Material supply chain in the construction industry

A case study of PEAB AB’s material supply chain
Purpose

The purpose of this study is to understand the reason behind why it occurs a large number of pickups each year in the construction industry. In the case company alone, it occurs 160,000 pickups per year and an estimated loss of 50 MSEK. This thesis will try to investigate and explain why the pickups occur, and also what the underlying factors are that could influence the number of pickups.

Methodology

The data in the thesis was collected from semi-structured interviews with eight employees within the case company. We chose to interview four employees from the construction department and four employees from the construction service department. The reason to that was that different departments works differently to each other, and we wanted to know what the differences were. The employees all had management or supervisor positions and were based in different geographical areas. In the thesis, we applied a mix of content analysis and grounded analysis method.

Findings

The findings made during the thesis, were that the different departments work with pickups very differently when comparing to each other, one department had almost all their supplier contact at the beginning of the projects and didn’t require more supplier contact during the production. While the other department, due to their nature required regular supplier interaction which created an increase number of pickups. The main reasons behind the pickups were to inadequate planning and the organizational culture.

Conclusion

The conclusion provides areas where the company can improve on regarding the pickups and recommendation of how the case company can reduce the number of pickups, based on the gathered data and the theoretical frame of references. The recommendations were: enhance the supplier relationship, re-evaluate the contracts with the suppliers, education regarding planning and work-method.
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1 Introduction

1.1 Background

Every project in the construction industry is unique, which also means that every supply chain to the construction site has to be uniquely developed for the specific project. Most construction companies have a standardized supply chain plan for the projects, but to make it fit the project, the companies has to adapt and create a unique and temporary supply chain for the specific project (Vrijhoef & Koskela, 2000). This factor creates a challenge, with many variables to consider, such as when the construction company has finalized their decision, the decisions are not set in stone. During the process, changes could be made, from the customer who wants a different floor panel to the developer that has thought of a new change to the project (Vrijhoef & Koskela, 2000). This might push the project further back in the schedule and making it difficult to plan. This could lead to lack of material at the construction site and thus creating a need for the employees to go to the hardware store to get the needed material. This process is time consuming and creates a loss in productivity for the company, this problem could be seen as a two-edged sword, if the employees doesn’t get the needed material, the production could be on hold. As mentioned, this process is time consuming but also creates a loss in term of money and productivity.

The construction industry in general is an industry with overall long lead times, high fragmentation, many cost and time overruns, low productivity and a high degree of disputes and conflicts in general compared to other industries (Xue, Wang, Shen & Yu, 2007). Therefore, it is important that the projects follow the estimated production costs and planning in order to not decrease the profit margin and delay the project. According to Josephson and Saukkoriipi (2005), 10% of the production costs can be connected to waste in production, due to hold ups in the production, not using the machines to their full potential and material waste. According to Bankvall, Bygballe, Dubois and Jahre, (2010), there are two main improvement areas that the construction industry needs to work on: the logistics and the material supply. While comparing to other industries such as the automotive and manufacturing industry, the main difference is that these industries has changed their view on logistics as a key factor as a competitive advantage, rather than viewing logistic as just a cost reduction process (Mentzer, Flint & Hult, 2001).

While most industries such as manufacturing industry are continuous, the projects in the construction industry are temporary, which creates temporarily workplace with temporary workers at the site (Vrijhoef & Koskela, 2000). This creates disorder at the site where there are materials coming in and out, and labourers working with different activities, which needs to be shared at limited space. Which leads to insufficient planning of logistic and material supply to the site (Vrijhoef & Koskela, 2000).

Extensive research has been made on the topic of logistic and material planning in the construction industry, but the construction companies still face the same issues. This leads to
the question, is the research missing some aspect in order to implement the solutions or are there any resistance to change within the industry problem, where construction companies are conservative, making it difficult to implement changes?

As mentioned, one of the difficulties in the construction industry is the high cost of waste in the production. The construction workers sometimes have lack of material at the construction site and they solve the problem by going to a wholesale for building supplies during their work time, also known as pickups. This is an extensive issue within the construction industry. According to an internal study by PEAB AB, a large Swedish construction company, pickups occurs approximately 160,000 times each year within their organization with an estimated cost of 50 million SEK due to losses in productivity, time etc (Månsson, 2015). While this problem has been affecting the whole industry for a long time, and there have been studies pointing out the production loss and several suggestions of solving the issues, it seems like the industry has not adapted the solutions.

1.2 Problem

The general problem within the construction industry is that it occurs a vast number of pickups during a fiscal year and it affects the productivity and revenue for the construction companies. Pickup in the construction industry is where the employees goes to the building suppliers and get the material themselves, instead of using the delivery service from the suppliers. There might be number of reasons to why the pickups occur, and some of the reasons could be of bad planning, inexperience etc. The reason to why the companies wants to minimize the pickups are due to the fact that when the employees leaves the construction site and pick up the supplies, it creates a loss in productivity, and it is time consuming. According to an internal study made by the case company, a pickup takes an average of one hour, from when the employees gets in the car to pick up the materials and get back to the site. The problem with the topic is to understand the aspects that affects this issue and creates the frequent occurrence within the construction industry.

The topic of this thesis would be of interest to companies in the construction industry because of the high competition and low profitability in the market. With other research, which has been focusing on the profitability and productivity losses, this thesis will focus more on the underlying aspects, understand the reason why the solutions that has been presented in previous research, have not changed the industry. What does it require for a change to happen?
1.3 Purpose and Research questions

The purpose of this study is to understand the underlying reasons to why the pickups occur in the construction industry and what underlying factors that could influence the number of pickups. This thesis will try to clarify on why the pickups keeps happening even when statistic has shown that it creates a huge loss in terms of money and productivity. There are different types of pickup, whether it is pickup of materials and supplies or equipment it still affects the company’s productivity and revenue. This thesis will focus more on the pickups regarding materials and supplies. To be able to understand the problem and why this occurs we have developed some research questions that would help this study to clarify more on the topic. The research questions are following:

- Why do pickups occur within the construction industry?
- What are the underlying factors that could influence the number of pickups in the construction industry?
2 Theoretical frame of reference

We chose to do an old school literature review to present and give an overview of the topic. By old school literature review, we mean that, we read other articles which we found interesting and within our topic. We backtracked the references that were used in the articles and used it in our theoretical frame of reference.

The course literature used in the thesis was provided by Jönköping University. Both physical and digital copies were provided. The course literature was connected to change management, leadership and research methods. Existing theses have been used in the thesis to give leads on how to conduct the research. They were also used to identify knowledge gaps and give suggestions on future research. By backtracking the references used in the theses, it was possible to find valuable sources connected to the topic. Some of the theses were found through the database “Primo”, provided by Jönköping University. Others were provided from the case company. The scientific reports were also used in the thesis and were found through databases such as “Web of science”, “Google Scholar”, “DiVa” and “Primo”.

We read other theses made by students and discovered that the topic of change management was inadequate in the previous research, thus, we found a gap. With the gap in mind, we started to investigate in the topic of change management and found previous research in change management and backtracked the references. To find the relevant articles we started to scour the world wide web. We identified keywords such as; “Logistic”, “Change Management”, “Supply Chain”, “Construction”, etc. We also combined these keywords with Boolean operators and when searching the literature in “Web of Science”, we ticked the fields of “Management”, “Business”, “Engineering Civil”, etc. To help us find the relevant articles, we also included other databases such as Google Scholar and Primo.

2.1 Logistics

Logistics has been around for a long time and plays an important part in today’s society. It comes from the term “logistique” which originally meant supply of material to troops in warfare, and was implemented during the Napoleonic wars (Zieger, 2018). Logistics can be defined as the process of strategically manage the procurement, movement and storage of materials, parts and finished products as well as the related information flows in the organization and its marketing channels (Christopher, (2016). The aim is that the current and future profitability are maximized by cost-effective completion of orders. The logistics aspect i.e. how to reach and serve the customers has come to be a critical dimension of competitiveness for most organizations.

2.1.1 Material Supply

An effective material supply is key for a construction company to be profitable (Mattson, S. 2012). Material supply is the term for providing the production all its material, in what it needs and when it needs it. More than often, it is the purchasing department whom has the main responsibility for the material supply (Jonsson & Mattson, 2005). They are responsible for which suppliers to use for the specific project and cut the deal with the supplier for a reasonable
price. An effective material supply demands a precise planning for companies with several and widely-spread components. A company with a vast range of different materials and components are called companies with “heavy inbound flow” (Langley, et al., 2008).

2.1.2 Construction supply chain
As mentioned before, every project in the construction industry are unique, and therefore needs to have its unique logistic and material supply, although some projects may look the same. Standardized machines, materials etc. cannot be used as effective in the construction industry, as for example in the manufacturing industry (Salem, Solomon, Genaidy & Minkarah, 2006).

Construction Supply Chain (CSC) or Construction Supply Chain Management (CSCM), is a multi-organisational process. With every new project, there is a new team with several different actors involved, such as: architects, subcontractors, contractors, supplier, customer etc (Xue, et al., 2007).

2.2 Lean Production
The concept of Lean derived from Japan, more specifically from the company Toyota, it is also known as Toyota Production System (TPS) where it said to be created by Taichii Ohno, an engineer at Toyota (Womack, Jones & Roos, 1990; Dahlgaard & Dahlgaard-Park, 2006). The basic philosophy of Lean is to reduce waste, also known as _muda_, it is the core of Lean, where it focuses on quality improvements (Dahlgaard & Dahlgaard-Park, 2006). According to Womack, et al., (1990), the Lean philosophy changes the way an organisation thinks and work, for an example it pushes down the responsibility down the hierarchy. Where the blue-collars gains more responsibility, and better for worst it creates more challenging day-to-day work and demands more from the blue-collars (Womack, et al., 1990). Taichii Ohno created several different methods to reduce _muda_, some example is the Kanban system and Just-in-Time (JiT). This will be explained more in detail further down. Although the Lean philosophy originated in the automotive industry where the production site is static, it could be applied across industries, such as the research topic, the construction industry. But due to that the construction industry is so different to the automotive industry, Lean production has been, lacked for better words “translated” to the construction industry, and is known as “Lean Construction”.

With the research in mind, the company whom is being used as a case study, has implemented the Lean philosophy, although, not in perhaps in full extent as the automotive industry, we think that to give a better understanding about the topic, we deem it to be relevant to have Lean in our theoretical frame of reference and give an overview about Lean philosophy.

2.2.1 Lean Construction
Lean construction bases on the same principles as Lean production but with a different take. The idea of Lean construction is to reduce waste but also achieve a better result of meeting the customer needs (Tommelein & Ballard, 1999). Due to that, manufacturing and construction is so different when comparing to each other, a new take of the Lean philosophy was needed. In the construction industry, the finished product cannot be moved, and it produces a larger unit, compared to the manufacturing industry where you can move the finished product to the end-
According to Salem et al. (2006), there are three major differences between the construction and manufacturing industry. The first difference is that in the construction industry there are on-site-production, meaning that the production occurs on the building site, comparing to manufacturing industry where the production is fixed (Salem et al., 2006). Second, there is one of a kind production meaning that every project/production is different. The customer decides the design of the end-product and can be changed during the project in contrast to the manufacturing industries, where the production is standardized and there is slim to none customizability of the product (Salem et al., 2006). Third is the complexity aspect, which refers to that projects in the construction industry is often complex and unique. This also requires subassembly on-site, where there are alot of different activities going on and several different actors working on the site. When comparing to traditional manufacturing industry, the subassembly is often the same and standardized. (Salem et al., 2006)

When trying to understand what Lean construction means and the difference between Lean production and Lean construction, Salem et al., (2006) presents four categories that differs.

**Heijunka - Flow Variability**
Flow variability within Lean production is about controlling the fluctuations of demand in the production and to produce the minimum sequences of batches (Salem et al., 2006). However, in Lean construction, there are no “batches”, and Heijunka or Flow Variability in Lean construction is about planning or “Last Planner” (Salem et al., 2006). Last planner are the ones whom is responsible for the weekly plans and controlling the workflows. If any activities don’t follow the workplan or hasn’t been done in the correct time, the “Last Planner’s” job is to a root cause analysis and create an action plan on how to avoid the same problem in the future. (Salem et al., 2006)

**Jidoka - Autonomation**
Autonomation in Lean production is about preventing defects, that you should take immediate action when noticing a defect in the production. This could be made by visual inspection when operating a machine, which allows the employees the autonomy of stopping the process and determine the root cause of the issue. In the construction industry, it is difficult to detect defects before having the installation process, therefore Lean construction focuses on more on prevention of the defects that can occur and implement fail-safe action plans. (Salem et al., 2006)

**5S - Transparency**
Within the Lean philosophy, transparency is about visualization and transparency at the site, which can help identify the workflow and streamline the material handling. The tool that can aid the visualization and transparency is called “Five S”, which stands for Sort, Straighten, Standardize, Shine and Sustain (Salem et al., 2006).

**Kaizen - Continuous improvement**
Continuous improvement in the Lean philosophy is about involving the workers in the everyday work, which create opportunities for the workers to have a say of the daily work and being involved in the continuous improvement of the workplace (Salem et al., 2006).
2.2.2 Just - in - Time

Just in time (JIT) is a set philosophy designed to increase efficiency and quality in production. The philosophies were developed in Japan by Toyota as a part of “The Toyota production system” (Bertelsen & Nielsen, 1997). How Just-in-time is perceived differs between organizations. However, it is generally agreed that the set of philosophies improves the quality, preventive maintenance, the employee’s motivation and morale, the workers involvement and commitment, and also decreasing the inventory levels, lead and set-up times, defects, which results in a decreased cost of production (Akintoye, 1995).

The aim of Just-in-time is to have a minimum level of inventory i.e. close to zero before refilling the inventory with the amount needed for the next operation in the production process. This results in savings of storage, work space and capital bound in inventory (Bertelsen & Nielsen, 1997). By applying JIT, however, means that the organization tries to minimize the inventory of material in the greatest extent possible. The pickups occur mostly due to lack of material on the construction site, and the reason behind lack of material could be that the case company doesn’t apply JIT in a good way in the organization. JIT could be one of the factors that results in the pickup problem.

The JIT in the construction industry differs a bit from other industries. The reason behind this is the various required materials used in the production, ranging from low cost items such as nails and screws to high cost items such as steel beams. It also requires large numbers of components to be purchased, delivered and used at the construction site in order to achieve the end product. In the process of building construction, a typical materials flow is characterized by convergence to the end product i.e. the finished building (Akintoye, 1995). According to Akintoye (1995), the application of JIT in building material management requires that some questions should be addressed to implement it.

What material?
This question should determine type, volume, quantity and location or distance from the construction site for the parts, materials and components that is required for a contract. The materials and components must be classified in the ordering systems and it may be possible to classify it in categories of massiveness, critical to the construction programme and quality control. This can be categorized in four different order systems:

- **Synchronized system** - Generally applied to large volume components.
- **Prescheduled ordering system** - Generally applied to big volumes, but smaller volumes than synchronized system.
- **Periodic ordering system** - Generally applied to materials which are required in various stages during the construction process.
- **Non-periodic ordering system** - Generally applied to smaller volume but larger quantity materials which are obtained when the need emerge in the process.
Who supplies these materials and components to construction site?

There are mainly three ways of supplying materials and components to the construction sites. The first one is in-house supply, which means that parts and components are fabricated from the contractor’s workshop. Materials like quarry products are produced by a division within the construction firm. The second way of supply is fabrication of parts and components by subcontractors, and the third option is supply of parts and materials by out-house vendors. Each of the materials, components and parts used in the construction process must be classified to be supplied in one of the three options mentioned.

What would be the best distribution system?

Examples of available distribution systems are:

- Direct from part and component fabrication workshop or production factory of materials to site.
- Direct from contractor or supplier depot/warehouse to site.
- Travelling pickup of materials from multiple suppliers to site.

The delivery system for the supplies must be selected based on the ordering system chosen for the materials or components.

The application of just-in-time in the construction industry, in relation to inventory, focus on decreasing all waste. The goal is to get the delivered material straight into the work-in-process instead of using the traditional way of receiving, inspecting and storing the materials as these activities doesn’t add any value to the process and therefore should be minimized to achieve inventory reduction in the process.

2.3 Planning

In construction projects, material supply is an important aspect to consider as it affects the quality of a project. Material costs reaches up to 70% of the total construction estimation costs, and therefore activities such as delivery, planning and material consumption are important from a project efficiency perspective and require proper management (Sobotka & Czarnigowska, 2005).

In all construction projects, there is a project manager that is responsible for ensuring that the contract between customer and construction company is fulfilled (Levy, 2009, p. 57). The project manager must focus on the quality, costs and schedule on the project, and is often assisted in these tasks by the site manager at the construction site. The site manager handles the day-to-day activities on the construction sites and also overlook the operations. The Project managers generally are office-based but depending on the size of the project, they might work in a temporary office on site to get a better overview of the project. The project manager’s responsibilities vary widely between the construction companies. Some companies rely on the project manager to purchase all materials and equipment for the project, while others leave the purchasing tasks to other staff members or a purchasing department. The reason companies use
a centralized purchasing department is often to keep one source current on costs, reliable suppliers, new products and economics of scale in the purchasing function (Levy, 2009, p. 57, 59).

Before and during a project, there are project meetings where the planning is done, and different aspects of the project are discussed. An important item for discussion in these meetings is the construction schedule. Most of the construction schedules in today’s industry are Critical path method schedules (CPM) (Levy, 2009, p. 172). A CPM-schedule is complex, encompassing many activities that will be done during the entire construction project and also states in which order they will be started and finished. The schedule is dynamic during the project as changes may occur, and the CPM-schedule is revised in order evaluate if the changes will affect the overall project completion date. Some minor changes might affect other activities, resulting in a series of delays that in the end may not appear so minor.

According to Sobotka & Czarnigowska (2005), planning in a construction project includes the preparation of:

- Schedules and charts of labour and equipment utilization, material consumptions and subcontractors work.
- Logistic concept of the construction site.
- The design of site installation and disassembly.
- Guidelines for purchasing and or leasing of machinery i.e. contracts and agreements often set by the centralized purchasing department.
- Selection of suppliers, which also might be affected by contracts and agreements.
- Plans of logistic processes.
- Assessment of logistic service efficiency and environmental impact.
- Planning and placing orders, and also scheduling the deliveries based on the activity time schedule for the project.
- Waste management planning.
- Planning the information flows management and methods.

Due to the extensive and complicated projects the construction industry carries out, the planning is an important part of the process. In order for us to understand the topic of the thesis, we have to understand the process within the construction industry, which planning plays a big part of. Although the planning process could look differently for different companies, the paper by Sobotka & Czarnigowska (2005) gives a good understanding of the topic.

### 2.4 Supplier interaction

The construction industry works a lot with suppliers in order to supply their projects with materials and supplies. For our thesis, this part of the process is important to understand how the supply chain works and what kinds of relations there could be between construction companies and suppliers. We have to know how the construction companies interact with the suppliers and and how different relationships could affect the outcome of a project.
From a traditional point of view, supply in the construction industry is controlled as a chain of individual activities rather than being viewed as an integrated value-generating flow, like in the supply chain management (Forsman, Bystedt & Öhman, 2011). Issues occurring in the supply chain management are often related to information and communication problems in the different phases and between the contributors in construction, and the problems are mostly caused by other actors or part processes in earlier stages of the supply flow. According to Forsman et al. (2011), for improvements across conventional organizational boundaries, it is beneficial to use long-term relationships or partnerships between the actors in the construction process. This will minimize the work of finding routines for cooperation and interaction with new members and instead focus on improving the routines of interaction with the current members of the process.

In the supply chain management for the construction industry, there are two main relational patterns, adversarial relationships and trust relationships (Gadde & Dubois, 2010). Adversarial relationships are based on dependence structures existing within construction projects and trust relationships are based on long-term cooperation and collaboration between different supply chain actors. Trust encourages the parties to share confidential information with each other and supports the growth of the relationship. Although Gadde & Dubois (2010) suggest trust relationships, the benefits of different relationships could vary between different projects or environments.

2.5 Core capabilities
The definition of core capabilities is not fully stated between the research published, however, Leonard-Barton (1992) defines it as the knowledge set that differentiates and gives a competitive advantage for the organization. In the knowledge set, there are four dimensions.

1. **Employee knowledge and skills**
The first dimension is employee knowledge and skills. It is connected to the people in the organization and is mostly associated with core capabilities. It is most relevant to new product development and includes firm-specific techniques and scientific understanding.

2. **Technical systems**
The second dimension is knowledge within technical systems, which is results from years of gathering, processing and structuring the tacit knowledge in people’s head. This kind of physical production or information systems represent a collection of knowledge from several individual sources. The knowledge comes from both information such as products tests over many years, and from procedures such as proprietary design rules.

3. **Managerial systems**
The third dimension is called the managerial systems, which represents formal and informal ways of creating knowledge and controlling knowledge. Example of knowledge creation could be networks with partners and apprenticeship programs. Controlling knowledge relates to things such as reporting structures and incentive systems.

4. **Values and norms**
Within all the three dimensions mentioned above, there is a fourth infused dimension which is called values and norms. The values and norms within an organization affects how the organization structures, collect and control the knowledge. Even physical systems get affected by the values as, for example, an organization with a centralized control would like their software and hardware to be limited for individual impact within the organization.

Core capabilities are a collection of knowledge sets, which means that they are distributed and constantly being enhanced from several different sources. They are not easy to change because the value dimension affects them all. Therefore, managers are unwilling to change them as they don’t want to challenge accepted modes of behaviour within an organization. Yet, in industries such as technology, it is crucial that the organizations challenge their values and norms in order to fit in the swift moving environment. If they don’t challenge and change their old core capabilities, they won’t be leaders on the market. Because the market always changes, a good time of searching for new core resources is when the current core works well (Leonard-Barton, 1992). As the core capabilities are affected by the values and norms in an organization, they are strongly connected to the organizational culture and needs to be take into account when trying to change the culture and behaviour within an organization.

For our thesis, we have to understand the company and how it’s built. Core capabilities are the foundation to a company’s competitive advantage and it’s what the company should focus most on in order to maintain the competitiveness. To identify the underlying aspects, we have to know the company and how it’s built in terms of technical systems, values and norms, skills and knowledge, and managerial systems.
2.6 Organizational culture

Organizational culture is another aspect that is important to understand in order to know a company. In order for us to identify underlying aspects, we have to know the culture within the organization and how it could affect the company.

There have been several attempts to define the concept of organizational culture (Mihaela & Bratianu, 2012). Organizational culture represents a set of values that help people within the organization to better understand which actions are considered acceptable and which are not (Griffin and Moorhead, 2006). According Hofstede, Hofstede & Minkov (2005), there is no standard definition of organizational culture. However, there is a common understanding that organizational culture contains the following:

- Holistic.
- Historically determined.
- Related to things such as rituals and symbols.
- Socially constructed i.e. created and preserved by the group of people that make up the organization.
- Soft.
- Difficult to change.

An organization’s culture is not only maintained by the members within the organization, but also by the stakeholders. The stakeholders are everybody who interacts with the organization in any way such as suppliers, customers, authorities and neighbours (Hofstede et al., 2005).

Trying to understand the culture within an organization is important, but it is not straightforward. Even when a strategy and the values are written down in an organization, the underlying “taken-for-granted”-assumptions are usually only apparent in the way people behave day-to-day (Scholes, Johnson & Whittington, 2002, p. 201). The organizational culture could be divided in four layers.
Figure 2.6.1 The four layers of organizational culture (Scholes, Johnson & Whittington, 2002, p. 200).

The “taken-for-granted”-assumptions are also known as the “Paradigm” and is considered to be the core of organizational culture. They are the aspects of organizational life that people find hard to explain and identify but take for granted in the organization. In order for an organization to operate efficient, there has to be these kinds of general set assumptions. Behaviours are the day-to-day way that an organization operates and is visible for people within the organization, but also from people outside. Beliefs are specific and they are issues in which people within the organization can bring up and talk about. An example would be the belief of not trading with a specific country or company. The outer circle represents the values in the organization. Values can be easy to identify in an organization, and they are rather often written down as statements. The statements concern the organization’s mission, objectives or strategies. But the statements have a tendency to be vague, resulting in different interpretations (Scholes et al., 2002, p. 199-200)

The cultural web is a representation of “taken-for-granted”-assumptions and the behavioural manifestations, the two inner ovals in figure 2, of an organization and could be called a physical manifestation of organizational culture. The model is mostly used to understand the culture at the organization and/or functional/divisional levels. The “map” produced by the cultural web, is a rich and valuable source of information of the organization’s culture. The cultural web can be seen as a powerful tool for the organization members to see the organization as it actually is (Scholes, Johnson & Whittington, 2002, p. 201, 207).
The figure 2.6.2 shows different aspects that make up the paradigm in an organisation. By answering the following questions, it is possible to establish the paradigm and evaluate the possibility of change.

**Stories:**
- What core beliefs do stories reflect?
- How pervasive are these beliefs?
- Do stories relate to strengths or weaknesses, successes or failures, conformity or mavericks?
- Who are the heroes and villains?

**Symbols:**
- Are there particular symbols which denote the organisation?
- What status symbols are there?
- What language and jargon are used?
- What aspects of strategy are highlighted in publicity?

**Power structure:**
- How is power distributed in the organisation?
- What are the core beliefs of the leadership?
- How strongly held are these beliefs?
● Where are the main blockages to change?

Organisational structures:
● How mechanistic/organic are the structures?
● How flat/hierarchical are the structures?
● How formal/informal are the structures?
● Do structures encourage collaboration or competition?
● What types of power structure do they support?

Control systems:
● What is most closely monitored/controlled?
● Is emphasis on reward or punishment?
● Are controls related to history or current strategy?
● Are there many/few controls?

Routines and rituals:
● Which routines are emphasised?
● Which would look odd if changed?
● What behavior do routines encourage?
● What are the key rituals?
● What core beliefs do they reflect?
● What do training programmes emphasise?
● How easy are rituals/routines to change?

Conclusion:
● What do the answers to these questions suggest are the fundamental assumptions that are the paradigm?
● How would you characterise the dominant culture?
● How easy is this to change?

2.7 Change Management
Change management for organizations refers to periods of change in the environment, market or organization where radical action is required in order for the organization to survive and prosper. The meaning of change is about moving from the current position into a desired future state. It is about the purpose of the organization and the vision of the future state, how to organize the resources in the future and what means are required in order to reach the desired future state (Elearn Limited, 2007, p. 1-2). Since 1960s, the periods of stability i.e. when business operations just could be managed, have become shorter and the need to make changes has become more frequent. The main reason behind this is the increased competitive pressure in the markets. If an organization and their products have no competition in their market, the pressure for change doesn’t exist. The sources for competitive pressure come from technological change in manufacturing process and product development, the globalization of products, markets and competitors, more cost-efficient communication and distribution, and change of laws and regulations from the governments (Elearn Limited, 2007, p. 6).
Although there has been an increase in competition in the construction industry where there is low profitability margins, the pickups are still happening. There has been extensive improvement and research regarding the material supply chain (MSC) in the construction industry. We are trying to understand the reasons behind the pickups, whether if it is due to low margin of error while planning or if it is either a cultural or management aspect. The theory of change management would be able to help us give more clarity regarding the subject.

2.8 Organizational change
To be able to keep up with the evolving and changing markets, organizations needs to be ready to change, whether it is change within the cultural-, strategy-, or structure aspects of the organizations, the implementation of change is needed to keep up with dynamic markets (Armenakis, Harris, & Mossholder, 1993). There are several factors to consider when trying to implement an organizational change, one of them, according to Armenakis et al., (1993) is readiness. Readiness is about how well the employees react to the change, i.e. the intentions, attitude and beliefs regarding the change, readiness is also about if there is resistance or towards the change (Armenakis et al., 1993).

The most important part for creating readiness in an organization is to communicate the change. According to Armenakis et al., (1993), there are two issues to consider when trying to incorporate the change. First, is to communicate the need of the change, what the difference is between the wanted end-result and the present state before and after implementing the change (Armenakis et al., 1993). Second is about what is needed of the members of the organization to be able to make to change (Armenakis et al., 1993).

Understanding of how an organization can change and what requires creating a change is important for our study. We believe that there is more to it than just a lack of an effective supply chain. Therefore, to be able to understand the factors behind the problem regarding pickups, we need to understand what readiness is about, which Armenakis et al., (1993) explains very well. The paper presented by Armenakis et al., (1993) is a good complement for the models which is being presented further down.

2.9 Eight-step model for transforming organisations
A model developed by Kotter (1995), suggests that there are eight steps to consider when trying to change an organisation. Kotter (1995) developed the model by studying over 100 companies, whom has made an effort to change, whether it is due to changes in market, trying to be better than their competitors, etc. The author states that, some companies have succeeded in implementing change, some has failed miserably, and some has been somewhere in between. The overall lesson to be learned is that, organisational change takes time and is a process and skipping steps in the process will never produce satisfying results.

The reason to why we included this model was that perhaps the industry has tried to change before but have not succeeded. We thought that perhaps we could introduce this model to help the industry to follow specific steps, so they don’t miss out on important factors when trying to
change. Although this model is generally wide and could be applied to all industries and companies, the reality is not always black and white. The companies may need to change some steps but still have this model as a guideline when trying to change.

**Eight Steps to Transforming Your Organization**

1. **Establishing a Sense of Urgency**
   - Examining market and competitive realities
   - Identifying and discussing crises, potential crises, or major opportunities

2. **Forming a Powerful Guiding Coalition**
   - Assembling a group with enough power to lead the change effort
   - Encouraging the group to work together as a team

3. **Creating a Vision**
   - Creating a vision to help direct the change effort
   - Developing strategies for achieving that vision

4. **Communicating the Vision**
   - Using every vehicle possible to communicate the new vision and strategies
   - Teaching new behaviors by the example of the guiding coalition

5. **Empowering Others to Act on the Vision**
   - Getting rid of obstacles to change
   - Changing systems or structures that seriously undermine the vision
   - Encouraging risk taking and nontraditional ideas, activities, and actions

6. **Planning for and Creating Short-Term Wins**
   - Planning for visible performance improvements
   - Creating those improvements
   - Recognizing and rewarding employees involved in the improvements

7. **Consolidating Improvements and Producing Still More Change**
   - Using increased credibility to change systems, structures, and policies that don’t fit the vision
   - Hiring, promoting, and developing employees who can implement the vision
   - Reinvigorating the process with new projects, themes, and change agents

8. **Institutionalizing New Approaches**
   - Articulating the connections between the new behaviors and corporate success
   - Developing the means to ensure leadership development and succession

**Figure 2.9 - Eight steps to transforming your organization (Kotter, 1995)**

Besides the eight-step model for transforming organisations, Kotter (1995) introduce the general errors that are made in each phase:

- Error #1: Not establishing a great enough sense of urgency
- Error #2: Not creating a powerful enough guiding coalition
- Error #3: Lacking a vision
- Error #4: Undercommunicating the vision by a factor of ten
- Error #5: Not removing obstacles to the new vision
- Error #6: Not systematically planning for and creating short-term wins
- Error #7: Declaring victory to soon
- Error #8 Not anchoring changes in the corporations’ culture
2.10 A framework for change


The reason we think this model is relevant to our study is that when analyzing the empirical result, we can use this model as a guideline when trying to come to a conclusion on how and if the industry needs a change. We also believe that this framework would be better for companies that are new regarding how to change their organization. Because it is a combination between different models and are more detailed and clarifies more than for example the model provided by Kotter (1995).

Step 1: The idea and its context

The first step is the step of highlighting the new idea, new product or what could be done to increase the competitive advantage. Here is where you present what changes needs to be done. According to Mento, et.al. (2002), there is two different scenarios when coming with an idea of change, either is through some new innovation or ideas, or to fix current organisation problems. With this comes two “desires”, when trying to change a current organisation problem, the desire is to change the current status quo. When trying to implement new ideas or product, the desire is more of a creative desire. The problem when trying to change a current organisation problem is that, when the problem becomes less pressing and the situation is somewhat improved, the energy for changes succumbs.

Step 2: Define the change initiative

Step 2 is where you begin to analyse the organisation and form key-roles to make the change happen, such as implementers, strategist and recipients. Here, it is important to identify the need for change, create a vision, what changes is tangible to make and whom should sponsor and defend the idea.

Step 3: Evaluate the climate for change

In this step is where you need to understand the organisation and its environment, the strength and weaknesses, how the organisation operates. By understanding these key factors, you are able to provide different scenarios of the proposed changes. Here, there is also a need to understand the organisations history and how they have dealt with changes before, have it succeeded, or has it failed?

Step 4: Develop a change plan

This is where you create the plan for change, i.e. it should include specific goals, provide clear details and responsibilities for all involved. The authors describe how to deal with this step and provides us terms such as carrot and hammer. Meaning that when trying to implement a change, it is like planting seeds in a garden, where you actively searching for which seed gives fruit or if you need to break the ground and do it over. The authors also present the idea of short-term
and long-term when trying to implement change. Short-term involves a hammer but this won’t make people accept the idea in long-term. The key when trying to make a long-term change is to make people see the return of investment, i.e. the carrot, show them the reason why the changes needs to happen and how it benefits them and the company.

**Step 5: Find and cultivate a sponsor**
When trying to find a sponsor, the authors suggest that looking at people at the bottom, who works closely to the target audience is ideal. Although when implementing change, it usually starts from the top down, a sponsor from a high level is risky due to that more than often, they are not the one directly involved in the change and usually not affected by it on the personal level.

**Step 6: Prepare your target audience, the recipients of change**
No matter if the change is of a positive or negative nature, there will always be resistance to the change, because of the sole reason it affects the status quo. We as people are comfortable with what we know and dealing with the unknown adds factor such as stress.

**Step 7: Create the cultural fit - Making the changes last**
In order to make any change efforts, it is important that the change is rooted in the existing culture. This means that the members of an organization need to accept and understand that the change as the new reality of how things are done in the organization. A strategic initiative that is in line with the established culture within an organization has a high chance of succeeding, while a change initiative that doesn’t work with the culture has a low potency of succeeding. To aid this step, an adaptation plan can be created through a consistent vision and the development of a distinct linkage between the core competences, strategic direction and the organizational culture. By developing an adaptation plan and the cultural change is perceived as an investment, the likelihood for success is significantly greater.

**Step 8: Develop and choose a change leader team**
In large scale changes, the leaders play a critical role in creating the organization’s vision. The leaders also inspire the members to embrace and accept the vision as their own and builds an organization structure that in a consistent way rewards member who focus on pursuing the vision. By using a leader team instead of an individual leader, it is easier to provide the necessary leadership role, and a team can also be carefully selected to match the appropriate skill sets required for the change.

**Step 9: Create small wins for motivation**
In order to be able to implement a change, it is important for the employees to stay motivated. Some changes may take a long time to implement and to avoid lack of motivation, it is important to create visible short-term wins along to road. The leaders must create visible performance improvements and recognize the employees that is a part of them. Also, by creating short-term victories, it is possible to update stakeholders in the change process on what developments that
has been made and convince them that the change is going in the right direction. By receiving positive feedback from the stakeholders, it is possible to boost the teamwork in the process and opening communication lines. Also, there is often through small win celebration that new ideas surface in the change process.

**Step 10: Constantly and strategically communicate the change**

It is critical that the leaders constantly communicate, are honest and involve people in the change process. The aim of the communication should be to increase the organization’s understanding and commitment to change, to reduce confusion and resistance within the organization, and prepare the members within the organization for the effects of change, which could be both positive and negative. It is also important to communicate with the sponsors of the change process in order to get the resources needed. The way in which a message is communicated might not suit for all levels in the organization, and the communication should be tailored for the specific audience that it is supposed receive it.

**Step 11: Measure progress of the change effort**

Step 11 involves creation and installation of metrics to assess and evaluate the programme success and to chart the progress of change by using milestones and benchmarks. This step goes hand in hand with step 7, which referred to creating short-term wins in order to keep the organization motivated along the process of change. An organization should often and only measure those variables that is believed to be logically related to important milestones in the change process and avoid assessing wrong or misleading measures of the concept that the organization wants to assess. The change process needs to be measured at all stages, and not just in the end-stages. The measurements should be concerned with all members within the organization that is involved in the change process, and should be clear in respect to roles, goals and expectations.

**Step 12: Integrate lessons learned**

To learn lessons from completed project and processes, it is important to reflect. Reflection is a personal cognitive activity that requires people to step back from an experience and carefully evaluate it. Reflection unveil insights and learning concepts by directing and guiding participants of the change to think about learnings during the change process. Reflection then connect the learnings to job performance which creates more relevant learnings for the individuals and is considered to be a very powerful way to learn from experiences. The core of reflection is carefully designed trigger questions to start the thinking and reflection process. Research has proven that people tend to reflect poorly unless they are provided with these kinds of questions. Such questions could be:

1. What did we set out to do?
2. What actually happened?
3. Why did it happen?
4. What are we going to do next?
2.11 Nudging
The supply chain keeps evolving, and suggestions on how to improve the pickup-problem has been made before. However, nothing has really changed to decrease the problem. This is the reason why we think that there is a more fundamental problem with underlying aspects within the organization, and that it might be in need of a change. Nudging is one of the many tools available to change behaviour and culture within an organization. Nudging is a theory connected to the behaviour of human decision-making. The theory was introduced by Thaler & Sunstein (2009) and explains how different tools can be used in order to steer people into making decisions. Every day, humans face different decisions in their daily life. Depending on how the situation of decision making is arranged, a variety of factors will affect the outcome. By arranging the situation in a certain way, it is possible to enforce people to make “the right decision” without them knowing it. It is not a matter of using a punish and reward system, but rather make the decision feel natural in the current setting. One example of this would be painted parking lines in the parking lot for bicycles. Without the lines, people would most likely park the bicycles wherever there is a free space, but the lines encourage people to park them in a certain order without punish them if they don’t follow it. By “nudge” people in a specific direction, it is possible to change their behaviour and make decisions they wouldn’t normally do. In an organization, this is an effective way to change the members behaviour without punish or reward them (Thaler & Sunstein, 2009). Due to the fact that nudging doesn’t punish the members within an organization, it could be effective if a change potentially could face resistance from the members. Nudging would instead allow them to make it feel like they make their own decisions instead of being forced. However, in an ever changing environment and unique projects within the construction industry, it could be hard to create a setting where you steer people in the right direction for every situation. And this could lead to unwanted results.
3 Method

In this chapter, the authors explain the different methods and tools used to conduct the research. The details concerning research philosophy, research approach & strategy, research design, research method, data collection strategy and case selection are presented and elaborated in this chapter.

3.1 Research Philosophy

When trying to understand our research philosophy, which way we are heading towards when doing the research, we needed to understand our research. And this is where ontology and epistemology come in. Ontology is how we perceive the existence and nature of reality and epistemology is about the theory of knowledge (Easterby-Smith, Thorpe & Jackson, 2015). When looking at our research, we understand it to be a form of relativist ontology, since a relativist ontology argues for that there are many truths, depending on how we view it as observers (Easterby-Smith, et.al, 2015). Because of the fact that we are conducting interviews, where we as researchers are asking the questions and interpret the answers, we are not viewing the social reality as objective, we interpret it. Therefore, our epistemological stance is a form of social constructionism, where we gather facts by interviewing different people and trying to understand them and their answers. Rather than collect the data through frequency patterns, we are paying attention to the interviewee’s thoughts and feelings. Also, our main driver is our interest about the topic, and increase the general understanding about the problem. Where we think that the underlying problem about the pickups cannot be solved by throwing solutions at the problem, we rather think that to be able to change the mentality about the pickups, is to understand the underlying cultural aspects.

3.2 Strategy & Approach

According to Patel & Davidsson (2011), to be able to answer the proposed research questions, you can narrow it down to two types of strategies, quantitative and qualitative research (Patel & Davidsson, 2011, p.13). Quantitative research focuses on numerical data, using tools such as statistical analysis, survey analysis etc (Patel & Davidsson, 2011, p.13). Qualitative research is focused on non-numerical data, which includes text, interviews, observations, interpretive analysis etc (Patel & Davidsson, 2011, p.14). The qualitative approach is not as structured and narrow as quantitative research, whereas quantitative research is limited due to pre-set questions, creating a low probability of generating new findings. The qualitative approach is more suitable when trying to discover new concepts and findings. When trying to decide which approach to use, the authors needs to understand what type of research they are doing and if they are finding themselves asking questions such as “where?”,” “how?”,” “What’s the difference”, these questions are characterized as quantitative approach. Questions such as “What is this?”,” “How come?” are characterized as qualitative approach (Patel & Davidsson, 2011, p.14).

We are conducting this study with the approach of a qualitative study, due to the reason that, to be able to gather information and understanding about the industry. Because of the fact that we are launching a qualitative study, we have chosen to embrace the research approach of
abduction. Pragmatism is the logic for abduction, and it was introduced by Charles Sanders Peirce (James & Retzlaff, 2003). Pragmatism is about how to solve metaphysical problems, such problems can be topics that are opposite to each other, for example: Is the world one or many? Is it predetermined or free? This are the kind of problems pragmatism seeks to solve (James & Retzlaff, 2003).

According to Patel & Davidsson (2011, p.24), abduction is a combination of deductive and inductive approach. Where the first step of an abductive approach is characterized of an inductive approach, which from a specific case create a theory (Patel & Davidsson, 2011, p.24). The second step of an abductive approach is characterized by a deductive approach, where you test the theory on a different case (Patel & Davidsson, 2011, p.24). We are doing a single case study where we first and foremost are doing an interview analysis and we are “creating” a theory about the topic of pickups, where we as researchers believe that to be able to change the mentality regarding pickups, we need to address the culture perspective and behaviour of the organization. The abductive approach allows us as researcher to constantly have a comparison between the theoretical frame of references and our empirical study, which leads that both constantly affects one another.

As mentioned earlier in the introduction, there has been previous student thesis about the effects of pickups and how much it affects the productivity and revenue for the organizations. Although, other research has come to a solution of how to deal with it, none has focused on the cultural aspects and how to “plant the seed”, regarding on how to start changing an organization or industry. We think that a research about how to change the industry with change management and cultural aspects is of relevance, because of the sole reason that there has been research about the effects of the pickups and the losses, but the industry still hasn’t changed. Our goal is to enlighten the topic about pickups and how the mentality about pickups can be changed, and with the abductive approach, we hope that it can lead to new discoveries.

### 3.3 Research Design

Our research is going to base on a single case study at a construction company, where we will be conducting interviews of seven site managers and three construction managers. The reason to why we chose to do a single case study is because that we wanted in-depth understanding of the people and the organization in its context. By doing our case study on one of the largest construction company in Sweden, it is uniquely interesting, because the same phenomena happens at very large companies and the smallest ones, therefore by conducting single case study we are able to understand the complexity regarding the topic to occurs in the whole industry.

“The logic being that we only need one example of an anomaly to destroy a dominant theory – as in the case of Einstein’s refutation of Newton’s theory. And although we are unlikely to identify a ‘talking pig’ organization, there are many examples where single cases can be uniquely interesting; for example, the company that does significantly better (or worse) than
all others in the same industry, or the entrepreneur who builds a fortune from small beginnings. (Easterby-Smith et al., 2015, p. 264)”

According to Easterby-Smith, et al., (2015), there are two different ways of doing a case study, i.e. multiple-case study and single-case study. When doing a study with the design of multiple case study, the researcher comes more than often from a positivist epistemology, while researcher with single case study comes more often from a constructionist epistemology (Easterby-Smith, et al., 2015). Connecting to the subchapter “Research Philosophy”, we can argue that due to the conclusion about our research is a form of a social constructionism, it is logical that we chose to do a single case study.

We will able to access these individuals through our contacts at the case company, where our supervisor will give us contact information to the individuals. The design of the interview questions will be designed to be open where we are able to ask supplementary questions and be more personal. During the interviews we will be taking notes and transcribe the interviews. After the interviews, we will compare our notes and analyse them and see if we came up with the same conclusion and summarize the transcribed interviews. To be as transparent as possible, we will forward the interview questions to the interviewees beforehand and explain to them what the research is about and ensure them it will be anonymously. We will also attach the interview questions in the research paper and with the ethical implications in mind, we will not mention the names, gender, age, nor their geographical location.

3.4 Methods & Techniques

3.4.1 Data collection
To be able to gather all the necessary information, different kinds of data collection were applied. The data collection used could be categorized as primary data. The primary data is the empirical data that researchers gather and interpret themselves for a specific a research project (Patel & Davidson, 2011). Examples of methods for gathering primary data are surveys, interviews, and observations. The applied methods to gather information in this thesis were interviews. To create a deeper understanding of the topic, it was also necessary to gather information about the construction industry, in this case from literature by different sources.

The eight interviews for data collection will be an hour-long interview with each and every one of the interviewees, with this we will prepare interview questions that are created with regard of our theoretical frame of references. The interviews are structured as semi-structured interviews, and therefore new questions may arise during the interviews. The interviews will be held as both digital meeting and face to face meeting, because of some managers not being in the proximity of Jönköping.

We have decided to conduct interviews with construction managers and site managers at the case company. The motivation for why we chose to do interviews instead of the other types of data collection such as surveys, is because of that we wanted to understand the reason behind why the pickups occur, and to be able to understand the reason, we need to understand the
people who are doing the pickups and the people whom is involved in that process and have knowledge about it.

### 3.4.2 Case selection

We are doing an instrumental case study on PEAB AB. In the thesis, the construction company PEAB AB is used as a case for the whole construction industry because of the fact that PEAB AB is one of the largest and most established organizations in the construction industry throughout the Nordics. Therefore, we argue that these kinds of research questions that are studied could be generalized for the whole industry.

PEAB AB has a turnover of approximately 52 billion SEK in the fiscal year of 2018 and approximately 15,000 employees in the Nordics. PEAB AB has around 130 offices in the Nordics with its headquarters in Förslöv, Sweden.

PEAB AB is divided in four different business areas:

- **Construction** - Works with new constructions of homes, public and commercial premises and renovations.
- **Civil Engineering** - Works with infrastructure such as highways, railroads, bridges and roads.
- **Industry** - Delivers such as ballast, concrete, asphalt to internal and external customers
- **Project Development** - Works with development, management and divestment of housing and commercial property. Also handles group acquisitions.

At PEAB AB, the research will be conducted on the business area “Construction” which will include different types of managers whom is involved in the processes connected to the thesis topic.

### 3.4.3 Interviews

When doing interviews, there are different aspects to consider, whether the interview questions are standardized and what degree of structure it is to it. According to Patel & Davidson, researchers needs to consider how much responsibility the interviewee has when designing the interview question and how much freedom the questions has for the interviewee interpret when answering the questions. When designing the interview questions, the content and outcome needs to be considered. If an interview is fully standardized and has high degree of structure means that the respondents doesn’t have much freedom to answer and the answers would be predictable (Patel & Davidson 2011, p. 75-76). However, considering the topic and research question in the thesis, the interview questions for this research, was designed to be open and give the respondents freedom to answer, with pre-prepared questions which are connected to the research topic. This would arguably be considered as low degree of standardization and low degree of structure (Patel & Davidson 2011, p. 75). The interviews were conducted in Swedish and the questions were made in Swedish, because of the respondents talked Swedish and so did the authors, it was easier to communicate and reduce the communication gap.
Qualitative interviews

Qualitative interviews can be described and conducted in several different ways, generally, qualitative interviews always have a low degree of structure (Patel & Davidson 2011, p.81). The purpose of doing a qualitative interview is to identify and discover the characteristic of an individual's thoughts and how they perceive the world as they know it or to understand a phenomenon (Patel & Davidson 2011, p.82). Therefore, when conducting a qualitative interview, the researcher needs to consider that there is no right or wrong answers, which also means that approach with a qualitative interview could be both an abductive or inductive way of research (Patel & Davidson 2011, p.82).

With the thesis in mind, we designed the questions and interview as semi-structured interviews. We designed the questions with the help of our theoretical frame of reference. By understanding the different theories e.g, organizational culture, planning phases, Lean etc. could work we could then develop our interview question to better fit the respondents and the research topic. Which means that when in the process of creating the interview questions, we designed the questions to be about the specific topic, i.e. the pickups but we gave the respondents full freedom to answer the questions however they wanted to. The questions were set at specific order but, some follow-up questions were made as well, depending on what the respondent answered. A semi-structured interview is more of a conversation than an interview, which means it is the most open form of a qualitative interview (Patel & Davidson 2011, p.82)

3.4.4 Choice of respondents

The reason to why we are choosing to do the interviews with the managers and supervisors is because that when trying to implement change in an organization, it usually starts from top down (Mento et.al. 2002). The site managers and supervisors are the ones whom are doing the pickups if there are lack of materials at the construction site, hence they should be able to answer the questions related to the topic. The reason to why we also included Construction Managers in our study is because of the reason that, with a top management perspective, we can include their perspective as well regarding pickups. The respondents were selected based on their geographical location and their position in the process. The requirement for the geographical location was to be within the proximity of Jönköping, and the reason for this was to enable us to have face to face interviews to the highest extent possible without the need of traveling to far. The first connection with the respondents were established with the help of our supervisors at the case company.
Table 3.1 List of respondents

<table>
<thead>
<tr>
<th>Position</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 Construction Manager</td>
<td>Construction Service</td>
</tr>
<tr>
<td>R2 Site Manager</td>
<td>Construction</td>
</tr>
<tr>
<td>R3 Site Manager</td>
<td>Construction</td>
</tr>
<tr>
<td>R4 Site Manager</td>
<td>Construction</td>
</tr>
<tr>
<td>R5 Construction Manager</td>
<td>Construction</td>
</tr>
<tr>
<td>R6 Supervisor</td>
<td>Construction Service</td>
</tr>
<tr>
<td>R7 Site Manager</td>
<td>Construction Service</td>
</tr>
<tr>
<td>R8 Supervisor</td>
<td>Construction Service</td>
</tr>
</tbody>
</table>

3.5 Data analysis

When doing the data analysis, we first thought of which methods exist and which of them is suited to our research. We came to a conclusion that the method of data analysis that suits our research is a mix of Grounded analysis and Content analysis. The reason to why we see our analysis as a mix is that content analysis focuses more on searching for content, linking concepts & ideas structure analysis and aims for clarity and unity. While grounded analysis focuses more on understanding the context, faithful to views of respondents and preserves ambiguity and illustrates contradiction. In our analysis we are trying to understand the context and are faithful to the views of respondents, however we are also linking concept and ideas and we are also aiming for clarity and unity. This is why, we see our data analysis as a mix of grounded- and content analysis.

Table 3.2 - Qualitative data analysis: Content versus grounded methods (Easterby-Smith et al., 2015, p. 547).

<table>
<thead>
<tr>
<th>Content analysis</th>
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<td>Searching for content</td>
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<td>Objective/Subjective</td>
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<td>More deductive</td>
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Because of the huge chunk of qualitative data, we came across during our interviews, we needed a method that could sort out the essential parts. First, we started with analysing our notes we took during the interviews, also known as memo-writing which is connected to grounded analysis according to Easterby-Smith et al., (2015). From there we found code words and categories that we found relevant to our research. With the code words and categories, we could then find more information connected to these when transcribing the interviews, this refers to open coding in a grounded analysis. From there we tried to conceptualize the codes, i.e. we tried to find patterns and similarities from the gathered data.

From the first cycle of coding (open coding), we found out that we needed to supplement our theoretical frame of reference, because we found more interesting information regarding our topic and to give a better overview of the industry and how the organization works. After the first cycle of coding we could develop a framework for the analysis. In the second cycle of coding, we applied the new information from the theoretical frame of reference to be able to get a more in-depth analysis of the important themes or codes. Furthermore, we started linking the codes with each category, we found 4-5 different categories for each business area and from there we applied our coding on to each category.

3.5.1 Ethical implications
In the research, we are following the four main ethical rules (Patel & Davidson, 2011, p. 63). The first rule is to inform everyone involved in the research about the purpose of the study. In the interviews, we began with explaining our study for the respondents and what the purpose with it was. The second rule is to get consent from the respondents, which means that the respondents have the option to decide for themselves if they want to take part of the research or not. In our interviews, we asked our respondents if they wanted to take part after they received the explanation for the purpose of the study. We also asked for their consent to record and transcribe the interviews. The third rule is concerned with the confidentiality claim of the study. The information about the participants in the study should be handled with great confidentiality and personal information should be stored in a way that prevents access from unauthorized individuals. In our study, all the participants are anonymous. The information gathered is presented in such way that it cannot be traced to any individual within the case company. The recordings were deleted after the transcription. Names and specific events were changed or removed in the transcription to prevent the information to be linked to a specific individual. The fourth rule of ethics in research is the use requirement, which means that information gathered from individuals are only allowed to be used for the research purpose (Patel & Davidson, 2011, p. 63). In our study, the information gathered from the respondents were only used as a source of information to present the results and draw general conclusions about the phenomenon that we investigated.

3.6 Trustworthiness
Reliability and validity go hand in hand when doing a research, validity is about the fact that we actually research what we say we are going to research (Patel & Davidson 2011, p.102). Reliability is about that the research has been done in a trustworthy way (Patel & Davidson
With the thesis in mind, when talking about reliability and validity, to ensure the reliability in the interviews, the two authors have been present in every interview and both have been taking notes of the answers and later on compared the notes. In each interview, the interviews have been recorded, parallel to taking notes, which after each session has been transcribed. When comparing answers and transcribing the interviews, this could be seen as a measure of reliability (Patel & Davidson 2011, p.104).

To ensure a good validity in the research, we designed the research questions with the foundation of the theoretical frame of references. Which according to Patel & Davidson (2011, p.102-103) is one of the criteria to ensure the validity.
4 Results from interviews

Under this chapter, we will present our findings from the interviews that has been conducted, we will divide the findings into two categories, one for each sector in the business area of construction and four main categories that we found during our data analysis.

4.1 Construction

The company’s business area of construction is divided into two sub-departments: construction and construction service. The construction department focuses on larger and more complex projects, such as apartment complex, office space, public places e.g. malls, arenas etc. Due to the mass and complexity of these projects, there are several actors involved. The main actors whom is involved are project leaders, construction managers, site managers and construction workers, especially when looking at our research. Construction managers and site managers are the ones whom are responsible for having the materials available in time on the construction site. Construction managers are the ones whom is responsible for the overall planning of the material, such as time-schedule i.e. when and where every construction is supposed to be doing each week and also when the materials are supposed to arrive at the construction site. Whereas, the site managers are responsible for planning the consumables and the everyday need of materials.

We interviewed four employees, who had different roles and belonged to the construction department, they were located at different regions in Sweden. With the data we gathered from our interviews and with the help of coding, we found patterns and translated it to four different categories that was always brought up during the interviews, these categories will be presented further on.
4.1.1 Planning

Figure 4.1 An overview of the process of planning materials & supplies

When trying to understand how materials and supplies comes to a construction site, we asked questions such as “Can you describe how materials comes to a construction site, from order to delivery”. When asked to the interviewees, we gained similar answers, the general answers were: “It depends on what material you are talking about”. The interviewees explained that supplies and materials such as balconies, windows and dry walls are ordered when planning the long-term schedule and these are crucial that they arrive at the exact day and time. These are ordered through internal systems or through email and phone calls. Materials that are consumables and is available at the hardware store, they usually order it the day before and have it the next day. This is also done through internal channels, phone calls or email, but it can also be done through the supplier’s app or website. According to the respondents, the suppliers have a good delivery system, if they order the day before, they will have the materials that are available in stock the very next day.

Due to the complexity and small space when building apartment complex, there is no intermediate storage available at the construction site, if there are, they cannot store much material and supplies. Therefore, it is crucial that the schedule works perfectly, and the arrival of supplies and materials is “just-in-time”. When discussing this with the respondents, we understand that the departments from different regions work similarly, they state that planning is crucial for a successful project, but it is very difficult to plan everything in to the smallest detail, due to the amount of materials and supplies needed and there is always waste due to handling of the material. Therefore, it is inevitable that pickups occur.

When asking the interviewees about the materials and the reason to why there is shortage of materials at the construction site, the main reason to it was the same, it was about planning. But when asking about how many times a week or month a pickup occurred, it varied. One of the
interviewees said, during his/her time of being involved in the process, a pickup occurred 10 times in four years. Another interviewee said it occurred 0-3 times a week, and another said it was 10 times a month. The main reasons to why the pickups occurred was because a lack of planning, late or wrong delivery from the supplier or something unexpected happened at the construction site.

4.1.2 Culture
When asking the interviewees about the reason for why the pickups occur, they state that except from lack of planning, it is a cultural thing. One example from the interviewees was that a few years back, when he/she was an apprentice, there was a manager that couldn’t wait to leave the construction site and loved going to the hardware store where the manager could take a break and chat with other people while buying a package of screws. Nowadays, especially from the point of the interviewee who gave the example, this is not happening anymore, at least to the interviewee’s knowledge. Another respondent stated that, when leaving the construction site and going to the hardware store is a cultural thing that has been established from the “old days”, where people wanted to leave a stressful work-environment and take a break.

According from one of the respondents, “It’s hard to make a change, but I like to push the limit, and if it’s successful is depending on the people and I think it’s a generation issue. Nowadays the new generations have no history to go back on and makes it easier to influence them”.

4.1.3 Experience and personality
The reason to why there is lack of planning or bad planning, is according to some of the interviewees about the experience of the construction and site managers and their personality. Some said it was because it is hard to plan everything in detail was the reason to lack of planning. According to one of the respondents was that when hiring graduates or people whom are new to the industry is one of the reasons to why the pickups occur more often, due to their inexperience.

When we asked the question “What do you think is needed to reduce the number of pickups?”, the answers were, except planning, about how important it is to everyone in the hierarchy, from construction managers to construction workers to have some sort of responsibility. The construction managers, site managers and supervisors are responsible for the overall planning and the daily planning of activities. To be able to do that, according to some of the interviewees, the construction workers needs to have some foresight of telling the supervisors when consumables, such as screws, wires, gloves etc are about to expire, so that there is a chance for the supervisors to plan accordingly. Here is where it differs, according to the respondents: the supervisors and managers can only do so much, unless the construction workers are proactive in their work. The reason to why some is more proactive than others, is depending on their personality, according to the respondents. The same goes for the managers and supervisor, they need to be proactive as well and have knowledge about the project to be able to plan correctly, and to do that, you need experience.
The interviews were semi-structured, and that enabled us to ask follow-up questions, one of the questions was regarding, if there were any tendency towards a pattern of more lack of planning if a hardware store were closer to the site geographically. The answer from one of the respondents was “No, I don’t think so, you don’t want to go and pickup the supplies, so you try to plan it, but people are different, and some managers and supervisors are fantastic at planning, some are worse. We are all different.”

4.2 Construction Service
The construction service department, which is an independent company within the PEAB AB group, is a part of the construction business area and offers construction services in both private and public places. An example of a construction service project might be remodelling or renovation of a kitchen in a private house. The projects in construction service are typically short compared to the projects in construction and it is not unusual that the workers have several projects going at the same time. Each year, PEAB AB construction service carry out 50 000 projects. Depending on the size of the project, the number of workers needed for a project could vary between at least 2-10 people.

The offices for construction services are located in many places throughout in Sweden and the company has around 600 employees. Each office has a construction manager, managing the overall planning. Below the construction manager is the site manager handling the day to day planning, purchasing and invoice. Below the site manager is the supervisor, handling and planning the day to day activities at the projects.

In the semi-structured interviews, we sat down with 4 different employees within construction service. They all had different roles within the organisation and their geographical location varied to get a better understanding of the organisation as a whole.

4.2.1 Planning
Planning in construction service is a vital part for success. In each project, there are different aspects to consider in material demand, staff, logistics and time. For material supply in the construction service, the simplified process looks like figure 8.

![Figure 4.2 The standardized material flow for construction service](image)

In the interviews, we asked the respondents “How does the material flow look to the construction sites?”. The respondents answered the question and described the material flow in a similar way. The process begins with preliminary calculations of the estimated material demand for the project. When the different amounts needed for the project have been calculated, the materials are purchased from the suppliers. The case company have contracts with some suppliers to get lower prices and better services, and the company enforces its employees to purchase from
these suppliers. The purchasing happens either through an online ordering system, through email or by phone. After the purchase, a delivery is booked to the construction site. As the construction service does not have any storage on the construction sites, it is important that the deliveries are planned in cooperation with the staff planning thus someone has to receive the deliveries on site. After the delivery is on site, the construction workers can begin with the project.

However, after interviewing the respondents from construction service, it is clear that this material flow doesn’t always correspond with the reality. When we asked the question “Does the construction sites sometimes lack material, and what is then the reason behind it?”, the respondents stated that it is hard to estimate and calculate the amount of materials needed for a project as every building is unique, making it impossible to know the required materials at a first glance of a project. This issue then results in false calculations and often a shortage of materials in construction, requiring the supervisor to purchase more material from the suppliers, as shown in figure 9.

![Figure 4.3 Material flow with lack of material](image)

This solution works in some cases, but it is not applicable in others. When we asked the question “What do you do when material is lacking?”, the respondents said that if lack of a material is crucial for the progress of the project, it might be too costly to wait for the delivery of the material as production is at halt. In these cases, it is seen as more effective to send a construction worker to the hardware store and purchase the necessary material as the solution is faster. This flow is shown in figure 10. In other cases, it is easier to pick up materials at a hardware store instead of ordering, as some contract suppliers require the customer to buy a certain volume, which might be bigger than needed in the project resulting in waste of material. In other cases, the product range in the purchasing systems doesn’t meet the demands of the project, or some materials are hard to visualize and need to be seen in person to establish what’s required.
All participants in the interview said that the main problem for material shortage and the need for pick-ups are limited and insufficient planning. And the reason behind this is the limitations in the information which is the foundation to the calculations of material demand.

When we asked the respondents “Do you think it would be any advantages if the pick-ups vanished from the process?”, all participants stated that a “zero pickup” rule would not help the organisation, but instead hurt it as it is needed in some cases of the process. However, they all said that it would be possible to decrease the number of times by planning the work schedule better during the work days. Instead of going to the hardware store a number of times during the day, it is possible to pick up the material in the beginning or the end of the work day, when the construction workers is on their way to or from the construction sites. The advantages all would see if the pick-ups disappeared was a more efficient and production-oriented process.

One of the respondents also said that “pick-ups usually happen more often when the construction site is close to a hardware store”. The reason behind this is that the planning sometimes does not go into so much detail due to the knowledge that if something is missing, it is easily accessible by driving the short distance to the hardware store. Compared to when the construction site is hours away from a hardware store, the planning almost always seems to be sufficient in order to finish the project. When we asked the question “How many times a week does pick-ups occur? ” the answers varied between 2-5 times a week depending on the projects. For some projects it might be needed to use pick-ups even more frequently. One of the respondents stated that “A project with workers who are stationed at one construction site all the time makes it easier to plan and use the delivery systems provided, making the pick-ups unnecessary”.

4.2.1 Culture
From a cultural perspective, we were interested in how the organization works and why they act in a certain way. We were interested in how they perceive their surroundings and the processes. From the interviews, we learned that the construction industry could be perceived as
a quite conservative sector. The respondents told us that a couple of decades ago, a normal way of supplying the construction sites with material was by using pick-ups at the hardware stores. Also, it was a social part of the workers day to interact with personal at the stores during a coffee break. According to the interviews, this way of working still exists today by some individuals in the organization. The management in the organization works with briefing and informing the employees about the drawbacks and consequences about pickups. When asking the question “Have you heard about the drawbacks with pickups before?” 3 out of 4 participants in the interviews said that they had been informed about the drawbacks of pick-ups, and that the topic is brought up in meetings on a regular basis. However, when we asked about the costs and the frequencies of pickups, none of the participants had been informed about the costs and the frequency of the pickups. Only 1 of our 5 interviewees had never heard about the drawbacks of pick-ups. All of the participants said that the costs and frequencies is of interest, and that this information would be good to support the arguments for drawbacks in the meetings, as it is based on hard facts.

Another aspect of culture that was mentioned in the interviews were the use of new material supply delivery systems. Some suppliers offer deliveries to the construction sites within a few hours after an order has been placed. This service is relatively new, and when we asked if the respondents had used it in any project, it was established that only a few of the participants has tried it, although all of the participants knew about it. In our opinion, the fact that all knew about it but haven’t used it could point to a reluctance in changing the way of working and ordering. But as one of the respondents stated, “If the fast delivery service doesn’t deliver on time, we are the ones that must answer to the costs of loss in production”. This statement makes it obvious for us that the lack of trust in the service makes the employees avoid this service and instead rely on themselves by using pickups at the hardware store as a solution.

4.2.3 Experience

When we asked about aspects that might affect the number of pickups, experience is one aspect that all the participants mentioned as something that might influence. Due to the complexity of some projects, it might be hard to know the materials and supplies needed for every step. With experience of similar projects, it could be easier to foresee what is needed and when, and also what traps to avoid falling in to. Therefore, new employees might tend to be using pickups more, as a solution for fixing urgent problems, while more experienced employees have already foreseen the issue and worked proactively to prevent it from becoming a problem. But on the other hand, experienced workers could also be used to using the pickups as a solution for material supply, and therefore keep using it although other options are available.

Experience is also connected to planning. An experienced employee might have enough professional experience to know how to schedule the day in an efficient way. A less experienced employee could have trouble to plan all steps in an effective order, as the employee just have a hard time getting all the steps in the schedule. This is also one aspect that could influence the number of pickups.
4.2.4 Personality

While interviewing the respondents, a new category emerged in the discussion. The personality-category was developed when discussing the people within the organisation and how they act and view things. Also how the managers use the employees’ different personalities to “get the right employee at the right place”. As one of the respondents said, “The construction service is a rather social profession as the construction workers interact with co-workers, customers, suppliers and management in order to solve the projects”. The respondents with a management position said that they try to match their employees with projects that match their social competence or social needs. Projects in private places like private homes etc. demands higher social capabilities as they work close with the customer. An aspect that one of the respondents stated during the interviews was that “some employees who works close with the private customers can feel that it is natural to also interact with the supplier in a social way i.e. by using the phone or drive to the physical store”. Employees with these traits could therefore see pickups as a natural way of obtaining material instead of using the digital systems available.

Figure 11 - Interaction between supplier, construction service and customer.

Connected to planning, the personality also plays a big part. Depending on how structured and planning-oriented a person is, the number of pickups could vary. As the construction workers have a lot of responsibility on their own, most employees plan their schedule on their own based on their work hours and their assigned project timelines. This means that an effective employee could get all the supplies needed in one pickup or delivery, while others would need more to supply the needs. In the interviews, the respondents said that it is brought up on a regular basis in meetings that the employees should put effort into planning, and this according to the respondents, most employees follow these exhortations.

When we asked, “Is it possible to eliminate pickups as a way of supplying the construction sites?”, the respondents said that in the way construction service works today, it is impossible to have zero pickup as it would hurt the production and the company. The management have to allow pickups in order to make the construction process work. A question that was asked to the respondents were “Could you see any abuse of using pickups too much as a way of supplying the construction sites due to the free responsibilities given to the employees? All respondents answered in a similar way that they think it might occur in some cases, but none of them had seen it in their own teams. A statement from one of the respondents was that some employees might not have the insight of what a pickup actually costs the company, and therefore doesn’t see the problem of doing in, although managers keep raising the issue regularly.
Some of the respondents also added that depending on the personality and the will to learn new things, employees have different opinions about the best way of supplying the construction sites. Employees with higher technical skills tend to use the digital tools available for ordering materials and see it as smoother in general, while employees with lower technical skills and a lack of interest in learning prefer the old ways of ordering i.e. by phone or pickups because of the problems occurring when using the digital tools due to the lack of digital knowledge.

4.2.5 Supplier Contract

Some suppliers offer express deliveries of materials, as described in the culture section. Those who had tried it mentioned that it eased their work, but the promised delivery times wasn’t held in some cases which made them refrain from the service. A statement from one of the respondents was that “the contract with the suppliers should include a claim that the suppliers should be responsible for the costs that generates from late deliveries”, which according to the respondent is not included in the contracts today. Instead, it is the construction service that must pay for these costs, and therefore some choose to do pick-ups as it is more reliable.

Another aspect that one of the respondents mentioned as an issue with the supplier contracts was that the suppliers doesn’t always provide the beneficial services as non-contract suppliers do. Services that ease the work for the employees, like pre-cutting, could influence the employee’s decisions on where to buy the material, even though they know that they should stick to contract suppliers. An input was that the contracts doesn’t always reflect on the needs of reality, and therefore some contracts could be inappropriate to use because it doesn’t fit the project.
5. Analysis

5.1 The importance of having the material and supplies in time

To be able to have the material and supplies in time, a functional logistic system is crucial. According to Mattson (2012), an effective material supply is key for a construction company to be profitable. This is somewhat true in this case, although the case company is profitable, they can be more profitable if they find a solution to streamline their material supply to reduce the number of pickups. Due to reliance on suppliers, the construction companies rely heavily on the partnership with different suppliers, and this requires a relationship with the suppliers and supplier interaction before and during the production phase. According to Gadde & Dubois (2010), to be able to enhance the relationship and keep it growing with the suppliers, trust is needed from both parties. We can see that especially from the construction service point of view. Because of the nature of the department, they usually needs the materials as soon as possible, and to have the materials in time or just in time, there has to be both a contract and trust between these two parties.

Suppliers and hardware store are the ones whom is providing the construction site all its materials, also known as the material supply chain. To be able to do that, a foundation is created by the project team with every new project. The project team are responsible for creating a plan on what and when the materials needs to be on the construction site, how many construction workers is needed etc. The project team is responsible for creating its own supply chain i.e. their own construction supply chain. The reason to this is that every new project is unique, regarding the site, suppliers etc that are nearby and with every new project, there is often new project teams with different actors, thus creates a need of its own unique supply chain. This is similar to Sobotka & Czarnigowska (2005); Levy (2009), where they describe the responsibility of a project manager during the planning phase, and we understood it was the same with the case company.

According from the results we gathered from our interviews, all project teams within the construction department work with Just-In-Time (JIT), which is within the Lean philosophy (Bertelsen & Nielsen, 1997). How far in the chain, JIT has been implemented varies from different project, this is because of different managers and how good they are at planning. We noticed, when talking to the managers and supervisors, some said they were working a lot with JIT and some said they try to work with JIT as much as possible. Depending on how good at planning the managers were, the better the result of having the materials and supplies just in time. That lead to less pickups at the hardware store and less time on having to go to the hardware store. Because of the nature of how the construction industry, where there are often no space to store the materials, it is logical for the industry to adopt JIT. According to Bertelsen & Nielsen (1997), the aim of JIT is to have a minimum level of inventory before a refill is needed. The downside of JIT and could be a possible explanation to why pickups occur is the fact that the aim is to have a minimum level of inventory. If something goes wrong or there is bad planning due to inexperience etc, it could instead increase the number of pickup.
Within the construction department, there is not much of a supplier interaction during production, the managers don’t want to go to the hardware store and buy a package of screws, therefore the supplier interaction is during the planning phase. This is where most of the contact with suppliers is occurring. While Gadde & Dubois (2010) talks about adversarial and trust relationship with the suppliers, the relationship with the supplier in the case company are often based on evaluating the prices from the different suppliers to get the best price. This is different to what Gadde & Dubois (2010); Forsman et al., (2011) propose on building trust with the suppliers to have a collaboration between the actors.

The construction department has different contract of services for the suppliers, depending on where they operate. Most of them has a next day delivery service, where the suppliers can order smaller batches of supplies and material and get them delivered the very next day. Some has a container on site where consumables and materials that are used in the everyday work is stored and the suppliers comes to the site and refill the container. In cities where the site is in the middle of the centre, where there is a lot of traffic, the materials and supplies is filled during the night time. To have an efficiency in the process, it requires a proper project management, which Sobotka & Czarnigowska (2005) also implies on the crucial aspect of efficient planning. Due to very different factors at different project, it is hard to standardize a project, therefore it is crucial that the planning phase goes correctly and that the suppliers do their part of the deal. But whatever can go wrong will go wrong (Murphy’s law), there will always be some slip-ups and error that are made, because it is hard to plan every single detail for a project of these magnitudes. This is the reason to why some of the pickups occur, that they need something acute to be able to the work that is planned, or else the construction workers will not have anything to do and the production stop.

However, it is not only up to the managers and the suppliers, the managers can create a plan very well and detailed and a supplier can give the best service. But if the construction workers and supervisors doesn’t communicate with each other, there will be pickups either way. The construction workers need to communicate with the supervisors when materials and supplies are about to expire, preferably a day or two ahead, so the supervisor can plan and order the supplies. This is where the Lean philosophy comes in mind, where the responsibility is pushed further down the hierarchy (Salem et al., 2006). Kaizen is one of the pillars in Lean, where the main goal is continuous improvement by involving the workers in the everyday work (Salem et al., 2006). By creating an opportunity for the workers to affect their everyday work and give them more responsibility creates a better work environment (Salem et al., 2006). However, people are different and according to our interviews some of the workers doesn't want to be involved, some just want to do their work and go home and not be involved in the planning process. This could create a friction between the supervisors and workers, if the workers are not able to tell the supervisor in beforehand, it is impossible for the supervisors to know what to order before the supplies and materials expires.

It is quite different between the departments, especially when considering construction versus the construction service. The construction service needs to interact with the suppliers in their everyday work, because of how they work. Every project is unique, but it is quite small projects
comparing to the construction department. Construction service focuses on various different things, from renovating a bathroom to renovating a whole apartment. The most separable from these departments are that the construction service doesn’t really know what to do before they are at the site, most often the site belongs to a private customer and they can work on several projects every week. They might know that they need to redo a bathroom, but often they don’t know how much work is needed, this create a difficulty when trying to plan in beforehand. The process for a construction service worker, starts by going to the construction site with a general knowledge of what to do, they have their equipment and some of the materials with them. While inspecting the site, most often they realize they need more equipment or materials than they currently had with them. Due to that, construction service work in teams of two and two, and their only storage of materials and equipment is in their car, there is not much room to store a lot of it. Therefore, the way it works in the construction service, they visit the hardware store several times a day and that registrate as a pickup within the organization. Construction service requires a different way of planning comparing to the construction department. They need to plan for several projects and with the projects being someone’s home, they cannot really store their equipment and material at the site. They don’t really have a place to have a break or a coffee. According to the results from our interviews, we understand that the workers pick up the material that they need when they have a scheduled break, it also allows them somewhere to have a coffee and the suppliers offers them a place to enjoy their break. This is a way of building trust from the suppliers, which according to Gadde & Dubois (2010); Forsman et al., (2011) is important to have an efficient supply chain. We could argue and see it from the organization point of view and see it as approximately three pickups per day, but if we look at it from the perspective of the construction service, it is necessary for them.

5.2 The organizational behaviour

The construction industry could be seen as a quite conservative industry compared to other industries. Knowledge is an important part of the organization, but professional experience seems to be even more valuable, as it is in most industries. The professional experience is based on individual experience from different positions and projects within the organization. Because of the great value put in professional experience, the way in which the organization works is based mostly on this experience. This is one of the foundations creating the core capabilities for the organization (Leonard-Barton, 1992). Years ago, the normal way of supplying the construction sites was by going to the hardware store and purchase the materials needed. The way of work has been changed in the recent years, as new systems have been implemented in the organization, the supply of materials is now mostly ordered through a digital system and the materials are delivered by the supplier. However, some members of the organization still prefer the old way of supplying the construction sites with material and have a negative mindset about the new systems. It is the way things has been done before and it worked, so why change? This could be seen as a kind of routine within the organization (Scholes et al., 2002, p. 203).

Although some members of the organization possess this mindset, the majority seems to be positive about the new systems, mainly because it lets them focus on the production instead of material supply. But to implement a new system in the organization seems to be challenging. When talking to the respondents about a new service system provided by some suppliers, most
of the participants had heard about it but just some had used it due to the rumor that the material might not be delivered in time. This could be seen as a story within the company that affect how the employees work (Scholes et al., 2002, p. 203). As the material supply plays such an important role in the projects, it is crucial that the material supply works properly to avoid delays in production and consequently more expenses for the company. This argument could be one of the factors that influence the choice of system for material supply and make the members of the organization doubtful to new solutions and don’t trust the suppliers. And a trust-relationship is something worth pursuing (Gadde & Dubois, 2010). The consequence of not using the new solutions is that they don’t have the chance to evolve and adapt to fit the business as no one dares to rely and invest in it. Our opinion, which have support from Forsman et al., (2011), is that the case company should change mindset towards the suppliers and see the value in developing close, long-term relationships in order to build up trust between the actors.

The values within the organization is quite clear based on the information gathered from the interviews. Values are another part of the foundation that makes up the core capabilities (Leonard-Barton, 1992). Productivity, quality, working environment and employee’s safety are important factors influencing the construction processes. The hierarchy in the organization is very structured and it is in our opinion clear for everyone within the organization what’s required from them and what position they have. The hierarchy influence the paradigm and the organizational culture (Scholes et al., 2002, p. 203). Professional experience is valued highly among the members. The way in which construction service uses pickups in their daily way of work could be seen as a routine within the organization (Scholes et al., 2002, p. 203). That pickup is a part of their material supply flow and seems to be something they take for granted, or a part of the organization’s paradigm. The organization have been using the pickup-system for so long that they cannot see a functional construction process without it.

**5.3 Is there a need of an organizational change?**

Yes, but not really is the short answer. If the case company wants to change their organization, there are several factors to consider, however, if they need to change is another question, and this we will analyse further on.

PEAB AB is one of the largest construction company in the Nordics and has had a steady growth of turnover the last couple of years, arguing for that they need to change looking at numbers would be a false argument. But looking at how the company can change in aspect of to increase the turnover even more and be more competitive is another factor. To be able to compete in today’s market, with regards of the low profitability in the construction industry, we need to understand how we can enhance the supplier relationship, customer satisfaction and also improving the working method. By improving the working method, we argue that by doing so we also enhance the supplier relationship and customer satisfaction.

The general problem, according to the internal study from the case company is that it occurs too many pick-ups which results in a loss of 50 million SEK each year. To be able to do something about it and change the way of how and why the pickups occur, we need to first look at the reasons behind the pickups, the organization culture and how to change it. The main
reasons to why pickups occurred that we found from our results was planning and the cultural aspects according to the respondents. According to our supervisors at the case company and the internal study, they want a change regarding the pickups and the word “change” is according to Elearn limited (2007) “The meaning of change is about moving from the current position into a desired future state.” To be able to change, there is different ways of doing so, and in our opinion, there is some need of an organizational change, especially in the cultural aspects of the organization. To be able to change, according to Armenakis et al., (1993) the organization needs to create a form of readiness when trying to implement change. The organization needs to be clear regarding the change, what the goal is, why there is a need for change. To create this kind of readiness, the organization needs to be clear about what they want to change about the pickups, they cannot just throw numbers and expect the pickups to change. However, if they follow the the “Eight-step model for transforming organizations” by Kotter (1995) or the more the more detailed model by Mento et al., (2002), they could gradually change the behavior of the pickups. A change in an organization takes time, especially in an organization as large as PEAB AB. And with the models provided by Mento et al., (2002) and Kotter (1995), the organizations should not plan on gaining short-term wins, rather to look at the long-term. To change the cultural aspects which has been rooted in the organization requires work and determination. We believe, by changing the cultural aspect in the organization regarding pickups, will in the future result in a decrease in the number of pickups occurring each year.

5.4 Is there a need of change towards pickups?
In our analysis we can conclude that the pickup problem does exist in the organization. In the construction department, pickups seem to be rare and the fundamental reason to the occurrence is inadequate planning or unexpected issues. In the construction service however, the pickups seem to be a way of how the organization works i.e. a routine (Scholes et al., 2002, p. 203). Although, the information about the drawbacks from pickups have been presented in the organization and construction service tries to minimize the number of pickups by thorough planning of the project and the work schedule. Instead of going to the store several times a day or week, they try to gather all supplies in one run and do it when they are traveling to or from the construction sites. But the pickups could decrease even further, especially in the construction service. By increase the effort into planning a project it could be possible to decrease the number of pickups. This solution, however, doesn’t remove pickups from the way in which the organization works i.e. the problem will still be there, but maybe in a smaller scale. By instead changing the way of how to work towards material supply, pickups could just be a emergency solution in the cases in which something unexpected has occurred that stops the production. This option would require the organization to change their paradigm (Scholes et al., 2002, p. 203), which means that they have to change their organizational culture (Hofstede et al., 2005). We think that the organization should put more effort into developing solutions with their suppliers that satisfy the needs of reality. Even though the organization could handle logistics and material supply, their core competence is construction and running projects. By instead outsource the material supply to trusted suppliers, it would make the organization more focused on their core competence, which is their main competitive advantage (Leonard-Barton, 1992).
organization outsource most of the material supply to suppliers today, but in the construction service there is even more room for improvements in this area. By implementing better supply systems from the suppliers and prove that they work, it would make it easier to convince the sceptical workers that it is the right way to do things. They have to build up a trust relationship between the supplier and the members within the organization, and that's argued by Forsman et al., (2011) to be beneficial in the construction industry. By proving the systems works, it could change the stories within the organization, which is one of the pillars creating taken-for-grantedness. By doing this it’s possible to change the paradigm (Scholes et al., 2002, p. 203). By using the theory of nudging, it would help the organization to change the members opinions about new systems, i.e. changing the culture, and make the solutions seem as the natural and best way to supply the construction site. The benefits from using the theory could be that the reluctance towards new systems would be considerably lower. It could however be hard to perfect this tool in the construction industry due to the changing environment and the unique projects.

According to the interviews, it is sometimes hard for the members of the organization to use the digital systems. The assortment doesn’t match the need and in some cases it is necessary to use the professional experience by visualization which kind of material is needed. By increasing the cooperation with the suppliers, it would be possible to match the assortment to the needs, both at a national scale and also to the regions in detail. Forsman et al., (2011) argues that a long-term and better relationship with the suppliers will benefit the process of finding routines with the suppliers, which affects the assortment and services provided.
6 Conclusions & Discussion

6.1 Conclusion
One conclusion is and perhaps the most important for the case company are that, the most pickups occurs in the construction service department and not in the construction department. As we understand it, and the information we gathered during our interviews is that the number of pickups which occurs in the construction department is trivial if we compare the number of pickups in the construction service. However, due to how the construction service work, there’s no way of getting rid of the pickups entirely.

We can also conclude from our findings that the reason to why pickups occur is a combination of different factors, such as the cultural aspect and how each individual plan their work. Some are experienced and good at planning, which leads to less pickups happening, and some are not as good which results in an increase of pickups. We can also see that in different teams at different regions work differently, this could be seen as a leadership or managerial issue. The cultural aspects where the employees go to the hardware store and having a coffee are still happening, especially in the construction service department. It was mentioned several times during the interviews regarding JIT, we understand it that they are trying to work with Lean and JIT as much as possible. Depending on the knowledge and the experience of the employees involved, the outcome varied.

Another aspect that we can conclude from our work is the problems with the contract agreements. From what we learned during the interviews, the contract agreements do not suit the needs of reality and doesn’t match the demands from the projects. This results in that the workers go to non-contract suppliers where they are not regulated by the contracts and buy the necessary supplies or get the demanded service needed for the specific project. If the case company wants to change this behaviour, they have to start communicating and including the involved parties in the contract development process.

6.2 Discussion
A similar thesis on the topic has been done before at the same case company. Månsson (2015) states that one of the reasons that the issues with pickups occur is the lack of proper planning in projects, which is in line with our conclusion about the topic. Månsson (2015) however, focus on evaluating the costs of the pickups and how they affect the company’s profits while providing options on how the company could minimize the costs of pickups. Our thesis contributes in providing other aspects of the reason behind pickups i.e. the cultural and behavioral aspects and we think that the organization needs to do an organizational change in the matter in order to minimize the number of pickups within the organization. We argue that the issue doesn’t only involves the costs and processes, but also the people and culture within the organization. Blomdahl & Wikner (2013) have contributed to the literature with different factors that influence the logistics and supply chain. One factor that they don’t include is the culture and people. This is something we have investigated in this thesis and explained how it could influence the supply chain and logistics at the case company. Månsson (2015) mentioned that communication is a key factor, we agree with the statement, but we also provide concrete
cases where the communication should be developed in order to increase the efficiency in the case company. Our work is a confirmation and validate some of the aspects that Månsson (2015) mention, as well as it unveils new aspects that could play an important part in order to minimize the issue within the organization. Månsson (2015) limited the research to construction service, while our work includes both departments in the construction area within the organization. Through this, we could come to the conclusion that the problem mainly occurs within the construction service, and not within the construction area in general, which could be seen as applicable for the whole industry. This insight is important for the industry to understand. The difference between the two areas are vital to consider when trying to change the organization and applying the same solutions to both areas might lead to a negative result in one of the them as they are different from each other.

Bankvall et al., (2010) states that there are two main areas in which the construction industry should improve, which are logistics and material supply. As our work confirms, these are areas that the case company should improve and currently have some problems with, especially in the construction service. Furthermore, we think that in order to solve this, the organization should focus on their core competence and potentially outsource these areas. They should have a closer cooperation with their suppliers, and this argument is strengthened from the conclusions by Månsson (2015); Dahlström & Silvhem (2016) in construction service. Ivarsson (2014) emphasize on the importance on the improvement of the material handling and material supply to the construction site. While Ivarsson (2014) focuses more on the construction department, our study focuses on both the construction and construction service department, which differs significantly. Ivarsson (2014) mentions that a lot of time goes to searching for the materials at the construction site, although we do not bring that up in our thesis, it could connect to why the pickups occurs.

Blomdahl & Wikner (2013) states that construction sites that has more space for stocking materials and supplies, are more prone to have bad planning of the logistics. Construction sites that has less space are prone to have better planning of the logistics. The reason to this is that, instead of seeing logistic as a way to reduce waste and plan for unforeseen problems, logistic are just used because of the lack of space (Blomdahl & Wikner 2013). This may be true on their point of view, on ours, however, we have not seen any tendencies to these phenomena. However, our studies show that because of the lack of planning is an immediate result to why pickups occurs, and therefore could be connected to the same problem as Blomdahl & Wikner (2013) describes.

In conclusion our thesis provides a different angle to the problem of planning, pickups, material handling etc. While authors such as Blomdahl & Wikner (2013); Ivarsson (2014); Månsson (2015); Dahlström & Silvhem (2016) provides a view regarding the cost-evaluation, the structure of the logistic system and the improvement areas that can be made to sort the problems. Our thesis focuses more on the human aspects, i.e. the cultural aspects. This is our contribution to the existing literature.
6.3 Managerial implications

The managerial implications from this thesis could help the organization, but also the industry to change mindset towards pickups and understand the causations. From the case study, we concluded that there is a need for change towards the way the organization works in order to minimize the pickups. This thesis could be a foundation for the management to start the process of changing the work process, but also to educate the employees even more about the issues. We state in the thesis that the organization should put more effort into developing the new systems that have risen during the last couple of years, and work even closer with the suppliers to develop such systems. The organization should, in our opinion, focus more on their core competence and outsource the material supply to the suppliers in the extent that is possible.

The organization, and mostly the management, should develop the contracts with the suppliers in collaboration with the lower level management who are the ones on the construction site. An issue that we identified was the lack of requirements that was fulfilled in the contracts with the suppliers in the eyes of the construction workers, and therefore the workers chose to buy the materials from other non-contract suppliers who met these demands, although they knew it wasn’t the correct approach. This issue should be addressed, and a more joint development of the contracts and the requirements should be done between the purchasing management and the lower level management. If the issue is not resolved, it could lead to dissatisfaction in the organization and the purchase behaviour from non-contract suppliers probably won’t change.

6.4 Limitations

This study focused primarily from the views of construction managers and supervisors, how they saw their reality and how they interpret it. The study was done at one of the largest construction company in Sweden, and the geographical locations were narrowed down to areas near Jönköping, where the authors is based. Similar studies that are done in other geographical locations, could give different results.

The result and analysis of this study are based on the authors interpretation of the answers given by the respondents, due to the authors have no background in the field of civil engineering, the result could vary if it were done by researchers who had more experience in the field. The number of participants were limited to a minimum of 8-10 respondents.

The thesis is limited to 10 weeks of full-time study, which is the time frame for the course Master Thesis in General Management, 15 credits at Jönköping International Business School.

6.5 Further research

Further research made on this topic could include the views from construction workers to give a better understanding of the problem regarding pickups, and also investigate if there are any difference occurring between different geographical locations. Furthermore, we recommend that future studies could be made on how to develop a plan on how to enhance the relationship with the suppliers and reach a better agreement with the suppliers regarding delivery service etc. which then could help reduce the number of pickups.
6.6 Ethical considerations

The topic is connected to the supply chain and how the organization works during construction processes. Ethical aspects to consider when investigating and presenting a conclusion on the matter could influence the employees in the organization. If the management use the information in this thesis, it could affect and change how the organization works. This could result in an impact on the status quo in the organization. The management and the workers are used to how the organization works today, and a change could potentially lead to disruption and uncertainties within the organization. A change could also influence the employees work-environment in both positive or negative ways, and this aspect is important to consider. As the thesis is based on information gathered from a few individuals within the organization, and the individuals are limited to a geographical area, the results could potentially face the risk of not reflecting the reality of other geographical areas or the organization as a whole. This could implicate that all the members within the organization could be seen as having the same opinions as the respondents, which might not be the reality.

6.7 Recommendations

Our recommendation on to find ways of reducing the amounts of pickups are that, the way we see it, to reduce the number of pickups, the information regarding the effects of pickups needs to be clearer and the directive from the managers needs to be in an educational way, or else there will be no effect. This statement is regarding to the cultural aspect of the industry, where the norms and values about pickups is in the roots of the industry, where it is allowed to go to the suppliers and take a break. Where the suppliers, provides a space where the workers can take a break and even offers them cookie, coffee and sometime lunch. This could be seen as both positive and negative, the negative part could be that, due to it is allowed for the workers to go the suppliers and take a break while picking up the supplies and material that is needed to be able for them to do their job, the system could get abused. The positive side of this is obviously for the workers, where they have a space, they can take a break, because they usually work for private customers and in their homes. In our opinion, the organization shouldn’t remove the possibility to take a break at the suppliers, because it is the only place except the office where they can take their break and lunch. If it were to be removed, the organization needs to find another way to give the workers a space to have their break, and that could end up costing more than the cost of the pickups.

Our advice for the case company, is to focus on the construction service department, and try to find the best practice from different regions on how the ones who has the lowest number of pickups plan their work. When interviewing our respondents, one of the managers said that some construction workers are really good at planning and have a very low amount of pickup. If the company could use that and learn how he/she does it and later implement it further in the organisation by education etc., we believe it would result in a lower number of pickups than necessary.

Another way of reducing the number of pickups is to further develop the relationship and agreements with the suppliers. The reason to why some pickup occurs, according to our interviews is that the contracted suppliers didn’t have the materials and supplies that they
needed, and therefore needed to go to a supplier which offer the product that they needed. For some workers, the contracted suppliers were not in the vicinity of the project, and for that reason, whenever they needed materials and supplies, they had to drive much further to get the supplies. Another reason to the pickups was that the trust between the suppliers and workers varied, we understand it that some suppliers offers a delivery service. When ordered, they can deliver it in three hours, but the workers don’t really use it because of the reason that they think it is more effective that they go to the supply store by themselves, rather than waiting for the delivery.
References


Patel, B.Davidson, Forskningsmetodikens grunder, upplaga 4:8, Lund, 2011.


Appendix 1

Interview questions

These questions are translated from the original version which was in Swedish.

1. Can you tell us about yourself and what you do at PEAB AB?
2. For how long have you been working at PEAB AB?
3. Can you describe the material flow to the construction site, from placing the order until delivery?
4. What happens when material is lacking and needs to be supplemented on the construction site?
5. What could be the reasons behind lack of material on the construction site?
6. What is done when material is lacking?
7. According to the central purchase department at PEAB AB, a vast number of so-called pickups occur at supplier such as Beijer, Ahlsell, XL Bygg etc., which means that employees go from the construction site to the supplier, purchase and collect material in the store. What do you think are the reasons that these pickups occur?
8. Which positive/negative consequences are there when material is collected through pickups?
9. Are there any other way to acquire the needed materials?
10. Do you see any benefits if these kinds of pickups disappeared from the construction process?
11. Have you been apart of any pickups in the past week/month? If yes, in what context and why? Did it contribute to any positive or negative aspects on the daily work?
12. How frequently do these pickups occur during a week or a month in a project?
13. Do you think these pickups affect the productivity and the profit for the company in general?
14. What do you think one pick up approximately costs (materials not included)?
15. Have you had any previous information about this before? Has any manager told you about it or showed you any statistics of the consequences regarding pickups?
16. Have you been informed about this topic before? Has any manager or responsible employee told you or showed you statistics about the consequences from using pickups?
17. What do you think is needed to reduce the number of pickups?
18. Where do you think the change regarding pickups needs to come from? (Management, co-workers etc)
19. What can you do differently to decrease the number of pickups?
20. What can your suppliers do to minimize these store pickups?
21. What obstacles or challenges do you think can arise when trying to change this purchasing behaviour in the organization?
22. Are you going to think differently about pickups in the future after this interview?