta näiden hyötyjen realisointi edellyttää pitkän tähtäimen sitoutumista ja avoimuutta muuttaa ajattelutapaamme ja tapaamme toimia.

Avainsanat lean management, arvonluominen, asiakasarvo, leanREB

ISBN (painettu) 978-952-60-4756-0 **ISBN (pdf)** 978-952-60-4755-3

ISSN-L 1799-4896 **ISSN (painettu)** 1799-4896 **ISSN (pdf)** 1799-490X

Julkaisupaikka Espoo **Painopaikka** **Vuosi** 2012

Sivumäärä **urn** http://urn.fi/URN:ISBN:978-952-60-4755-3

PREFACE

Real estate business has changed its course from a product oriented business to a customer value generating sector. This requires changes in the way of thinking and performing. Lean management offers new concepts and frameworks to actually conduct the change. This was the starting point in the *Value Creation Models in Real Estate Business* research project. During the project the focus has been on defining customer value, understanding how the current value is delivered, and how the current value creation could be improved. This report aims at discussing these issues.

The research is funded by the Finnish Funding Agency of Technology and Innovation (TEKES) and four real estate organisations: Senaatti Properties, Ovenia Ltd., Skanska Ltd., and Ilmarinen Mutual Pension Insurance Company. From these companies a great acknowledgement belongs to Sampsa Nissinen, Auli Karjalainen, Minna Niittyniemi, Kaj Hedvall, Mika Valtonen, Mikko Turunen, Kimmo Virtanen, Jarkko Sipi, Ilkka Romo, Tiina Koppinen, Tomi Aimonen and Ville Laurila. The research team would also like to thank all the interviewees and workshop participants who have contributed to the research on their time.

The research team includes academics from two universities: professor Seppo Junnila, researcher Tuuli Jylhä and research assistants Lasse Forsman, Jan Olin, and Erik Enomaa from Aalto University and professor Edward Finch, professor Lauri Koskela, and researcher Audrey Schultz from University of Salford.

In Espoo 9.8.2012
Seppo Junnila and Tuuli Jylhä

CONTENTS

1 Introduction 3
1.1 Motivation of the research 3
1.2 Aims of the ARVO project 3
1.3 Funding and research resources 6
1.4 Structure of the report 6
2 Introducing a new way of thinking to REB 7
2.1 Value thinking – introduction to the TFV theory 7
2.2 The three lean components for value creation 8
2.2.1 Customer value – what to generate? 9
2.2.2 Waste elimination – what to avoid? 10
2.2.3 Continuous improvements – what to do next? 11
2.3 Summary 12
3 Empirical part 13
3.1 Case studies setting 13
3.2 Research process and data collection 14
4 Results 16
4.1 Customer value assessment methods 16
4.1.1 The Kano model with interviews 16
3.2.2 Other methods 19
4.2 Evaluation of the current value creation 19
4.2.1 OLA -A procedure to evaluate service processes 19
4.2.2 Improvement potential in REB service processes 22
4.3 LeanREB model – How to enhance value creation? 27
4.3.1 Shift from sub-process focus to the entire value creation process 28
4.3.2 Shift from price minimisation to true cost minimisation 30
4.3.3 Shift from collecting data to utilising it 31
5 Conclusions 34
References 37

1 Introduction

This is a report of *Value creation models in real estate business* research project (in Finnish Kiinteistöliiketoiminnan käyttäjäarvon mittaaminen ja johtaminen). In the project, lean thinking has been used as a lens to evaluate the current value creation in the service processes of real estate business (REB) companies and, thus, to challenge the current way of doing and thinking. This report is written for all the REB organisations to gain new insight on improvement potential for their own service processes.

1.1 Motivation of the research

Lean management is not a widely used philosophy in REB although it has been successfully used in other industries such as car manufacturing (e.g. Liker 2004), health care (e.g. Kollberg 2006), and public services (Radnor 2009). The lean&REB literature is limited, but there are some papers that connect lean thinking to REB (e.g. Jylhä and Junnila 2011, Tyldsley 2011, and Vishal 2009). The research related to actual value creation in REB sector is even more limited (Jylhä and Junnila 2011 and Luoma et al. 2011) although it could help companies to improve their service processes dramatically.

Although lean management and the value creation thinking that is based on lean can be seen as a great potential in real estate business sector, lean as such from Toyota's car manufactories cannot be solely copied into the service processes of real estate organisations. The general thinking such as waste reduction, value generation and continuous improvements can be adapted but each real estate company should find their own implementation plan.

1.2 Aims of the ARVO project

Derived from the changing business environment and lean management, ARVO project has three aims:

1. To develop customer value assessment methods in real estate business

2. To evaluate the value creation of service processes in real estate business organisations from customer value perspective
3. To develop a leanREB model to support the value creation in real estate business

The aims were studied in four work packages (Figure 1). The customer value assessment methods (aim 1) and the value creation of the service processes (aim 2) were studied in three cases studies in the work package 1. The value creation of the service processes was also studied in the work package 2, in which it was assessed how virtuality would enhance the value creation. The third aim had an own work package, number 3. This report stresses the third aim (WP 3): it introduces the first version of the leanREB model.

Figure 1 The work packages of ARVO research project.

In addition to this report, there are also other main research outcomes that contribute to the three above mentioned aims. Table 1 illustrates research outcomes and their contribution in ARVO project. The Lean&REB column describes if lean thinking is connected to REB sector in the paper. A list of the publications will be updated to the web pages of ARVO (http://arvo.aalto.fi).

Table 1 The contribution of research outcomes to the research aims in ARVO project.

	Lean& REB	Aim 1	Aim 2	Aim 3
This report	x	x	x	x
Case study reports:				
Case A, non-public	x	x	x	
Case B, non-public	x	x	x	
Case C, non-public	x	x	x	
Doctoral thesis				
Jylhä's dissertation, *in process*				
Schultz's dissertation, *in process*				
Journal papers*:				
Jylhä, T. & Junnila, S. (2011) The end-customer value loss in work environment construction project, Lean Construction Journal, special issues.	x		x	
Jylhä, T. & Junnila, S. (2012) Learning from lean management – going beyond input-output thinking, *accepted 12.8.2012*.	x	x	x	
Jylhä, T. & Junnila, S. (2012) Value creation challenges in a partnership, *in process*	x		x	
Jylhä, T. & Junnila, S. (2012) How to improve value creation?, *in process*	x			x
etc.				
Conference papers:				
Jylhä, T. & Junnila, S. (2012) Using the Kano model to identify customer value, IGLC 20 in San Diego, 18-20.7.2012.	x	x		
Jylhä, T. & Junnila. S. (2012) Partnership practices and their impact on value creation – reflections from lean management, ERES in Edinburgh, 13-16.6.2012.	x		x	
Olin, J. et al. (2012) Virtuality - What does it mean for FM?, CIB in Cape Town, 23-25.1.2012.			x	
Luoma, T. & Junnila, S. (2011) The value flow of a workplace in construction process – a case study, IGLC 19 in Lima, 13.-15.7.2011.	x	x	x	
Luoma, T, Junnila, S. & Forsman, L. (2011) Illustration of value creation in real estate business, ERES in Eindhoven 15.-18.6.2011.	x		x	
Kyrö, R. & Luoma, T. (2010) Linking Lean to Green – Energy Efficiency as a Value Stream, EFMC in Vienna, 23.-25.4.2011.	x			
Luoma, T. et al. (2010) Office occupiers' real estate attributes – identifying occupiers' preferences, FIG in Sydney, 11.-16.4.2010.		x		
Scientific posters:				
Luoma, T. & Junnila, S. (2011) Analyzing the sustainability of real estate business, ISIE in Berkeley, 7.-10.6.2011.	x			
Luoma, T. & Junnila, S. (2011) Analyzing the sustainability of real estate business, SIEYP II in Berkeley, 11.6.2011.	x			
Luoma, T. (2010) Value creation in real estate business, ERES in Milan 23.-26.6.2010. (best poster award)	x		x	
White paper:				
Finch, E. (2012) Lean Thinking in FM, www. http://i-fm.net, 26.7.2012.	x			
Master's thesis:				
Forsman, L. (2010) Arvovirtojen johtaminen kiinteistöliiketoiminnassa	x	x	x	
Olin. J. (2012) Improving Value Creation in Real Estate Business Through Virtuality	x		x	
Enomaa, E. (2012) Defining Customer Value in the Real Estate Business	x	x		

* A full list of the journal papers will be updated to web page of ARVO (http://arvo.aalto.fi). This table presents the publication situation on 1st August.

1.3 Funding and research resources

ARVO research project is funded by Finnish Funding Agency of Technology and Innovation (TEKES). The main research organisation consists of Real Estate Business (REB) team at Aalto University School of Engineering and School of Built Environment at the University of Salford. The project companies of the ARVO research project are Senaatti Properties, Ovenia Ltd., Skanska Ltd., and Ilmarinen Mutual Pension Insurance Company.

The research project lasted 2½ years from autumn 2009 to spring 2012. The project co-operated with University of Salford, UK. Aalto University co-ordinated the project. The research team was:

1. Aalto University
    - Seppo Junnila, professor in real estate business
    - Tuuli Jylhä, researcher and project manager
    - Lasse Forsman, research assistant
    - Jan Olin, research assistant
    - Erik Enomaa, research assistant
2. University of Salford
    - Edward Finch, professor in facility management
    - Lauri Koskela, professor in theory based lean project and production management
    - Audrey Schultz, researcher

1.4 Structure of the report

This report is divided into 5 sections. After the introduction, the theory section introduces a new way of thinking into the field of REB. The third section describes how the research project has been conducted. The fourth section has the most central role; it presents the results. The results chapter is structured according to the aims of the research. Finally, the last chapter presents the conclusions.

2 Introducing a new way of thinking to REB

We all have a way of thinking that is impacted by our own experiences, education, and surroundings, among other things. The current way of thinking guides us in the decision making, planning and implementation. In this research project, lean theory is used to challenge the current way of thinking behind our actions. Next, the value creation thinking from lean management is introduced through Koskela's (2000) TFV theory. After this the three key components of lean management – waste, value and continuous improvements – are introduced.

2.1 Value thinking – introduction to the TFV theory

Koskela's (2000) TFV theory consists of three views: transformation, flow and value. Each concept has its own logic and explains well the differences in the way of thinking.

Transformation (T) view. In T view, products and/or services are produced in a process of transformation: input is given to the process and the process transfers the input to output (Figure 2). In the T view, the production is usually divided into smaller sub-processes that are treated independently: each sub-process is optimised, not the entire value stream. The input-output thinking allows that effectiveness is achieved without improving the actual production: the input/output ratio is the primary tool to monitor effectiveness and it allows making decisions without knowing what happens between the input and output.

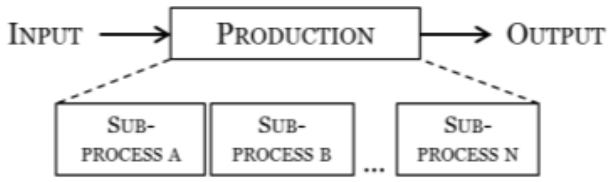

Figure 2 TFV theory – transformation (T) view (Koskela 2000).

Flow (F) view. In the F view, the efficiency improvements are gained through a different path: the non-value adding activities, i.e., waste are

eliminated to make the entire process flow. In other words, instead of focusing solely on improving the activities that create the value, the focus should be on eliminating the non-value adding activities, such as waiting and moving (Figure 3).

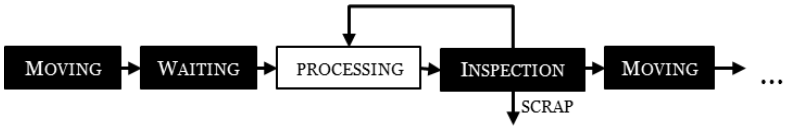

Figure 3 TVF - flow (F) view (Koskela 2000).

Shingo (1989) stated that in the West it is common that the processs, in which the materials are transformed into products, and the operations, in which worker's or machine's actions actually accomplish the transformation, are mixed. This might lead into a situation, in which the individual operations are improved without considering the overall efficiency of the entire process.

Value generation (V) view. The T and F views have focus on the production process. However, making the production efficient does not yet guarantee that value is generated. In the V view, the idea is to avoid possible value losses. Therefore, customers should be listed and, thus, customer value should be captured, produced and delivered (Figure 4).

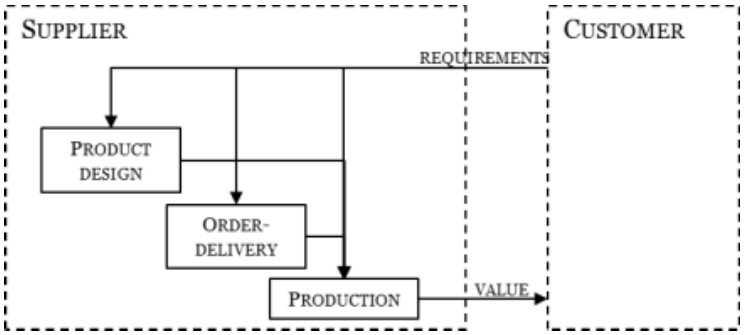

Figure 4 TFV - value (V) concept (Koskela 2000).

The TFV theory does not suggest that the value generation view is the only and at the same time best way to produce services and products. However, it is recommended that the production is a combination of the T, F, and V views. The balance between the different views should be found (Bertelsel and Koskela 2002).

2.2 The three lean components for value creation

Lean management can be defined in several ways. In this research, the role of the three components of lean – customer value, efficiency waste thinking

and continuous improvements – is highlighted to illustrate a solid starting point for value creation.

2.2.1 Customer value – what to generate?

Value is a challenging concept. Value can mean different things but it is often connected to monetary/exchange value, or value in use. In this research, value refers to value in use. For example, the value of premises is not delivered when the lease agreement is signed but when the premises are in use. The customer itself can neither unequivocally be defined: it can be an individual, who is using the premises such as an employee, a guest or a consumer, or a paying organisation. It can also be an environment, society, or someone else.

To better understand the dynamics of customer value, an *attractive quality* theory from a Kano model (e.g. Löfgren and Witell 2005) is adapted. The Kano model works with five quality attributes i.e. customer value dimensions. The dimensions are called (1) attractive, (2) one-dimensional, (3) must-be, (4) indifferent, and (5) reverse (Figure 5). *The Attractive* provide satisfaction when fully achieved but they do not cause dissatisfaction when not fulfilled because customers do not expect them. *The One-dimensional* quality attributes are also called the-more-the-better attributes. These attributes cause satisfaction when fulfilled and dissatisfaction when not fulfilled. *The Reverse* attributes are opposite to one-dimensional attributes: the more a reverse attribute appears, the more dissatisfied the customer is. *The Must-be* attributes are attributes that customers expect and regard as basic attributes. These attributes can cause dissatisfaction when not fulfilled but they cannot cause increased satisfaction. *The Indifferent* quality attributes do not cause satisfaction or dissatisfaction.

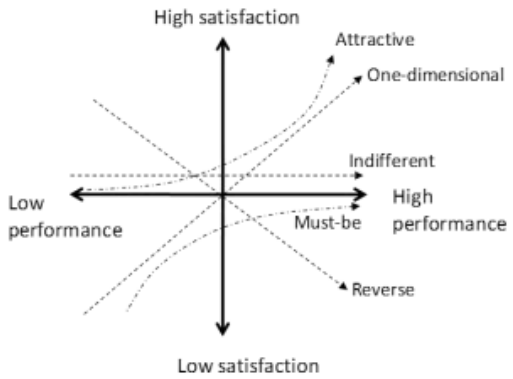

Figure 5 Kano model (Löfgren and Witell 2005).

Customer satisfaction and customer value can be easily mixed. Even though the customer is satisfied, it does not necessarily mean that customer value is increased. For example, when a toilet is broken and cannot be used, the user of the premises is dissatisfied and the broken toilet does not create value for them. However, when the toilet is repaired, the user is no longer dissatisfied but on the other hand the functional toilet does not bring extra increase to the customer value because it is assumed that the toilet is not broken. The increased customer value and satisfaction can be gained through attractive and one-dimensional quality attributes.

Although the identification of customer value might sound easy, this is the most challenging part of the value creation: how to understand and measure customer value? In ARVO project, the ideas of the Kano model were particularly highlighted, but also other methods were used. More information on the other methods can be found from Enomaa's Master's thesis (2012).

2.2.2 Waste elimination – what to avoid?

The waste elimination was briefly introduced in the Koskela's TFV theory. In the F view, the waste elimination has a central role when improving the value creation processes. Waste is activities that should not be done at all. Unfortunately, a lot of what we do is waste or generates waste. In an office environment the typical ratio between value adding and non-value adding activities is (Hines et al. 2008):

- 1 per cent value adding activities
- 50 per cent non value adding but necessary activities
- 49 per cent non value adding activities

Originally waste types have been studied in manufacturing environment. Waste types can be categorised in several ways. Here are presented 11 types of waste found from literature (Ohno 1988; Liker 2004; Bicheno 2004; Morgan & Liker 2006; Hines et al. 2008):

1) Waiting and delays
2) Overproduction
3) Unnecessary inventories
4) Incorrect processing e.g. duplications, inappropriate systems
5) Unnecessary transport
6) Unnecessary motion and movements
7) Defects and errors
8) Unclear communication
9) Making a wrong product or service efficiently

10) Untapped employee potential
11) Opportunity lost

When waste is minimised, there is less to do and the actual value creation takes less time. Rothe (2010) found out that usually the exact opposite is done: the minutes of value-adding time is reduced and the time spent on non-value-adding activities is ignored. However, to solely concentrate on waste elimination does not mean that the value is increased.

The waste elimination has a central role in lean: it assists in making a flow when interruptions in the value stream are reduced. Liker (2004) used the term *one-piece flow* to describe the work performed in different operations and the time spent between the operations.

2.2.3 Continuous improvements – what to do next?

Waste elimination and customer value generation lose their power if they are not done constantly. The needs and requirements of the customers change and the value generation should keep up with the existing needs. Also value creation processes do not stay static, which is why the waste elimination should be continuous. Continuous improvements, in Japanese *kaizen*, keep the dynamics on.

What do continuous improvements then mean? Continuous improvements can be explained through a well-known model called Deming's cycle although Shewhart was the first to present it in 1939 (Imai, 1997). The cycle is presented in Figure 6. In the plan (P) phase, targets are set and an action plan to reach the targets is established. In the do (D) phase, the plan is implemented. After this it is checked (C), if the planned improvements were realised. If the act realised improvements, the act (A) is standardised. If not, a new plan is established. Also the established standards should be developed constantly.

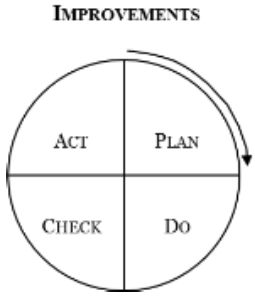

Figure 6 PDCA cycle (Imai, 1997).

Continuous improvements are not a separate project or an event, but it should be integrated with the daily working. It is a built-in mechanism in

workers to solve problems, improve procedures, and work with the daily challenges.

2.3 Summary

To solely concentrate on one of the three components - customer value generation, waste thinking or continuous improvements - long term benefits cannot be realised. When the customer value approach is joined with waste elimination thinking, the production process and other activities are done not just effectively but efficiently. In other words, right things are done effectively. The third component, continuous improvements, creates the self-imposed strive for perfection. Without continuous improvements, the benefits of value and waste thinking will not sustain. Continuous improvements are required to get the wheel going on (Figure 7).

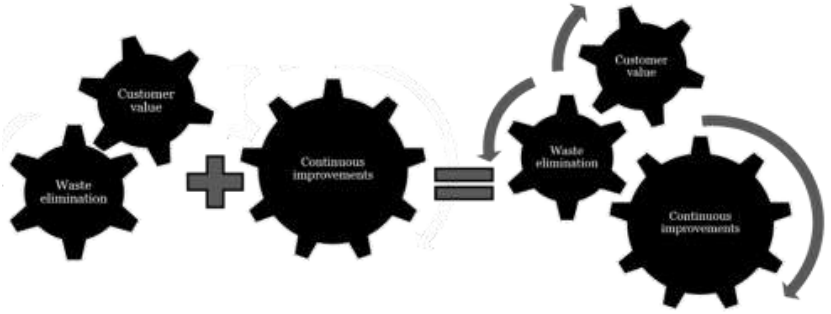

Figure 7 Three key components in lean management.

3 Empirical part

The data has been collected in a case study setting. In ARVO, three case studies were conducted. The data collection was a long period: the first kick-off meeting in the first case study was in January 2010 and the last interview in the last case study was arranged in February 2012.

3.1 Case studies setting

In all the three case studies, the value creator(s) and customer was identified and then depending on the preferred focus the actual value creation process was selected. Table 2 clarifies the previously mentioned aspects in each case. After this, each case is briefly introduced.

Table 2 Case study setting.

	Case A	Case B	Case C
Value creator organisation (s)	Real estate owner and its manager	Property assets manager	Construction company
Customer	Office user organisations in the Helsinki CBD	Research institute and its researchers	Nursing home companies and their nursing staff
Service/ Product	Taking care of the customer after signing a lease agreement	Strategic workplace management (SWM) service	Development project when establishing a new nursing home
Focus in the process assessment	How the value of caretaking is delivered in a request process?	How the value of a SWM service is delivered and managed before and after the construction?	How the value of a nursing home is delivered and managed when establishing a nursing home development project?

Case A – value of caretaking service in an office. In case setting A, the owner and manager aim at creating the value in a partnership for the customer. The customers are one of the demanding office tenants in Finland: they pay the highest office rent in Finland and they know it. The

focus in the case was on the caretaking, i.e., after the lease agreement has been signed. This is the period when the customer actually experiences the value of the premises and related services and caretaking (value in-use).

Case B – value of workplace. In the case study B, the property asset manager provides strategic workplace management (SWM) service to the customer. The value creation of the SWM service was studied in a larger process because the SWM was part of the particular process. Also in this case, the customer was demanding and the customer's real estate unit was aware of the impacts that premises can have on the performance of the employees.

Case C – value of nursing home. Case C focuses on nursing homes and related needs. In the case, the construction company establishes nursing home projects. In Finland, the population is aging and new premises to provide better nursing services are required. Although the demand is high, the process to get permission and to start the construction is complex. Therefore, the focus was on the value creation in the establishment phase: How the value of a nursing home is delivered and managed when establishing a nursing home development project? A special attention was on building information modeling and how it could provide richer customer value.

3.2 Research process and data collection

All the three case studies followed the same research process with the same data collection methods. A detailed description is presented in Section 4.2.1. The main data collection methods were interviews and workshop working (Table 3). The research process had three main phases according to the research questions:

(1) *How the customer perceives the value?*
The identified customers were interviewed to understand what should be created for them. The interview included a questionnaire based on a five dimensional Kano model and open-ended questions.

(2) *How the value has been created currently?*
The employees of the case organisations (=value creator) who actually perform the tasks that delivers value were interviewed to understand how the value is currently created.

(3) How the value creation could be enhanced?

The customer value and current value creation processes were assessed in joint workshops with the value creator organisation and customer. In addition to workshops, several brainstorming sessions were conducted within the research team.

Table 3 Data collection in the case studies.

Data collection method	Case A	Case B	Case C	Total
Pre-interviews	4	6	2	**12**
Value interviews	7	13	20	**40**
Value creator interviews	11	13	12	**36**
Workshops	2	1+1	1+1	**4+2**
Post-interviews	3	1	1	**5**
Quantitative data	yes	yes	no	
Total	**27**	**34+1**	**36+1**	**97+2**

4 Results

Next, the results are presented related to the three aims of the research project. First the results related to the customer value assessment are presented. After this the results on the current value creation of the service processes are described and finally, the first version of the leanREB model is introduced.

4.1 Customer value assessment methods

There are several ways to define customer value. In this report a special emphasis is on the Kano model. According to Appel-Meulenbroek (2008), Pen (2002) has used Kano model in his dissertation (in Dutch) and later Appel-Meulenbroek (2008) used the same ideology when identifying what pushes tenant away from the premises, what keeps them in the premises and what pulls tenants into other premises. Otherwise, Kano model is not a well-known or well-used method in real estate business or in the built environment.

4.1.1 The Kano model with interviews

The Kano model was selected as one of the methods in ARVO project because it provides information on what should be offered, what is enough, and what should be avoided. In other words, it provides a new approach to understand customer value and it does not solely concentrate on the past performance but has an outlook into the future.

The Kano model in practice. The main idea and dimensions of the Kano model are explained in the theory Section 2.2.1. In practice, the different quality attributes are divided into five dimensions through a duo of questions and given answer options. Figure 8 illustrates the type of the question duo and the answer options. After the interviewee has given responses to the questions, an evaluation table (example in Figure 8) is used to classify the responses.

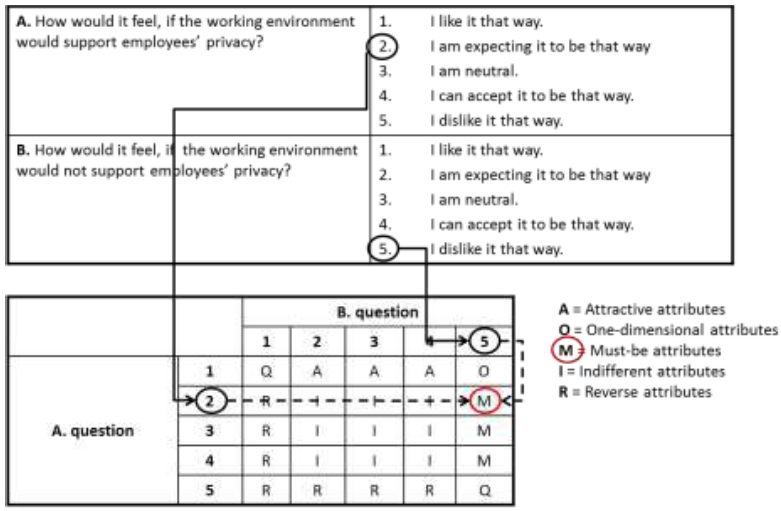

Figure 8 Evaluation table of the responses in the Kano model (Löfgren and Witell 2005).

The usability of the Kano model. In the ARVO project, a Kano model based questionnaire was built three times in three case studies. Figure 9 presents the results of the usability assessment (combination of researcher and interviewee perspectives) of the Kano model based questionnaire.

STRENGTHS	WEAKNESSES
- From respondents' perspective: ○ Easy to answer. ○ Have focus on the future, not on the past activity. - From researchers' perspective: ○ Layout of the questionnaire is simple. ○ Categorising of the answers is straightforward. ○ Gives a new approach to assess customer value.	- From researchers' perspective: ○ Need to limit the number of questions due to the ○ length of the questionnaire ○ form of the questions ○ Takes time.
OPPORTUNITIES	**THREATS**
- From case organisations' perspective: ○ The attractiveness of new ideas can be tested. ○ Access close to the customer interface.	- From researchers' perspective: ○ Questions can be formulated incorrectly ➔ the answers cannot be assessed ○ After a while the respondent does not read the 2nd question ➔is the answer given to the right question? ○ Missing open-ended questions may cause difficulties when interpreting the results.

Figure 9 SWOT analysis on the use of the Kano model.

To summarise, the respondents felt that the questionnaire is easy to fill and the form of the questions is easy to understand although they were not familiar with it before. There are also some drawbacks that questionnaires usually have: the number of the questions must be limited, otherwise the questionnaire will be too long. Also the form of the questions (How would it feel…) creates limitations. For example, it is challenging to ask opinion on precise numbers such as rent levels (e.g. 18 euros / sq m / m) or areas of the space (e.g. 20 sq m).

In the ARVO project, the Kano model based questionnaire survey was joined with open-ended questions. The open-ended questions assisted in interpreting the results especially in the first two cases.

In the future the suitability and applicability of the Kano model should be studied more in our field. For example, if the same questionnaire is conducted with a continual frequency, would it capture the change in the customer value?

The results of the Kano model. In total three different Kano model based questionnaires were formed. Next, the key results of the questionnaire and interviews are briefly presented.

In the case A, the customer value interviews and questionnaire survey were focused on office occupiers' experiences of being served (feeling from care taking). In total 7 customers filled the questionnaire and were interviewed. According to the analysis, there are three things that the customers expect and one thing that the customers find attractive. First, the customers expect fast and individual service with short delays. Second, the customers also expect to have real time information: when the broken door will be fixed, how it will be fixed, and who will fix it. Third, the customers expect that the contact people are available. The previous three issues cannot provide high satisfaction, but the fourth issue can: the customers would be attracted if she/he would receive customer oriented reaction instead of the typical engineering reaction. This would create a feeling of good service.

In the case B, eight office users and five representatives of the customer's real estate unit (in total 13 respondents) were asked how they perceive the value of workplace. The users and real estate representatives did not emphasise on the same issue. Users expect a working environment that offers possibilities for (1) spontaneous and confidential discussions with colleagues without disturbing others, (2) mobile working, (3) concentration, and (4) personalising an own space. On the other hand, the CREM-unit expects (5) fast information and regular communications from the landlord on working environment issues, (6) green agreements, (7) landlord's visible role in defect and fault situations in a physical working environment, and (8) the possibility to conduct confidential research in the premises.

In the case C, the focus was on building information modelling (BIM) and how it could generate value for the customers and how the customers would perceive the value. The customers were nursing home companies and their staff. In total 20 interviews with the Kano model based questionnaire were conducted in ten companies. From each company one decision-maker and one nurse filled in the questionnaire and discussed the interview questions. The results of the 20 interviews can be summarised into four points. In general, the opportunities that BIM brings were seen highly attractive; the customers do not expect (not yet!) the benefits that BIM could offer, and therefore, it could bring *richer customer value*. First, BIM would help to get the details right and details have a crucial role in nursing homes. Second, the customers were especially attracted by the idea that BIM is used not solely to get the technical details right but also to make the nursing processes more efficient. BIM was also seen as a great way to enhance collaboration between the customers, architects and construction company due to its visualisation possibilities. This would help to do the things right in the first place.

3.2.2 Other methods

In the ARVO research project, the customer value assessment methods were collected and tested in a Master's thesis of Erik Enomaa. The thesis can be found from the ARVO's webpages (http://arvo.aalto.fi).

4.2 Evaluation of the current value creation

In this section the results of the current value creation in the REB service processes are presented through two sub-sections. The first section describes how to evaluate the value creation in the service processes in REB and after this the improvement potential in the service processes is presented through the nine identified waste factors, which are preventing the value to flow.

4.2.1 OLA -A procedure to evaluate service processes

In the research process a procedure to evaluate and analyse the current value creation processes was developed. This procedure is called *operational lean analysing* (OLA) model. OLA model is illustrated in Figure 10 and described next in more detail.

Figure 10 Operational lean analysing (OLA) model.

The OLA model comprises nine phases. The model presents the phases in a chronological continuum but in practice some of the phases are executed as parallel phases. Especially phases 3 and 4 are executed at least partially at the same time when the current state of customer value (phase 3) and value creation (phase 4) are studied. This is also highlighted in Figure 9.

The procedure begins by selecting a service process. After this the research team with the case organisation(s) defines aim and scope for the selected service process, and identifies who the customer is. All this is done in a kick-off phase. When the procedure goes on, the aim and scope are elaborated, but they should not change completely in order to avoid jeopardising the evaluation. After the kick-off phase, more background information is required on the social structures, power dynamics, and contractual responsibilities. This phase also assists in identifying a range of interviewee candidates for the next two phases.

After creating the basic understanding on the case, it is possible to begin to gain more detailed information on the current state. In an optimum case, a deep understanding on the customer value is gained (phase 3) before visualising the current value creation process (phase 4). Customer value is identified to understand what should be provided in the selected service process. The OLA model suggests that the customer value is defined by asking it from the actual customer through the Kano model based questionnaire and open-ended interviews. Of course, other methods can be also used.

In addition to identifying customer value, a parallel phase is conducted to understand how the customer value is currently created. This is done by interviewing the value creators, i.e., those people who are actually creating the value in the case organisation(s) for the customer. As an outcome, value stream maps and descriptions are made to illustrate the current value creation process.

Because phases 3 and 4 can be conducted based on the information gathered and issues decided in the phases 1 and 2, they can be conducted as parallel phases. However, it should be noted that if the aim and scope are poorly structured or the background information misguides, the research team might end up in a situations that it has studied customer value that is not planned to be delivered through the selected service process. Because the aim and scope are heavily based on the customer value delivery, the model recommends that the customer value defining phase is at least started before studying the current value creation.

After collecting the data in the phases 3 and 4, it should be analysed. The analysis includes several phases but the value workshops are central milestones to rhythm the analysis phases. First, the data should be

structured to serve the first 1½ day long value workshop with the case organisation(s) and their customer and, thus, a description of the customer value and value stream maps are formed (phase 5). From researchers' (= facilitators in the value workshop) perspective, the goal of the first value workshop is to verify and supplement the results of the previous phases. However, from the perspective of case organisation(s), the interest is on how the service process is structured, can the service process deliver the identified customer value, and how to improve the service process and related practices.

After the first value workshop, the researcher(s) makes a more comprehensive analysis of the case and recognises the main improvement potential by using lean management as a lens. Based on the analysis, key value creation policies to improve the value creation are established for the case organisation(s). The key value creation policies are then presented and discussed in a smaller ½ day value workshop to get feedback and continue the discussion. After this, the researcher should evaluate the success and impact of the procedure for self-learning. Finally official and unofficial check-points should be repeated to keep in touch with the process.

The procedure usually lasts approx. 1 year. It offers a great possibility to dive into the real life with real people and gain deep understanding on the current value creation practices. The primary data is qualitative although opportunities to collect quantitative data, such as lead times and number of work orders, as secondary data are recommended to harvest. Although the procedure requires time, the procedure does not heavily disturb the daily working of individual workers in the case organisation because the time required for the interviews is divided among many employees. At the end of the project, it is crucial that the management who participates in the value workshops are motivated and committed to the projects. Otherwise, the realisation of the benefits is difficult. The researcher should also avoid being treated as a consultant: usually the best practical solutions are invented by those people who know the daily working best.

4.2.2 Improvement potential in REB service processes

In each case, improvement potential can be found. From lean perspective a fundamental challenge is the amount of waste that exists in the value creation process. Waste disturbs the flow and prevents the value creation in the REB service processes. If the waste could be removed, REB organisations would gain huge improvement potentials such as more efficient processes, more satisfied employees, and more loyal customers. Next, the identified six fundamental waste factors that are disturbing the value creation are presented in more detail (Table 4).

Table 4 Six fundamental waste factors in REB.

	Cases		
SUB-PROCESS FOCUS	**A**	**B**	**C**
The work, that creates the value, is done in separate sub-processes by different people without a comprehensive management.	x	x	x
The goal of the sub-process does not always aim for customer value delivery, but to deliver a report, to sign an agreement, to deliver a building, etc.	x	x	x
The doing is not integrated, but the results are.	x	x	x
PRICE MINIMISATION	**A**	**B**	**C**
Heavy use of time-consuming bidding with the aim of price minimisation.	x	x	x
Conflicts between the stakeholders - whose value is captured?	x	x	x
UNMANAGED INFORMATION FLOWS	**A**	**B**	**C**
At the same time flood and lack of information.	x	x	x
Information is lost.	x	x	x
Information is scattered or it is not documented at all.	x	x	x
Some of the potential of software systems is lost, because the systems are used improperly.	x	x	x
Information chains are long.	x	x	x
The heavy use of emails to communicate and manage projects.	x	x	x
Customer does not know that the value is already delivered.	x		
TRUE CUSTOMER VALUE STAYS UNCAPTURED	**A**	**B**	**C**
The requests, expectations or wishes of the customer are misunderstood and, thus, in the service/product wrong activities are done.	x	x	x
Customer does not know that the stated requests, needs, and wishes do not create value for them.	x		x
The value delivery process does not respond to the rapidly changing needs of the customer.	x	x	x
The contact people are unavailable.	x	x	
Customer does not know who to contact.	x		
THE UNLEVELLED WORKLOAD OF EMPLOYEES	**A**	**B**	**C**
The continuous overload and peaks of work frustrates employees.	x	x	x
A great deal of waste activities (e.g. improper software systems)	x	x	x
Some employees are especially stressed due to their node status.	x	x	
The employees vote with their feet.	x	x	x
CONTINUOUS IMPROVEMENTS ARE CHALLENGING TO REALISE	**A**	**B**	**C**
Best practices are not shared systematically.	x	x	x
The power of standardisation is missed.	x	x	x
Decision-making and doing are separated.	x	x	(x)

1st waste factor: Sub-process focus. The value creation in REB is structured through sub-processes. In each sub-process the person in charge is changed; after doing his/her tasks, he/she hands over the value creation to the next person in charge. Because of the hand-overs, the flow is interrupted. In each sub-process, the people in charge aim to optimise their

sub-processes without knowing how the actions impact on the next sub-processes.

The sub-processes may have goals that are usually linked to the outcome of the sub-process such as writing a report or signing a lease agreement. Unfortunately, the goals are usually not derived from the customer value. Therefore, the goals do not necessary instruct to deliver customer value but for example to follow a contract or to deliver a report.

As described above, each sub-process usually generates an outcome such as a plan, a decision, or an agreement. After the separated sub-processes have generated their separate outcomes, they should be combined together. This can be problematic.

2nd waste factor: Price minimization. As in many other sectors, cost minimisation has strongly guided the decision-making in the REB sector. When having a closer look into the underlying practices, it becomes evident that currently the actual costs are not minimised, but the merely the prices. In lean management, costs are usually minimised through waste minimisation: when waste is eliminated, the actual costs are eliminated too. Because waste thinking is not widely applied in the REB sector and the pressure to minimise costs is high, organisations might end up doing the same activities with fewer resources. If the actual value creation process is not changed, the actual costs are not minimised either.

One major practice that escalated the price minimisation is bidding. Bidding is heavily used in the REB sector: most of the services are outsourced and, thus, are purchased through bidding with short-term service contracts. In the daily life of a REB employee, bidding is very time-consuming and causes a lot of waiting for the customer. Also short-term contracts do not encourage service providers to invest in improvements that might bring true cost reductions, because of the temporary nature of the customership. It is obvious that the current bidding practices with the aim to decrease prices are not sustainable. However, it is not argued that bidding should be totally rejected.

The self-interest in the price minimisation is well presented when the interest of two or more stakeholders is in conflict. For example, if a single employee in an office makes a work order to install a new microwave oven, the fast and user-friendly way that most likely would increase the customer value would be giving the work order to a maintenance man who would install the new appliance. Currently, installing a microwave is not always as simple as described because there are other stakeholders involved. Before the actual installation can be done, there might be other activities, such as checking contracts for who is responsible for the installation, contacting the

service providers, asking for bids, comparing the bids etc. that the owner of the premises, the real estate unit of the user organisation or some other party might require. Usually, the other activities at least delay the value delivery to the end-user, while the other stakeholders have been ensuring that they have the least high prices.

3rd waste factor: Unmanaged information flows. Currently, a lot of information exists. Some of the information is captured and some of it is not. Paradoxically, at the same time there is an overload of information and a lack of information.

Information has a central role in the value creation: it makes people do their tasks, which should create customer value. If the information is not available or correct or it is lost, value cannot be captured. The case organisations have already noticed the problem and begun to use software systems to harness the information that is scattered among the people. However, when using several software systems improperly, the information is still scattered. Therefore, value creators spend a lot of time searching for information through the improperly used software systems.

The sub-processes also require that the information is chained from one sub-process to another. For example, the information can be chained from the tenant to the helpdesk, from the helpdesk to the manager, from the manager to the supervisor of the maintenance man, and from the supervisor to the maintenance man. Along the chain, the information may not stay the same.

Currently, emails have a central role when delivering or asking for information. The use of emails makes information difficult to manage but still they are utilised in many contexts: in communication, monitoring, checking, purchasing, signing contracts, managing projects, and informing the customer, to name a few. It seems that emails have become the plague in the daily life of the REB employees. Parallel ways for communication are required.

After the value is delivered, e.g., the doorbell is fixed or microwave is installed, it is neglected to inform the customer. If the information is not delivered, the customer may remain thinking that the request or work order that she/he gave, has no impact on the value creation.

4th waste factor: The true customer value stays uncaptured. Although it sounds simple, one of the most challenging tasks is to capture customer value. In the research project the customer varied in each case, so it is not specified here who the customer is, but there are many excuses why the customer value stays uncaptured. First, sometimes the value creator

misunderstands the customer value. Because unrequired value is attempted to be realised, a lot of waste activities are generated. Second, customers do no always know beforehand what features of the product or service will create true value for them. Usually after a service or product is delivered, the customer can estimate if it delivered the value. When the value is delivered, the customer is the best person to estimate how successfully the value was delivered. Third, organisations are not stable but constantly changing as is the business environment around them. Sometimes the customer value and related requirements and attractions change so fast that the value delivery lags behind. Fourth, the customer value stays uncaptured if the tenant cannot contact the value creators. This contact would start the value creation. Similarly, if the customer does not know, what to do or whom to contact, the problem remains. Moreover, the customer is not satisfied.

5th waste factor: The unlevelled workload of employees. In REB, the workload of employees is not levelled. Unfortunately, the peaks of work are continuous, not just temporary. Based on the analysis, it is clear that one reason for the overload is the waste activities that should not be done at all. For example waiting does not create value for the customer. However, many employees do a lot of time-consuming checking that results in waiting for the customer because of the improper use of software systems: the information is not easily available and, thus, the employees make extra phone calls and send extra emails.

Especially among the employees, who have a so-called node position (i.e. everything goes through them), the inefficiency can cause a lot of negative stress because taking care of a small task might require plenty of extra work. If the small task needs to be conducted in 30 properties, the stress continues increasing.

The overload causes a lot of frustration especially when the value creator sees the waste but cannot remove it. Employees might feel that they have no other option that changes the workplace in order to decrease their own workload. This is realised as a high turnover of employees. When an employee is lost, interruptions are evident in the value stream.

6th waste factor: Continuous improvements are challenging to realize. In REB and other sectors, improvements are usually done in projects. The idea that employees could actually do continuous improvements in their daily working is missed, although employees develop their own practices constantly and, thus, develop their own best practices. However, an information loop is missed and, thus, best practices are not

shared efficiently but the wheel is invented over and over again. Another issue that does not support sharing of best practices is related to non-standardisation. Because everybody does their work differently, it is challenging to implement improvements because there is no basis for them.

Third point that does not necessarily support implementing improvements is that the decision-making is separated from doing. When people, who do not know most of the activities on the operational level, make the decisions, it can be assumed that some improvement ideas are challenging to get positive decisions.

Other waste factors. The above mentioned list of waste factors is not all-inclusive but presents the issues that are currently heavily disturbing the value creation. Especially the case-specific waste factors are not included in the discussion.

4.3 LeanREB model – How to enhance value creation?

The previous chapter describes what is interrupting the value creation in the REB sector. Six waste factors were identified to disturb the value creation. The further analysis showed that three waste factors are deeply rooted into the practices of the organisations (hereafter called *rooted waste factors*). The rooted waste factors impact heavily on the magnitude of other identified waste factors (hereafter called outcome waste). In other words, there are relations between the six waste factors. In the leanREB model, the relations between the rooted waste and outcome waste factors are explained through the key three components of lean management – customer value, waste and flow, and continuous improvements.

The rooted waste factors are called sub-process focus, price minimisation, and unmanaged information flows. The effect of the rooted waste factors is seen in the outcome waste factors, which are uncaptured customer value, constant overload of work, and lost potential of continuous improvements. For example, the separate sub-processes define how successfully the customer value is captured. Typically customer value encapturing is enhanced by being closer to the customer or trying new methods to identify the customer value. However, this is not enough, if the sub-processes are allowed to crumble the intention of the typical improvement attempts. Therefore, it is necessary to eliminate or at least reduce the rooted waste factors. The leanREB model suggests three shifts (Figure 11) that would enhance the value creation. The shifts are

(1) shift from price minimisation to cost minimisation,
(2) shift from optimising sub-processes to make the entire process flow, and

(3) shift from data collection to utilising it.

The leanREB model is not an all-inclusive model but describes the major fundamental shifts toward enhanced value creation in REB. Next, the shifts are described in more detail.

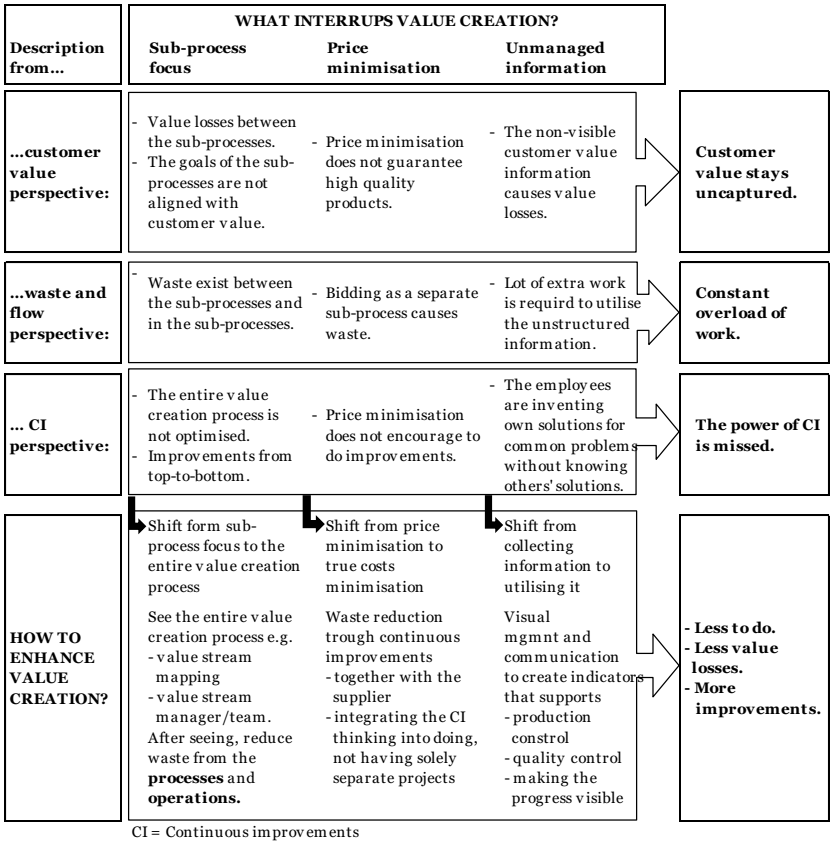

Figure 11 LeanREB model, version 1.0.

4.3.1 Shift from sub-process focus to the entire value creation process

What does this mean? The sub-processes cause a lot of value losses, waste and other interruptions in the value creation process. Although the impacts of sub-processes have existed for a long time, it has been difficult to see them because the current thinking encourages focusing on the operations, not on the entire process. Shingo (1989) has also noticed a similar kind of impact. He explains that the mistaken assumption misleads us to improve the overall efficiency of the process flow by improving individual operations (=sub-processes).

The sub-processes affect the value creation in many ways. First, waste activities from the sub-processes cause a heavy overload of work. In other words, because of the sub-processes, a lot of activities are performed that should not be done in the first place. Second, the sub-processes are also one of the main reasons why the customer value stays uncaptured: the goals of the separate sub-processes are not aligned with customer value and the customer value might not be visible in all sub-processes.

How lean suggests enhancing the value creation? To minimize the workload that is caused by the waste activities and to avoid value losses, lean suggests creating a flow. To make it flow, waste should be identified and eliminated. The suggested value enhancement is illustrated in Figure 12.

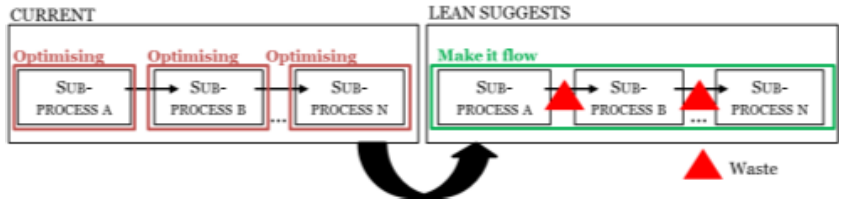

Figure 12 Shift from optimising sub-processes to make the entire process flow.

To achieve a flow, Womack and Jones (1996) advise to ignore traditional boundaries of tasks, operations, jobs, functions, divisions, and companies. Shingo (1989) highlights that waste should be identified and eliminated on two levels: on the process level and on the operation level. He suggests process improvements through two ways: (1) improving the process methods through waste thinking and (2) improving the product itself. In REB sector a great deal of interest has been aimed at improving the real estate, premises or service itself (improvements suggestion 2), but the process methods lag behind (improvement suggestion 1). According to Shingo (1989), process improvements include improvements in inspections (e.g. self and source inspection) and transportation and movements (e.g. improving the layout), but also in eliminating of storages (e.g. through levelling and synchronisation). Waste should also be removed in operations. Shingo (1989) classifies the operations into for groups:

1. *Setup operations* that means the preparations before and after operations (e.g. asking for bids and handling invoices)
2. *Principal operations* that actually performs the work (e.g. fixing a broken doorbell and painting a wall)
3. *Margin allowances* that are activities indirectly related to work (e.g. finding information from the databases and travelling to have a meeting)
4. *Personal allowances* are activities that are not related to the work (e.g. an employee having a coffee break or going to the toilet)

In the REB sector, the focus is often on principal operations, but the greatest potential of waste reduction actually exists in setup and margin allowances activities.

Because waste elimination does not guarantee that value is not lost, attention should be also aimed at making the customer value visible along the entire process. The visuality is discussed in more detail in Section 4.4.3.

4.3.2 Shift from price minimisation to true cost minimisation

What does this mean? As described in Section 4.3.2, the intention might be costs minimisation but in the current value creation only prices are minimised. Lamming (1993) described a same kind of problem in his dissertation. For example, when a real estate owner is calling bids to renovate its tenants' premises, the winner usually is the one who has the lowest price tag in the bid. The lowest price tag does not guarantee that the costs generated in the renovation are the lowest. Neither does the lowest price tag guarantee that the value of renovating services is the most suitable for the real estate owner or the tenant. Neither does the lowest price tag encourage for continuous improvements nor does it decrease the workload of the employees. According to Lamming (1993), the bidding merely forces to cut the margins of the supplier, not the actual costs. If the focus would be on true costs, which are generated in the renovation process, great efficiency gains would be achieved.

How lean suggests enhancing the value creation? According to lean, to make the shift from price minimisation to cost minimisation, waste thinking with the striving for continuous improvements are required to do together with the partners. The basic idea of continuous improvements is presented in section 2.2.3 through the PDCA cycle (plan-do-check-act). The starting point in the suggestion is that because waste consists of activities that should not be done in the first place, it should be minimised. When waste is minimised, also the true costs are minimised.

Currently, REB organisations are following the PDCA cycle to some extent, but long-term improvements are required. Figure 13 illustrates the current use and how lean management suggests utilising the cycle.

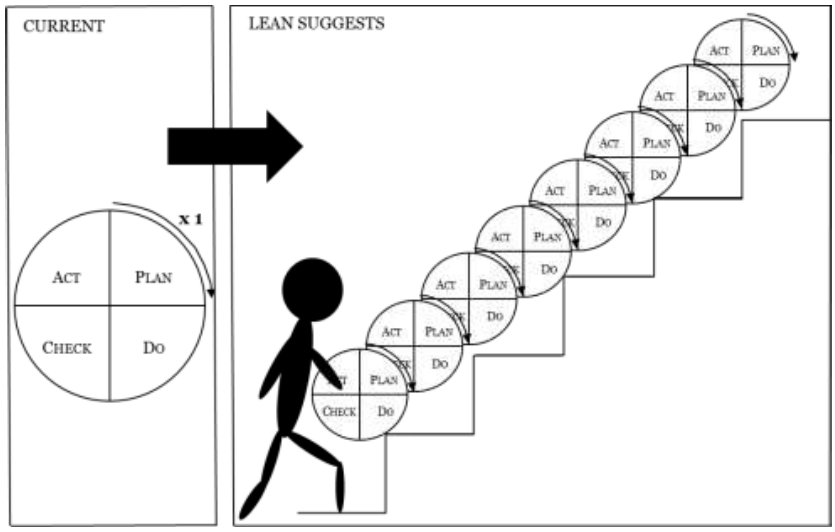

Figure 13 Shift from price reduction to true cost reduction through continuous improvements (adapted from Rothe 2010).

A major challenge in the REB sector is that improvements are developed in single-use projects and the PDCA cycle in the projects makes only one circle. The idea of continuous improvements is to use the cycle all the time. Rothe (2010) explains well the difference of using the cycle once or several times. Let us use Rothe's getting-up-and-going-to-work example. The target in the morning is to be in the car and ready for work in 60 minutes after waking up. Taking the PDCA cycle once means that the time is checked twice: at the beginning (=when waking up) and at the end to measure the outcome (=when sitting in the car). However, at this point if the morning routines have taken 65 minutes, there is nothing that can be done to reach the 60 minute target. Lean suggests constant checks and, thus, learning and adapting from the previous checks. In other words, the process where the morning routines are conducted should be constantly checked and the act should be aligned with the issues that have been learned from the checks.

Currently in the REB sector the PDCA cycle is mainly used for measuring the outcome (=what is the time when I am sitting in the car). When the outcome is solely measured, there is little information to improve the process. A true PDCA cycle means more learning and doing continuous improvements together.

4.3.3 Shift from collecting data to utilising it

What does this mean? Currently in the REB sector, a great deal of information exists and is collected. However, the utilisation of the data lags behind: the collected data is not easily found and neither is it in a form that enables easy usability. If the property manager sees only long tables, but the tables are not easily interpretable, the information cannot guide the

property manager. A huge potential is missed and at the same time a great amount of waste is created, because employees are spending time when typing, searching, and trying to interpret the information.

How lean suggests enhancing the value creation? Lean management encourages using visual management as a way to harness the lost potential of information and to reduce waste. Instead of providing long reports that are stored in databases (like this report), the information can be provided to the employees without a search. Figure 14 illustrates the sustainable meaning of visual management in lean management.

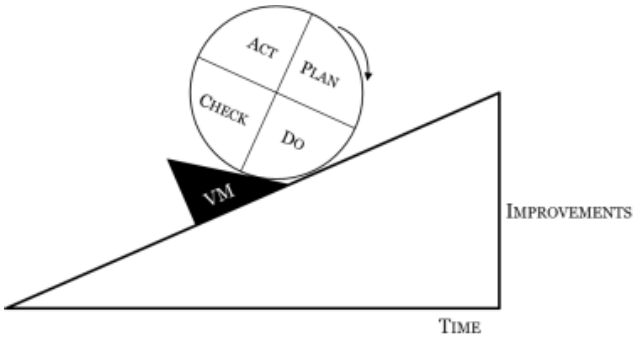

Figure 14 Visual management (VM) sustains lean improvements (adapted from Brady 2012).

Greif (1992) explained the role of visuality also through the PDCA cycle although in this case it is called SDCA circle (Figure 15).

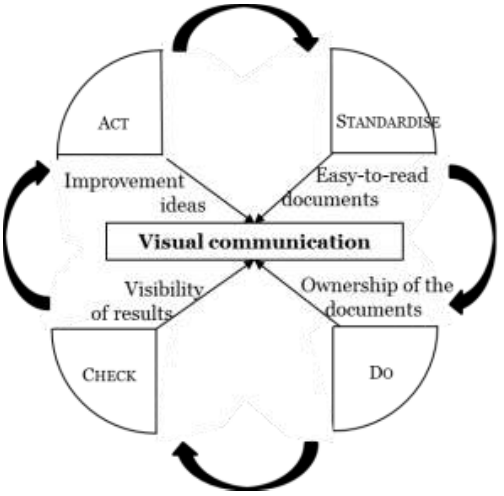

Figure 15 Shift from collecting data to utilise it (adapted from Greif 1993).

In the SDCA circle, the plan (P) of the PDCA cycle is substituted with standardise (S). This is because a way of working proved to be useful and it was standardised as a best practice. However, in lean management

standards are not created to last, but a good standard constantly evolves. Figure 15 illustrates that standards are needed to progress (Greif 1991): if the standards are not visible and in the hands of the group that is actually performing the tasks, it is difficult to get the drive to do improvements. Therefore, “a standard is a point of reference that simultaneously provides the group with a point to adhere to and a point of departure” (Greif 1992).

In addition to visual documents, such as A4 or A3 formats, Greif (1992) has described how to use visual management in production control, quality control, process indicators, and making the progress visible. These tools can be used in data intensive REB organisations. For example, instead of listing the work orders in time order, visual management can be used to control the service process and the quality of the service process and its outcome towards visible customer value. And best of all, the process and quality control could be done without harmfully increasing the workload. The indicators would also create a basis for continuous improvements: the employees could suggest improvements to value creation practices and the impact of the improvements could be measured.

5 Conclusions

ARVO research project introduces lean management thinking into the field of real estate business (REB). Lean attracts REB organisations, because it offers a new way of thinking with customer-driven service processes and efficiency gains. However, to apply lean might not be as straightforward as thought. To solely take some of the lean tools and use them in own operations does not mean that the organisation is lean but the organisation needs to cultivate lean thinking into the actions of the employees.

The ARVO project had three aims:

1. To develop customer value assessment methods in real estate business
2. To evaluate the value creation of service processes in real estate business organisations from customer value perspective
3. To develop a leanREB model to support the value creation in real estate business

This report had a special stress on the third aim, because it introduced the version 1.0 of the leanREB theory. The results are based on three cases studies that are conducted according to the operating lean analysing (OLA) model. In each case a primary data was collected through interviews and workshop working:

1. Customers were interviewed in order to understand how the they perceives the value of the selected service/product
2. People who were creating the value for the customers were interviewed.
3. Workshops with the case organisation and customer were arranged in order to elaborate ideas on how to improve the value creation and its match with the identified customer value.

The results indicate that there is a great deal of waste in the REB value creation processes. Six waste factors, which are disturbing the value creation, were identified:

1. **Sub-process focus:** The sub-processes are optimised, not the entire value creation process.
2. **Price minimisation:** Instead of true costs minimisation, merely prices are minimised.
3. **Unmanaged information flows:** The unmanaged information causes potential losses.
4. **Uncaptured true customer value:** The customer value is rarely often captured.
5. **The unlevelled workload of employees:** The employees have a constant overload of work.
6. **The challenge to realise improvements:** The power of continuous improvements is missed.

Based on further analysis, three waste factors were identified to be rooted in the practices of organisations. These rooted waste factors are called (1) sub-process focus, (2) price minimisation, and (3) unmanaged information flows. The *rooted waste factors* have a significant impact on the magnitude of *outcome waste factors*, that are here named (4) uncaptured customer value, (5) constant overload of work, and (6) lost potential of continuous improvements. The leanREB model explains the relations between the rooted and outcome waste factors. These relations are described through the key component of lean management – customer value, waste and low, and continuous improvements.

Customer value. Currently in the REB sector, the customer value stays too often uncaptured. Because the value creation is mainly seen as a chain of separate sub-processes, whose outcomes are integrated, the entire value generation is not aligned with customer value. Price minimisation also causes value losses because the lowest bid does not guarantee that the customer value is delivered. A third issue that contributes to poor value delivery is that information on the customer value (=what should be delivered) is not visible to all. How can the employees provide necessary customer value, if they do not know it?

Waste and flow. A second major issue in REB field is that the employees have a constant overload of work. From waste and flow perspective, the workload could be decreased if the waste, activities that should not be done at all, in and between the sub-processes is minimised. Second, bidding is one of the individual sub-processes that create a lot of work if the procedure is not light enough. A third issue that increases employees' workload is unstructured information. The current way of capturing information requires a lot of extra work from the employees to use the data.

Continuous improvements. The final major issue is related to the unharvested power of continuous improvements. It was found that the sub-processes switch the attention from the entire process to the sub-processes that are optimised by the top management. Second, the employees are not empowered or assumed to make improvements. Neither the suppliers are encouraged to do improvements because the short-term relationships with bidding do not support collaboration. Third, currently improvements relating to information are heavily based on new software systems. Unfortunately, this has not always made information more visible to the employees. Employees are also inventing a lot of solutions for their problems over and over again although it would be possible to share best practices in a more systematic way.

In the future, the leanREB model should be developed further. The first version of the model pinpoints the major issues that are interrupting the value creation in general in the field of REB. It is also evident that the issues that are currently interrupting the value creation will change along the time and, thus, the model should be constantly re-developed.

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Aalto-ST 16/2012

ISBN 978-952-60-4755-3 (pdf)
ISSN-L 1799-4896
ISSN 1799-4896
ISSN 1799-490X (pdf)

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Department of Real Estate, Planning and Geoinformatics
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