

CHALMERS



Employees' perceptions of operational strategies based on Lean philosophy – A case study of a Swedish house developer

Master of Science Thesis in the Master Degree Programme, Design and Construction Project Management

JONATHAN DAHL & DAVID NORDGREN

Department of Civil and Environmental Engineering
Division of Construction Management
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden, 2014
Report No. 2014:57

MASTER'S THESIS 2014:57

Employees' perceptions of operational strategies based on Lean philosophy

A case study of a Swedish house developer

Master of Science Thesis in the Master Degree Programme, Design and Construction
Project Management

JONATHAN DAHL

DAVID NORDGREN

Department of Civil and Environmental Engineering
Division of Construction Management
CHALMERS UNIVERSITY OF TECHNOLOGY

Göteborg, Sweden, 2014

Employees' perceptions of operational strategies based on Lean philosophy
– A case study of a Swedish house developer

JONATHAN DAHL

DAVID NORDGREN

© JONATHAN DAHL AND DAVID NORDGREN, 2014.

Report no: 2014:57
Department of Civil and Environmental Engineering
Division of Construction Management
Chalmers University of Technology
SE-412 96 Göteborg
Sweden
Telephone + 46 (0) 31-772 1000

Chalmers Reproservice
Göteborg, Sweden 2014

Employees' perceptions of operational strategies based on Lean philosophy
- A case study of a Swedish house developer

© JONATHAN DAHL & DAVID NORDGREN, 2014.

Department of Civil and Environmental Engineering
Division of Construction Management
Chalmers University of Technology

ABSTRACT

Organisations implement operational strategies in order to develop and stay competitive in a changing business environment. However, the strategy needs to be anchored and understood by the employees in order to become successful. This study aims to clarify how initiatives in the operational strategy, Structured production, are perceived by the case organisation JM. JM is a house developer and contractor with an operational part focused on development and production of residential buildings and residential areas. The main research questions of this study are; How is JM's strategy Structured production connected to the Lean philosophy, how are the initiatives of the strategy perceived by the employees and how has the employees' perception changed since the implementation of Structured production in 2010? Literature that regards strategy, Lean philosophy and change management are used and a case study of a Swedish housing construction organisation has been performed. The methods of research have been through interviews with eight senior managers and a survey with 251 answers of the organisation's employees. Results from the case study indicate the organisation's employees perceive a change since 2010, however large dissimilarities is shown between hierarchical levels in the organisation. The study also shows that there are areas of the Lean philosophy, which the organisation has prioritised over others. The study concludes that the organisation is on track with the implementation of the operational strategy, however areas regarded structure the processes and work with continuously improvements has been prioritised over areas regarding developing the organisation and manage improvements.

Keywords: Change management, Construction industry, Employee perception, Lean philosophy, Strategy implementation

Employees' perceptions of operational strategies based on Lean philosophy
- A case study of a Swedish house developer

© JONATHAN DAHL & DAVID NORDGREN, 2014.

Department of Civil and Environmental Engineering
Division of Construction Management
Chalmers University of Technology

SAMMANFATTNING

Organisationer implementerar operativa strategier för att utvecklas och öka sin konkurrenskraft på en föränderlig marknad. Dessa strategier behöver vara kommunicerade och förankrade hos medarbetarna för att organisationen ska lyckas. Målet med den här studien är att tydliggöra hur initiativ i JMs strategi Strukturerad produktion uppfattas av medarbetarna. Det studerade företaget, JM är en bostadsutvecklare och bostadsproducent. Målet med studien är vidare att förklara hur strategin är kopplad till Leanfilosofin, hur den beskrivs av högre chefer och hur initiativen uppfattas av organisationen. Ytterligare är målet att undersöka hur uppfattningen av strategin har förändrats sedan 2010 då Strukturerad produktion implementerades. Litteratur om företagsstrategier, förändringsarbete, Lean och projektbaserade organisationer presenteras. Undersökningsmetoden för det här arbetet har bestått av en kvalitativ studie där åtta högre chefer inom JM har intervjuats samt en kvantitativ studie där 251 medarbetare inom affärsområdet produktion har besvarat en enkät. Resultatet visar en signifikant positiv förändring sedan den tidigare genomförda undersökningen år 2010. Dessutom visar studien på stora skillnader på uppfattning mellan medarbetare på olika ledningsnivåer. Studien visar också att medarbetarna prioriterar vissa delar av Leanfilosofin före andra delar.. En slutsats är att organisationen följer sin strategi och att de prioriteringar som har gjorts syns hos medarbetarna i hela organisationen. Dock visar resultatet att standardiserade processer och kontinuerliga förbättringar har fått högre prioritet i strategin än utveckling av organisationen och leda och styra förbättringar.

Table of content

1	INTRODUCTION	1
1.1	THE CASE: JM AB	2
1.2	PURPOSE OF THE STUDY	3
2	LITERATURE REVIEW	5
2.1	STRATEGY	5
2.1.1	Intended or emergent strategy	7
2.1.2	Change management	8
2.2	THE LEAN PHILOSOPHY	12
2.2.1	Section 1: Long-term philosophy	13
2.2.2	Section 2: The right process will produce the right results	13
2.2.3	Section 3: Add value to the organisation by developing your people and partners	14
2.2.4	Section 4: Continuously solving root problems drives organisational learning	16
2.2.5	Lean implementation	16
2.3	PROJECT BASED ORGANISATION	17
2.3.1	Temporary organisation	18
2.4	RECOMMENDATIONS FOR INCREASED PROFIT	19
3	METHOD	23
3.1	LITERATURE REVIEW AND THEORETICAL FRAMEWORK	23
3.2	QUANTITATIVE DATA COLLECTION	24
3.3	QUALITATIVE DATA COLLECTION	25
3.4	DATA ANALYSIS	25
4	RESULTS	27
4.1	RESULTS FROM THE INTERVIEWS	27
4.1.1	The history of Structured production	27
4.1.2	The driving forces behind Structured production	28
4.1.3	The goals and the values of Structured production	29
4.1.4	The implementation of Structured production	30
4.2	RESULTS FROM THE 2010 SURVEY	32
4.3	RESULTS FROM THE 2014 STUDY	35
4.3.1	The employees' perceptions of the 31 recommendations	35
4.3.2	The change in view from 2010 to 2014	40
4.3.3	The employees' view on which recommendations JM should focus on in the future	44
5	DISCUSSION	47
5.1.1	Section 1: Long-term philosophy	47
5.1.2	Section 2: The right process will produce the right results	48
5.1.3	Section 3: Add value to the organisation by developing your people and partners	49
5.1.4	Section 4: Continuously solving root problems drives organisational learning	51
5.2	CHANGE OF THE EMPLOYEES' PERCEPTION FROM 2010 TO 2014	52
5.3	THE CHANGE REQUIRES LEADERSHIP	54
5.4	REFLECTIONS ON THE METHOD	55
6	CONCLUSIONS	57
7	REFERENCES	61
	APPENDIX	64

Acknowledgements

This thesis was performed during the spring of 2014 in collaboration with JM Bostad Sverige in Stockholm and the Department of Civil and Environmental Engineering at Chalmers University of Technology.

We would first of all thank our supervisor, Professor Per-Erik Josephson at the Division of Construction Management, for the support and feedback given. We would like to give a special thanks to John Eklund at JM Produktion Stockholm for supervision and the trust in our work. Cecilia Frithiofsson administrative support at JM, we are grateful for all work and help you have contributed to. Further, we would like to thank all employees at JM that participated in the data collection for this thesis through the interviews and the survey. Additional thanks to JM Region West for allowing us to use their office and drinking their coffee during the period of writing the thesis.

Finally, special thanks to Felicia Hellström and Simon Grimberg for giving us social stimulation, entertainment and feedback during the period of writing this thesis and finally oppose on our master thesis.

Göteborg June 2014

Jonathan Dahl & David Nordgren

1 Introduction

The market changes towards becoming more global, which results in that the Swedish construction companies face new competition from international actors. Simultaneously, the construction industry has for decades been blamed for their low productivity (Polesie, 2011). Over the last decades publications have highlighted the issue with an unproductive construction sector with expensive apartments and high construction costs as a result (Fernie and Fowler, 2006). Even the Swedish government have been involved in the debate through publications of investigations of the low productivity and its causes (SOU, 1997:177, SOU, 2002:115). To be able to keep up the competitiveness against the international actors, the Swedish construction companies have to increase their productivity by lower their production cost and increase the quality of their products.

Since the market develops, the organisations need to introduce changes within the organisation to increase its competitiveness. To be able to introduce changes that strive against common goals, an organisational strategy is often formed (Johnson et al., 2011). Further, strategy and change are two closely related concept (Löwstedt, 2012). The strategy then describes the path the organisation follows towards these goals, for example to be more competitive. Since the hierarchical levels of the organisation operate in different ways, the strategy needs to be translated into actions that are relevant for each level of the organisation (Clegg et al., 2010). The organisational strategy consists of three parts; a corporate strategy, a business strategy and an operational strategy (Johnson et al., 2011). Organisations often struggle with the connection between these parts, hence the strategies needs to strive against the same goals and at the same time be relevant for the operational work at each level. Therefore it is important to analyse how different levels of the organisation perceive the initiatives of the strategy and thereby understand that the organisation strive towards the shared goals.

When changes, that a new strategy generates, are introduced to an organisation it is important that all members of the organisation adapt to the changes (Austin and Currie, 2003, Bridges and Mitchell, 2000). The organisational members react to changes that later affects the productivity during the period of change. Further Austin and Currie (2003), state that different hierarchical levels of the organisation adapt the changes at different times with a shift of phases between the levels. It is therefore important to map this process to understand when and why the productivity changes occur. Further, it is important that all employees are informed to understand, not only how the changes are implemented but also why the change is needed. Hence, it is not until the strategy is communicated and understood by the organisational members it gain its power to change (Kotter, 1997).

In this study, a Swedish house developer and contractor's strategic work is analysed. Their strategy, which is based on the Lean philosophy, have been developed and implemented since 2010.

1.1 The case: JM AB

JM AB, hereafter JM, is a house developer and contractor with an operational part focused on development and production of residential buildings and residential areas in Scandinavia, Finland and Belgium (JM AB., 2014). JM was founded in 1945 and until 2014, only five persons have been CEO in the organisation. Last year, the year of 2013 JM had an annual turnover of 12.6 billion SEK, around 2,200 employees and had approximately 5,600 apartments in production. JM Bostad Sverige is the largest business segment, which contributes with around 60% of the total income for the organisation and consists of six regions. The regions are located in the southern half of Sweden and are named South, West, East and three regions in Stockholm; Sthlm North, Sthlm City and Sthlm South. The regions are divided, based on a geographical aspect, see Appendix I. One important factor for JM is that they own its projects from acquisition of land through the development and construction process to the selling of the product to the end customer. This creates an opportunity to take strategic decisions with a holistic view of the organisations processes.

In the beginning of the 21th century JM had for years faced a trend of increased production and post-market costs. Therefore, the board of directors took the strategic decision to start focus on improvements through structuration of the organisation's processes. The decision was the beginning of a general strategy named Structured Project Development (SPD) (JM AB., 2014). The vision with this strategy was to generate value through quick and cost-efficient processes, create faultless products, improve cost control and standardise the end product and its construction processes. Since this decision was taken, SPD have been divided into several operational strategies that cover several departments of the organisation. However, not all departments have yet been involved in SPD (Grimberg and Hellström, 2014). In Figure 1 are some operational strategies within SPD presented.

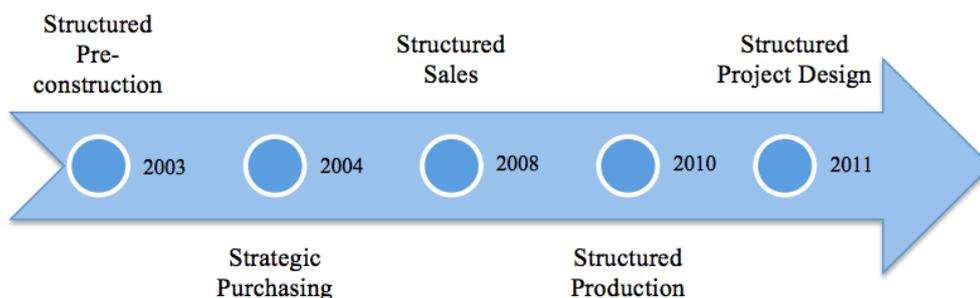


Figure 1. An overview of the strategy Structured Project Development including some of its operational strategies together with the years they were launched. (JM AB., 2014).

In 2010 the strategy Structured production (SP) was launched in the business segment of production and the overall strategy started to be implemented at the production sites. SP contained four essential parts; manuals for standardised work procedures, descriptions for routines and instructions for unified time scheduling and finally education for all employees in the business segment. The process of building the product became equal through all projects. Experienced craftsmen and foremen developed the manuals together for all work moment in the process (Gíslason et al., 2013), simultaneously as a common cycle time was established. From the start of SP, all of JM's employees were educated in SP and why JM should work according to this operational strategy. SP has also implemented structured meeting schedule with daily morning meetings, out on site between foremen and craftsmen. John Eklund, Head of production development at JM, states that SP is inspired by the Toyota Production System and its philosophy. The work with SP gave quick results and nowadays JM is well known in Sweden for their way of work with development of their site production. The production strategy, SP, gave JM the award of "Lean builder of the year" in 2011 (JM AB, 2011). To enable continuous improvements, all employees of JM have the possibility to give suggestions for improvements to the Division of production development. The aim of the suggestions for improvements is to collect best practise from the employees within the processes. These suggestions are then used for example to modify the manuals for standardised work procedures to fit best practise.

1.2 Purpose of the study

The purpose with this study is to develop a deeper understanding of how JM's employees perceive how JM work with improvements in their production process. Since the strategy, Structured production, is based on the Lean philosophy, the purpose is furthermore to analyse how the strategy is connected to Liker's (2004) description of the Lean philosophy. The study includes all six regions of the Production department of JM Bostad Sverige.

A qualitative analysis was made to investigate how JM's senior managers express the goals, visions and initiatives of Structured production and the driving forces behind them. Further, a quantitative research was made to investigate how JM's employees perceive to what extent JM focuses on different sections of the Lean philosophy and the initiatives in Structured production. The quantitative data were compared with data from an earlier study made in 2010. The aim of the data research was to investigate how senior managers expressed the strategy and how these expressions are visible in lower levels of the organisation. Another aim was to measure if any significant change in view could be recognised since 2010.

The following research questions will be discussed:

- How is JM's strategy Structured production linked to the Lean philosophy as explained by Liker (2004)?
- How are Structured production expressed by senior managers, and how are the strategy's initiatives perceived by the employees?
- How has the employees' perception of the initiatives changed since the implementation of Structured production in 2010?

2 Literature review

The literature review presents the theoretical framework used to understand and analyse the results collected. Since Structured production (SP) is a strategy, the first section introduces the concepts of strategy and organisational change. To be able to connect SP to the Lean philosophy, the second section presents this philosophy. Research shows that organisations often fail during the implementation of Lean strategies (Bhasin & Burcher, 2006). To create an understanding of why, hindrances are also presented. Since JM is a project-based organisation, characteristics of this organisational form are presented in the third section. Further, the last section summarises earlier research of JM's work with SP.

2.1 Strategy

The competitive environment in the business market drives organisations to develop and change faster and more accurately than their competitors (Kaplan and Norton, 1992). An organisation describes this change, which is driven by decisions to make the organisation more competitive, in their organisational strategy. Strategy is a complex term and should address all business areas of the organisation (Johnson et al., 2011). An organisational strategy could describe the long term direction of the organisation, the scope of their activities, how to gain advantages, how to handle changes in the current business environment and how to handle their stakeholders. However, strategies are applied in different levels in the organisation, see Figure 2. The levels can be categorised into three levels; corporate-, business- and operational strategy (Clegg et al., 2011, Johnson et al., 2011).



Figure 2. The organisation illustrated as a triangle with strategies on the different hierarchical organisational levels. Adapted from Johnson et al., (2011).

The corporate strategy, which concerns the overall purpose and mission of the organisation, describes how the organisation should add value to their customer through its existent (Johnson et al., 2011). One step further down in the organisational pyramid is the business strategy level. This level address issues that regards how the organisation should compete on its dedicated market, how to capture and maintain their market share and how to develop satisfied customers. Furthermore, in the bottom of the pyramid, are the strategies for the operational level. This area addresses the strategies to how the organisation work with employees, resources and processes (Slack and Lewis, 2002). Furthermore, Slack and Lewis (2002) argue that the operational strategy must move the business towards the long-term goals, in order to align with the business and corporate strategy.

Regardless of where in the organisation the strategy is applied, the term strategy has been defined by several researchers throughout the history and Chandler (1963) defined strategy as “...*the determination of the long-run goals and objectives of an enterprise and the adoption of courses of action and the allocation of resource necessary for carrying out these goals*”. Meanwhile Johnson et al. (2011) states clearly that a strategy is “...*the long-term direction of an organisation*”. Another definition was made by Mintzberg (2007), who states “... *a pattern in a stream of decisions*”,

In this study and further on in this chapter is the focus of strategy set to be on strategies towards the operational levels in the organisation. The reason behind this direction taken is that the study is directed towards a strategy, which address to the segment of the organisation, which performs activities in the daily business. However, the operational strategies are closely linked to the other two types of strategy. It is the operational strategy which should deliver the expected outcome of the corporate and business level strategy (Johnson et al., 2011). To make it possible for the organisation to fulfil the operative strategies, which the board of management has decided on, they are obligated to handle the right terms of tangible and intangible resources. Examples on tangible resources the organisation need are the right amount of employee and capital to achieve the results. Intangible resources could on the other hand be trust, brand image and support.

To achieve a strategy it is also important that the decisions taken is connected to the strategy and that upcoming activities are steps towards the operational strategy. On the other hand, it is difficult to develop an operational strategy, which suits and are relevant for the organisation’s operational work and simultaneously supports the organisations business strategy and corporate strategy (Frizelle and Woodcock, 1995). Even if it is in the operational level of the organisation the strategy is going to be implemented, it is occasionally middle managers that are involved in creating the strategy and the workers of the organisation are practically never involved in the strategic development (Mantere, 2005).

2.1.1 Intended or emergent strategy

A strategy is mainly evolved through two different processes in an organisation (Johnson et al., 2011). Either the strategy is accurately planned and meticulously thought out by the top management and launched as an intended strategy to the organisation. The opposite, of the intended development process of the well-planned strategy, is the emergent strategy. This is a development process of a strategy that starts with a number of actions which is performed over time with no intention of being a strategy and then, in a retro perspective, proclaimed to be a strategy in the organisation. However, it is the top management which steers the strategic work and finally sets the formulation of the strategies (Jarzabkowski and Paul Spee, 2009).

In large organisations, the intended strategy is often based on the traditional and established theories on strategy development (Johnson et al., 2011). The strategies are developed from the organisation's vision and mission and by well-known methods launched in the organisation. To have a successful implementation of an intended strategy, a plan over the implementation process is a key aspect to have before the implementation starts (Grunert et al., 2011). Johnson et al. (2011) also argue that communication, coordination of resources and to provide common milestones are vital parts of the plans. However, while implementing a strategy the psychological aspects has an essential role too. Therefore, to involve the employees in the strategy development work helps them to feel that they are a part of the development and thereby feels more secure and engaged in the new strategies which will change their daily work.

Strategic work in an organisation is often associated and viewed as the earlier described, intended strategy development. However, research shows that new strategies in an organisation do not take big leaps from the old ones (Johnson et al., 2011), but rather makes small changes of directions from the old established strategies (Johnson, 1992). Therefore, the small changes in the strategic direction do not often appear for the top management or the organisation until years later, when they realise that a new strategic direction has evolved through the organisation. An emergent strategy has developed through the organisation's daily routines, activities and processes (Johnson et al., 2011). Further on, Quinn (1989) described the emergent strategy as logical incrementalism and described the expression as "*learning from partial commitments rather than through global formulations of total strategies*". The description was followed up with four factors that supported his statement and why it is difficult to develop a strategy in advance in an organisation, which operates within a changing environment.

- The environment is uncertain, and managers rely on historical data when they try to predict the future of the organisation.
- Managers have a generalised view of strategy, and could therefore be a hinder for innovation of new strategies.

- The strategy needs to be experimented in small scale before launched in full scale into the organisation's daily business.
- Managers need to navigate through formal and informal communication channels in an organisation to be able to launch a determined strategy, within an organisation with employees with its own political and social agenda.

Further on, Quinn (1989) argues that the change process for the organisation will be easier for the employees if the strategy is logical incremental, hence it is an emergent strategy. A strategy that takes small directional change is easier to understand and commit to. Small changes in strategic direction are likely to face less resistance, than major changes.

2.1.2 Change management

Organisational change is important for organisations to be able to position themselves differently from its competitors. As the business market changes the organisation is affected by forces that drives change. The forces can be formed from many directions, for example the environment, new visions and missions, or from strategies developed by the organisation itself (Palmer et al., 1991). There are several models that identify the type of change.

One way to analyse the organisational change is through the *Capston steering change model* (Dawson, 2003). The main concept is to categorise change by scale and organisational behaviour (Figure 3).

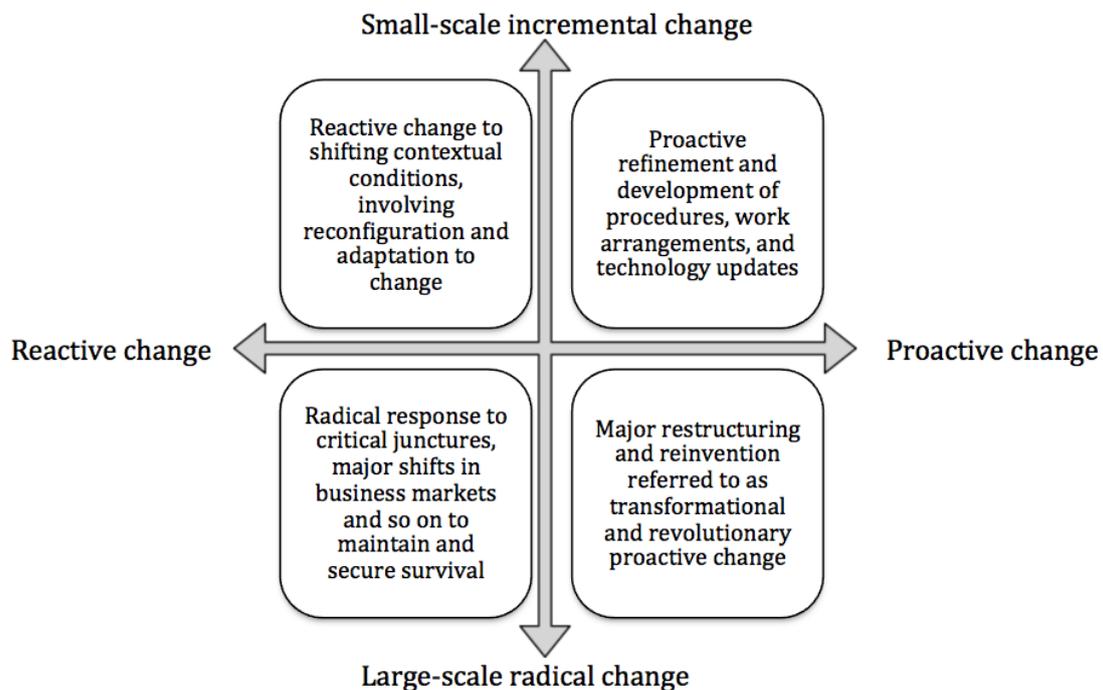


Figure 3. The Capston steering change model (Dawson, 2003).

Large-scale radical changes are often recognised by a defined period of when the need for change occurred. Furthermore, a large-scaled change requires senior managements support and commitment to resources to move from need of change to action of realisation. In opposite small-scale changes can occur in small units of operation for example; procedures, work arrangements and technology development. Small-scale incremental changes can often be discrete and moving forward without any support from senior managers. According to Dawson (2003), changes can be either reactive or proactive. Reactive changes are characterised by changes forced by an organisational misfit in the business environment. The misfit can occur from changes in business environment that in a negative way affects its performance. The organisation is therefore forced to change to regain fit to recover its performance. In opposition, a proactive change is generated by strategic decisions to create an advantage on the business market.

One other model, developed by Dunphy and Stace (1993) through research of 13 service sector organisations in Australia, is the change matrix. The matrix categorises change based on two factors, the dimension of the change and the leadership style during the implementation. The size of the change is ranged from fine-tuning to corporate transformation and the leadership style is ranged from collaborative to coercive (Figure 4).

Style of change management	Fine-tuning	Incremental adjustment	Modular transformational	Corporate transformation
Collaborative	Type 1 Participative evolution		Type 2 Charismatic transformation	
Consultative				
Directive	Type 3 Forced evolution		Type 4 Dictatorial transformation	
Coercive				

Figure 4. Change matrix developed by Dunphy and Stace (1993).

A collaborative style of management involves a high level of involvement from a wide range of employees (Dunphy and Stace, 1993). Decisions made within the process is made collaboratively that gives the employees power of the organisation's future. The consultative style involves consultation with the employees. This result in a limited involvement from the employees in decisions made but gives the staff an opportunity to get its voice heard. The directive leadership style is leading through managerial authority and directions as the main way of decision-making. This leadership style gives limited space for employees to be involved in the decision-making process.

Furthermore, the last style is coercive leadership. This style is characterised by that decisions are forced into parts of the organisation (James, 2005). Further it gives no room for any involvement from the employees.

The first two styles can be categorised as transformational leadership where managers lead through motivation and satisfaction among the followers (Forsyth, 2010). Transformational leadership is a method of leadership that boosts followers' motivation, confidence and satisfaction. By create this type of feelings within a team, the leader can unite the followers to strive against a common goal. Followers of this leadership often feel like they are important in the decision-making process and therefore feel personal engagement for the process. The transformational leadership characterised by rewarding the employees and create fulfilment high up on Maslow's hierarchy of needs (Winkler, 2010). In opposition, the two later leadership styles are based upon transactional leadership where the relationship between leaders and followers are based on an exchange of resources. The result is that the follower only unites with the leader when the resources are exchanged. The research made by Dunphy and Stace (1993) indicated that for large scale transformational changes directive or coercive leadership styles are likely to be the more successful, while fine-tuning and incremental adjustments are more likely to be successful with collaborative or consultative leadership.

The change process throughout the organisation

Already mentioned, organisational change requires, regardless of choice of strategy, a strong and well-defined leadership. However, in the process of change leaders tend to focus on physical change as the primary activity. That often results in lack of attention to the psychological processes of how people respond to changes (Austin and Currie, 2003). Further, how the changes proceed has a major impact on the success of the organisational change. Lastly, a decrease in productivity is taking place during the process of change. A deeper understanding of how this process proceeds could help managers minimise the negative effects of lower productivity and conflicts among employees.

Austin and Currie (2003) have, from a case study of an organisational change in an American organisation, created a model of how employees react to changes. Their findings show that all people are going through roughly the same psychological process in a specific sequence. This process is illustrated in Figure 5. The figure also shows how the process of change affects the productivity of the employees. Further they argue that the productivity level is connected to the psychological process of the employees.

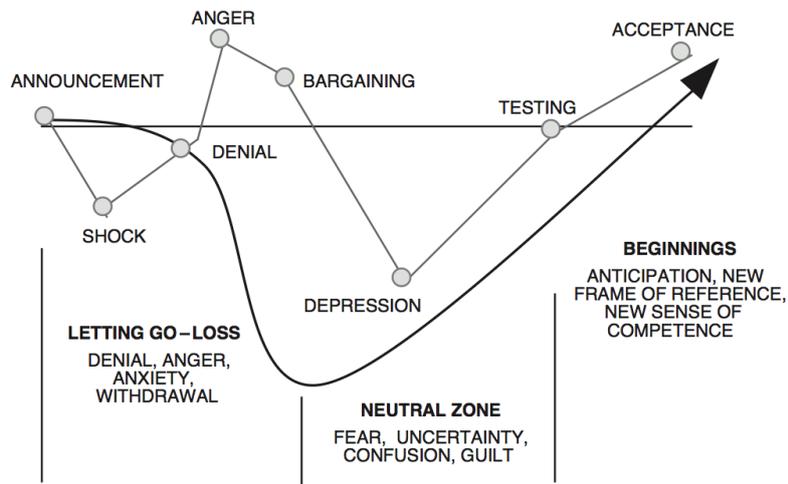


Figure 5. Employees' reaction to change. The fat black line with an arrow shows the productivity level and how it is affected by the different phases in the change process (Austin and Currie, 2003).

Further on, Austin and Currie (2003) describes what impact the hierarchical levels have on the awareness of the change. The different layers of the organisation start the change process at different times dependent on their position. The top managers and directors start its journey first, followed by managers who are followed by the employees. This shows that a higher centralised organisational structure should result in a slower implementation of an organisational change. The process is presented in Figure 6.

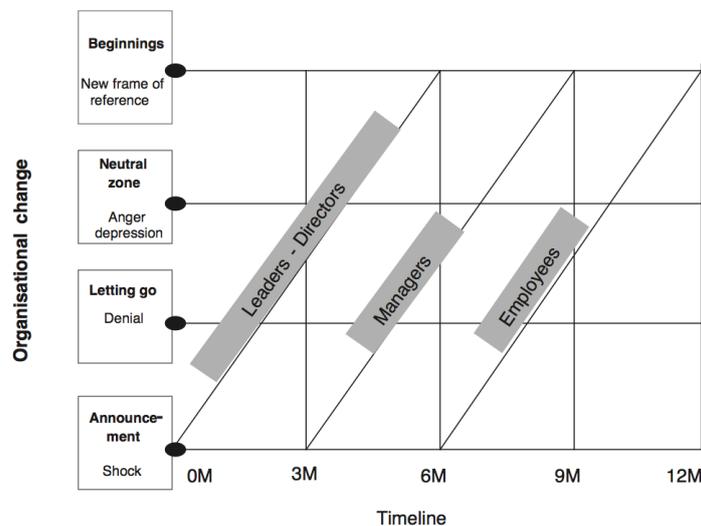


Figure 6. The shift in reaction between the hierarchical positions (Austin and Currie, 2003).

This theory is supported by Bridges and Mitchell (2000) where it is described as the marathon effect. The leaders of an organisation are often from a technical, financial or operational background where little of their previous skills are in help when leading people through change. However, their previous knowledge helps them understand and accept the organisational change. Therefore, the leaders know the destination of the change before the employees know that the race has begun. This creates a gap between where the different levels of the organisation are located within the change process. The gaps also create confusion among the middle managers within the organisation,

although they need to talk about the past with their employees and about the future with their leaders.

One way to deal with the gaps is through active and repeatedly communication. Bridges and Mitchell (2000) states that communication reduces uncertainty. In a changing environment there are more unknown than known. Communication can make the aim of the change more understandable and predictable which could help the members of the organisation move smoother into the next step of the change. The importance of communication is supported by Kotter (1997), who states that it is not until a vision is communicated it gain its power to change the organisation. To be able to change an organisation the vision has to be communicated, understood and has a clear goal and direction.

2.2 The Lean philosophy

Lean originates from the Toyota Production System (TPS) which was developed in the 1950's (Liker, 2004). However, it was not until Womack et al. (1991) released the book "The machine that changed the world" as the term Lean production was familiarised (Holweg, 2007). Lean production have then become a synonym for TPS and used to describe the philosophy of Toyotas successful production system (Liker, 2004). The TPS is based on four principles; Philosophy, Process, People/Partners and Problem solving. These four basic principles are the cornerstones of the philosophy and are developed and transformed into the Lean-house, visualised in Figure 7. The foundation to the house consists of Toyotas Philosophy and standardised processes. The pillars are illustrated as just in time and quality management. The roof is the outcome from TPS, which are the best quality, lowest cost, shortest lead-time, best safety and high morale. Inside the house we find the heart of The Toyota production system, the work towards continuous improvements. The illustrative picture of the Toyota Production System is later breakdown into 14 principles in four sections of the Toyota Way (Liker, 2004).

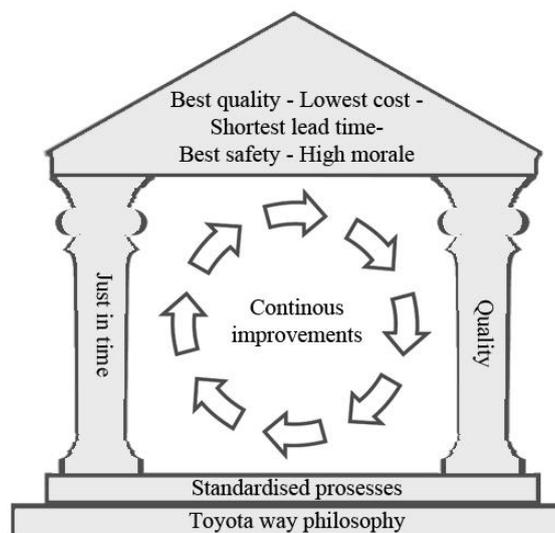


Figure 7. *Toyota Production System illustrated as the "Toyota house". Adapted from Liker (2004).*

Liker (2004) categorise these 14 principles into four sections; Long-term philosophy, The right process will produce the right results, People and partners and Continuously solving root problems. However, the strength in the Toyotas system is that there is no section that is more important than the others and all of them need to be accomplishing in order to follow “The Toyota Way”. Gallagher (2005) stresses that TPS is not a toolbox; it is about the culture in the organisation and their ability to work towards their mission, the organisation’s philosophy. Further in this chapter are the principles from Liker (2004) summarised and presented.

2.2.1 Section 1: Long-term philosophy

- 1) Organisations should base all the management decisions on a long-term goal, even at the expense of short-term financial goals

The first principle and the only principle in the first section describes that a Lean organisation should have a long-term philosophy. This philosophy should guide the organisation to base all their management decisions on long-term goals. If this sentence is developed, it means that all work and all decisions, which the organisation takes, should strive for the common purpose of the organisation and should follow the long-term philosophy the organisation has. These works and decision should generate value for your customer, but also for the society. In other words, the organisation should take full responsibility and add value to all stakeholders e.g. their customers, their employee and the society.

2.2.2 Section 2: The right process will produce the right results

- 2) Organisations should create a continuous process flow
- 3) A pull system should be used to avoid overproduction
- 4) Level out the workload for the all employees
- 5) Build a culture of stopping and fix problems, to get quality right the first time
- 6) Standardised tasks are the foundation for continuous improvement and employee empowerment
- 7) Use visual control so no problems are hidden
- 8) Use only reliable, thoroughly tested technology that serves your people and process

Within this section, the right process will produce the right results, there are in total seven principles. The first principle in this section describes that organisation’s should create a continuous process flow in order to bring up problem to the surface, which is done by strive for only value adding activities in the processes. It also means that all materials, people and procedures should have a specific spot in the value chain. Those processes and value added activity need to be evident throughout the organisation, when the employees see the progress and where value is added, then it motivates people to

continue and contribute more. Furthermore, a pull system should be used to avoid overproduction. With “pull” Liker (2004) means that an organisation should only produce what the customer demands, when they want it and in the exactly right amount as they requires. The fourth principle is to; Level out the workload for the employees. This principle strives to equalise the workload between the workers, but also for the individual workers overall available time. Workload should be divided and work peaks should be cut, in order to reduce workers mental and physical stress during work peaks. Moreover, Build a culture of stopping and fix problems, to get quality right at the first time. Quality should be highly premiered and all necessary modern quality assurance methods that are available should be used to ensure highest standard of quality, because this is what the customers demand. This principle describes that the organisation need to have a system to visualise and give the quality errors attention. This system of quality control needs to be a part of the culture and the philosophy in the organisation, because this enhances high quality and high productivity in a long term perspective. One tool, to secure the quality to a certain level, is to standardise tasks which creates a foundation for continuous improvement and thus employee empowerment. The processes in the daily operation should be stable and repeatable, this makes it possible for the process to deliver a predictable output and therefore make it easier to deliver the pull system which only produces what the customer has ordered. The processes should be developed and all actors that perform the process should use the best practise, and when new people enters the process the knowledge should be transformed and translated from the earlier persons that has owned the process. Use visual control so no problems are hidden, is a principle that strive to emphasise and visualise the problems that exist in the organisation. If the problem is visualised it becomes easier to handle the problem. This should be visualised beyond the computer screen and close to where the problems occur, then everyone has the chance to understand the visualised information. The last principle in this section is to; use only reliable, thoroughly tested technology that serves your people and process. Technology should exist to help the employees in the organisation, not to replace them. Before a new technology is launched in the organisation it is essential to test the stability, reliability and productivity before it is taken into the daily operation. However, new technologies should be viewed positive if they are proven to raise the productivity and manageability for the processes.

2.2.3 Section 3: Add value to the organisation by developing your people and partners

- 9) Grow leaders thoroughly understand the work, live the philosophy, and teach it to others
- 10) Develop exceptional people and teams who follow your organisation’s philosophy
- 11) Respect your extended network of partners and suppliers by challenging them and helping them improve

This section in the Toyota productions system is about the people inside the organisation and the partners around the organisation, and how these actors could add

value and develop the organisation. The ninth principle concern that an organisation should; Grow leaders thoroughly to understand the work, live the philosophy, and teach it to others. An organisation who wants to become Lean must use their leaders as role models for the organisation's philosophies and key values. The leaders should be developed from the own organisation and not been "bought" from another, this is mainly because the leaders need to understand the daily work in detail and be able to teach other employees about it. The tenth principle is; Develop exceptional people and teams who follow your organisation's philosophy. This principle is interpreted into follow sentences. Team work is essential and make your employees to grow meanwhile they continue to build the organisation's culture and distribute it further out in the organisation. The teams should preferably consist of cross-functional people which disseminates new knowledge and perspective which leads to improved quality and productivity for the organisation in the long run. The last principle is that the organisation should respect its extended network of partners and suppliers by challenging them and helping them improve. According to Liker (2004), the partners and suppliers to the organisation should be seen "as an extension of your business" and you should contribute to their development and challenge them to achieve further progress. If your suppliers and partners are healthy, your organisation will also have the possibilities to succeed.

2.2.4 Section 4: Continuously solving root problems drives organisational learning

- 12) Go and see for yourself to thoroughly understand the situation
- 13) Make decisions slowly by consensus thoroughly considering all options; implement decisions rapidly
- 14) Become a learning organisation through relentless reflection and continuous improvements

The first principle in this section is; Go and see for yourself to thoroughly understand the situation. This principle is directed to the leaders and managers of the organisation where they are encouraged to get out in the daily business, because they need to see, understand and contribute to the daily operations. If they know their daily business they also have the possibility to solve the right problems, verify data and theorise problems. It is an advantage to be able to reason with own knowledge gathered by participating in the daily business. Make decisions slowly by consensus thoroughly considering all options; implement decisions rapidly is the next principle. The decisions, which should be taken in the organisation, need to be truly investigated, carefully considered and aligned to the organisations philosophy. However, when the decisions are taken, they should be rapidly implemented according to all pre-set plans. The last and fourteenth principle is to; Become a learning organisation through relentless reflection and continuous improvements. This paragraph makes the other thirteen long lasting, continuously improved and never completed. The implementation of Lean cannot be complete, because Lean philosophy is a culture that will develop the organisation forever. If an organisation becomes Lean and stops continuously improvements in the very same moment is the organisation not Lean anymore. This principle also stress the fact to protect organisational knowledge by use slow promotion system and careful succession systems. The last message is that the organisation should learn from best practice and not reinvent the wheel in every new project.

2.2.5 Lean implementation

As Lean has developed from the TPS it has transformed from a fixed production system into a philosophy. The philosophy is a way to picture Lean as a general mind-set that can be used and referred to when implementing Lean into other organisations. Therefore, there is no general toolbox with methods of Lean that can be implemented into every organisation (Bhasin, 2012). The Lean philosophy needs to be translated and formed into a strategy before it can be implemented. Every organisation are therefore forced to either create their own way to implement Lean or copy other similar organisations created strategies. Regardless of the decision of Lean strategy, there will always be barriers that hinder the implementation. According to Bhasin (2012), who have made a literature review of hinders in Lean implementation, the main barriers are quoted as people-related. This statement is further supported by Mann (2009), who argues that Lean implementation requires strong leadership and discipline.

Research made in the UK industry indicates that about 90 per cent of UK industries fail to accomplish a successful Lean implementation (Bhasin and Burcher, 2006). One contributing factor to the failure is, according to Bhasin and Burcher (2006), the approach of interpret Lean as a process instead of a philosophy. This creates a view of Lean as a toolbox of systems that can be implemented to increase profit while the mind-set of ‘thinking Lean’ gets ignored. Further, Kotter (1997) claims that strategy formulation represents only 10 per cent of the success while the remaining 90 per cent is related to implementation, which has to be driven by leadership. A successful long lasting implementation of Lean requires a consistent Lean management approach that involves a change in mind-set and behaviour of the organisations managers (Mann, 2009).

Another highlighted barrier is the organisational culture. An organisational culture can be described as the sum of the individuals’ work habits (Mann, 2010). The culture allows the organisational members to work in a more consistent way supported by norms and values. When a new strategy based on Lean is implemented, norms and values need to be changed to enable an opening for new techniques and work habits. According to Mann (2010), every change requires a strong management system that supports the cultural change towards a sustainable strategic change.

Since Lean should be seen as a philosophy, with continuous improvement as a critical success factor, the implementation should therefore be seen as a never ending learning process and not a project (Halling and Renström, 2011). Halling and Renström (2011) claim that research indicates that even if Lean implementation is tool-focused in the beginning of the implementation process, it evolves over time to include cultural development, behavioural issues and coaching and communication, what Liker describes as human value of flow. This indicates that in the implementation process it is impossible to separate the people development from the process development. It also supports Likers (2004) “Toyota house model” where standardised processes and the philosophy are the foundations of the TPS.

2.3 Project based organisation

Tasks has been accomplished through project based activities within companies for ages, however it was not until the 1990s the concept; project based organisations (PBO) started to become popular among researchers (Thiry and Deguire, 2007). A definition of the concept was made by Hobday (2000) and defines Project Based Organisation as “*the project is the primary business mechanism for coordinating and integrating all the main business functions of the firm with no formal functional coordination across project lines*”. According to Thiry and Deguire (2007), this definition by Hobday (2000) is the most accepted by researchers. Further on, Hobday (2000) state that a PBO consists of plenty temporary organisations. These temporary organisation is based on four basic concepts; time, task, team and transition (Lundin and Söderholm, 1995).

2.3.1 Temporary organisation

A temporary organisation is created to fulfil a special purpose, which often contains an element of change (Lundin and Söderholm, 1995). To achieve the purpose of the temporary organisation, it needs to take the four basic concepts into consideration. The first concept is time, and is linked to a temporary organisation origin, and it is the concept that make temporary organisation structure differ most from ordinary organisations (Lundin and Söderholm, 1995). Time is seen as linear in a temporary organisation, with a start and an end point, where the project starts with an initiation phase and end with evaluation (Maylor, 2010). The same procedure repeats in every project in the PBO. The time is limited in the projects and is well known in the organisation, and within its time limit, it should accomplish the organisation's purpose, hence its task.

A project has a task, which legitimise the temporary organisation's existence in the PBO (Lundin and Söderholm, 1995). The task in the project could be categorised in two groups; unique and repetitive (Hellström and Wikström, 2005). In the construction industry repetitive projects could for instance be highways, railways and residential buildings (Hassanein and Moselhi, 2005), meanwhile other researcher in the field argue that every construction project is unique (Dubois and Gadde, 2002). In a unique task none of the team members in the project has any experience from earlier identical projects, hence it is unique (Lundin and Söderholm, 1995). Meanwhile in a repetitive project the team members have codified the practise into own experience. Another example of differences between these categorised projects is where the leadership lay; in a unique project the leadership is more concentrated up in the organisation and in a repetitive project the leadership is further down close to those who perform the practical work. The third basic concept according to Lundin and Söderholm (1995) is the team. The performance of the project is dependent on the individuals in and around the temporary organisation (Maylor, 2010). The performance and development of the team relays on the individuals will, commitment and ability to create, develop and terminate results (Lundin and Söderholm, 1995). Further on, Lundin and Söderholm (1995) argue that there are two different aspects of how a team emerge. The first aspect is the relation between the team and the individual, and the second aspect is the relation between the team and the environment. The team members are formed together to accomplish a task, within limited time and to expected quality (Clegg et al., 2011). However, one example of a difficulty for a team could be that during the time of the project a member, or several members, exchanges and therefor change the social context of the team. This could change the team dynamics, and reset the development of the team towards well-functioned. The last concept is transition and Lundin and Söderholm (1995) refer it to in two ways, a transformation from a before to after a scenario. The second meaning of transition is the process of ideas, perceptions of causal relationships and conclusions of the project. These four basic concepts make the foundation for temporary organisation inside the project based organisation.

Further, Thiry and Deguire (2007) identify temporary organisations as innovative, flexible and reconfigurable and they argue that it is the opposite of organisations with large hierarchical structure e.g. traditional and functional organisation structure. These characteristics, which Thiry and Deguire (2007) mention is result of that the temporary organisation, is decentralised and the projects become small organisations within the organisation (Selin, 1991). These projects consist of several members from different departments in the organisation and together create the team; this is visualised in Figure 8.

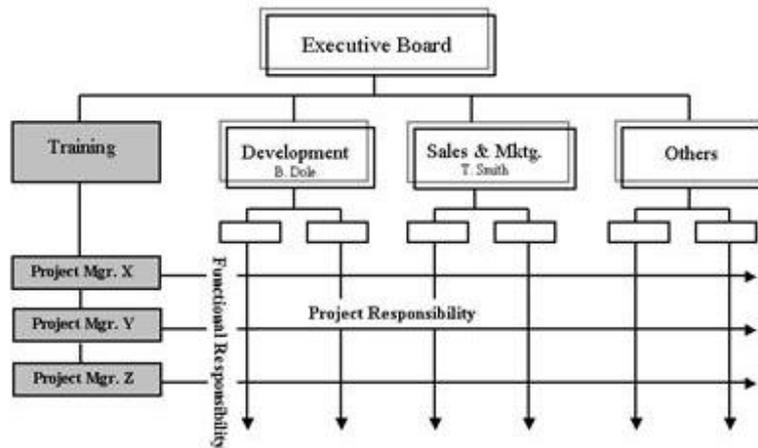


Figure 8. Project Based Organisation (Lent, 1990).

2.4 Recommendations for increased profit

In 2009 the report “31 recommendations for increased profit – reducing waste” was published by the Chalmers researchers Per-Erik Josephson and Lasse Saukkoriipi. This report presented, as the title of the reports indicates, 31 recommendations to the construction sector to reduce waste, lower production costs and improve the daily work for the sector and its employees in their daily operation and ultimately increase the profit for the organisation. The recommendations were developed and formulated through reference groups around Sweden including clients, building contractors, consultants, material suppliers and real estate managers together with the researchers. Josephson and Saukkoriipi (2009) categorised the recommendations as “value pyramid” with the pyramid’s base in structure, culture, competence and leadership and the holistic view creates the top of the pyramid, see Figure 9. The recommendation and the report were in 2011 translated to an English version (Josephson and Björkman, 2011). The 31 recommendations have later been used in several studies for analysing work with productivity improvements in construction companies (Josephson et al., 2009, Polesie, 2012).

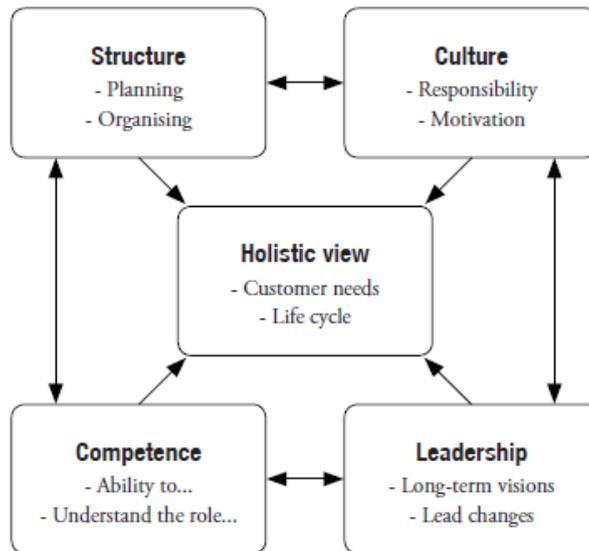


Figure 9. The value pyramid, which (Josephson and Saukkoriipi, 2009) based the 31 recommendations on in their reports.

When JM started the implementation of SP to the organisation in 2010 and during the related education of Lean philosophy and SP, the participants answered a survey which was based these 31 recommendations, see Table 1. The employees graded JM in the survey between 1 and 10 of how they perceived that JM prioritised the recommendations. While JM performed the survey a total of 508 employees answered whereas 254 of them had their daily work in the production segment. The employees in production that answered the survey were; Production Managers in leading positions, site managers, foremen and craftsmen with the responsibility over their team. A new categorisation of the 31 recommendations were presented by (Josephson, 2013). The new categories are based upon a factor analysis that groups the recommendations dependent on statistical correlations.

Table 1. The 31 recommendations developed by Josephson and Saukkoriipi, (2009), categorised after (Josephson, 2013).

I	Develop the organisation
	<p>Support the development of individual effectiveness (1)</p> <p>Encourage further training (2)</p> <p>Strive for aligned teams and project organisations (3)</p> <p>Select employees with the appropriate skills and attitudes (4)</p> <p>Consider new skills to meet new approaches (5)</p> <p>Plan in reflection and training (6)</p>
II	Manage improvements
	<p>Measure to control improvement work (7)</p> <p>Measure in order to uncover waste (8)</p> <p>Link all improvement initiatives to product characteristics or to the value-adding process (9)</p> <p>Collect and use best practices systematically (10)</p> <p>Set high demands that drive development (11)</p> <p>Give clear instructions, which cannot be misinterpreted (12)</p> <p>Reward good work (13)</p> <p>Strive for order and neatness in the workplace (14)</p> <p>Base management decisions on a long-term philosophy (15)</p> <p>Actively support suppliers in their development (16)</p>
III	Structure the processes
	<p>Oversee that all project members know and understand the project goals (17)</p> <p>Define the factual customer requirements (18)</p> <p>Use all of the week's 168 hours (19)</p> <p>Standardise information management tools (20)</p> <p>Minimise weather dependency by means of pre-fabricating and weather protected assembly (21)</p> <p>Establish disciplined information structures and meetings (22)</p> <p>Structure supply flows for efficient assembly (23)</p> <p>Plan accurately and follow-up continuously (24)</p> <p>Seek long-term customer-supplier relationships (25)</p>
IV	Standardise the products and the processes
	<p>Standardise components (26)</p> <p>Reduce the range of components (27)</p> <p>Develop technical solutions that can be used for several products (28)</p> <p>Develop similar ways of working (29)</p>
V	Create sustainable products
	<p>Base product definition on running costs (30)</p> <p>Prioritise sustainability in system choices (31)</p>

3 Method

In order to examine and evaluate JM's work with initiatives in production made in the implementation of the strategy SP, a collection of data from the employees were made. In this case, initiatives are seen as activities and decisions taken to fulfil the goals of SP. The data was collected through both a quantitative and a qualitative data collection that later was connected to literature within strategy, Lean and change management. To be able to measure the employees' perception of initiatives in SP, the 31 recommendations by Josephson and Saukkoriipi (2009) was used to evaluate the initiatives which were performed in SP. Since the 31 recommendations and SP are based on the Lean philosophy, an evaluation of the initiatives of SP in relation to Lean could be performed.

The qualitative data was collected through interviews with region managers, production managers and department managers in JM Bostad Sverige. The quantitative data was collected in two ways, first through a survey with the employees at the construction sites in six regions and secondly through a web survey sent to managers in the production segment at JM Bostad Sverige. Quantitative research method is categorised by a deductive approach where specific theories are tested (Bryman, 2007). The theories are tested through analyse and measure logical patterns and relationships between different factors in a large amount of data. For example, to measure and analyse the change in view among JM's employees within a topic. The qualitative research method is on the other hand characterised by an inductive approach where gathered information is used to provide evidence for a conclusion. For example, interview questions were answered to determine how the interviewees perceive the development of a new strategy. In addition to previous stated methods, several discussion sessions with JM's Development managers John Eklund have taken place during the study. These sessions have helped to increase the knowledge of JM and SP to clarify the context of JM in the study.

3.1 Literature review and theoretical framework

The purpose of the literature review was to develop a deeper understanding of the main focus areas of this report. The first part of the theoretical framework in the study is strategy; what strategy is and how it emerges. Furthermore, the study addresses the area of change; where identification and the process of change management are described. The second part of the theoretical framework is Lean philosophy. Lean philosophy is in this case of interest due to the fact that JM AB bases its strategy SP on Lean philosophy (JM AB, 2014). Furthermore, a brief overview of Project Based Organisation is presented to describe the organisational form which JM operates in.

3.2 Quantitative data collection

A quantitative study was made through a survey to determine the organisation's employees' view upon initiatives in Structured production. The quantitative study was made to collect data from the employees that have their daily work connected with on-site production. The sites were located in all six of the geographical regions and totally ten site visits were performed. At the sites, craftsmen and present managers answered the survey and the respondents had opportunities to ask questions regarding the survey. The data collection started in the middle of February and ended in the middle of March of 2014. The intention to visit all regions was to get a broad view of the employees' perception of the implementation of SP.

In addition to the site visits, a digital version of the survey was sent to managers at the sites that were not visited. The employees who answered the survey were positioned in different hierarchical levels in the organisation from craftsmen and foremen to site managers and Production Managers within the business segment of production. The range of people examined was chosen in order to create a general picture of the view of productivity through the whole organisation. In total 251 answers were collected and the outcome is presented in chapter 4. Quantitative studies are often used to collect empirical data from a large amount of people to measure an overall opinion of a specific subject (Patel and Davidsson, 2011). The survey that was conducted in this study was earlier made by Josephson (2013), and was then answered by 248 of JM's employees in the production segment by 2010-2011. The same survey was used by us to enable a comparison of possible changes in view upon JM's focus on the initiatives among the employees. One factor to notice is that the categorisation of the 31 recommendations has been changed since 2009. The new categories are based upon a factor analysis made by Josephson (2013). The new categories are used in our analysis. However, the old categorisation was used in the survey to keep the similarity between the two surveys. In Appendix II the questionnaire form used for this study is presented with all 31 recommendations.

The survey was used to investigate how JM work and focus on the recommendations, through which the employee rated each of them on a scale 1 to 10, where 1 means very low priority and 10 means very high priority. The survey is measured on an ordinal scale where the distance between the answer alternative is insignificant (Bashkansky and Gadrish, 2010). The ordinal scale is one of four scientific measurement scales, according to Stevens (1946), and after nominal scale the least informative and categorised with each other to be a categorical variable measurements. Furthermore, the other two is interval and ratio measurements, which categorises to be numeric variables. The strength of an ordinal measurement is that the answer alternative could be compared as; equal, greater then, lesser then etcetera (Bashkansky and Gadrish, 2010). However, the measurement is not able to determine factors as; twice, half of, 10 % more etcetera.

3.3 Qualitative data collection

A qualitative study was chosen to establish a deeper understanding of the interviewee's views within a specific area (Patel and Davidsson, 2011). In this case the interviews were held to investigate the goals, visions and initiatives of Structured production. The questions used in the interview were sent to the interviewees in advance, in order for the interviewees to be able to prepare themselves before the interview; hence the available time was limited. The interviewees were chosen by JM with the criteria of being in a leading position and operate in JM Bostad Sverige. A total of eight managers were selected and the interviews were conducted with a length of 30 minutes. The numbers of interviews and the length of them were chosen by JM to reduce time consumption for the organisation. During the interviews were the work divided, one of us acted as the interview leader and the other took notes. All interviews were recorded after permission from the interviewees. The answers from the interviews is anonymously presented, this choice was made to make the interview to speak more freely. However, one negative aspect to make the interviewees confidential is that the interviewees do not get the recognition and appreciation for their time and effort they put into the interview (Kvale and Brinkman, 2009). Furthermore, the interviews were conducted in Swedish, due to the fact that all participants in the study had Swedish as their mother tongue and it leads to richer answers and less risks for misinterpretations. All eight interviewees were high ranked managers, and when persons in position with power are interviewed it is important that the interviewer is familiar with the person, the area of knowledge and the social context (Kvale and Brinkman, 2009). Furthermore, the interviewer needs to balance their questions to be investigative and not provocative in order to get the interviewee's attention and interest in the interview.

3.4 Data analysis

The qualitative data from the interviews were categorised upon the different questions used at the interviews. At each question, buzzwords were highlighted to compare the expression from the different interviewees. Due to the relatively small number of interviewees all answers were summarised into the report as one group's opinions. These opinions have been presented in section 4.1. Due to the fact that a wide range of managers has been interviewed a general opinion of senior management could be described. The data from the qualitative and quantitative study are later compared and discussed in chapter 5.

To be able to analyse the collected quantitative data the statistical software SPSS Statistics was used. By separating the data into categories, the data could be used to draw new conclusions. The categorisations were based upon the respondent's position, region and age. These categorisations enabled an analysis if there were any differences in the view dependent on these factors. The main focus has been a comparison of the mean value from each recommendation between the groups.

When a mean value is used to analyse data, simplifications is made to be able to present the data and thus certain quality of the data will be removed. However, it gives the picture of what the majority of the sample answered. One additional way the data is analysed; is to use the standard deviation (σ). The standard deviation is a statistical measure which analyse the spread of the answer around the mean value (Gold, 1991). A high standard deviation translates into that the sample perceives the question differently from each other, meanwhile a low value on the standard deviation translate into that the sample have a similar view upon the answer.

The mean value has later been translated into a ranking to clarify differences in view between the groups. There has also been a comparison of the standard deviation of the answers. This standard deviation can be used to determine if there are differences in opinions within the groups but can also indicate an uncertainty of how to rate the recommendation.

Another part of the data analysis was to investigate if any change in perception has occurred between the 2010 to the 2014 study that this report are based upon. The change in perception was measured through difference in mean value of each recommendation between the two observations. To define if the changes in mean values are statistically significant, a paired t-test has been used. A paired t-test is used to determine if the differences between two observations are statistically significant. The t-test is used to answer the two hypotheses:

H1: The change in mean value is due to coincidence

H2: The change in mean value is due to a change in view

A t-test uses the following formula (1.1):

$$\frac{m_2 - m_1}{\sqrt{\sigma_1^2/n + \sigma_2^2/n}} \quad (1.1)$$

m_1 and m_2 is mean values from each recommendation in 2014 and 2010 and σ_1 and σ_2 are standard deviation values from the observations. The n value is the number of observations. The formula is later used to calculate the p-value, which represent the possibility that the hypotheses are true or false. Usually a 95% confidence interval is used. If the change in mean value is within the interval, it generates a p-value $< 0, 05$. The p-value then represents a 95% possibility that H2 is true. In these cases H1 can be rejected. Since only groups with equal amount of answers can be compared, the larger of the two compared groups needs to be reduced. In this case a random sample from the larger group were used to enable the use of the t-test. One additional part of the survey was to choose three recommendations, which the respondents' perceived were the most important for JM to work with to increase the productivity in the organisation. These three choices were categorised upon position to analyse if any differences in opinion could be observed.

4 Results

In this chapter the results from the qualitative and quantitative data collection are presented. The results from the interviews are divided upon a categorisation made from focus areas of the questions. This part of the result describes the history of and driving forces behind the strategy. Later the qualitative data will show how the employees perceive how JM work with the 31 recommendations and the employees' view of which areas JM should focus more on in the future.

4.1 Results from the interviews

The eight interviews were performed with senior managers at JM. They were selected by JM to represent the common view upon SP and give a general picture of the strategic development within the organisation. The interviewees are from now on referred to as "Senior managers" or the "Interviewees", where all of the group members are seen as one entity. In this group, their daily positions in the organisation are production managers, regional managers, or department managers. The majority of the Senior managers have a long record of work within the organisation. Six of them have worked over ten years in JM and of these have two of the Interviewees worked more than 20 years. Only two of the Senior managers have worked less than five years in the organisation. The interviews were performed in the spring of 2014 and by then the operational strategy SP had been up and running for four years and only two of the Senior managers were not in the organisation when SP was launched.

All the Senior managers are today involved in the development of SP. The involvement ranges from being one of the founders, to be a member of development groups where SP is discussed and refined. None of the Interviewees were working full time with the strategic development of SP, however they all had daily contact with questions and decisions concerning the operational strategy. All of the Interviewees are responsible to communicate the strategy towards the organisation and therefore all of them have the responsibility to actively communicate and steer their processes in accordance to SP.

4.1.1 The history of Structured production

According to the Senior managers SP is a part of a large strategy work, with the vision to be "*The most professional house builder, on all levels*". This journey started in the late 1990's when JM decided to mainly focus their resources to only build residential buildings. This strategic decision has had influences on the business and has made it possible for the organisation to work further with the strategy to structure all of JM's processes. Before SP was launched, several other projects were performed in the organisation. The first project in the large strategy work was to standardise the pre-construction; their processes and decide how a "JM-house" should be designed. While the organisation knew what they designed it became natural to standardise how and what material to purchase for their projects, therefore strategic purchasing was

implemented in 2004. These two sub-projects were the start of the large strategy work; Structured production development (SPD).

In 2008 the early phases of SPD had moved from an implementation phase to a managing phase, simultaneously the costs for the production had started to rise. JM therefore decided to continue the work of standardise their processes. SP was therefore, decided by the board of management, started to be developed to an operational strategy and launched in the organisation. From this point and through the years to 2014, JM has worked actively with SP and implemented it in the organisation. The vision is, like the earlier sub-projects in SPD, to end the implementation phase and move it to a managing phase. The Interviewees do not believe that this point has come yet, however they believe that SP will sooner or later come to a managing process. However, the journey has not been completely marked out. In this early phase of SPD one Senior manager explained that JM did not know exactly which steps in SPD which should be performed in the future. These sub-projects emerged during time, when the utility was showed in the organisation and an opportune market situation existed. Regardless, a vision existed and a Senior manager describes as they believed what they had to do, but how and when was not clear, however they knew that they could raise the performance in all of their parts of the organisation.

4.1.2 The driving forces behind Structured production

To understand the driving forces behind the sub-project SP, there is a need to understand the driving forces for the overall strategy, SPD. Through the interviews, numerous driving forces have been explained of why JM started with the strategic work. Several of the Interviewees underlined that JM did not perform poor during the time SPD started, hence according to the Interviewees, JM was in the forefront of their competitors in the construction sector. However, a strong driving force was, according to one a Senior manager, that JM always had the ambitions to strive to become the most professional house builder. Other driving forces to start the SPD was cost runaway, insufficient cost estimations and a high degree of uncertainty in their design work. Together with these internal forces, a tough economic market in 2003 forced the organisation to take action. It was the external force, which was the catalyst to perform the strategic development work within the organisation in a fast pace, however it would never have occurred without the internal driving forces.

In 2008, when JM suffered from the global economic crisis, once again the external environment acted as a catalyst to continue to standardise the processes in the organisation. SP was developed and launched in the organisation. However, in this point of time the production segment of the organisation had started to observe risen costs, the early phases of SPD had entered the managing phase and the organisation was ready for a new change process. Except rising cost, as a driving force, another internal force was to continue with the work, which was started in the SPD and strive to utilise the strength of a standardised product and become a more competitive house builder. The will to become better was expressed by one of the Senior managers as *“There must be ways we*

can make this better”, about the discussion which circulated among the Interviewees before SP was launched. One of the Senior managers mentioned that one driving force was the increased cost, which was clearly showed in the actual spending in the department of aftermarket; *“Yes, it was mainly because of the lack of quality in our product, which was showed in rise of aftermarket costs”*. This was according to this Senior manager one of the large driving forces behind SP. Another external force was the economic situation, during the last years a boom in the Swedish housing market occurred with sky rocket prices which had led to more actors on the market. Due to a harder competition on the market had occurred, when more Swedish actors and even international actors had entered the Swedish house builder market, the organisation had to stay competitive and not lose market share, and with SP JM should ensure its quality and consistency on their product on a tougher market.

Further on, the Senior managers describe how JM has looked towards the process industry and foremost the automotive industry to find inspiration. Role models for JM has been the Swedish automotive companies; Scania, Volvo and SAAB. One of the Interviewees reasoned about the automotive industry’s work to standardise products and processes as; *“If they manage to do this, we could do it as well”*.

4.1.3 The goals and the values of Structured production

The goals of SP are described by the Senior managers today as to increase the competitiveness, lower the production cost, create a better product, work with health and safety and create a platform for continuous improvement. One of the Interviewees described that one goal of SP is to create the possibility to communicate and create a strong brand toward its stakeholders. In the Senior manager’s view, SP made it possible for the production segment to communicate its message and intention to its stakeholders. One example which was underlined, were that SP made it easier to communicate to JM’s suppliers and sub-contractors why, how and when their services were needed. Other stakeholders, whom the Senior manager saw SP as a communication tool towards its employees, potential employees, other departments at JM, the end customers and the society. According to the Senior Managers, SP should cover plenty of perspective but, summarised from the interviews, the main goal of SP is to ensure a high and consistent quality of JM’s product to their end customer. All Senior managers argued that the goals are achieved through a widespread involvement in the initiatives from all employees at the department of production, from craftsmen to senior managers. This involvement is described as one of the most vital part of the strategy and it is seen as essential for the success of the development and implementation.

The values of SP are described similar by the Senior managers. One explained that the value of SP is the movement towards being less dependent on the individual. To focus the organisation towards the processes and not the individual, the Interviewees argue that a higher level of lowest quality will be reached on their products and, make the processes in the projects overall smother. The lower dependency of the individual is

achieved by increased amount of standardised work procedures, which ensures that all members of the organisation have an arranged work procedure. Further on, with less dependency in the individual it argues that an increased quality of the end product to the customer, and this will be showed in lower aftermarket cost. Furthermore, one additional value of SP, according to Senior managers, is the increased competitiveness which SP gives JM. Consequently, the Senior managers discussed around that the Swedish construction market is perceived as conservative and ineffective to be able to keep their share on the market, JM have to produce their product more efficient. With SP, JM can standardise their components and work procedures to create a foundation for future development of the production process. One of the Interviewees discussed in these terms and stated that “*SP does not increase our productivity, it ensures our quality and create us a standard and a platform that make it possible to increase the productivity in the future*”. Another perspective is that SP changes the view of how their organisation works, from being a project-based towards a new view of being a process-oriented organisation. This new view is seen as added value for the organisation where ideas from other production sectors can be applied and used in their construction process.

4.1.4 The implementation of Structured production

As described earlier, implementation of a Lean based strategy into an organisation comes with challenges that hinder the implementation process. Increased uncertainties, decreased productivity, and additional friction between layers of the organisation are some of many characteristics of reactions to change. Regardless of reaction, all managers in an organisational change face challenges that require additional leadership skills.

The by far most common answers, when the Senior managers were asked what the main challenges perceived during the implementation, were related to communication. A major communication challenge is to make sure that all members understand the information, this includes aspects as; why we are changing, what will be changed and how the change process will occur. One other challenge connected to communication is to make everyone understand the initiatives, to reach everyone in the organisation with the same information and message in an accurate time frame. If different information is spread in the organisation and if the information reaches the organisation in a large time interval, a Senior manager explains that rumours and uncertainties grows in the organisation and creates mistrust. Another challenge is to convince all employees that the change is mandatory and that there is no return to old procedures. One of the Interviewees describes the complexity with communication as following; “*It is always a struggle with the information flow to the employees. They give us a lot of feedback and questions. We are working with this input in different groups but it is a challenge to communicate and visualise for the employees that we are working with their questions. We are missing that information flow and transparency and that is a major challenge*”. Furthermore, the Senior managers underlined the importance of consistency in decisions and activities around SP and believed that consistency overall is one of the most

important factor to succeed with the implementation. A higher consistency in the initiatives results in less uncertainties and misunderstandings.

One additional challenge that was described is the importance to hold on to the strategy and never lose focus. The whole strategy SPD that SP is a part of has been under development and implementation for over ten years. The Senior managers explained that over all these years they had to keep on working with the strategy and never let it stagnate. One of the Interviewees stated *“If the activity level of the implementation decreases, focus will easily move to other activities”*. Therefore, all managers in the organisation need to be persistent and always feed the implementation with new initiatives. Further on, the Senior managers describe that one challenge has been to motivate the organisation to drive changes even when the organisation perform positive results. A support from the top management through the process is seen to be vital for continuous development of an already well performing organisation.

The majority of the Senior managers mentioned their own industry as a challenge. The construction industry was pictured during the interviews as conservative, unproductive and not inclined to new ideas. As mentioned before, JM looked towards the Swedish automotive companies for inspiration and as role models. The Interviewees discussed that the housing industry has not been exposed to the same competition as the automotive industry and this could be one reason of why the industry is conservative and unproductive. The group highlighted the need of change in the view of the construction from projects into processes. *“Volvo can plan their production process after tact times. So why can't we? [...] It is just a matter of view upon the process. We have factories as well as any production company, [...] we just have a couple of extra factors to concern.”* With these opinions there was a widespread understanding of those changes which needed to be done. The Senior managers believed that SP can, through the standardisation of the construction process, create opportunities to not necessary build faster but smarter. However, all of the Interviewees mentioned that SP would increase the organisations competitiveness on the market and the Interviewees perceived that SP was a proactive strategy to prepare the organisation to harder competition in the future.

The implementation of SP has opened new doors for improvements in other areas that support the production. One of the Senior managers described a possible increased collaboration with sub-contractors and suppliers. *“If we can work together and develop each other, there are many possible benefits”*. These collaborations are supported by SP through the structured way of working and as a platform for continuous improvements. Another Senior manager stated that the platform could, through similar communication procedures and working methods, help subcontractors and suppliers to develop into a more structured way of working. With increased structure among collaborators, JM can secure the flow of their working process. The increased structure of SP has paved the way for further improvements in construction through logistics. Several of the Interviewees stated that the next move of the strategy is to structure the logistics around the construction site to lubricate the flow of materials. One of the Interviewees stated

that in three to five years; *"We will definitely have a better logistic system, the work with logistic that we are about to start now was not possible to do before we had standardised the other parts of the processes. Every journey has its own time"*. The implementation of SP has, according to the Senior Manager, increased the possible gains of improvements in logistics. With a new approach to the construction sector, time can be spent on continuous improvements instead of solving problem. Therefore, new competences from the employees are requested from the organisation; *"Before we requested problem solvers, now we want proactive employees that can eliminate the upcoming of problem"*.

The Senior managers highlighted several times that trust of the initiatives are important for the implementation process. Trust to the idea, which the new system is based on, trust that the top management believes in the change and trust that this is the way the organisation is going to work. One factor that creates trust in the strategic work of SP is the broad understanding of the potentials of SP because all of the Senior Managers had a similar view of the initiatives and goals. One other factor that creates trust in SP is the showed engagement in the development from all parts of the organisation. In the beginning of the implementation there were a lot of resistance to change but the resistance later changed to engagement in the process. All parts of the production department are now involved in the process. The engagement from the craftsmen through proposals for change in work procedures is highlighted as one of the critical success factors for acceptance by the organisation. All Senior managers showed, at the interviews, a genuine engagement for SP and expressed trust in the strategy.

4.2 Results from the 2010 survey

In this chapter, the results from the survey in 2010 are summarised. The results are chosen to create a general picture of the perception of the initiatives in SP among employees in production. Described earlier in chapter 3.2, the respondents were asked to rate each of the 31 recommendations on a 1-10 scale. From these answers a mean value were calculated for each recommendation. The mean values are then interpreted as an indication of the group of respondents' overall perception of how JM is working with each of the recommendations. To be able to compare which recommendations that are prioritised over other, the mean values are translated into a ranking system. The recommendation with the highest mean value received ranking 1 and the recommendation with the lowest mean value received ranking 31. A high mean value are interpreted, as the employees perceive that JM prioritise this recommendation in relation to the other recommendations, while a low mean value interprets as the contrary. In

Table 2 the mean value and rank for all positions are summarised. The complete results from the 2010 survey are concluded in Appendix III.

Table 2. The mean values and ranks of the 31 recommendations from the 2010 survey (Josephson, 2013).

I	Develop the organisation	Mean	Rank
	Support the development of individual effectiveness (1)	5.91	23
	Encourage further training (2)	6.15	16
	Strive for aligned teams and project organisations (3)	5.29	28
	Select employees with the appropriate skills and attitudes (4)	6.14	17
	Consider new skills to meet new approaches (5)	5.64	26
	Plan in reflection and training (6)	5.29	29
II	Manage improvements		
	Measure to control improvement work (7)	6.25	15
	Measure in order to uncover waste (8)	5.90	24
	Link all improvement initiatives to product characteristics or to the value-adding process (9)	6.13	18
	Collect and use best practices systematically (10)	6.08	21
	Set high demands that drive development (11)	6.64	8
	Give clear instructions, which cannot be misinterpreted (12)	6.40	11
	Reward good work (13)	5.06	31
	Strive for order and neatness in the workplace (14)	7.97	1
	Base management decisions on a long-term philosophy (15)	6.11	19
	Actively support suppliers in their development (16)	5.49	27
III	Structure the processes		
	Oversee that all project members know and understand the project goals (17)	6.11	20
	Define the factual customer requirements (18)	7.14	3
	Use all of the week's 168 hours (19)	5.92	22
	Standardise information management tools (20)	6.80	7
	Minimise weather dependency by means of pre-fabricating and weather protected assembly (21)	5.24	30
	Establish disciplined information structures and meetings (22)	6.83	5
	Structure supply flows for efficient assembly (23)	6.48	9
	Plan accurately and follow-up continuously (24)	6.36	12
	Seek long-term customer-supplier relationships (25)	6.83	6
IV	Standardise the products and the processes		
	Standardise components (26)	6.94	4
	Reduce the range of components (27)	6.32	14
	Develop technical solutions that can be used for several products (28)	6.43	10
	Develop similar ways of working (29)	7.55	2
V	Create sustainable products		
	Base product definition on running costs (30)	5.88	25
	Prioritise sustainability in system choices (31)	6.34	13

With the data sorted by working position, differences between the occupational groups can be highlighted. The most prioritised recommendations according to JMs employees in these occupational groups are presented in the lists below. The groups are divided upon hierarchical positions. The group Production Managers involves higher managers in the production department.

Production Managers

- Develop similar ways of working (10)
- Strive for order and neatness in the workplace (24)
- Standardise components (5)

Site Managers

- Strive for order and neatness in the workplace (24)
- Develop similar ways of working (10)
- Standardise components (5)

Foremen

- Develop similar ways of working (10)
- Strive for order and neatness in the workplace (24)
- Define the factual customer requirements (6)

Craftsmen

- Define the factual customer requirements (6)
- Strive for order and neatness in the workplace (24)
- Develop similar ways of working (10)

To compare what the occupational groups perceived what JM prioritised most, the next list shows what the employees perceived that JM prioritised least.

Production Managers

- Measure in order to uncover waste (28)
- Plan in reflection and training (22)
- Actively support suppliers in their development (16)

Site managers

- Use all of the week's 168 hours (9)
- Measure in order to uncover waste (28)
- Measure in order to control improvements (29)

Foremen

- Actively support suppliers in their development (16)
- Measure in order to uncover waste (28)
- Use all of the week's 168 hours (9)

Craftsmen

- Actively support suppliers in their development (16)
- Use all of the week's 168 hours (9)
- Reward good work (27)

4.3 Results from the 2014 study

The results from the survey have been collected through site visits and a web survey, which is mentioned in chapter 3.2. In total, 251 employees answered the questionnaire, where 124 are responses from craftsmen and 127 are responses from managers in different hierarchical levels, see Table 3. The responses are spread over all of JM Bostad Sveriges regions.

Table 3. Number of responses, categorised by geographic region and managerial or worker position.

Region/Position	Prod. Managers	Site Managers	Foremen	Craftsmen	Total
Sthlm North	3	5	13	40	61
Sthlm Central	4	8	15	21	48
Sthlm South	2	9	17	12	40
South	1	1	8	18	28
West	2	7	10	11	30
East	6	7	9	22	44
Total amount of employees who answered	18	37	72	124	251
Total amount of employees in each position at JM	35	69	160	556	820
Per cent of employees who answered	51%	54%	45%	22%	31%

The majority of the managers have answered through the web survey. The high response rate could indicate a high interest in the subject among the managers or the easy accessible web survey. Further, a majority of the managers were interested to share their view upon priorities at JM, which make the outcome from survey reliable and useful for further analysis. The lower response rate among craftsmen is a result of the different methods used when the data was collected. As described earlier, the craftsmen answered the questionnaire during ten site visits. Therefore, only 22% of the craftsmen at JM could be reached in the study.

A collection of the participant age was also performed in connection to the survey. The age of the respondents were collected and put into three categories; 18-35 years, 36-49 years and over 50-65 years. The age of the respondents were collected to see if any differences in opinions could be related to age. All three categories had at least 50 members, which made it possible to compare the three different groups.

4.3.1 The employees' perceptions of the 31 recommendations

In the 2014 survey as well as in the 2010 survey, the respondents were asked to rate the 31 recommendations on a 1-10 scale. In Table 4 all of the participants' mean value is presented for each recommendation. A high mean value are interpreted, as the employees perceive that JM prioritise this recommendation in relation to the other recommendations, while a low mean value interprets as the contrary.

Table 4. The mean values and rankings of the 31 recommendations from the 2014 survey.

I	Develop the organisation	Mean	Rank
	Support the development of individual effectiveness (1)	5,91	23
	Encourage further training (2)	6,15	16
	Strive for aligned teams and project organisations (3)	5,29	28
	Select employees with the appropriate skills and attitudes (4)	6,14	17
	Consider new skills to meet new approaches (5)	5,64	26
	Plan in reflection and training (6)	5,29	29
II	Manage improvements		
	Measure to control improvement work (7)	6,25	15
	Measure in order to uncover waste (8)	5,90	24
	Link all improvement initiatives to product characteristics or to the value-adding process (9)	6,13	18
	Collect and use best practices systematically (10)	6,08	21
	Set high demands that drive development (11)	6,64	8
	Give clear instructions, which cannot be misinterpreted (12)	6,40	11
	Reward good work (13)	5,06	31
	Strive for order and neatness in the workplace (14)	7,97	1
	Base management decisions on a long-term philosophy (15)	6,11	19
	Actively support suppliers in their development (16)	5,49	27
III	Structure the processes		
	Oversee that all project members know and understand the project goals (17)	6,11	20
	Define the factual customer requirements (18)	7,14	3
	Use all of the week's 168 hours (19)	5,92	22
	Standardise information management tools (20)	6,80	7
	Minimise weather dependency by means of pre-fabricating and weather protected assembly (21)	5,24	30
	Establish disciplined information structures and meetings (22)	6,83	5
	Structure supply flows for efficient assembly (23)	6,48	9
	Plan accurately and follow-up continuously (24)	6,36	12
	Seek long-term customer-supplier relationships (25)	6,83	6
IV	Standardise the products and the processes		
	Standardise components (26)	6,94	4
	Reduce the range of components (27)	6,32	14
	Develop technical solutions that can be used for several products (28)	6,43	10
	Develop similar ways of working (29)	7,55	2
V	Create sustainable products		
	Base product definition on running costs (30)	5,88	25
	Prioritise sustainability in system choices (31)	6,34	13

In Table 4 all of the recommendations with received ranking are presented. The three recommendations which the employees perceived that JM prioritised most are Strive for order and neatness in the workplace (14), Develop similar ways of working (20) and Define the factual customer requirements (3). The contrary to these, the 251 respondents

perceived that JM worked least with Reward good work (13), Minimise weather dependency by means of pre-fabricating and weather protected assembly (21), and Plan in reflection and training (6).

From the overall data has some tendencies emerged; there is no univocal difference among the responses depending on the respondent's age, there are regional differences, and there are foremost differences between hierarchical levels in the organisation. A short summary will explain these three general characteristics of the data before more detailed results are presented.

The age-spans show equal amount of lowest and highest mean values of the recommendations and throughout the survey the differences between the groups are small, therefore is the age not taken into account further in the results. In contradiction to the age-span, it is possible to see general differences of the perception in the different geographical areas. To be able to present the differences the six regions are divided into two general groups; the three regions in Stockholm becomes "Stockholm" and the regions West/East/South becomes "Riks". For three recommendations the mean values had a significant higher value at Riks than in Stockholm: Strive for aligned teams and project organisations (3), Use all of the week's 168 hours (19) and Establish disciplined information structures and meetings (22), see Figure 10.

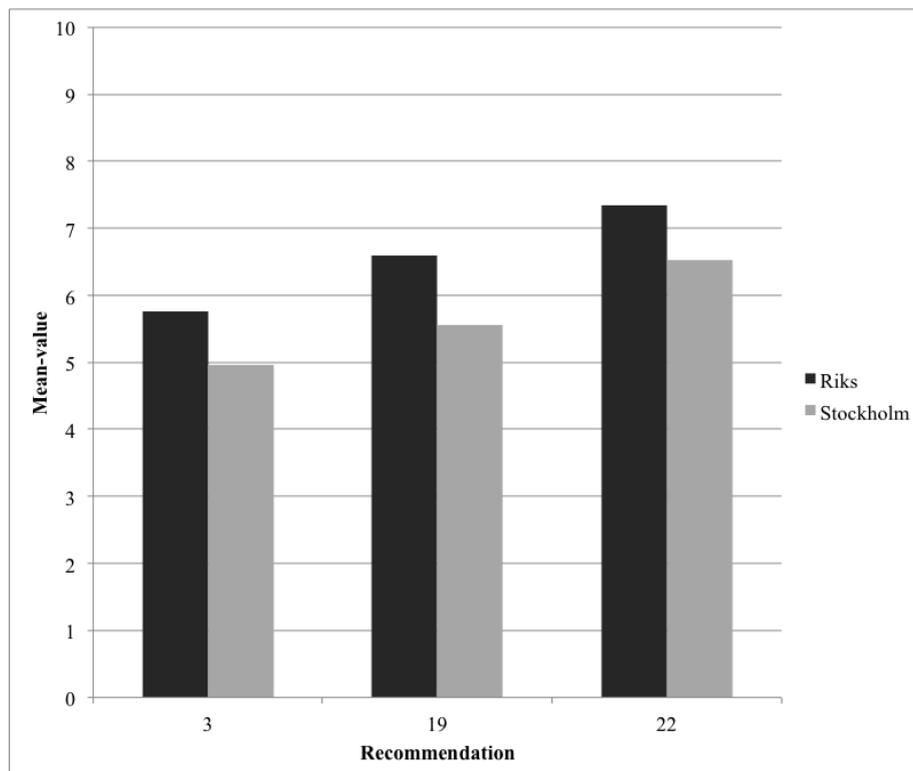


Figure 10. Differences in perception in three recommendations between the employees in Stockholm and in Riks.

There is only in two of the recommendations there is a possibility to show the contradiction, that the mean value are higher in Stockholm than in Riks. These are Standardise components (26) and Reduce the range of components (27) are the two

recommendations. However, the differences are less and are measured to approximately 0.25 steps on the ten-graded scale.

On the other hand, when the mean values are compared between the four different positions a clear tendency is found. Through all recommendations, Production Managers and Site Managers perceive to a large extent equally. However, the Site Managers has a small general higher perception of the recommendations. Figure 11 illustrates recommendation Set high demands that drive development (11) and Strive for order and neatness in the workplace (14), these two are examples of the general picture; how the different positions perceive JM's work. Here are the hierarchical differences distinct and the perception decreases further down in the organisation. The Foremen's perception is found midway between the Craftsmen and the Site Managers. The Craftsmen's answers resulted in lowest mean value on all recommendations except two, where their perception barely exceeds the Foremen's.

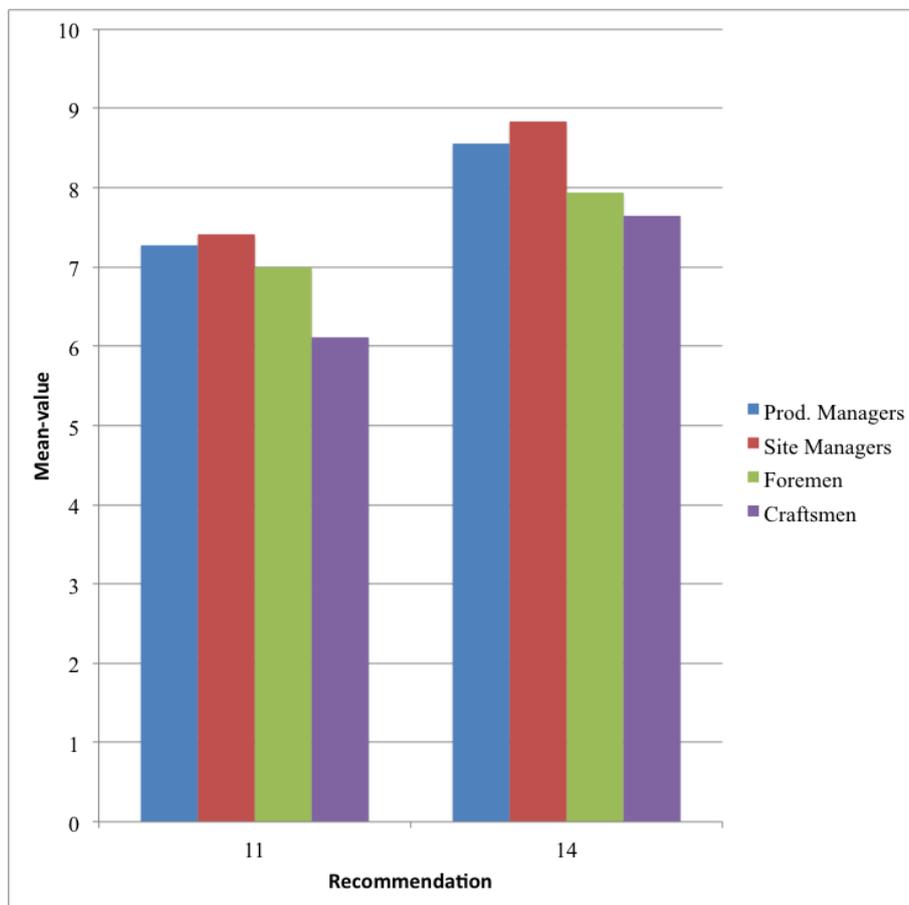


Figure 11. Recommendation 2 and 31 shows the general display of JM's employees' perception illustrated with recommendation 11 and 14.

The mean values distribution shows clear tendencies among the employees. However, more interesting observations are seen when the rank of the mean values is studied. The top three ranked recommendations are approximately the same across all positions, which are presented in Table 5. However, further down in the rank more dissimilarity are showed. Recommendation Establish disciplined information structures and meetings

(22) are graded to rank three among both Site Managers and Foreman in the organisation, meanwhile Production Manager perceived that JM work with 18 of the recommendations more and graded (22) only to rank 19. Furthermore, two other recommendations with large dissimilarity are, Encourage further training (2) and Structure supply flows for efficient assembly (23), these two differs by 15 steps in ranking. Foremen perceived that JM is working with recommendation no. 2 to that large extent that they rank it, as their number nine, meanwhile the Craftsmen perceive it as their 23rd most prioritised recommendation. Meanwhile, regarding recommendation no. 23, the Production Managers perceives that this is the 20 most prioritised recommendations in the organisation meanwhile the Site Manager perceives that it is the 6th most prioritised.

On the other hand, the recommendations which the employees perceive most similar are found in the top rank and in the bottom of the total ranking. Recommendation no. 14 Strive for order and neatness is ranked first or second cross all the categories of employees. Further, recommendation Minimise weather dependency by means of pre-fabricating and weather protected assembly (21), are perceived to be ranked 29 or 30 by all four categories of employees.

An additional measurement to the mean value is standard deviation, which indicates a distribution in view among the respondents. The following table shows the mean value and standard deviation divided upon positions. Table 5 shows that there are connections between mean value and standard deviation. In general, a high mean value is connected with a low standard deviation and opposite when the mean value is low. Exceptions to this relation exist and one example is recommendation Consider new skills to meet new approaches (5), is one of them. The mean value of this recommendation is relatively low but the standard deviation is low as well. This indicates a low variation of answers to this recommendation. The employees appear to agree in the view that this recommendation has lower priority.

Table 5. Mean value (Mean), rank and standard deviation (σ) for three managerial positions and craftsmen in the 2014 survey.

Rec.	Prod. Managers			Site Managers			Foremen			Craftsmen		
	Mean	Rank	σ	Mean	Rank	σ	Mean	Rank	σ	Mean	Rank	σ
1	6,39	24	2,12	7,16	16	1,79	6,15	20	1,81	5,31	24	2,17
2	6,72	17	2,02	7,27	10	1,69	6,76	9	1,93	5,37	23	2,33
3	6,00	28	1,88	5,08	31	2,44	5,51	28	1,76	5,11	28	2,62
4	6,50	21	1,43	6,59	23	1,91	6,44	17	1,69	5,77	15	2,22
5	6,50	22	1,62	6,32	26	1,77	5,87	26	1,59	5,17	27	2,00
6	5,72	31	2,61	5,84	29	2,21	5,03	30	1,93	5,21	25	2,26
7	7,28	8	1,87	7,14	19	1,75	6,44	18	1,65	5,73	17	1,95
8	6,44	23	2,06	6,62	22	1,85	6,03	23	1,96	5,54	21	1,97
9	6,89	12	2,08	7,00	20	1,80	6,30	19	1,78	5,66	19	1,82
10	6,28	25	1,97	6,89	21	1,68	6,06	22	1,96	5,82	14	2,25
11	7,28	9	2,16	7,41	9	1,42	6,99	6	1,74	6,11	7	2,00
12	6,89	13	1,45	7,16	17	1,46	6,48	16	1,85	6,06	9	2,17
13	6,06	27	2,24	6,11	27	2,00	4,99	31	1,98	4,64	31	2,76
14	8,56	2	0,98	8,84	1	1,01	7,94	2	1,71	7,65	1	1,79
15	6,89	14	1,88	7,22	13	1,58	6,51	15	1,77	5,41	22	1,99
16	5,89	29	2,08	6,00	28	1,87	5,83	27	1,37	5,08	29	2,12
17	6,78	16	2,05	6,59	24	1,82	6,01	24	1,77	5,92	11	2,05
18	7,39	7	1,61	7,24	12	1,54	7,39	4	1,51	6,93	2	2,02
19	6,28	26	2,63	6,54	25	2,27	6,00	25	2,40	5,62	20	2,69
20	7,56	5	1,62	7,70	5	1,73	6,68	12	1,96	6,48	4	2,09
21	5,78	30	1,96	5,81	30	1,76	5,49	29	1,78	4,85	30	2,28
22	6,67	19	2,22	8,19	3	1,39	7,43	3	1,65	6,10	8	2,09
23	6,56	20	2,12	7,51	6	1,37	6,88	8	1,87	5,93	10	2,01
24	6,83	15	1,47	7,49	8	1,56	6,76	10	1,66	5,71	18	2,02
25	7,44	6	2,01	7,51	7	1,73	6,94	7	1,85	6,48	5	2,08
26	7,78	3	1,63	7,89	4	1,39	7,35	5	1,60	6,28	6	2,03
27	6,94	11	2,07	7,16	18	1,52	6,66	13	1,73	5,77	16	1,84
28	7,72	4	1,90	7,27	11	1,45	6,69	11	1,87	5,84	12	1,89
29	8,61	1	1,29	8,24	2	1,26	8,04	1	1,61	6,89	3	2,12
30	6,72	18	1,97	7,22	14	1,64	6,14	21	1,72	5,18	26	2,25
31	7,11	10	1,84	7,19	15	1,70	6,56	14	1,50	5,84	13	1,88

4.3.2 The change in view from 2010 to 2014

In this section the results from the 2010 survey are compared with the new data from 2014 survey. The differences are described as a change in mean value and ranking from the 2010 survey to the 2014 survey. The differences are read as a change in view, among employees, on how JM prioritises the recommendations. The differences are summarised in Table 6 below:

Table 6. The change in mean values and ranking from the 2014 survey and 2010 survey with measured significance from the t-test.

Rec.	2010		2014		Change		Significance
	Mean	Rank	Mean	Rank	Mean	Rank	
1	5,77	15	6,48	21	0,71	-6	**
2	6,39	5	6,91	12	0,52	-7	n.s.
3	4,99	24	5,45	30	0,46	-6	*
4	5,71	17	6,50	20	0,79	-3	***
5	5,40	20	6,10	26	0,70	-6	**
6	4,70	27	5,36	31	0,66	-4	**
7	4,53	28	6,76	16	2,23	12	***
8	4,10	31	6,26	24	2,16	7	***
9	4,88	26	6,59	18	1,71	8	***
10	4,93	25	6,33	22	1,40	3	***
11	6,13	10	7,15	7	1,02	3	***
12	6,09	11	6,74	17	0,65	-6	**
13	5,20	22	5,46	29	0,26	-7	n.s.
14	7,29	2	8,29	1	1,00	1	***
15	5,84	13	6,77	15	0,93	-2	***
16	4,14	30	5,89	27	1,75	3	***
17	5,36	21	6,29	23	0,93	-2	***
18	6,81	3	7,35	5	0,54	-2	**
19	4,26	29	6,20	25	1,94	4	***
20	6,19	8	7,10	8	0,91	0	***
21	5,07	23	5,62	28	0,55	-5	*
22	5,45	19	7,54	4	2,09	15	***
23	5,79	14	7,02	9	1,23	5	***
24	5,72	16	6,98	11	1,26	5	***
25	6,35	6	7,18	6	0,83	0	***
26	6,69	4	7,57	3	0,88	1	***
27	6,02	12	6,85	13	0,83	-1	***
28	6,33	7	7,01	10	0,68	-3	*
29	7,32	1	8,18	2	0,86	-1	***
30	5,60	18	6,54	19	0,94	-1	***
31	6,19	9	6,83	14	0,64	-5	**

The first column shows the recommendation number. In the 2010 survey and 2014 survey columns the recommendations rank and mean value are stated. Highest mean value has got the highest ranking. At the change column the difference in ranking and mean value between the two surveys are stated. The results from the two surveys are tested pairwise for each recommendation with a paired t-test.

The p-values from the t-test are from now translated into rating in significance. * represents over 95% significance, ** represents over 99% significance and *** represents over 99,9% significance. In 29 of the 31 recommendations, a statistically significant change in mean value could be observed. The only two below 95% is recommendation Reward good work (13) and Encourage further training (2) are marked as not significant (n.s). One reason why a statistically proved difference could not be observed is due to the small change in mean value from 2010 to 2014. There is over 5%

risk that the observed change in this case is due to coincidence. In average the mean value have changed by 1,03 between the two surveys. The results show that between 2010 and 2014 significant changes in view upon the recommendations have been made. In other words, JM's employees perceives that the organisation is working more with the recommendations in 2014 survey than they did in the 2010 survey, with two exception of recommendation (13) and (2). This can be seen as the employees perceive that JM have not increased their priority to Reward good work (13) or Encouraged further training (2) since 2010.

When differences in ranking between the surveys are made, recommendation Measure to control improvement work (7) and Establish disciplined information structures and meetings (22) are the two recommendations that have made the largest change in ranking. The recommendations that have dropped in ranking are not because their mean value dropped, rather than the other recommendations had a larger increase in mean value. Reward good work (13) is the recommendation that have made the largest drop in ranking between the surveys. This is due to the small change in mean value since the 2010 survey.

When standard deviation is compared between the two observations there is a tendency of lower standard deviations in the 2014 study. As described earlier, the value seems to be connected with the mean value. The mean value has generally increased between the two surveys, which generate an expected lower standard deviation. One exception is among the Production Managers where the standard deviation has in average increased from 2010 to 2014. For the other two positions, Site managers and Foremen, the mean value has decreased. This indicates a larger distribution in answers from Production Managers today then in 2010. When the difference in standard deviation is analysed for Production Managers between the surveys there are a group of recommendations with increased ranking. Three of the largest differences are for the recommendations Plan for reflection and training (6), Set high demands that drive development (11) and Reward good work (13). At the same time the mean value has increased for all three recommendations. The fact that a statistical significant change cannot be measured does not necessary mean that the view is the same in both observations. One example is recommendation Set high demands that drive development (11). The mean value for this recommendation has increased by 1.17 for Production Managers between 2010 and 2014. Meanwhile, the standard deviation has also increased, which influences the p-value from the t-test. For recommendation (11) the p-value for the change in mean value among Production managers are over tolerated for being statistical significant. However when the histograms over the answers on this specific recommendation, major differences can be recognised between the two observations. The histograms are presented in Figure 12.

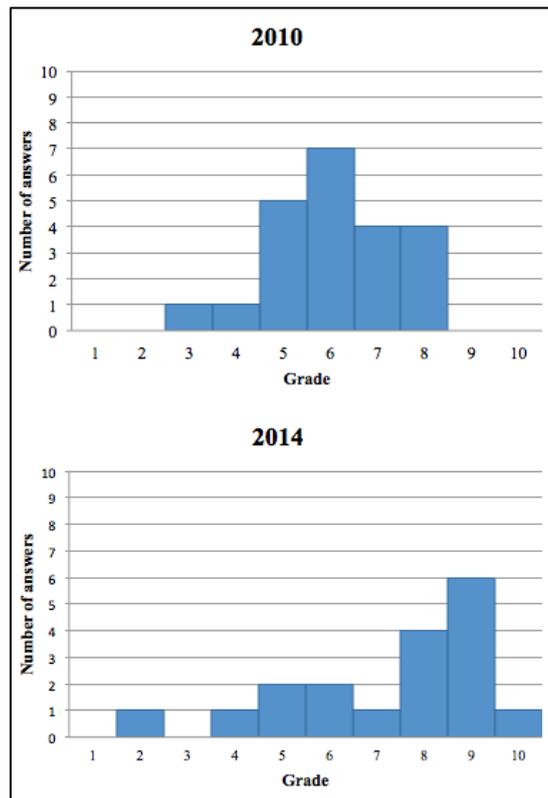


Figure 12. The Production managers' distribution of answers on recommendation Set high demands that drive development (11).

The number of recommendations where the standard deviations is lower 2014 among the Production managers are few, only five out of the 31 recommendation has a lower standard deviation in 2014 then in the 2010 survey. It is a remarkably small number if it is compared with the Site Managers where 28 out of the 31 recommendations have lower standard deviation between the same observations.

However, if the change in perception on position level is studied the data shows a more differentiate and nuanced result. Approximately all recommendation's, over all positions, mean value has risen over these four years. This is illustrated in Table 7. However, the distributions of statistical significant results differ between the positions. The Site Managers' perception has risen, with a statistical significance, in 28 of 31 recommendations and this group of employees' perception has clearly risen. Among Production managers and Foremen has certain groups of recommendations changed, meanwhile in several of recommendations is it not possible to state that a significant statistical change has occurred since 2010. However, changes in view of the craftsmen could not be analysed though only craftsmen with managerial positions were observed in the 2010 survey. Therefore was a comparison between the years not significant.

Table 7. Change in mean value between the observation in 2010 and in 2014 and the results from t-test, which present if the result has a significant change or not, for the three managerial positions.

Rec.	Prod Manager		Site Manager		Foremen	
	Change Mean	Significance	Change Mean	Significance	Change Mean	Significance
1	0,11	n.s.	2,16	***	0,18	n.s.
2	-0,06	n.s.	1,51	**	0,41	n.s.
3	0,50	n.s.	0,51	n.s.	0,51	n.s.
4	0,72	n.s.	1,24	**	0,63	*
5	1,33	n.s.	1,78	***	0,27	n.s.
6	1,44	n.s.	1,73	**	0,11	n.s.
7	2,89	***	3,51	***	1,47	***
8	2,28	**	3,14	***	1,70	***
9	2,22	**	3,24	***	1,07	***
10	1,33	*	2,49	***	1,09	**
11	1,17	n.s.	1,81	***	0,87	**
12	0,67	n.s.	1,30	**	0,59	*
13	0,17	n.s.	1,30	**	0,13	n.s.
14	1,06	**	1,57	***	0,87	*
15	0,44	n.s.	1,97	***	0,70	*
16	1,72	**	2,35	***	1,64	***
17	1,39	n.s.	1,76	**	0,58	n.s.
18	0,94	*	0,76	n.s.	0,47	n.s.
19	1,44	n.s.	3,43	***	1,77	***
20	1,06	n.s.	2,00	***	0,47	n.s.
21	1,00	n.s.	0,43	n.s.	0,56	n.s.
22	1,89	*	2,92	***	1,86	***
23	1,28	n.s.	2,16	***	1,06	***
24	0,67	n.s.	1,89	***	1,32	***
25	1,00	n.s.	1,30	**	0,54	n.s.
26	0,83	n.s.	1,46	***	0,97	***
27	1,17	n.s.	1,03	**	0,90	**
28	1,89	*	1,54	***	0,23	n.s.
29	0,67	*	1,19	**	1,06	**
30	1,11	n.s.	2,03	***	0,44	n.s.
31	0,89	n.s.	1,35	**	0,31	n.s.

4.3.3 The employees' view on which recommendations JM should focus on in the future

One of the tasks at the survey was to mark 3 out of the 31 recommendations that the respondent considered to be the most important for JM to focus in the future. These three choices were used to get recommendations from employees within production but also to measure differences among different work positions.

The three most popular recommendations chosen were:

- Reward good work (13)
- Strive for aligned teams and project organisations (3)
- Select employees with appropriate skills and attitudes (4)

The three least popular recommendations were:

- Establish disciplined information structures and meetings (22)
- Base product definition on running cost (30)
- Link all improvement initiatives to product characteristics or to the value-adding process (9)

Table 8. Amount of choices in per cent for each recommendation divided upon hierarchical position.

Rec.	Prod. Managers	Site Managers	Foremen	Craftsmen
1	6%	11%	15%	10%
2	6%	3%	6%	16%
3	6%	41%	21%	23%
4	17%	32%	28%	19%
5	6%	5%	4%	12%
6	11%	8%	6%	2%
7	11%	0%	1%	6%
8	6%	5%	8%	6%
9	0%	3%	1%	1%
10	6%	27%	22%	14%
11	17%	3%	10%	10%
12	11%	11%	21%	15%
13	0%	8%	24%	44%
14	11%	19%	15%	23%
15	11%	3%	7%	5%
16	11%	8%	4%	6%
17	0%	8%	7%	2%
18	11%	5%	13%	4%
19	11%	8%	1%	6%
20	6%	0%	4%	3%
21	6%	11%	3%	7%
22	11%	0%	0%	3%
23	22%	14%	11%	10%
24	6%	3%	8%	6%
25	17%	5%	4%	2%
26	6%	3%	7%	3%
27	0%	3%	10%	1%
28	28%	5%	10%	11%
29	22%	11%	11%	4%
30	6%	0%	1%	2%
31	17%	22%	11%	5%

Table 8 shows that there are major differences in what recommendations the different work positions believe that JM should prioritise. One example is the in average most popular recommendation (13) Reward good work, were the opinions in the difference in positions is distinct. The percentage increases downwards in the organisation. None of the Production Managers choose the recommendation while 44% of the Craftsmen rated

it as one of the most important. Another interesting fact is that recommendation (28) Develop technical solutions that can be used for several products, is the most popular choice among the Production Managers while it have not scored among the highest by non of the other positions. The recommendation Strive for aligned teams and project organisations (3), is mainly ranked high due to high ranking among Site Managers. This recommendation is one of the most popular by the Site Managers while it has one of the lowest scores among the Production Managers, where only 6% selected it as one of the most important.

There are also differences in what categories the different positions made their choices. The Production Managers choices are quite even spread out among all categories. In the other positions, where the employees are positioned at the sites, the majority of choices are in category I Develop the organisation and II Manage improvements. There is also a tendency of higher focus on these categories in lower level of the organisation. A summary of the choices grouped in the five categories is displayed in Figure 13 below. To clarify the differences, category I and II are marked blue while III, IV and V are marked red. Among the Production Managers the popularity among the categories are not so distinct. When the hierarchical positions are studied, the increase of popularity in blue categories follows the decrease in level of the organisation.

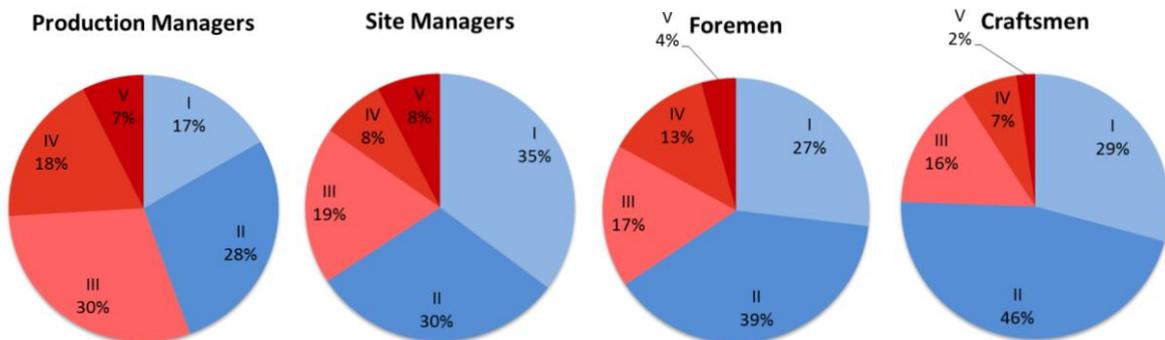


Figure 13. Distribution of the employees' recommendations for JM to work with in the future. The distribution is divided upon Josephsons' (2013) categories.

5 Discussion

In this chapter is the theoretical framework discussed with regards to the collected results from the answers in the quantitative study and from the qualitative interviews. To be able to understand the results from this study, in the context of present research, the results are in this chapter discussed with the support of the literature review. The first part of the discussion will use Likers (2004) four sections of Lean to anchor the discussion to the theoretical framework and the results from the collected data. This chapter is connected to the first and second research question; How is JM's strategy Structured production connected to the Lean philosophy and how is Structured production expressed by senior managers and how are the initiatives of the strategy perceived by the employees? The answers from the survey on the 31 recommendations are used to evaluate how the employees perceive how JM is working with initiatives in SP. In section 5.2 will the change of the employees' perception, between the 2010 and the 2014 survey, be discussed and presented. Here is the third and last research question answered; How has the employees' perception developed since the implementation of Structured production in 2010? Further a chapter covering change and leadership are presented to clarify the influence of organisational change and leadership in a Lean implementation context. Finally, a chapter about circumstances of the chosen methods, strength and weakness in the study will end the discussion.

5.1 The employees' perception - connected to the Lean philosophy

The operational strategy, SP, is based on Lean philosophy (JM AB., 2014) and the recommendations created by Josephson and Saukkoriipi (2009), which is also influenced by the Lean philosophy. That makes it possible to discuss and compare JM's employees' perceptions of the initiatives of SP. In the overall strategy SPD, it is only SP that is officially outspoken to be based on the Lean philosophy. However the other sub-projects and SPD follow essential parts of the philosophy. Even if these early parts of SPD are not consciously based on Lean, the development and mind-set of them has strong influences of the philosophy. To structure the organisation, involve the employee to collect best practise and work with a long term strategy are some of the essential parts of Lean, which JM worked with before SP and Lean was introduced to the organisation.

5.1.1 Section 1: Long-term philosophy

The Senior managers described that SP is one part of the strategy SPD, which has emerged through a chain of strategic decisions and has emerged since the start of the implementation. The strategy has been used and developed for more than a decade, since 2003. During this time, decisions have been taken with a long-term goal to standardise the products and the processes. JM's strategy SPD is a good example of an emergent strategy, which Johnson et al. (2011) describe where it has been developed through its lifetime. Quinn's (1989) definition of a logical incrementalism strategy fits

well with how JM's strategy has evolved with environmental impacts, partial commitments and small-scale launched implementation. The long-term and consistent strategy is related to Likers' (2004) theory of a long-term lean philosophy. In the survey, the employees have answered how they perceive how JM work with this section through recommendation Base management decisions on a long-term philosophy (15). The employees rank this recommendation as number 19 of 31 in the survey of 2014. This indicates that this recommendation is not top prioritised in relation to other recommendations. However, the long-term philosophy reflected in other parts of the organisation. The Senior managers that has been interviewed, has an average employment in the organisation of 14 years and through JM's history there has only been five CEOs since the start in 1945. However, this recommendation has not either been requested through the three choices, from the survey, to a larger extent. The highest score was among the Production Managers where 11% choose the recommendation. The higher score among Production Managers could be explained by a closer connection to strategic decisions than the rest of the employees. This is supported by Mantere (2005), who states that higher managers are more connected to strategic work than operational managers are.

Described earlier, there are difficulties to create operational strategies that are connected to the long-term business strategy (Frizelle and Woodcock, 1995). The results from our study indicate that the employees in production does not perceive that the organisation prioritise this recommendation or request that they should. However, research in strategy and Lean implementation shows that a key factor for successful implementation of a Lean strategy is close connection between decisions and long-term philosophy (Johnsson et al., 2011; Liker 2004). Frizelle and Woodcock (1995) states that for a long-term business strategy, it is of great importance that all decisions taken are connected to the strategy.

5.1.2 Section 2: The right process will produce the right results

One vital part of SP for JM has been to take control over its processes. Through SP, JM gain control over what, how and when they perform work at the production sites. Senior managers stated that ideas of SP came from the Toyota Production System and that they use the Swedish automotive industry as an inspiration and role model. To be able to adapt ideas from the automotive industry, JM's production processes needed to become more similar to the automotive industries' processes. One major hinder for implementation of the strategy were the wide variety of components and unique work procedures. Therefore decisions were taken to standardise and structure the production process within the organisation to be able to use ideas developed by the other industries. The standardisation was also used to become less dependent of the individuals and this was achieved by standardised work procedures. The less dependency of individuals is believed to reduce the amount of quality errors and increase the use of best practise. These factors are seen by the Senior managers as a main benefit of SP.

Bhasin (2012) explains that there is no general toolbox for implementing Lean into all organisations. Therefore the organisations need to either create an own toolbox of Lean or copy other similar organisations successful strategic tools. As the managers perceive that JM are ahead of its competitors within the construction sector, no tools were collected from similar organisations. To ease the creation of its own toolbox, JM align its production process with inspiration from the automotive industry. With a changed mind-set it made it possible to learn from the automotive industry and work with its own processes to become more Lean-oriented.

From the survey, the recommendations in categories III Structure the process and IV Standardise the products and the processes are connected to this section of Lean. These categories hold 80% of the 10 highest ranked recommendations when all of the employees are summarised. Therefore the strategic initiatives taken in this area seem to be well recognised and visualised for the employees. There is no large discrepancy between the different hierarchical levels either, and this concludes that the employees perceive that JM work with structure and standardisation of the processes to a large extent. These initiatives are also underlined by the Senior Managers during the interviews, which describe that focus has been to ensure high quality, through a well-known product and process. Further, these initiatives in SP do also reflect in the employees' three choices of the most important recommendation for JM. The Production Managers, which are highest up in hierarchy by the respondent, perceive that these two categories are more essential for JM, than the other employees. One example of this is recommendation Develop technical solutions that can be used for several products (28), where 28% of the Production manager's perceived this recommendation to be important, meanwhile only 5% of the Site Managers had the same opinion. This could be explained by the employees' different perspective of the categories. In category III and IV the Production Managers puts 44 % of their choices and that indicates that they perceive that JM should work further with these recommendations meanwhile only 17% of the Craftsmen's choices is placed here.

5.1.3 Section 3: Add value to the organisation by developing your people and partners

One part of SP is to educate the employees with the purpose to increase the awareness of why and how JM is working with SP and Lean. During the implementation of SP all employees in production have been educated, ranging from Craftsmen to Production Managers. When a Lean strategy is implemented the need of change in norms and behaviour is necessary, which Mann (2010) states, and education could be an approach to affect and help the employees to adapt to the new organisational culture. Further on, as Mann (2010) describes, culture can be one barrier that hinder the implementation of a Lean strategy. Therefore it is of great importance to challenge old norms and habits through the implementation process. This together with the Interviewees' opinions about the construction industry as conservative and inclined to new approaches makes the culture a factual hinder. JM has approached this hinder with education but also with recruitment of new employees with a different mind-set to promote the new way of

working. During the past, problem solvers were recruited, today JM search for proactive leaders that reduce the origin of problems. In the survey is category I Develop the organisation and II Manage improvements connected to this section of Lean.

All recommendations in category I is identified by the employees to be ranked 16 or lower among the recommendations, which positions the whole category in the bottom half of 31, see Table 4. This indicates that the employees perceive that this category is less recognised in relation to other more prioritised categories in the survey. When answers from the managers at three organisational levels and craftsmen are analysed there are small differences. The majority of the employees perceive that JM prioritise this category less in comparison with other categories. The only recommendation where a larger difference can be measured is for recommendation Encourage further training (2). Among Foremen and Site Managers is this recommendation ranked 9 respectively 10, which indicates that they perceive that JM in larger extent work with this recommendation meanwhile the Craftsmen rank it to only 23 most prioritised.

Category I in the survey is also the category with the highest standard deviation in the respondent's answers. The high standard deviation translates into that the employees has a widespread perception of how JM works with these recommendations. In this category do we find for example Strive for aligned teams and project organisations (3), Select employees with the appropriate skills and attitude (4) and Plan in reflection and training (5). A reason of the discrepancy could be explained that JM operates in a Project Based Organisation. Hobday (2000) states that a PBO exist of plenty of temporary organisations. These organisation works with new teams, during limited time and with new tasks (Lundin and Söderholm, 1995). However, even if JM's project is classified to perform repetitive projects the organisation suffer from the characteristics from a PBO. The characteristics are, that there is different individual with different leaders in the different teams, which makes the temporary organisations unique. One temporary organisation can work consistent with for example recommendation (2), but the other temporary organisation does not prioritise this recommendation and therefore the standard deviation becomes high. This could be the reason why this recommendation, which is dependent on the individual leadership, shows a higher standard deviation. Therefore, it is not surprising that the category with the lowest standard deviation is "IV Standardise the products and processes", which is not dependent in the individuals instead is steered from centralised leadership.

The same comparison, which was presented in the previous Lean section, when the three choices are compared between the managerial levels, is performed in this Lean section as well. This comparison is illustrated in Figure 15, and in this Lean section is even more discrepancy showed. 75% of all Craftsmen's choices are put in category I or II and this indicates heavily that JM's Craftsmen perceive that JM should work with these recommendations in the future. The higher up in the hierarchical level, the less is these two categories prioritised. Among Foremen and Site Managers 65% of the marks are put in these categories and only 44% of the Production Managers' choices is to be found in these categories. For the employees in the organisation is recommendations

which regards leadership, personal and organisational development the most vital that the organisation should work with in the future. This statement from the employees together with the perception that JM do not prioritise these recommendations creates a gap. Kotter (1997) states that 90% of the success factors of a Lean implementation are about the leadership. This gap needs to be recognised, and Bhasin and Burcher (2006) claims that 90% of the failed implementations due to view the Lean philosophy only as a process with structure.

Several of the Interviewees stated the importance of an increased collaboration with their sub-contractors. The structured way of working is believed to secure the flow of materials in the future, through a developed relationship with sub-contractors and suppliers. In the survey, recommendation Actively support suppliers in their development (16), is connected to this section of Lean. The employees' perception of this recommendation generates a ranking of 27 out of 31. Recommendation (16) is also one of the recommendations that have lower percentage of the three choices by all employees. In this case the vision does not appear to been translated into action yet and are therefore not visible in this survey. The increased focus on logistics, described at the interviews, might change the future employees' view of this recommendation.

5.1.4 Section 4: Continuously solving root problems drives organisational learning

The Senior managers expressed that SP is a platform for continuous improvements. SP is an operational strategy that ensures the quality and creates a standardised way of work to be able to increase the productivity in the future. One expressed way of continuously develop SP is through the suggestions of improvements. All employees at JM are supposed to send in suggestions for improvement to further develop, for example the assembly instructions or other processes within the organisation. By doing this, new feedback from the organisation is collected and used to develop new ways of best practise. The vision expressed during the interviews with the Senior managers, as mentioned before, to strive towards “*being the most professional house builder, on all levels*”. To accomplish this vision, JM have to continuously develop their organisation in a faster phase than its competitors and break new ground. The initiatives, in this area of continuously improvements at JM ,is supported by Halling and Renström (2011), when they state that this area is one critical success factor for a successful never-ending Lean implementation. One Senior manager describes this phenomena in the interview and highlight the importance to never stop feed the implementation with new energy and new initiatives. In other words, the challenge is to always be persistent and never give up the vision.

In the survey, there are five recommendations that cover the area of continuously improvements. The recommendation Measure to control improvement work (7), Measure in order to uncover waste (8), Link all improvement initiatives to product characteristics or the value adding process (9), Collect and use best practises systematically (10) and Set high demands that drive development (11) describe what

Liker (2004) discussed under the fourth Lean section. These recommendations are fairly low prioritised by the employees and are ranked roughly between 15 and 25 as the most prioritised recommendation. However, recommendation (11) peaks out among these five and is ranked between 6 and 9 by the organisation's employees. These results could be seen as mediocre but, as presented later in the chapter 5.3, these recommendations have made one of the largest change in perception since the beginning of SP.

When the choices of recommendations are analysed similar pattern could be viewed, as when the mean values were studied. Recommendation (7) to (9) got almost no attention from the employees, regardless of hierarchical position and they perceive no need to prioritise this recommendation in the future. In contrast to this, recommendation (10) is more prioritised among Site Managers and Foremen when 27% respectively 22% perceive that JM should focus on this recommendation in the future. Thus they believe that use of the best practise will benefit for JM in the long-term.

5.2 Change of the employees' perception from 2010 to 2014

The first time the survey was performed, in 2010-2011, were when the employees were educated and introduced to Lean and the operational strategy SP. Since 2010 JM has worked broad and intensive with the implementation of SP and when our study was performed during the spring of 2014, all employees where educated and the organisation are supposed to work according to the strategy. The Senior managers described, that during these four years of the implementation process, the organisation has performed a hard and continuous work in order to anchor and establish the strategy in all hierarchical levels. According to the surveys, a change in perception has occurred and the employees perceive in general that JM works more with reducing waste, lowering production costs, improving the daily work for the sector and its employee in their daily operation, and ultimately increasing the profit for JM.

The paired t-test, see section 3.4, which was performed to analyse if a statistical significant change had occurred showed that JM's employees perceives that JM works more with these recommendations, except of the recommendations Reward good work (13) and Encourage further training (2). These recommendation's change in mean value is not statistical significant and therefore is it not possible to state that JM works more with all recommendations now than in 2010. The change in perception and the fact that all mean values have risen during this time interval, is supported by Austin and Currie (2003). They describe the awareness that a change takes time and also different time dependent of which hierarchical level the employees belong to. This awareness depends, according to Austin and Currie (2003), of how many organisational levels the employee are away from where the decisions is taken and according to their model it takes six month per level in the organisation to reach the same level of awareness. On the other hand, one of the Interviewees felt that this cycle took up to one year in this organisation. This indicates that the awareness take time to reach further down in the

organisation. However it is difficult to calculate exactly when the awareness reaches all of the employees. When the change in perception is compared by hierarchical levels between 2010 and 2014, Austin and Currie's theory about awareness indicates that the broad understanding only has reached the Site Managers and not to the Foremen. This statement is based on Table 7, where the Site Managers perception has significantly raised during these four years, meanwhile the rise in mean value among Foremen is located to specific recommendations. One area where Foremen perceive a change has occurred are the recommendations, which Liker (2004) names at the heart of Lean philosophy, the continuous improvement. However, the category where the Foremen do not perceive a change is the recommendations about category I Develop the organisation, hence themselves. According to this theory, the full understanding should not have reached the craftsmen either, however the craftsmen did not participate in the 2010 survey and therefore it is not possible to draw the conclusion. Neither has the Production Managers' perception changed as much as the Site managers, this could be explained by Austin and Currie's (2003) model, and then it indicates that the Production Managers already had a understanding of SP in the 2010 survey.

When the overall mean values are studied clear tendencies and patterns appear from the data. The mean values have increased on almost all recommendations for all managers and craftsmen in the organisation. The recommendations that have risen most concerns, which Liker (2004) describe it in the heart of the Lean-house, are connected to continuously improvements. These recommendations are; Measure to control improvement (7) and Measure in order to uncover waste (8) was ranked as number 28 respectively 31 in the 2010 study. However, this large change in mean values, see Table 6, indicates heavily that JM prioritise continuous improvements more now than in 2010. Another recommendation that has raised equally much is Establish disciplined information structures and meetings (22), which has moved from rank 19 to 4 by the employees. This could be explained through that one initiative of SP was to structure the meeting schedule and implement daily morning meetings on the construction sites. Those recommendations that has decreased in rank from 2010 to 2014, has not dropped due to their mean values is lower now than before. Instead, it is other recommendations that have risen more and it is possible to see certain patterns. All six recommendations in category I Develop the organisation has dropped in rank since the implementation phase simultaneously as the paired t-test describes a statistical significant in the risen mean value, except in Encourage further training (2).

One of the recommendation where the change is not statistical significant, as described earlier, is Reward good work (13). It has also dropped 7 positions on the rank during these four years and is clearly nothing JM prioritise according to the employees. Craftsmen and Foremen rank this recommendation as JM prioritise least and Site managers and Production managers rank it only slightly higher. However, when the employees were asked what recommendation they believed that JM should focus most on, large dissimilarities were showed. 44% of the Craftsmen and 24% of the Foremen stated that JM should prioritise this recommendation in the future, meanwhile only 8% of the Site Managers and actually none of the Production Managers stated that this

recommendation is important for JM to focus on. This is a large discrepancy between hierarchical levels and a sign that the organisation is not aligned in this question. The recommendation, Reward good work (13), is the most favoured to be prioritised among Craftsmen and second most by Foremen and has the lowest rank in mean value by both, simultaneously as their superiors perceive the recommendation as not important. According to Winkler (2010) and Forsyth (2010) are rewarding a cornerstone in both transformational leadership and transactional leadership which can make the subordinate to achieve results beyond their own expectation.

There are different possible reasons, which could explain the change in perception from the 2010 to the 2014 survey. The general higher mean value of the employees' perception of that JM works more with these recommendations is positive results for JM. This signifies that JM focus more on areas, which should increase the productivity in the organisation. In other words, JM's employees perceive that the operational strategy, see Johnson et al. (2011), SP reflects the employees' perception and are to a greater extent more visible for the employees in 2014 than in 2010. However, there are still differences between the recommendation and between the employees' perception. One aspect to remember is that when the survey was performed in 2010 had the employees recently participated in an education of Lean and SP. This education could have made the employees more critical to the recommendation and more aware of good examples. One example of this is Use all of the weeks' 168 hours (19), which the organisation perceive has risen two steps on the ten graded ordinal scale, but does the organisation really use more time of the weeks' 168 hours more in 2014 than 2010?

5.3 The change requires leadership

The strategic work, which JM has performed since the start of SPD in 2003, has generated changes within the organisation. When SP started to be implemented, the change did no longer affect only the processes and products. It also contained behavioural change for the employees. When SP was launched in the organisation a Lean inspired change occurred, it was then necessary to change old norms and habits among the employees (Halling and Renström, 2011). The change process and the type of change has been defined and tried to be explained by researchers. The change, which has occurred in the organisation places JM in the bottom right quadrant in Dawson's model from 2003, as a proactive and large-scale change. However, JM place itself very close to the middle on the x-axis, which describe if the change is reactive or proactive. In Dunphy's and Stace's model from 1993 the change is categorised by the scale of the change together with style of change management that is used in the implementation process. In this model is JM's change in SP classified with a modular transformational change performed with a consultative management style, which together creates a Charismatic transformation. The characteristic style of leadership in a Charismatic transformation describes as transformational leadership, as explained in chapter 2.1.3. Winkler (2010) expresses the reward system, in this leadership style, to reward higher up on Maslow's hierarchy of need. Instead of reward with money, which covers low level in the "stair", the transformational leadership should aim to reward the employees

with esteem and self-actualisation. This theory together with the respondent's perception about a lack of priority regarding leadership creates an interesting gap. As discussed earlier, foremost it is the Craftsmen and the Foremen, 75% respective 66% of their choice was made in these categories, perceive that JM need to focus more on recommendations, which regards leadership. Simultaneously, all hierarchical positions gave these recommendations relatively low mean value and it is clear that JM has not prioritised these categories as much as the categories related to structure and the process. To continue the implementation phase and take care of all the work which has been performed, is leadership, in the temporary organisation out on the construction site, an essential critical success factor.

5.4 Reflections on the method

In this study we have used a questionnaire developed by a group of researchers and practitioners in 2009. When this study were performed the survey it is five years since it was created. This could have implication on the result and the measured recommendation in the survey could be out-dated or new focus areas could have arisen for the industry. However, this factor does not exceed the possibility to measure the change in perception over these four years since the last survey. Another implication with the survey, in this study, was that this was the first time the survey was performed on ordinary Craftsmen. The recommendations are written as a part of a popular paper. The language in the survey was adapted to suit an educated audience. This was noticed by several respondents, which expressed that they did not understand the questions or that the survey was hard to answer, due to the language. This was partly solved with explanations and guidance by the present authors. This formulation and level of language made some question easier to answer and especially choose while the employees made their own choices of which recommendations JM should focus in in the future. We believe that a recommendation as Reward good work (13) is easier to choose, because of its message and formulation, than Link all improvements initiative to product characteristics or to the value-adding process (9) as one example.

In 2010 when the survey was performed, the employees participated in an education in Lean, productivity and view upon waste in the construction industry. As mentioned earlier, this could influence the participant's mind-set to be more critical and view its own daily life from another angle. In contrast to the 2010 survey the survey in 2014 performed in their daily work and there mind-set was not as prepared and updated on the subject. However, this situation gives a fair and accurate view of the employees' perception. One thing that could have implications on this aspect is that JM chose which sites that were included in the study should they had the possibilities to steer towards "better" sites. We do not believed that was the case, because large construction site where requested and JM also picked out large sites. JM did also choose which individuals that were interviewed with the criteria to be a person in managerial position and has work connected to SP. However, the same analyse is done and we not believe that the choice had a major impact on the results. Different persons performed the 2010 and 2014 survey, which could result in dissimilar ways the recommendations were

explained and the questions were formulated. This is an additional factor that could affect the results from the survey.

The literature review covers several areas connected to the results of this study, however the literature are written in a general perspective with little or no connection to the construction sector. The fact that the construction sector is characterised as project based and of being conservative can have influences on the result of this study. Therefore the comparison with the general literature can affect the discussion.

One other reflection regarding the method is that in the qualitative study, the interviewees' opinions are collected and presented as one group, Senior managers. Since the eight interviews were held with managers from different hierarchical positions and from different regions there were no natural way of categorising the interviewees, and therefore they were analysed as one entity. We believe that this decision could have an impact of the result from the interviews but since the answers from the interviews were similar and seemed to be independent on the region or position the impact are interpreted to be minor.

6 Conclusions

This study seeks to develop a deeper understanding of how JM's employees perceive how JM work with improvements in their production process. In order to obtain this understanding a case study of JM has been performed through interviews with Senior managers and a questionnaire to the managers and craftsmen in the production segment. A literature review of strategy, change management, the Lean philosophy and project based organisation has also been performed in order to understand JM's work with the operational strategy Structured production, which is the organisation's approach to work with improvements in the production. First of all, the study concludes that JM have focused on and are consistent with the implementation of Structured production, the operational strategy which is based on Lean, and the study shows positive result of the employees' perception of the initiative in the strategy. JM has so far succeeded with the implementation, however in this never ending implementation, the organisation still has areas to improve and need to work with the continuously improvements.

The study have three research questions, the first is; How is JM's strategy Structured production linked to the Lean philosophy as explained by Liker (2004)? JM (2014) states that Structured production is based on the Lean philosophy. Furthermore, the interviewees describe the initiatives within Structured production that encourage standardise work procedures, employee involvement and continuously improvements which are closely connected to Liker's principles of Lean.

Furthermore, the second research question is; How are Structured production expressed by senior managers, and how are the strategy's initiatives perceived by the employees? Through the interviews has a view been obtained that JM's Senior managers has an united and distinct view of Structured production The managers enhance that SP is a platform for continuously improvements, JM's way to secure high level of lowest quality and become less dependent on the individuals knowledge through the creation of standardised work procedures. This is supported by the employees that express, through the questionnaire, which JM works with all of the 31 recommendations which are connected to the Lean philosophy. However, the study concludes that the employees' perceive that JM has prioritised structuring and standardisation of the processes and the products over a development of the organisation and manage improvements. Furthermore, the study concludes that no significant differences depending on age are recognised among employees. On the contrary, there is a tendency of a general higher mean value in the geographical area Riks in comparison with the Stockholm region. Meanwhile, the largest dissimilarities are seen, when the respondents' answers are divided on hierarchical positions. Site managers have the highest perception of JM's works with the initiatives in Structured production meanwhile the craftsmen has the lowest.

The last and third research question is; How has the employees' perception of the initiatives changed since the implementation of Structured production in 2010? The results show a general positive change in the employees' perception of JM's work with

the recommendations since 2010. 29 out of 31 recommendations have a statistically significant higher mean value, which states that the employees perceive that JM work more with the recommendations now than in 2010. It is the Site managers which present the largest increase of perception among the hierarchical positions and the study concludes that the strategy Structured production is communicated to this hierarchical level. Simultaneously, the recommendations which has increased most in perception, independent of position, is the recommendations that review continuously improvements. Further on, the individual recommendation that has increased most between the observations, and the study concludes further and had the greatest impact on the employees' perception, is Establish disciplined information structures and meetings (22).

Through the survey the employees provided JM recommendations to the future of what they believed JM should prioritise. The general conclusion made from these recommendations is that the employees choose recommendations which would make their daily life easier. The highest managerial positions requested more structures and standardisation, the managerial positions on site advocated recommendations regarding aligned teams and to select employees with appropriate skills and attitudes. Meanwhile craftsmen wanted JM to prioritise the reward of good work. The study concludes that lower hierarchical positions of the organisation prioritise recommendations which concern the individual leadership simultaneously as high managerial positions prioritise more centralised structure. One reason why there are major differences between these focuses could be that decisions connected to structure and standardisation is taken central while leadership improvements are more dependent on the decentralised individuals.

Halling and Renström (2011) and Mann (2009) argue that leadership is important for the success of an implementation of a strategy based on Lean. The implementation process also involves behavioural and cultural changes that stresses the organisation and affect its productivity (Austin and Currie, 2003). During the implementation, the organisation can therefore benefit from using use well-communicated leadership directives to secure the communication flow and reduce uncertainties (Halling and Renström, 2011). Kotter (1997) states that structure and standardisation stands for only 10% of the implementation while 90% is connected to leadership. Leadership is therefore important to avoid ending up with the 90% that fail with the Lean implementation process, according to Bhasin and Burcher (2006). The results from the observation shows that JM focus more on areas of Lean that are connected to standardisation and structure of the processes and the products in comparison with parameters connected to leadership. Simultaneously, the employees recommend JM to prioritise recommendations regarding the individual leadership. Therefore the study concludes that JM would benefit from turning the initiatives on the development of the organisation and manage improvements to continue its current successful Lean implementation.

Researches in the future are suggested to perform an additional observation of the change to be able to measure further development and change in perception. In additional observation the possibility to measure the craftsmen change in perception. Hence, it was not possible in this study since no previous data from craftsmen was available. Further research could also investigate the relative low change in perception among foremen and study how this group could make a similar change as the site manager made in our study. A plan for development of areas connected to leadership could also be a focus area for continuous research. Finally, this study only concern the production department of the organisation, additional research is therefore suggested to investigate the entire organisation, since all the strategies within the overall operational strategy are connected to parts of the Lean philosophy.

7 References

- AUSTIN, J. & CURRIE, B. 2003. Changing organisations for a knowledge economy: The theory and practice of change management. *Journal of Facilities Management*, 2, 229-243.
- BASHKANSKY, E. & GADRISCH, T. 2010. Some metrological aspects of ordinal measurements. *Accreditation and Quality Assurance*, 10, 331-336.
- BHASIN, S. 2012. An appropriate change strategy for lean success. *Management Decision*, 50, 439-458.
- BHASIN, S. & BURCHER, P. 2006. Lean viewed as a philosophy. *Journal of Manufacturing Technology*, 17, 56-72.
- BRIDGES, W. & MITCHELL, S. 2000. *Leading Transition: A New Model for Change*. Berlin, Eaton & Associates Ltd.
- BRYMAN, A. B., EMMA. 2007. *Business research methods*, Oxford, Oxford University Press.
- CHANDLER, A. D. 1963. *Strategy and Structure: Chapters in the History of American Enterprise*, Boston.
- CLEGG, S., KORNBERGER, M. & PITSIS, T. 2011. *Managing & Organizations - An introduction to theory & practice*, London, Sage.
- DAWSON, P. 2003. *Reshaping Change*, London, Routledge.
- DUBOIS, A. & GADDE, L.-E. 2002. The construction industry as a loosely coupled system: implications for productivity and innovation. *Construction Management and Economics*, 20, 621-631.
- DUNPHY, D. & STACE, D. 1993. The strategic management of corporate change. *Human Relations*, 46, 905-920.
- FERNIE, A. & FOWLER, N. 2006. Efficiency versus effectiveness in construction supply chains: the dangers of "lean" thinking in isolation. *Supply Chain Management: An international journal*, 11, 283-287.
- FORSYTH, D. R. 2010. *Group Dynamics*, Belmont, CA, USA, Wadsworth, Cengage Learning.
- FRIZELLE, G. & WOODCOCK, E. 1995. Managing complexity as an aid to developing operational strategy. *International Journal of Operations and Productions Management*, 15, 26-39.
- GALLAGHER, S. 2005. The Toyota Way. *Engineering Management, IEEE Transactions on*, 52, 140-140.
- GÍSLASON, E., SIGURJÓNSSON, A. & JOSEPHSON, P.-E. 2013. Construction Workers' View on Standardised Work Procedures and its Influences on Freedom and Innovation. *CITC VII-conference*. Bangkok.
- GOLD, N. 1991. Deviant Definitions. *Barron's National Business and Financial Weekly*, 12-19.
- GRIMBERG, S. & HELLSTRÖM, F. 2014. The Value Chain Concept Applied on a Construction Project Development Process. A Case Study Highlighting the Hindrances Through Lead-Times and from a Project Managers' Perspective. Chalmers University of Technology.
- GRUNERT, K., MEYER, R. H., KNÖFEL, M. & ZHAO, R. From strategy to implementation: tool-based planning of optical networks. 2011. 83100J-83100J-8.
- HALLING, B. & RENSTRÖM, J. 2011. Lean and the implementation process: managers perspective on change. *FALF 2011 Luleå Sweden: Det nya arbetslivet*.
- HASSANEIN, A. & MOSELHI, O. 2005. Accelerating linear projects. *Construction Management and Economics*, 23, 377-385.
- CHALMERS**, *Civil and Environmental Engineering*, Master's Thesis 2014:57

- HELLSTRÖM, M. & WIKSTRÖM, K. 2005. Project business concepts based on modularity – improved manoeuvrability through unstable structures. *International Journal of Project Management*, 23, 392-397.
- HOBDAY, M. 2000. The project-based organisation: an ideal form for managing complex products and systems? . *Research Policy*, 29, 871-893.
- HOLWEG, M. 2007. The genealogy of lean production. *Journal of Operations Management*, 25, 420-437.
- JAMES, W. 2005. The impact of corporisation and national competition policy: An exploratory study of organisational change and leadership style *Leadership & organizational development journal* 26, 289-309.
- JARZABKOWSKI, P. & PAUL SPEE, A. 2009. Strategy-as-practice: A review and future directions for the field. *International Journal of Management Reviews*, 11, 69-95.
- JM AB. 2011. *JM årets Leanpristagare* [Online]. Available: <http://news.cision.com/se/jm/r/jm-arets-leanpristagare.c9179424> [Accessed 22 May 2014].
- JM AB. 2014. Årsredovisning 2013. In: PRODUKTION, J. O. L. (ed.). Stockholm.
- JOHNSON, WHITTINGTON & SCOLES 2011. *Exploring Strategy*, Harlow, Pearson Education Limited.
- JOHNSON, G. 1992. Managing Strategic Change - Strategy, Culture and Action. *Long Range Planning*, 25, 28-36.
- JOSEPHSON, P.-E. 2013. *Långsiktig framgång: Reducera fel och slöserier i byggandet*, Stockholm, Svensk Byggtjänst AB.
- JOSEPHSON, P.-E. & BJÖRKMAN, L. 2011. 31 recommendations for increased profit - reducing waste. Chalmers University of Technology.
- JOSEPHSON, P.-E., POLESIE, P. & FRÖDELL, M. 2009. Understanding resources waste reduction priorities in Swedish construction. *Proceedings of CIB Joint International Symposium 2009: Construction Facing Worldwide Challenges*. Dubrovnik, Croatia.
- JOSEPHSON, P.-E. & SAUKKORIPI, L. 2009. 31 rekommendationer för ökad lönsamhet i byggandet - att minska slöserier! Göteborg: Avdelningen för construction management.
- KAPLAN, R. S. & NORTON, D. P. 1992. The balanced scorecard - measures that drive performance. *Harvard Business Review*, January/February, 71-79.
- KOTTER, J. P. 1997. *Leading change*, Harvard business press.
- KVALE, S. & BRINKMAN, S. 2009. *Den kvantitative forskningsintervjun*, Lund, Studentlitteratur.
- LENT, R. 1990. *Building an instructional design organization*, In Johnson, K. & Foa, L. *Instructional design: New alternatives for effective education and training*. New York, NUCEA.
- LIKER, K. J. 2004. *The Toyota way - 14 management principles from the world's greatest manufacturer*, Madison, WI, USA, CWL Publishing Enterprises.
- LUNDIN, R. A. & SÖDERHOLM, A. 1995. A theory of the temporary organization. *Scandinavian Journal of Management*, 11, 437-455.
- LÖWSTEDT, M. 2012. Exploring the concept of strategy by using a practise lens: The case of a large construction company. Chalmers University of Technology.
- MANN, D. 2009. The missing link: Lean leadership. *Frontiers of Health and Services management*, 26, 15-26.
- MANN, D. 2010. *Creating a Lean Culture*, New York, Taylor & Francis Group.
- MANTERE, S. 2005. Strategic practices as enablers and disablers of championing activity. *Strategic Organization*, 3, 157-184.

- MAYLOR, H. 2010. *Project Management*, New York, USA, Financial Times Prentice Hall.
- MINTZBERG, H. 2007. *Tracking Strategy: Toward a General Theory*, Oxford University Press.
- PALMER, I., DUNFORD, R. & AKIN, G. 1991. *Managing organizational change, a multiple perspectives approach*, New York, USA, McGraw-Hill/Irwin.
- PATEL, R. & DAVIDSSON, B. 2011. *Forskningsmetodikens grunder*, Lund, Studentlitteratur.
- POLESIE, P. 2011. *Improving productivity in construction: a contractor perspective*. Licentiate, Chalmers University of Technology.
- POLESIE, P. 2012. Reducing the use of resources in medium-sized Swedish construction enterprises: production managers' views. *Construction Management and Economics*, 30, 193-202.
- QUINN, B. J. 1989. Strategic Change: 'Logical Incrementalism'. *Sloan Management Review*, 30, 45.
- SELIN, G. 1991. Project management in decentralized organizations. *International Journal of Project Management*, 9, 216-221.
- SLACK, N. & LEWIS, M. 2002. *Operations strategy*, Pearson Education.
- SOU 1997:177. Byggekvalitetsutredning. Stockholm.
- SOU 2002:115. Skärpning gubbar! – Om konkurrensen, kvaliteten, kostnaderna och kompetensen i byggsektorn. Stockholm.
- STEVENS, S. 1946. On the theory of scales of measurement. *Science*, 103, 677-680.
- THIRY, M. & DEGUIRE, M. 2007. Recent developments in project-based organisations. *International Journal of Project Management*, 25, 649-658.
- WINKLER, A. 2010. *Contemporary leadership theories*, New York, USA, Physica-Verlag.
- WOMACK, J. P., JONES, D. T. & ROOS, D. 1991. *The machine that changed the world*, New York, Free Press.

Appendix

Appendix I

The regions of JM Bostad Sverige



Appendix II

Your position: _____ Your age: _____

Grade the following 31 recommendations on a scale from 1-10, where 1 means very low priority and 10 means very high priority.

I perceive that JM is prioritising following recommendation: 1-10

I Standardize the product from an overall perspective:	
Base product definition on running costs over the product's life cycle	
Prioritize sustainability in system choices	
Develop technical solutions that can be used for several products	
Reduce the range of components	
Standardize components	
II Define and standardize the process	
Define the actual customer requirements	
Oversee that all project members know and understand project goals	
Seek long-term customer-supplier relationships	
Use all of the week's 168 hours	
Develop similar ways of working	
Standardize information-management tools	
Plan accurately and follow up continuously	
Minimize weather dependence by means of prefabricating and weather protected assembly	
Establish disciplined information structures and meetings	
Structure supply flows for efficient assembly	
III Develop the organization and its capabilities	
Actively support suppliers in their development	
Select employees with the appropriate skills and attitudes	
Strive for aligned teams and project organizations	
Consider new skills to meet new approaches	
Encourage further training	
Support the development of individual effectiveness	
Plan in reflection and training	
IV Discipline management	
Base management decisions on a long-term philosophy	
Strive for order and neatness in the workplace	
Give clear instructions, which cannot be misinterpreted	
Set high demands that drive development	
Reward good work	
V Carry through successive improvements	
Measure in order to uncover waste	
Measure to control improvement work	
Collect and use best practices systematically	
Link all improvements initiatives to product characteristics or to the value-adding process	

Appendix III

Data from the 2010 survey. Top 3 values in each category is marked green and 3 lowest values are marked red.

	Prod. Managers, N= 22			Site Managers N=66			Foremen, N=118			Craftsmen, N=40			Total, N=254		
	Mean	Std, Deviation	Ranking	Mean	Std, Deviation	Ranking	Mean	Std, Deviation	Ranking	Mean	Std, Deviation	Ranking	Mean	Std, Deviation	Ranking
1	5,82	1,94	15	5,29	1,90	20	5,72	1,63	17	5,38	1,72	9	5,59	1,78	16
2	6,23	1,72	9	6,15	1,77	9	6,21	1,79	9	5,05	1,81	12	6,04	1,84	10
3	6,09	2,07	12	6,24	1,95	7	6,43	2,03	6	5,62	2,10	6	6,24	2,06	6
4	5,82	1,33	16	6,27	1,77	6	5,92	1,84	12	5,30	2,35	10	5,98	1,94	11
5	7,14	1,42	3	6,79	1,76	3	6,53	1,61	4	5,75	2,34	4	6,60	1,84	4
6	6,59	1,10	5	6,70	1,95	4	6,91	1,82	3	6,75	1,82	1	6,81	1,78	3
7	5,45	1,68	19	5,06	1,98	22	5,5	1,89	20	4,45	2,23	21	5,22	1,97	21
8	6,45	1,68	6	6,32	1,95	5	6,31	1,98	7	5,63	2,25	5	6,25	1,99	5
9	4,55	2,50	27	3,61	2,59	31	4,57	2,30	29	4,13	2,73	26	4,26	2,48	29
10	8,00	1,20	1	7,21	2,03	2	7,25	1,93	1	6,13	2,36	3	7,19	2,04	1
11	6,41	1,18	7	5,91	1,95	12	6,27	1,90	8	5,40	1,93	8	6,06	1,91	8
12	6,14	1,25	11	5,86	1,69	13	5,54	1,82	19	4,55	2,14	19	5,56	1,87	18
13	4,73	1,88	26	5,33	2,00	19	4,97	2,03	25	4,00	2,24	27	4,90	2,09	24
14	5,18	1,76	23	5,45	2,08	17	5,5	1,90	21	4,68	2,01	18	5,35	1,99	19
15	5,41	1,44	20	5,62	1,89	15	5,92	1,59	13	4,33	2,24	24	5,59	1,86	17
16	4,09	1,74	29	4,18	2,21	28	4,14	1,71	31	3,55	1,95	31	4,06	1,92	30
17	5,55	1,54	18	5,47	1,96	16	5,87	1,76	14	4,75	2,34	16	5,61	1,95	15
18	5,41	1,65	21	4,68	1,97	25	5,1	2,11	23	4,32	2,21	25	4,92	2,08	23
19	5,36	1,50	22	5,05	2,14	23	5,61	1,78	18	4,75	2,09	17	5,33	1,93	20
20	6,82	1,40	4	6,06	2,32	10	6,51	2,10	5	5,10	2,34	11	6,22	2,19	7
21	6,27	1,45	8	5,39	2,14	18	5,85	2,09	16	4,80	2,17	15	5,67	2,11	14
22	4,09	1,74	30	4,48	2,11	26	4,92	1,99	27	4,48	2,04	20	4,70	2,03	27
23	6,09	1,57	13	5,67	2,02	14	5,86	1,95	15	4,98	1,72	13	5,76	1,96	13
24	7,45	0,91	2	7,44	1,77	1	7,17	1,80	2	6,62	1,86	2	7,18	1,75	2
25	6,18	1,47	10	6,17	1,89	8	6,03	1,66	11	4,88	1,71	14	5,90	1,79	12
26	6,09	1,34	14	6,06	1,78	11	6,17	1,48	10	5,57	1,89	7	6,06	1,63	9
27	5,77	1,45	17	5,23	1,90	21	5,08	1,80	24	3,75	2,12	29	5,00	1,96	22
28	3,91	2,18	31	3,70	1,98	30	4,37	1,69	30	3,65	2,28	30	4,02	1,92	31
29	4,41	1,92	28	3,98	1,93	29	4,83	1,86	28	3,95	1,84	28	4,46	1,93	28
30	5,05	1,70	24	4,71	2,12	24	4,97	2,00	26	4,42	2,14	22	4,85	2,05	25
31	4,86	1,64	25	4,27	1,84	27	5,23	1,55	22	4,40	1,89	23	4,81	1,77	26