

## UTILIZING LEAN MANAGEMENT IN REAL ESTATE SECTOR

TUULI JYLHÄ<sup>1</sup> and SEPPO JUNNILA<sup>2</sup>

Aalto University

### ABSTRACT

*Lean management is in its take off in real estate sector. One of the greatest advantages in lean thinking is the utilization of waste thinking: the production processes where products and services are created should be improved by minimizing the activities that do not create value for the customer (i.e. waste). Organizations have increasingly shown interest towards the ideas of lean management. In this paper the aim is to discuss the perceptions of utilizing lean thinking in real estate sector. The discussion is based on four in-depth case studies in Finland. In each case study a deeper understanding on the current value creation and its improvement potentials was gained. The value creation thinking was adapted from lean management and was used as a lens in the assessment. The case studies indicate that lean thinking can be utilized in the real estate sector. The concepts of lean management are straightforward to implement into our thinking. However, the lean tools and methods cannot be applied as such but they should be adjusted with the new contexts. When the ideas of lean are utilized in organizations, it is most likely noticed that instead of fine adjustment the organizations need to commit to more wide-ranging improvements that might require for example redesigning and re-engineering of processes.*

Keywords: lean management, value creation, waste

---

<sup>1</sup> Aalto University, Department of Real Estate, Planning and Geoinformatics, PO Box 15800, FI-00076 AALTO, FINLAND, tuuli.jylha@aalto.fi

<sup>2</sup> Aalto University, Department of Real Estate, Planning and Geoinformatics, PO Box 15800, FI-00076 AALTO, FINLAND, seppo.junnila@aalto.fi

## INTRODUCTION

Lean management stems from Toyota's car manufactories that have been studied now for decades. Lean management offers a deeper understanding for process improvements as well as customer value production and delivery. In addition to car manufactories, lean thinking has also been adopted in other industries such as in aerospace (e.g. Michaels 1999 and Crute et al. 2003), construction (e.g. Koskela 2000 and Ballard 2008), and the service industry such as in health care (e.g. Kollberg et al. 2007 and Sharma et al. 2007) and insurance (e.g. Hammer 1990). Real estate sector is not (yet) on the list although real estate are indirectly linked with all lean studies: in each field the core business, whether it is health care services, insurance operations or car manufacturing, needs real estate and related facilities in which the core services are provided. For example, when hospital operations are streamed, the layout of the hospital should be also modified because it impacts on the efficiency of the core processes. Hendrich et al. (2008) have found that nurses walk one to five miles per 10-hour daytime shift. If the layout of the hospital would be different, the time spent for walking could be used for nursing. Also in factories, let us say an airplane repair shop, the layout impacts on the extra movements of the repair men. This is the corporate real estate management view on how real estate supports the core activities of organization.

In other words, real estate, facilities and related services have been included in lean management research, but they have rarely been the main research topic, i.e., how FM service providers could utilize the principles of lean management in order to improve their own business performance. There are only few papers that have studied the utilization of lean thinking in the field of real estate and facility management (e.g. Jylhä and Junnila 2011, Jylhä and Junnila 2013a and 2013b). Therefore, in this paper the aim is to discuss the perceptions of utilizing lean thinking in the real estate sector and especially in facility management services. The perceptions of utilizing lean thinking are studied in four in-depth case studies. Lean management was introduced to the case organizations' service processes.

The structure of the paper is divided into five parts. After this introduction, a brief intro for lean thinking is provided. Next, the methodology, research process and data collection are presented in more detail. After this the results from each case study are presented and the utilization potential of lean management is discussed based on the case study evidence. Finally, the conclusions are presented.

## HOW LEAN MANAGEMENT HAS BEEN UTILIZED

For a long time lean management remained an unidentified and inexplicable management concept in the West. The understanding of lean management has been gained little by little because of the language and cultural barriers. Most likely there are still levels of understanding that wait for discovery. The research focus and interest related to lean studies has evolved in time from shop-floor activities to service sector. Hines et al. (2004) describe the evolvement of lean understanding and interests. When the awareness of lean thinking emerged in 1980-1990 the focus was solely on shop-floor improvements in auto manufactories. At the beginning of 1990 the focus was still on manufacturing, but the attention was turned towards quality and waste elimination. Later the quality and waste theme on the operational level expanded into the strategic level and lean management was noticed to be more than just set of tools: it was seen as a strategy to generate customer value.

Perhaps the most radical difference that distinguishes the traditional Western thinking from lean thinking is the lack of waste thinking. A literature review conducted by Koskela et al. (2012) shows that waste and its minimization has been poorly understood in the management literature after 1930s.

The key ideas of lean that in this paper are assumed necessary to taken into account in the utilization assessment are waste minimization, customer value production and continuous improvements. The waste minimization refers to the idea that when waste and other interruptions are minimized from the production process, the process can flow (e.g. Liker, 2004 and Shingo 1989). This means less work and more efficient production process. Customer value thinking supplements the waste thinking: it is still waste if wrong things are done (Bicheno 2004), i.e., the production outcome does not match the customer value. The customer value theme is not a stranger in the real estate sector (e.g. Appel-Meulenbroek and Feijts, 2007; Lindholm 2008; Jensen 2010). The third concept, continuous improvements, is related to the changing environment and needs: things do not stay the same, and, thus, improvements should be done continuously (Imai, 1997). If improvements are not done, the performance of the production process and organizations begins to decrease.

## METHODS

To gain a deeper understanding on the perceptions of utilizing lean management in the real estate sector, case study was selected as the method. Four in-depth case studied were conducted. In each case the value creation was assessed by

using lean management as a lens. Although the structure of each case was designed beforehand, the research had an abductive nature: the literature on value creation theories in lean management was reflected constantly against the empirical data while it was collected. The dialogue between lean theory and empirical data offered a continuum for analysis.

## Description of the selected case studies

The case studies do not solely focus on parallel value creation processes, but instead the cases represent a wider scale of services in the life span of real estate. The cases are briefly explained next.

*Case A – Workplace management.* In the first case, called the workplace management case, the case organization is a property asset management organization that provides strategic workplace management (WP) services among other services to its customers. A Finnish research institute and its researchers in a selected building were defined to be the customers. The customers had experienced the strategic workplace management service process. The aim was to understand, how the strategic workplace management service delivers value to its customers.

*Case B – Energy management.* The case organization is an international facility management service provider. It had established an on-line remote control centre in order to offer high quality energy management services for its customers. The aim was to understand how the energy management service provides value for its customers. The customer was a retail chain and its retailers in Finland.

*Case C – Property management.* In the third case the value was created in a partnership of two organizations – a real estate owner and its manager. The customers were the office tenants in the Helsinki central business district. The aim was to understand how good service, not just the product, i.e, the office, provides value to its customers.

*Case D – Nursing home.* In the fourth case study an international construction company constructs nursing homes for nursing companies. The focus was not on the construction phase but the time before that. The aim was to understand how building information modelling (BIM) could be used to provide value for the customers.

## Research process

Each case followed the same research process in order to collect similar kind of data sets from each case. In total the cases had nine phases that are described shortly below:

1. *Kick-off:* The aim and scope of the case study was defined together with the case organization(s).
2. *Background of the case:* In each case, some preliminary interviews were made and material related to the topic was read in order to understand the social structures, contractual relationships, and power relations in the case.
3. *Defining customer value:* In this phase, the selected customers were interviewed in order to understand how they perceive the value of the selected service or service process. The interviews included a Kano model based questionnaire that the interviewees filled in.
4. *Understanding current value creation:* In order to understand how the value was currently created, the employees of the case organizations were interviewed. The interviewees described how they do their work, i.e., how they create value for the customers.
5. *Pre-analysis:* In this phase the data collected in the previous phases (3 and 4) was organized and analyzed for the first time. The results from the customer value data were documented and value stream maps from the employee interviewees were formulated to visualise the current value creation process.
6. *Value workshop I:* One to two-day workshop was organised with the case organization(s) and in three cases out of four also a representative from the customer organisations participated the workshops. In the first workshop, the results from the pre-analysis (i.e., identified customer value, value stream maps and other relevant results) were verified and supplemented with the case organizations.
7. *Analysis:* After the value workshop I, the researcher(s) made a more comprehensive analysis on the case. This phase was conducted without the case organizations. As an outcome, the cases were reported and in the reports lean policies were suggested for the case organizations to improve their performance and, thus, value creation.
8. *Value workshop II:* The second value workshop lasted usually half a day. The primary aim was to present and discuss on the suggested lean policies with the case organizations.
9. *Post-analysis:* In the last phase the success and suitability of the lean policies were analysed inside with and without the case organization. In each case, the key people were interviewed in check-point meetings in order to gain understanding how they have perceived the benefits of lean and the results of the research project.

Some of the phases were conducted in parallel, especially the phases three and four. In the energy management case these phases were conducted the other way around. The perceptions of utilizing lean thinking were collected with the case organizations in the value workshops and without the case organization before and after the workshops.

## Data collection

The four case studies were conducted from January 2010 to September 2011. The data collection and analysis in each case took approximately six months, but some cases were executed partly in parallel and, thus, the cases were conducted in less than two years. The main data collection methods were workshops and interviews with the customers and with the employees who were generating the value (Table 1).

The pre-interviews, customer interviews, and employee interviews were conducted always with one interviewee, but in the post-interviews 1-3 case organization representatives were interviewed at the same time. Key people were invited to participate in the workshops. The first value workshop was always more intensive and time-consuming than the second workshop. In the first workshop the number of participants varied from 10 to 12 including the research team and in the second value workshop the number of participants varied from 7 to 14.

In three cases out of four also some quantitative data was collected from the service request processes (e.g., the number of service requests, the nature of service requests and the lead times). Because of the open-ended nature of the main research question, the quantitative data is used here only as secondary data to explain some of the details.

**Table 1. Data collection.**

Data collection method	Cases				Total
	Workplace mgmt	Energy mgmt	Property mgmt	Nursing home	
<b>Number of interviews</b>	<b>33</b>	<b>29</b>	<b>24</b>	<b>35</b>	<b>121</b>
Pre-interviews	6	5	4	2	17
Customer interviews with questionnaire survey	13	8	7	20	48
Employee interviews	13	15	11	12	51
Post-interviews	1*	1	3	1**	6
<b>Number of workshops</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>8</b>
Value workshop I	1	1	1	1	4
Value workshop II	1	1	1	1	4
<b>Was quantitative data collected?</b>	yes	yes	yes	no	

\* One interview with two people

\*\* One interview with three people

## RESULTS

The results section is divided into two. First, the case study results are discussed. After this the perceptions of utilizing lean thinking in real estate sector and FM services processes is discussed at more general level based on the empirical evidence and theoretical literature.

### Case results

*Case A – Workplace management.* Workplace impacts on the performance of organizations and, thus, the case organization has developed a service that takes this aspect into account. Although the service does create value for the customers, three issues were found that were seen to create obstacles for the value creation. First, the visualization of

the value stream maps showed that a great deal of hand offs occurred in the value creation process (Jylhä and Junnila 2011). Because the work was handed over to the next employee, there was a greater risk that the needs of the customers were not transferred along the entire process. Therefore, the second discussed issue was the alignment of the value creation process with the identified customer value, not with the goals of the service provider. Third, the WP service was planned to be a strategic tool but it was found out that in the current position in the value creation process, this was not possible because the strategic decisions were made before the service was involved in the process. It was recognized that the service has the potential to be a strategic tool, but the potential was not used.

*Case B – Energy management.* In the case it was found out that the remote control centre makes excellent performance, but there was a potential that was not yet utilized (Jylhä and Junnila, 2013). Because energy management is a horizontal activity, i.e. it is efficient to combine the energy management thinking to other activities than keeping it in a separate silo. Therefore, a service request process was studied to understand how energy management issues are connected to the daily life. It was found out that the integration of energy management thinking offers possibilities to enhance the value creation. One of the most discussed issues was the fact that the FM service provider had two customers: the retail chain had the contractual relationship with the FM service provider, but in practice the energy savings were also a benefit for the retailers whether they were interested or not. This caused a lot of issues in the practical level.

*Case C – Property management.* In this case the customers were extra demanding. They knew that they are paying the highest office rent in Finland and, thus, they required (sometimes loudly) fast and customer oriented service. Because of this, the emphasis in the case was not only on how the customers perceive the value of products and services, but on the experiences and feeling of good service that could be utilized in the case. The idea of experiences bringing customer value is well discussed by Pine and Gilmore (1999). They described that products and services are not enough but customer satisfaction is also impacted by experiences, whether they are recognized or not. In the case it was discussed that the feeling of good service could be used to gain more satisfied customers. For example, the tone of emails and telephone calls and the way how service requests are informed impacts on the customer satisfaction. Could these tools be used consciously to create a good feeling of service? It was also clear that the experience level of service cannot provide higher customer value unless the daily processes, in which the value is delivered for the customers, are improved. A service request process was selected to demonstrate the problem. The manager in each property should keep the customer happy, but it required a lot of extra effort to do so. This was mainly because of three process related issues. First, the managers did not receive updated information from the maintenance organization, i.e., the contact people did not know what was done and when it was done. It required extra time to find out this information and inform the customer. Second, managers arranged bidding competitions for all sizes of repairs that were not included in the maintenance agreement. This caused a lot of delays and sometimes small repairs were not attractive enough for the repair organizations. Third, the strict format of the budget did not offer flexibility when organizing the value delivery. From the perspective of the customer this caused delays. In the research process it was found that the two partners did not always recognize the issues simply because they did not see them. Along the research process more challenges were made visible to all in order to start to deal with them. The research team also suggested to standardize good practices that offered value for the customer or assisted in avoiding value losses.

*Casey D – Nursing home.* The focus in this case was on two issues: on the process that establishes nursing home projects (hereafter the development process) and on BIM. Unlike many other processes, the development process was not standardised. Because of lack of instructions and guidelines, there were many ways to establish a nursing home project. This required a lot of extra time and effort from the employees to figure out what to do, how to do it and in which order to do it. When figuring out issues like these, the employees did create best practices but they did not have a system for sharing their best practices. Therefore, it was discussed if a bottom-to-top feedback loop could be established to share the best practices. BIM was a central theme in the case: how could it provide value for the customer? So far BIM is mainly used as a tool to assist in the design and construction phases. The customer interviews with the Kano model based questionnaire showed that customers would be very attractive if BIM could be used also for other purposes than delivering a building – it could deliver higher customer value (Jylhä and Junnila, 2012). BIM would assist to put the technical details in right places (e.g., railings in the right place) and to assist designing the functional details (e.g., the layout of the nursing home). The research team also suggested if BIM could be used to improve the actual nursing processes. Why to design a building that matches perfectly to the processes that are inefficient?

## **Perceptions of utilizing lean thinking in real estate sector**

In each case lean was used as a lens in the value creation assessment and in the identification of the improvement potential. Based on the assessment it can be argued that the case organizations perceived lean thinking with positive attitude. However, it was noticed that lean thinking cannot be applied as straightforward as organizations and researchers would hope. Next, the issues, that were perceived as greatest advantages and issues that were perceived the greatest challenges in the cases, relating to the utilization of lean thinking are discussed through the three concepts of lean: waste, customer value and continuous improvements.

Waste thinking was perceived as one of the greatest utilization potentials of lean theories. Unfortunately there is very little waste thinking currently in the real estate sector. Lean management encourages to minimize waste to increase efficiency but currently in the real estate sector efficiency is increased by doing the same faster, doing the same with less resources or getting the prices down through bidding. It is not common to think that efficiency could be improved by doing less as waste thinking suggests. This is one of the fundamental lessons that lean thinking offers and case organizations perceived this with high interest. In the value workshops the participants were able to identify waste based on a brief introduction to lean. Although the identification of waste was possible, the next step, i.e. waste elimination, proves to be more complex: to simply eliminate waste activity and keep the rest of the practice the same did not work. It was realized that the value creation processes require more wide-ranging improvements. To summarize, the waste minimization is extremely useful on conceptual level, but in practice the waste elimination also requires broader skills such as redesigning and re-engineering the value creation processes.

Customer value is not a totally new theme in the real estate sector. Customer needs, satisfaction and preferences have been studied in our field before. What was new for the case organizations was the connection of customer value to the production system that should generate that value. Lean demonstrated for case organizations that the way how value creation process is structured impacts on the perceived customer value. In other words, production matters. This concept was perceived to be very useful when the discussion was turned to improve the processes. In practice it was again very challenging to reject the old way of thinking that encouraged accomplishing a task, not to deliver customer value. However, a concrete (not necessarily well-defined) customer need, such as fast service, was easy to approach if the aim was visible. If the aim was kept in mind, progress was achieved.

Continuous improvement was neither a stranger for the real estate and facility professionals. However, a deeper insight into the case organizations practices showed that the improvement methodology in the prevailing value creation processes was different from the one in lean management. In the lean organization everybody makes improvements constantly in their daily working. In the case organizations improvements were merely done in projects. Although case organizations understood the differences and perceived that the lean way to do improvements would bring greater advantages, it was the most challenging concept to adapt. How everybody does improvements constantly? The plan-do-check-act cycle also known as the Deming or Shewhart cycle is a common way to explain what continues improvements mean. This kind of thinking was also adapted in the development projects. However, the challenge was to do this constantly, not just going through the cycle once in the project but to repeat it constantly in the daily working. It would require a major shift in our thinking and thus it cannot be adapted in a moment.

When the basics of lean were introduced, the concepts of lean management, such as waste, root cause, value losses, flow, value creation process, and customization, assisted to reach new levels of understanding. However, there were also some lean terms that intimidated the case organizations and their employees. For example, standardization was perceived very negatively, even as an assault against the current way of working. However, at the same time the companies agreed that it is very difficult to make improvements if there is no basis on which to build the improvements. So instead of standardization, the case organizations adapted eagerly the term best practices.

To summarize, it can be argued that lean thinking was perceived suitable to improve the real estate and facilities management related service processes as such on the conceptual level. However, the daily use of lean thinking with tools and methods required more effort because they could not be applied as such but they should have been adjusted with the contexts. To be able to do this we need to change our current way of thinking. It is also essential that everybody can change their way of thinking because they are the most likely people to improve their own working through the applied tools and methods because they know their work the best. However, the mind shift from the traditional way of thinking to the lean thinking is most likely the hardest part.

## CONCLUSIONS

Lean management has its origins in an industry that is different by its nature from our real estate field. Although lean thinking is not well-known in the real estate sector, signs from the industry indicate that there is an increasing interest towards lean thinking. Some organizations have already taken the early steps in pioneering lean in real estate sector (Schultz et al. 2012). Therefore, in this paper the perceptions of utilizing lean thinking were discussed in the real estate sector.

The perceptions of utilizing lean were studied in four in-depth case studies. In the case studies lean management was used as a lens when the value creation processes were studied. The results indicate that lean management is perceived with a positive attitude in the real estate sector. Lean management provides for all of us a new way of thinking on the conceptual level and it might feel straightforward. However, in practice much more effort is needed to streamline our processes and tasks. This is because it is not sustainable (or even possible) to simply take a lean tool and use it in our field. We need to adjust it or even redesign it to match our business contexts.

## REFERENCES

- Appel-Meulenbroek, R. and Feijts, B. (2007) CRE effects on organizational performance: measurement tools for management, *Journal of Corporate Real Estate*, 9(4): 218-238.
- Ballard, G. (2008) The Lean Project Delivery System: An Update. *Lean Construction Journal*, special issues: 1-19.
- Bicheno, J (2004) The new lean toolbox: towards fast, flexible flow. PICSIE Books.
- Crute, V., Ward, Y., Brown, S. and Graves, A. (2003) Implementing Lean in aerospace—challenging the assumptions and understanding the challenges. *Technovation*, 23(12): 917-928.
- Dent, P. and White, A. (1998) Corporate real estate: changing office occupier needs - a case study. *Facilities*, 16(9/10): 262-270.
- Hammer, M. (1990) Reengineering Work: Don't Automate, Obliterate. *Harvard Business Review*, 68(4): 104-112.
- Hendrich, A., Chow, M., Skierczynski, B.A. and Lu, Z. (2008) A 36-hospital time and motion study: how do medical – surgical nurses spend their time?. *The Permanente Journal*, 12(3): 25-34.
- Hines, P., Holweg, M., and Rich, N. (2004) Learning to evolve – E review of contemporary lean thinking. *International Journal of Operations & Production Management*, 24(10): 994-1011.
- Imai, M. (1997) *Gemba Kaizen – A Commonsense, Low-Cost Approach to Management*. McGraw-Hill, New York, NY.
- Jensen, P.A. (2010) The facilities management value map: A conceptual framework. *Facilities*, 28(3/4): 175-188.
- Jylhä, T. and Junnila, S. (2011) The end-customer value loss in a construction project, *Lean Construction Journal IGLC Special Issue 2011*: 69-81
- Jylhä, T. and Junnila, S. (2012) Using the Kano model to identify customer value, 20<sup>th</sup> annual conference of international Group for Lean Construction, San Diego, USA, July 18-20, 2012.
- Jylhä, T. and Junnila, S. (2013a) Learning from lean management - Going beyond input-output thinking, accepted for publication in *Facilities* 31(1).
- Jylhä, T. and Junnila, S. (2013b) Partnership practices and their impact on value creation – reflections from lean management, accepted for publication in *International Journal of Strategic Property Management*.
- Kollberg, B., Dahlgaard, J. and Brehmer, P.-O. (2007) Measuring lean initiatives in health care services: issues and findings. *International Journal of Productivity and Performance Management*, 56(1): 7-24
- Koskela, L. (2000) An exploration towards a production theory and its application to construction. Dr. Tech. thesis, Technical Research Centre of Finland, Espoo.
- Koskela, L., Sacks, R. and Rooke, J. (2012) A Brief History of the Concept of Waste in Production. 20<sup>th</sup> annual conference of international Group for Lean Construction, San Diego, USA, July 18-20, 2012.
- Liker, J.K. (2004) *The Toyota way – 14 management principles from the world's greatest manufacturer*. McGraw-Hill Professional, New York, NY.
- Lindholm, A.-L. (2008) Identifying and measuring the success of corporate real estate management. Dr. Tech. thesis, Helsinki University of Technology, Espoo.
- Michaels, L. M. J. (1999) The Making of a Lean Aerospace Supply Chain. *Supply Chain Management: An International Journal*, 4(3): 135-145.
- Pine II, B. J. and Gilmore, J. H. (1999) *The Experience Economy*. update edition, Harvard Business Review Press, Kindle version.
- Rothe, P., Lindholm, A., Hyvönen, A. and Nenonen, S. (2011) Work environment preferences – does age make a difference?. *Facilities*, 30( ½.): 78-95.
- Schultz, A., Finch, E. and Koskela, L. (2012) *Lean Facilities Management: The UK Perspective, Case Study Report involving: Estate and Property Services at The University of Salford and Balfour Beatty Workplace*. University of Salford. Available at [http://arvo.aalto.fi/publications/ARVO\\_Salford\\_08082012.pdf](http://arvo.aalto.fi/publications/ARVO_Salford_08082012.pdf) (Accessed 17 October 2012).

Sharma, V., Abel, J., Al-Hussein, M., Lennerts, K and Pfründer, U. (2007) Simulation application for resource allocation in facility management processes in hospitals. *Facilities*, 25(13/14): 493-506.

Shingo, S. (1989) *A Study of the Toyota Production System – From Industrial Engineering Viewpoint*. English re-translation, Productivity Press, Cambridge, MA.

Tyldsley, S. and Wyton, P. (2011) Lean: Changing the organizational discourse for facilities management?. 10th European Facility Management Research Symposium, in Vienna, Austria, 24-25 May, 2011.

**Email contact: [tuuli.jylha@aalto.fi](mailto:tuuli.jylha@aalto.fi)**