MASTER THESIS

How can a learning organization best be developed in a project-based, decentralized construction company?

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30-11-2022

1. Introduction

The construction industry is seen as conjuncture sensitive. Peaks in the construction output (both upward and downward) are greater than those of the total economy[1], which lead to both (relatively) high and low revenues. According to the EIB[2], the construction industry has faced two crisis in the past twelve years and is facing another one. According to the EIB, due to the COVID-19 pandemic, the industry will decrease by 15% and will lose 40.00 fulltime jobs as a result. Before the pandemic, the construction industry already faced decreased production in 2020 and 2021 due to strict environmental regulations from the Dutch government on nitrogen ("Handelingskader voor hergebruik van PFAS-houdende grond en baggerspecie, 2020; "Wet Stikstofreductie en Natuurverbetering", 2021). However, these "crisis" can also be seen as opportunities. The need for innovative ways of building, standardizing the construction for maximum efficiency is one of the pillars of the following decades in the construction industry.

Next to those regulations, the Dutch construction industry is faced with another opportunity: an increasing shortage in housing. According to ABF[3], the expected shortage in 2021 was set on 279 thousand houses and this shortage is still rising. One of the major difficulties of the abovementioned challenges and regulations is that the construction industry is labelled as a conservative industry and is reluctant to adopt new technologies (Shapira & Rosenfeld, 2011). Another study presents another reason for this label. "Innovation in construction involves multiple participants collaborating at a project level; as a consequence, innovation in construction cannot easily be found" (Xue et al, 2014).

This means that for an organization performing in the construction industry, different problems may arise. The (in)direct effects of the COVID-19 pandemic combined with the Dutch construction industry regulations, a unique approach will be needed to cope with these problems. For example, being able to design a roadmap from start to finish for a conservative industry as the construction industry will have great practical benefits (as well as academic) when looking at the potential problems that may arise in the future. Having the ability to effectively predict future costs, risks or other liabilities provide a great advantage for any organization, especially a construction organization.

A construction organization such as the case company is most likely a project-based organization (+ref). It is important to identify the unique aspects of a project-based organization. For example, within a project-based organization, major projects will include all the different business functions which are normally divided into different departments (Hobday, 2000). This study elaborates on the different aspects of a project-based organization. For example, each project is most likely to a very specific and well-defined product and the corresponding actors (customers and other types of customers) are very closely and directly engaged with the performance of the project. Additionally, project-based organizations organize their entire business structure and capabilities around the needs of that project, Hobday says (2000). This can also create liabilities with information and knowledge flow due to a

[1] https://www.cobouw.nl/marktontwikkeling/nieuws/2003/05/de-wisselende-samenhang-tussen-conjunctuur-en-bouwmarkt-101233385
[2] https://www.eib.nl/derde-bouwcrisis-in-twaalf-jaar-tijd/
[3] https://abfresearch.nl/publicaties/het-statistisch-woningtekort-nader-uitgelegd/

complex supplier-customer relationship (Brusoni et al., 1998). This research focusses on the transformation of such an organization towards a learning organization for a company performing in the construction industry. In this industry, the different deadlines of different projects are most often overlapping, which results in hectic and sometimes chaotic situations. By being able to implement standardization within these situations, negative consequences such as repeat mistakes could be avoided. Typically for the construction sector is that many companies subcontract much of the work (Yu et al., 2007). Every construction project is site-specific and is therefore difficult to standardize in detail. Furthermore, every project has different leading stakeholders with involvement which creates a different approach for every project. The construction industry is, in comparison with other industries, much less predictable and more complex which can result in inefficiencies on all different levels of the construction company (Lee et al., 2011). In other words, the activities on a construction site present today, in combination with an increased number of project participants, require a lot of planning and communication (Wang et al., 2004). This research serves the purpose of exploring the potential benefits a construction organization could experience of transforming towards a learning organization while also investigating the different perspectives of such a learning organization. This can be done by transforming towards a learning organization. A learning organization is an organization where employees continuously create, acquire and transfer knowledge (Davis & Daley, 2008). By doing so, employees contribute to an organization's ability to adapt on the future and outperform competition (Garvin et al., 2008). Management in many sectors and industries tend to see their firm's ability to learn as the main key to innovation and growth (Garavan, 1997). For the case company, knowing the different benefits of a learning organization is . Within literature, there is not much available on the topic of project-based organizations in combination with the learning organization. This means that the results of this research can be used for organizations with similar difficulties transforming towards a learning organization.

1.2 Research Objective

Due to the fact that this research is conducted within a construction company, this research has three main objectives, namely to: 1) identify objectives and requirements of a learning organization ; 2) provide insight in the learning organization in the field of knowledge sharing; and 3) analyze the connection between a learning organization and construction firms. The third objective provides a potential literature gap, whereas the connection between construction firms and a learning organization is not available broadly in literature. Similar firms that want to transform towards a learning organization can benefit from this research while the problems that arise in other firms are likely be similar to the case company as seen in the previous section. With project-based organizations, project management is a strategic competency and the improvement of this part of the organization is crucial for success (Erdogan et al., 2005). Improving performance is difficult when looking at the constantly changing nature of a project-based organization (Koskinen, 2012).

For instance, implementing projects is one learning process among other that form the project-based organization, this study states. The behavior of a project-based organization should change as a result of experience. According to this study, a project-based organization consists of infinite number of learning processes that can be affected. This study concludes that the process of organizational learning is

emphasizing the ongoing changing of a project-based organization. This means that this research is contributing to project-based organizations, where their ability to grow is dependent on their ability to learn. When looking at project-based organizations that are functioning in different regions, a similar and more complex problem can arise. Looking at the different perspective available within literature, the negative consequences of a project-based organization (coordination, improving performance, the constantly changing nature) could increase when the different regions of a project-based organization are not communicating with each other. Each region is then operating as a different project-based organization, meaning that all the different departments of each region are not collaborating but are (potentially) decreasing performance.

Assuming these regions are not collaborating, the coordination between the different regions is minimal. This results in a loss of knowledge due to the fact that there is no priority in learning from the project because the next project is already starting and needs all the available resources. Therefore, the improvement process within every project is neglected and unclear. That may lead to making the same mistakes over and over and results in additional costs for each future project. This leads to the problem cluster seen in Figure 1.

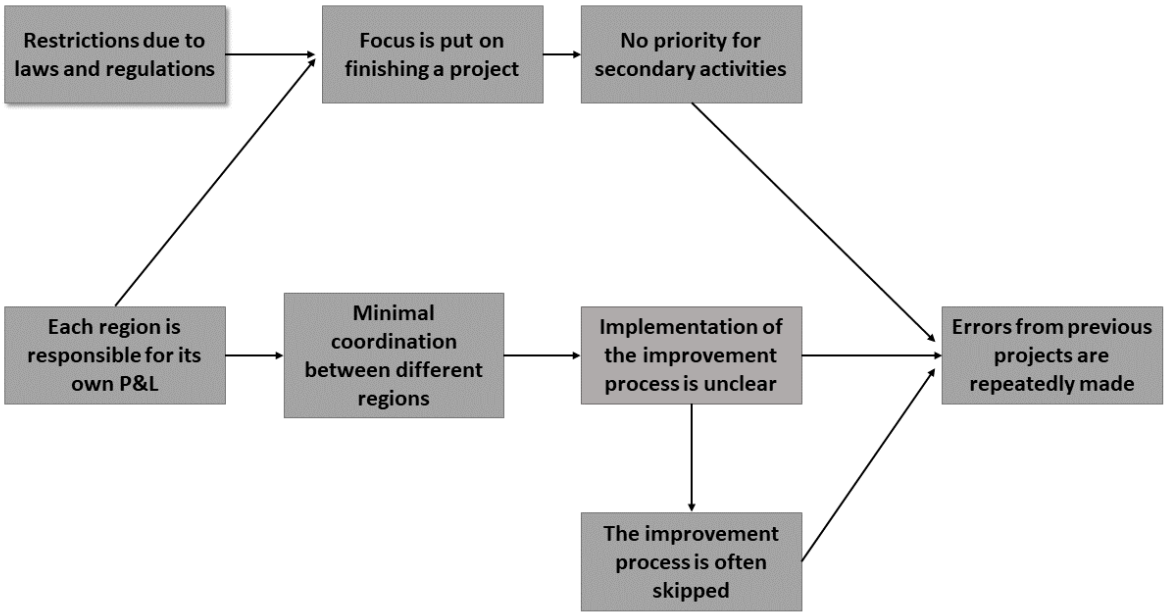

Figure 1: Problem Cluster

In addition, the research aims to provide practical recommendations for the case company while providing theoretical recommendations for the academic field.

The core research question is stated as follows:

How can a learning organization be established in a project based, decentralized construction company?

1.4 Research Questions

In order to obtain the answer for my core research question, the research is narrowed down up into sub-questions. Each sub-question will cover a different aspect of my research.

1. What is a learning organization?
    a. What are the enablers of a learning organization, according to literature?
    b. What are the phases of moving towards a learning organization, according to literature?
2. How can a project-based construction company best establish a learning organization?
    a. What aspects of the organization can be improved?
    b. What are the practical recommendations for the Organization X?

The overall goal of this research is to design a roadmap for building a learning organization within a conservative industry. This means that before I can start thinking about constructing a framework for this roadmap, I first have to perform research on what a learning organization is. What kind of requirements and objectives are necessary for being an effective learning organization? This will be done by performing a literature review, where the main goal of this review is to find out what aspects are required to become a learning organization. This literature study will result in different phases of transforming towards a learning organization and provides requirements/objectives for moving towards the next phase.

Then, I will conduct a baseline measurement for the case company and will provide a good starting point of the organization within the field of continuous improvement for learning organizations. In this phase I will conduct different interviews with the stakeholders of the case company to determine the position within the learning organization. For each of the stakeholders the position within the learning organization can be determined and therefore improvements are identified.

1.6 Practical Relevance

The practical relevance starts with the framework provided for organizations coping with similar problems when implementing new organizational culture. These problems can contain both organizational problems as well as cultural problems. More on this can be seen in Chapter 2, where a literature study is performed on the organizational and cultural enablers of an organization that could potentially negatively influence the success rate of such a transformation.

2. Literature review

In the following chapter, literature reviews are performed based on the two different aspects of this research. After reading this chapter it should be clear what a learning organization is and how it can be achieved within a (construction) organization. All the different aspects of such an organization are analyzed based on literature. Additionally, research is performed on the unique factors of the construction industry in relation with other sectors which provide insights into the difficulties that could arise when transforming a learning organization for an organization in the construction industry.

2.1 The learning organization

In literature, this term has a rich history. A case study (Galer & van der Heijden, 1992) already speak of "corporate learning" and talk of integrating learning within an organization. According to this study, business need to change their mental models in order to overcome external changes. Being a learning organization is stated to be an organization that has the ability to change their business environment faster than the change that is happening within the operating markets and their competitors. In other words, a learning organization is more seen as a business strategy and is purely focused on performance in the forms of revenue streams.

Another more recent study elaborates more on the historical changes of the term learning organization (Örtenblad, 2018a). In this paper, the term learning organization is explained through two parallel developmental processes. The first development process of the learning organization is "the organization of certain learning activities", which can be found in papers with a similar scope as well (Hofstetter, 1966; Huczynski & Boddy, 1979), where the subject area is more about educational science and pedagogy instead of business management. The other development process mentioned in this study is the transformation of the term "organizational learning" into "learning organization" (Örtenblad, 2018). According to this study, a learning organization should take the form of:

1. The organization is a facilitator of learning going on within the organization, supports initiatives regarding learning performed by individuals.
2. The organization is an additional, actual learning unit.
3. The organization is the end process responsible for the learning serves the goal to ensure continuous learning exists within the organization.

2.2 What are organizational enablers of a learning organization?

Literature provides different perspectives on what characteristics a learning organization should possess. A distinction is made between two types of enablers: Organizational and Cultural enablers. Within an organization, both the culture of the organization as well as the structure of the organization has enablers that allow an organization to transform towards a learning organization. Within this section ,the core focus is put on the organizational enablers. These can be seen as best practices that can be leveraged to support the implementation of the learning organization. In Section 2.3, the cultural aspects and enablers will be explained. Cultural enablers make it possible for people in an organization to engage in the transformation journey and contribute to building a culture of organizational excellence.

For the organizational enablers, several academic sources have been identified and analyzed. A case study (Cantle, 2000) provides a summary of findings in literature. These can be seen in Table 1. The four constructed themes are based on the energy flow model (Pedler et al, 1996) and provides a conceptual framework for the data analyzed in this study and can be seen in Figure 1.

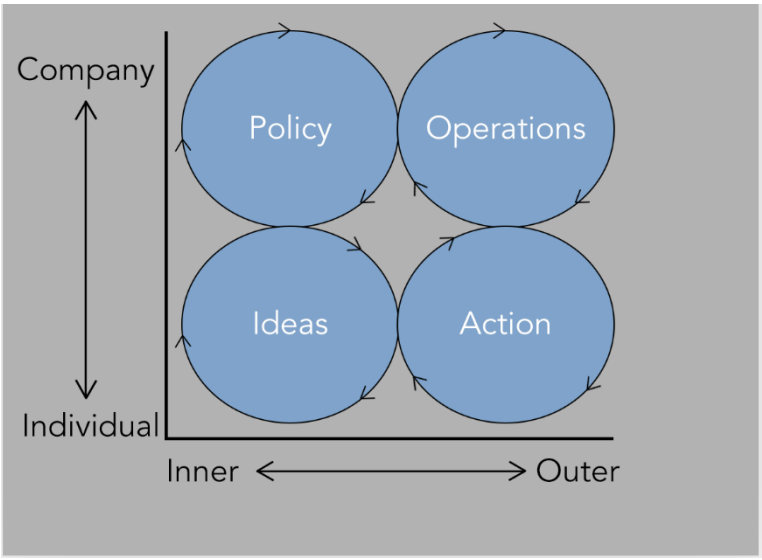

Figure 2: Energy Flow Model (Pedler et al., 1996)

This model requires some additional explanation. This model assumes that within a learning organization, there are continuous energy flows of interaction, dialogues, and exchanges. Neglecting one of the variables of this model may lead a decreased learning flow of the entire organization. According to Pedler et al, one of the most critical and most important management roles within a learning organization is managing the integration and interaction between the different variables of this model.

The model makes a distinction between four different fields of attention:

1. Connecting operations with actions → **Managing.**
2. Connecting policies with operations → **Leadership.**
3. Connecting actions with ideas → **Learning.**
4. Connecting ideas with policies → **Participation.**

This model allows an organization to measure their status of learning processes within the organization and will be explained more in Section 1.4, where a framework for measuring process is provided. In this framework, the list of key characteristics mentioned above based on a case study (Cantle, 2000) is also included which can be seen in Table 1. This list should be seen as the end-phase of a learning organization. For this research, additional phases will be constructed as well to serve one core goal: Providing a framework for an organization to transform towards a learning organization.

Table 1: Key characteristics of a learning organization

Themes	Key characteristics of a learning organization **(Cantle, 2000;** Pedler et al., 1996)
1. Policy	-Clear business and practice development plans -Clear strategic objectives -Staff contribution to decision making process -Client/patient involvement in policy and strategy forming processes
2. Operations	-Regular Operational activities review -Effective communication system within the organization -Effective teamwork -Staff highly valued for their contribution
3. Action	-Sharing information and experience between different disciplines -Provide opportunities for client involvement in service planning -Routine organizational activities well-coordinated
4. Ideas	-Support staff training needs -Encourage new ideas to facilitate change -Operate formal staff development plans

According to literature, there are several key aspect of a good learning organization. The most important finding is that all the different themes are interconnected in ways of knowledge sharing throughout every aspect of the organization (Cantle, 2000; Pedler & Megginson, 1996)

2.3 What are the phases of moving towards a learning organization?

Literature provides different perspectives on the number of phases of transforming into a learning organization. However, the requirements per phase are in most cases the same. In the following section, different types of models will be presented and explained, while in the last part the final model is constructed based on the findings in literature.

According to a book on knowledge management and organizational learning (Mathieu Weggeman, 2010) there are four different (continuous) phases. The first phase is called the knowledge development phase. In this phase, the knowledge required for the organization is determined. After that, the organization is analyzed on the (already) available knowledge and thus, a list of unavailable and available knowledge is constructed for the organization. The requirements of knowledge should confirm to the missions, visions, goals, and strategies of the organization.

The second phase is called the knowledge sharing phase. In this phase, the knowledge that is available is shared across the organization. The main goal in this phase is to ensure that everybody has the same level of knowledge regarding specific topics that will help develop them in their day-to-day work. The third phase is called the applying knowledge phase. In this phase, the main goal is to use the knowledge gathered in the previous phase by applying it throughout the business processes. The specific fields and

themes can be seen in Section 1.2 of this research. The fourth and last phase is called the knowledge evaluation phase. In this phase, all the previous phases are cyclical and continuously evaluated on effectiveness and performance. The goal of this phase is to identify improvements in each and every phase of the process.

Another perspective on transforming towards a learning organization can be seen in a study done on how to best structure an organization for organizational learning (Hong, 1999). In this study, three levels (Individual, Group and Organization) are presented with four overarching processes (Intuiting, Interpreting, Integrating, and Institutionalizing) that contribute to structuring a learning organization. The objective within the transformation process is increase the ability of the organization to search, share, interpret and distribute information. This is called the "absorptive capacity" of an organization (Cohen & Levinthal, 1990). In other words, combining the findings in literature, the main goal of transforming towards a learning organization is to increase the absorptive capacity to enable the knowledge sharing and applying within the organization.

The last perspective on this topic is a more recent study (María et al., 2011), where more focus is put on the different phases of moving towards a learning organization and speaks of similar phases as in the other sources researched (Hong, 1999; Mathieu Weggeman, 2010). The first phase is the information acquisition phase, where both internally and externally knowledge is gathered. External information can come from third parties such as consultancies or competitors or even financial statements while internal information is collected through treating employees as an important information source.

The second phase is called information distribution. As we can identify, the phases have similar names for the same activities. During the information distribution phase, "a social process is started where information from the different sources is spread among the organization's members" (María et al., 2011).

The third phase is called the shared interpretation, similar to the knowledge applying phase of Weggeman (2010). In this phase, the information distributed in the previous phase is given uniformly understood interpretations. In other words, the information becomes part of the organization's culture and the procedures of applying this information are harmonized within the organization. The last phase of this study is called the organizational memory phase, which serves similar goals as the other studies analyzed in this research. In this phase, the knowledge from the past has to be used in present and future situations.

Concluding this part of the literature research, the overlapping finding is that four phases are constructed in moving towards a learning organization (Cohen & Levinthal, 1990; Huczynski & Boddy, 1979; María et al., 2011; Mathieu Weggeman, 2010; Örtenblad, 2018b; Pedler & Megginson, 1996). While the phases have different names depending on the study, the goals of the phases are the same. Therefore, the following four phases are constructed and will be used for this research:

1. Knowledge collecting (collecting internal and external knowledge)
2. Knowledge sharing (distribution of the knowledge collected)
3. Knowledge applying (embracing the knowledge within the organization's culture)

4. Organizational memory and evaluation (using the past in the present and future)

2.4 Requirements for moving to the next phase

The requirements needed for moving to the next phase will be used for constructing a framework. This framework helps identifying an organization how far in the process of moving towards a learning organization they are. In this section, each phase will be discussed in more detail and a list of requirements will be proposed.

Phase 1: The knowledge collecting phase

This is the first phase of moving towards a learning organization. The goal of this phase is to identify potential knowledge gaps within the organization and describe a desired state in observable terms[4]. During this phase, knowledge is collected both internally and externally. Additionally, the generated information flows within the organization are mapped during this phase.

We speak of an internal collection of knowledge when the knowledge acquisition comes from within the organization (e.g., employees). Employees must be seen as important information sources because in that way, employees are encouraged to take part in both formal and informal networks of people. By doing so, different organizational units are connected. This behavior can be encouraged by facilitating meetings and provide incentives for providers of quality information. The external collection of knowledge is gathered from sources outside the organization. Some of the most important findings come from gaining access to knowledge and experience developed in other firms (María et al., 2011).

Phase 2: The knowledge sharing phase

The second phase is known as a social process where the information collected in the previous phase is spread and distributed among different organizational units and individuals. This can be done both through both formal and informal communication channels. During this phase, the information is distributed at an individual level, through conversations and relations between employees at the organization (Brown & Duguid, 1991), by using formal communications such as face-to-face meetings or reports and informal communication through talks at the coffee machine or in the hallway.

By distributing the information and knowledge available throughout the entire organization, employees as well as entire units experience learn through combining the different information flows they receive (María et al., 2011) from different organizational units (Slater & Narver, 1995). In this way, new uniform understandings are created within these organizational units.

Phase 3: The knowledge applying phase

The knowledge applying phase is the third phase of moving towards a learning organization. By now, the organization has mapped its internally and externally available knowledge and has identified knowledge gaps within the organization. Furthermore, the desired state is known, by mapping organizational values and thus creating a desired organizational culture with corresponding norms and values. Furthermore, the first measures have been taken to work towards this desired state. The organization at this point has internally shared the available knowledge and individuals as well as organizational units have created

[4] https://hbr.org/1993/07/building-a-learning-organization

shared understandings on the collected knowledge. The next step is to evolve these shared understandings into consensus across the entire organization. This consensus consists of both behavioral changes and cognitive changes at an individual level. The knowledge is ambiguous which implicates that throughout the organization the meaning of the knowledge is harmonized. Subsequently, this also means that the way this knowledge is used, learned, and stored is seen as an organizational value and is known by every individual employee. At this point, a shared interpretation is created (Slater & Narver, 1995; María et al., 2011).

Phase 4: The organizational memory and evaluation phase

In the fourth and final phase, all the previous phases are continuously monitored and evaluated. The main goal of this phase is to ensure that all the previous phases are not incidentally performed but are continuously lived up to. In this way, the knowledge that is collected (phase one), distributed (phase two) and transformed into shared interpretation (phase three) can now be used in present situations and in future decisions (Walsh, 1991).

The organization is now able to integrate information management into their decision-making, employees share implicit knowledge and are able to share and reuse this knowledge. For an organization this implicates that the knowledge loss is minimized because the employees have a shared interpretation on the procedures of all the aspects of knowledge.

Table 2: Full list of activities and requirements

Phase	Activities	Requirements
Knowledge collecting	**1.** Collecting knowledge internally	Identification of a knowledge gap
	2. Collecting knowledge externally	
	3. Mapping information flows	
	4. Mapping a list of organizational values employee's desire	Desired state is constructed
Knowledge sharing	**5.** Formally distributing knowledge	New shared understandings are created within organizational units and individuals
	6. Informally distributing of knowledge	
Knowledge applying	**7.** The distributed information is given a shared interpretation	The way knowledge is stored, used, and learned is an organizational value
Organizational memory and evaluation	**8.** Knowledge is continuously monitored and evaluated	Knowledge is used in present and future decision-making
		Employees share implicit knowledge

2.5 What are cultural enablers of a learning organization?

Cultural enablers make it possible for people in an organization to engage in the transformation journey and contribute to building a culture of organizational excellence. By combining the results from the previous sections with the addition of cultural enablers the next step of this research is to measure and monitor to what extend the organization (the case company of this assignment) is including these requirements within the day-to-day business. In that way, a maturity assessment on these topics can be performed which will be explained more in Chapter 3; where the chosen theory and methodology can be found.

Literature provides different perspectives on cultural enablers with respect to a learning organization. A study (Quatman-Yates et al., 2019) provides a list of themes and subthemes. These can be seen in Table 3. This study differentiates between microsystem enablers/motivators and macro-system enablers/motivators. A micro-system can be seen as a system that affects the direct surroundings of an individual on a personal level, while the macrosystem includes all other systems and the societal culture surrounding a person. The difference between an enabler and a motivator is as follows: An enabler of something facilitates an environment that allows for this change to happen, while a motivator stimulates the environment.

Table 2: Cultural enablers & motivators (according to QUATMAN-YATES ET AL.)

Type	Enabler
Micro-system enablers	Clear expectations and "Know how".
	A growth (versus fixed) mind-set.
	Trust that the supervisor values the initiatives.
	Dedicated time and resources
Micro-system motivators	Desire to provide the best possible care.
	Desire to grow, learn and/or advance
	Visible audits and feedback
Macro-system enablers	Strong vision, tenable strategies and committed leaders
	Balance of staff autonomy and standardization
	Access to methodological expertise
	Informatics support
Macro-system motivators	Sense of urgency and duty
	Shared sources of inspiration
	Formalized accountability and opportunity

Another source provides additional enablers (Love, 2020) to learn from errors in construction. While this source makes no distinction between micro- and macrosystems, the enablers have similar goals as seen in Table 3.

Table 3: Enablers (based on Love, 2020)

Enabler	Description
Authentic leadership	A good leader shows behavior that stimulates and enables positive psychological capacities and creates an underlying positive ethical climate.
Error management culture	Error management culture aims on embracing the mindset that errors are not bad but should be used to learn and the focus should put on mitigating the negative error consequences.
Psychological safety (individual/team)	This enabler is a shared belief that the team as well as the individual is safe in risk-taking.
Psychological contract	Such a contract is constructed by assumptions, expectations and an overall mutual agreement between the organization and the employee(s).

As seen in these two sources, these enablers have similar goals. The psychological side of the employee perspective is important, but the type of leadership of the overarching organization is similarly important to create the type of culture necessary for organizational learning.

Another study provides a perspective on error culture management (van Dyck et al., 2005). Errors are unintended differences between the goals and the reality and can have negative consequences for an organization if not managed well. According to this study, most organizations only focus on error preventing due to the fact that an error is mostly seen as a “failure” and should have been prevented beforehand. Learning from errors, on the other hand, takes place when people are encouraged to do so (Heimbeck et al., 2003). Therefore, organizations can benefit from pursuing two goals continuously and simultaneously: the goal of control with the goal of learning. Therefore, error management is overcoming the potential bottlenecks of allocating resources between control and learning perspectives (van Dyck et al., 2005).

This study (van Dyck et al., 2005) speaks of the best mediators and common practices of including error management culture within an organization and can be seen in Figure 4.

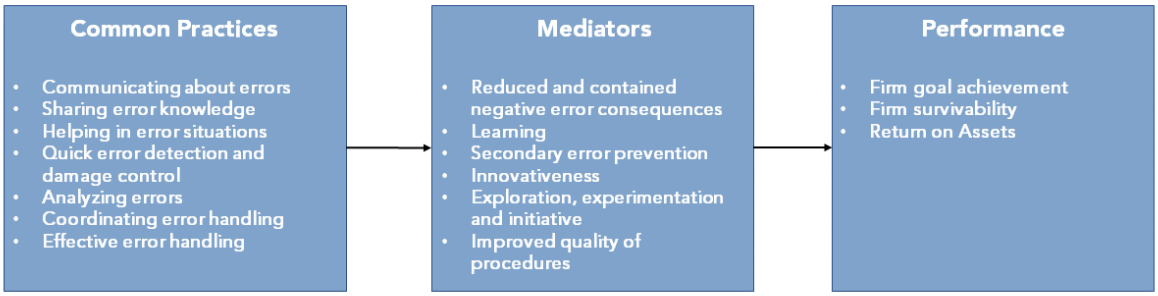

Figure 3: Error Management Culture (Dycke et al, 2005, p 1230)

2.6 What is an ideal organizational culture for a learning organization?

Based on the literature reviewed in the previous section, the three overarching pillars of cultural enablers are leadership, psychological environment, and error management. While most reviewed sources use four different themes, the three stated here can be used to contain all the different aspects of cultural enablers.

Table 4: Desired State

Theme	Desired State
Leadership	Leadership that enables positive psychological capacities and creates an underlying positive ethical climate.
Psychological Environment	The environment should reflect a safe and positive space where there is a desire to grow, learn and/or advance with visible audits and feedback.
Error management	Embracing the mindset that errors are not bad but should be used to learn and the focus should put on mitigating the negative error consequences.

The first theme is leadership. This enabler is important because it determines the work environment of an individual as well as a team. With the right leadership, the environment is safe and positive behavior is stimulated. On the other side, bad leadership may lead to negative behavior and eventually not an open and safe environment which is crucial for a learning organization.

The second theme is psychological environment. These include all the external and internal factors that contribute to a safe and positive workplace where positive behavior is stimulated. There is an overall desire to grow, learn and/or advance within the organization and feedback is continuously and transparently provided within the different layers of the organization.

Error management is the last theme of the desired state. With error management, the activities and initiatives that contribute to a positive mindset of learning of mistakes are included. This means that making a mistake is not per definition a negative situation. Not learning from these mistakes, talking about the mistake, and not trying to mitigate the negative consequences of this mistake is bad error management. On the contrary, the desires state facilitates an environment where making mistakes is not seen as bad but transformed into a lesson for the entire organization. Initiatives that help preventing mistakes are also included in this theme.

To conclude this section, a desired state of the learning organization has good leadership, a positive psychological environment that contributes to positive behavior and implements initiatives that contribute to good error management.

2.7 What characterizes a construction company?

Typically for the construction sector is that many companies subcontract much of the work (Yu et al., 2007). This means that alliances or partnering can be important in order to maintain a quality standard. According to this study, most of the companies based in the US have created synergies with fixed partners and thus, created a “preferred supplier” over the course of a project. Furthermore, this study speaks of several other important variables that are unique for this sector and will be discussed briefly. These variables are safety performance, environmental aspects, and labor relations. Safety performance in the construction industry is a variable that generate more revenue over time if done correctly. When working safe, productivity can increase, less loss time will be needed and less injuries/deaths occur on the workplace .

Environmental aspects are becoming more leading over the years when it comes to construction projects. Not only the building itself must adhere to certain environmental standards, but the surroundings are also becoming more important in construction (Borja et al., 2018). Therefore, within the project preparation, next to the direct results of the project (the impact of the building itself) the indirect results (meaning, the surroundings; stakeholder involvement etc.) must be prepared as well. Good labor relations have a positive effect on the labor productivity within the construction industry (Chaturvedi et al., 2018). This includes all the different aspects of working in the construction industry. Think of the availability of resources, proper scheduling and time management, good safety culture within the project and good coordination between the workforce and the management.

Another study speaks of other unique characteristics of a construction company (Lee et al., 2011). Every construction project is site-specific and is therefore difficult to standardize in detail. Furthermore, every project has different leading stakeholders with involvement which creates a different approach for every project. The construction industry is, in comparison with other industries, much less predictable and more complex which can result in inefficiencies on all different levels of the construction company (Lee et al., 2011). In other words, the activities on a construction site present today, in combination with an increased number of project participants, require a lot of planning and communication (Wang et al., 2004).

As seen in literature, most construction companies are project-based meaning, resources are allocated to a certain project and once that project is finished, there is room for another project. Practically speaking, this means that construction companies can be summarized with the help of three words: Time, cost, and quality. There is limited time for finishing a project, the cost is fixed (mostly agreed upon before starting the project) which means that any additional costs such as overhead costs are eating off profits. This can also be seen in the third word, namely quality. Providing the best quality possible within the given timespan and cost is extremely important. When the quality is lacking, the additional costs are also decreasing potential profits of the project for the organization. This means that for any construction company, the goal is to deliver a project with the best quality within a given timespan for minimal costs in order to create the best revenue.

Concluding, when looking at the literature, certain aspects of a construction company are likely to result in errors and mistakes when coordination and standardization is low (Lee et al., 2011). Additionally, being able to fully standardize the core process is difficult due to the subcontractor structure of the construction industry (Yu et al., 2007). By addressing these potential problems and prioritizing good labor relations, the overall efficiency could increase, and the overhead costs could be decreased (Chaturvedi et al., 2018).

3. Methods

In this chapter, the used methodology of this research is presented. This includes all the different aspects of the research design as well as the data collection.

3.1 Research Design

While academic information regarding topics such as organizational learning and lean management are broadly available, the connection with a team-based, conservative, decentralized organization based in the construction industry is not widely available. The focus of this research is the combination of literature studies and the maturity in the scope of organizational learning. The different phases of this research will be discussed in the next paragraphs.

In the empirical phase, I will have constructed an interview outline based on the literature from the previous phase. These interviews itself are used for qualitative analysis. The structure of the interviews can be seen in Appendix A. The goal of these interviews is to group the outcomes in different themes and categories to see where potential bottlenecks occur within the current situation of the case company. Therefore, the focus of this research lays on qualitative analysis. A good qualitative research ensures that the subjective meanings of the participants are illuminated (Fossey et al., 2002). This type of research is designed to either test an existing theory, using a structured format in which the questions and the corresponding analysis are standardized, while the other type of research seeks to learn meaning and perceptions to generate a new theory (DiCicco-Bloom & Crabtree, 2006).

This research has a balance between inductive and deductive research. Deductive research moves from the general to the particular. It starts form a theory and could derive other hypothesis from it; testing them and revising the existing theory (Locke, 2007). This research is therefore deductive to some degree, due to the boundaries that I have created that are based on (a combination of) existing theories. While I am not testing an existing theory or hypothesis, I am also not creating a completely new theory.

Inductive research, on the other hand, is about making empirical observations about some topic and forming concepts and theories based on these findings (Locke, 2007; Woiceshyn & Daellenbach, 2018). Research will be mostly inductive due to the fact that this research is aiming to developing at theory tailored to this problem and for this industry. I have combined several academic sources to construct a specific set of focus areas for the case company; not one fixed theory mentioned in literature. By closely analyzing the outcomes of the interviews, I can construct a theory.

3.2 Case description

The case company is one of the biggest construction companies in the Netherlands. It is a construction company that has grown enormously in size over the past years. This case company distinguishes between four regions (*Noord, Oost, Zuid, West and Midden)* and is active with four different branches: Project development, Renovation & Transformation, New Build and Property Management.

The case company is currently facing opportunities regarding the above stated regulations and policies and is ambitious in solving these challenges. However, some background information is needed to fully understand the importance of this research. The case company wants to move towards a learning

organization and wants to find the best roadmap possible for its organization to transform towards a learning organization. It is one of the biggest Dutch housing and has been growing over the past years. However, the case company faces different challenges coping with this growth and the needs of the market. The case company has chosen an innovative route that should contribute to solving the challenges on the market. Looking at the house shortage, the market is booming in both new construction as well as renovation and transformation of older projects. The market is however fragmented, where the competitors of the case company can be classified into three different categories:

1. Small-scale local developers (cheaper due to flexibility and minimal overhead costs)
2. Developers that implement factory-building (cheaper through standardization)
3. Innovative developers (quick adaptation to new demands and needs of the market)

The case company has created a strategical advantage over these competitors by implementing three core values within their business. These core values are standardized over all the previous, current, and future projects and are stated as follows:

1. “Fijn Wonen” (factory-build approach to projects; enables standardization while allowing customization and aims to be a cost leader)
2. “Wij wonen” (conceptual and modular building)
3. “Vrij wonen” (customer oriented, traditional construction)

However, there are changes in the market that increasingly puts the third core value under pressure. The increased external and internal competition (externally from competitors and internally with the availability and accessibility of the needed resources) results in a difficult situation for project developers. Project developers have to choose one of the three values within their project, but due to the potential problems stated above, the benefits of “Vrij wonen” seldomly outweigh the costs and therefore this option is not feasible in many projects. Therefore, there is an increased urge within the case company to monitor cost price improvement and quality improvement to increase the feasibility of this third option. Cost price improvement are all the activities that involve a decrease in overhead costs and failure costs. Furthermore, cost price improvements also involve activities such as improved collaboration with (co)partners and improved standardization across all the core processes of the case company. Due to the organizational structure of the case company, each of the five regions has its own P&L responsibility and focusses mainly on finishing the projects that generate revenue for them. This leaves little room for implementing the improvement process within their core business processes.

Furthermore, the priority within each project is on finishing the project; not on how to do this project better (e.g., more efficient) than the previous project. In the end, this leads to repeating errors made in the past. By the reduction of these errors, we can increase the efficiency of the organization and reduce the costs made during projects, which will inevitably lead to higher profit margins.

By solving the core problem, implementing the continuous improvement process, we can minimize overarching errors over the entire organization and create a higher revenue. Not only does this create higher sales revenues, but it also contributes to one of the strategic goal of the case company: becoming

a learning organization. They want to learn from learning instead of learning from doing. Their ambition is to create awareness of the benefits of becoming an effective learning organization and by implementing the improvement process, this ambition can be achieved accordingly.

While in the previous section the necessary monitoring processes are described, this section elaborates on the current monitoring system. There is a need to monitor cost price (improvement) and quality (improvement) within the case company to increase the feasibility of the core values stated in the previous section. By increasing standardization while enabling customization in construction projects, the strategic advantage the case company wishes to create is feasible. This means that previous, current, and future project are cost efficient, customer oriented and standardized. This results in a competitive and innovative place in the construction market for the case company. However, the current monitoring system is not matching the needs the case company has. In Table 5, the needs and demands can be seen with respect to the current situation.

Current situation	Required
Unclear lagging KPIs.	1. *Reliable and valid lagging & leading KPIs.*
Unclear leading KPIs.	
Review meetings lack non-financial KPIs.	2. *Reliable and valid non-financial KPIs.*
Lacking management system	3. *A clear and uniform management system that enables facilitates organizational learning.*
Personnel is skeptical towards implementing Lean culture.	4. *Personnel embraces lean culture within the organization.*

Table 5: the current monitoring system

3.4 Sampling and sample description

The case company has four different regions; each of them with their own profit and loss responsibilities as well as their own organizational structure. For this research, one of the regions will be analyzed. This region is Midden, where the origin of this assignment lays. The region will be analyzed on:

1. The maturity of the organizational structure with respect to the learning organization.
2. The maturity of the current culture of the organization with respect to the learning organization.
3. The maturity of their internal learning organization with respect to the overarching organization.
4. The maturity of the current evaluation process with respect to the learning organization.

Within the chosen region (Midden), five types of employees will be interviewed. In order to correctly analyze the status of the learning organization, the entire chain of the organization has to be identified and included. Therefore, the five types of interviewees will be:

1. Planner (preparation of a new project)
2. Executor (is implementing the new project)
3. Project Manager (is leading/managing the project)
4. Aftercare (is providing after service on the project)
5. Other employee (department should be different than departments 1 till 4)

In this region, one employee should be working in middle management. This is due to the fact that the case company addresses that middle management is the layer that is most affected with the possible changes of the learning organization and is therefore an important brick in the foundation of the implementation.

3.5 Data collection

There are three types of data that have been collected during this research. First of all, interviews have been conducted with employees which can be seen in Section 3.5.1. Additionally, data has been collected through analyzing papers and information provided by the case company internally. More on this can be seen in Section 3.5.2, where the methodology of this method will be explained. Lastly, data has been collected through field observations on-site which can be seen in Section 3.5.3. These three types of collected data will be used in later stages of this research to generate results and recommendations.

3.5.1 Interviews

The structure of the interviews can be seen in Appendix A . These interviews have been audio recorded and later transcribed for further analysis. The interviews took approximately 60 minutes per interview. Additionally, the interview did not last longer than 90 minutes per interviewee. Before conducting the interview, I had ensured a safe environment for the interviewee. The interviews had been conducted face to face and was done in an office based within the case company. An interview is a social interaction, and this meant that I had to facilitate an atmosphere that solicits active participation (Baumbusch, 2010). Due to the fact that some of the answers could contain sensible information, I had to ensure integrity during the interview while also respecting the dangerous position the interviewee could put himself in (Corbin & Morse, 2003). Therefore, I addressed that their answers were used anonymously. However, even when answers are regarded anonymous, there was still a chance that certain quotes could be recognized and linked to a certain interviewee (Larossa et al., 1981). These interviews had a semi-structured approach meaning there was a fixed structure of questions but based on their answers I asked different follow-up questions. The data generated from each interview provided insight in:

1. The maturity of the organizational structure with respect to the learning organization.
2. The maturity of the current culture of the organization with respect to the learning organization.
3. The maturity of their internal learning organization with respect to the overarching organization.
4. The maturity of the current evaluation process with respect to the learning organization.

Because the structured part of this interview was based on several academic sources, I limited myself for bias in the outcomes of their answers. I stayed open and objective throughout the entire interview and had to make sure that my follow-up questions were not too narrow-scoped which can cause bias. In total I will conducted twelve interviews. More information can be seen in Table 6.

Table 6: Types of interviews

Department	Number of interviews
Executor	3

Planner	3
Project Manager	2
Aftercare	2
Other	2
Total	12

3.5.2 Analyzing documents

For the second type of data collection of this research, I planned to analyze internally available documents. This is a systematic procedure for reviewing and analyzing documents (Bowen, 2009). This type of analysis requires data to be examined and determined to create meaning, purpose or understanding in order to create a theory and develop knowledge (Service, 2009).Documents provided a sign of change and development within an organization (Yin, 2009). This means that by analyzing the documents available at the case company, I was able to analyze their current state and development when it comes to the topics analyzed. For this type of analysis, I used the methodology described by Fereday et al (2006).

The process described in this study spoke of an approach, where the documents were coded and categorized similar to the process described in Section 3.5.1. Additionally, the (predefined) codes constructed in the coding of the interviews were applied for the used documents (Fereday et al., 2006). This meant that the used documents would be coded and analyzed in a similar way as done with the transcribed interviews and the results of these documents were also included in the data structure.

3.5.3 Field observation

Field observation can be done in two ways in research: structured and unstructured (Pretzlik U, 1994). In structured observations, research is done by analyzing a discrete activity on specific physical and verbal behavior. The observations done are predetermined based on known theory (Mulhall, 2003). This is not the case for my research, and therefore I made use of unstructured observations. These observations were made when I was on-site and when I identified certain aspects of the dimensions constructed as seen in Section 3.5.1 and 3.5.2. This generated the least amount of data (due to the fact that my time on-site was limited; I visited the location five times) and could not be used into the Data Structure Framework.

3.6 Data analysis

The methodology used is the method described by Corley and Goia in 2004 and later on improved in 2013. This method is an approach to qualitative research and theorizing the data generated from this qualitative research (Gioia et al., 2013). All the data analysis performed during this research was done according to the guidelines in this methodology and will be described in this section.

The underlying guiding research question was important for the interview. The research question must be well-specified rather general research question (Gioia et al., 2013). However, that was difficult. Defining the qualitative research was important but can also be challenging when defining this term clearly because it has no fixed methods or practices that shape this type of research (Denzin & Lincoln,

2011). Another study speaks of a good research question leads to a project that aims to generate new insights (Mattick et al., 2018). Concluding, the research question chosen for this research should be specific for the construction industry but should also propose a project that generates new insights within this field. The analysis started with using the transcribed interviews to create data for the 1st order analysis. In this phase, the relevant text fragments of the transcribed interviews were transformed in 1st order categories. Little attempt was done to create distilled categories, so in the end of this phase the number of categories was still large. Along the way, similarities and differences were observed in the 1st order categories that gradually were transformed to 2nd order categories. During the 2nd order phase, the research was transforming towards a theoretical realm, where emerging terms were suggesting concepts that shaped the underlying research results (Gioia et al., 2013). While performing this type of data analysis, the themes were constantly analyzed on further distilling and grouping similarities to create aggregate dimensions. When the full list of 1st order, 2nd order and aggregate dimensions were constructed, a data structure was developed.

After creating this data structure, dynamic relationships among the 2nd order concepts were identified in the data structure and used to transform this into a dynamic grounded data theory model and were used for generating results of this research.

4. Results

In total twelve interviews were conducted and yielded the following results. Along with the methodology based on Gioia et al. (2013) the relevant quotes were coded into first order concepts, second order themes and finally aggregate dimensions. The eight different aggregate dimensions are based on the findings in literature and the construction as well as further analysis on these dimensions can be seen later on in this chapter. In total 73 relevant quotes were used for coding during this process. Table 7 shows the different themes that have been identified in the coding process. In Appendix B several quotes can be found that have constructed to these first-order concepts.

Table 7: Data Structure based on Interviews

First-order codes	Second-order themes	Aggregate dimensions
Not certain where information is stored	Accessibility Knowledge	Gathering knowledge
Misses an online environment that has the good performance for their department		
New young employees do not have the needed knowledge		
Finding the right knowledge is a complex process		
Everything is focused on the HQ with regards to resources and manpower		
Wants to use filters for the Knowledge Center	Knowledge Center	
Essential documents are missing		
The PC system and Citrix is very slow		
Knowledge Center is (too) big and complex		
Finding the right data should be more user-friendly		
You have to be assertive to get the knowledge	Personal Characteristics	Sharing knowledge
There are not enough guidelines for working	Sharing Knowledge	
There is no fixed system for knowledge		
Files are often stored locally on a disk		
The way of working is not clear regarding knowledge sharing		
The needed knowledge is not at a fixed place	Applying Knowledge	Applying knowledge
Knowledge is not available		
The knowledge lays by people, not stored in systems		
Knowledge/experience is used in decision-making	Decision-making	
The improvements addressed are not receiving a follow-up	Improvements Disregarded	
Finds it frustrating that addressed improvements are ignored		
Top management has not made decisions regarding guidelines for working	Guideline for Applying Knowledge	
Other methods are used by employees for applying knowledge		

Is not sure about the official method for knowledge sharing/storing	Standardization	Applying knowledge
The case company treats its employees good	Employee wellbeing	Micro System Activator
Showing interest in employees could improve	Employee Involvement	
Craftsmen notice that their suggestions for improvements are not being taken seriously.		
Employees will not give input for improvements if they are ignored		
Has enough time for the work	Workload	
Has no time left for secondary tasks that increase the efficiency of the work		
There is more and more work to be done in less time over the years		
Wants more time for understanding new software		
Feedback to coworkers is given	Feedback	Micro System Motivator
The year-end evaluation is no longer of this time		
Want a more positive approach for giving feedback		
Positive feedback is limited		
New innovations with safety are disregarded due to the additional costs	Innovations	
The composition of a new team is not well executed	Team Composition	
Sit downs are done only when problems occur		
Never works with the same team twice which results in startup periods for every project		
Does not know to grow within the case company	Career	Macro System Activator
Early involvement with other departments is good	Collaboration	
Receives help from all different departments		
Thinks there is a good collaboration within the case company		
Believes new guidelines receive more support if they are communicated better and with more explanation		
Not having the right people on location is a disadvantage of a decentralized organization	Decentralized Organization	
Wants a more directive organization	Results of observed Leadership	
Frameworks are not clear for everyone		
New innovations are rarely started up		
Decisions by top management are sometimes difficult to understand		
Steering lacks in maintaining the standards.		
Certain frameworks are not fully supported but have to be used		

Standardization should be increased	Standardization	Macro System Activator
The standards should be better known and workable.	Standardization	
Wants to work more through standards		
Collective team goals are known	Team Goals	Macro System Motivator
Is not sure if the team goals are collectively shared		
Too little data is used	Data Integration	Evaluation
No dashboard is used		
Does not know why using data in monitoring has stopped		
Would like extra insight in planning		
Only the projects with below average results are evaluated	Evaluation	
Points for improvement are not taken on to the next project		
Has no time to evaluate the work		
Evaluation and feedback from the work floor is poorly organized		
Does not believe findings from evaluations are used in future projects		
Wants craftsmen present during evaluation		
Wants a broader evaluation approach		
Does not know how to benchmark projects properly		
There is no fixed format for standardization	Evaluation Format	
A specific format should be made available		

Alongside with the literature study performed in Chapter 2, different phases of transforming towards a learning organization were identified. In the following sections, each of these phases will be analyzed based on the data generated from the conducted interviews.

4.1 Gathering Knowledge

The case company has an online environment built for all the knowledge available within the organization. This environment should be the main source of all the knowledge used by all the different departments. During the course of these interviews, several perspectives were given on the accessibility of knowledge. *"The knowledge lies somewhere in a system, but exactly where I have no idea. There is no getting started; there are pieces in it that are five years out of date (IV1)."* Another interviewee adds: *"No, we have no agreements about it. We miss that at X. Of course, we have a knowledge center but that is a huge puzzle, and we actually miss an environment that is really for our department (IV5)."* Another respondent speaks about the Knowledge Center*: "Knowledge center has many things; sometimes it is untraceable but there are a lot of things on it (IV8)."*

About the allocation of resources within the region, an interviewee explains: *"What I do find is that what I need is very focused on the head office. All facets you need are all in X and are not available at our location. We have assigned people, but they are all in X. I sometimes regret that they are not in our*

building (IV2)." Meaning that the allocation of resources within the region is not evenly balanced according to this source. On the way how to obtain certain knowledge, a respondent says: *"If you do not have certain knowledge, it is also a quest. You have to be assertive here (IV12)."* Another respondent adds: *"The employees are young, so the knowledge is not there. It can be very difficult for them, while my own knowledge is based on my own experience, so they do not have that (IV9)."* Meaning that for new and/or young employees, obtaining the right knowledge can be a challenge.

The accessibility of the knowledge is also closely correlated to the quality of the infrastructure; *"In terms of resources, my computer system is really insanely slow right now and that's our tool that we have to work with. Citrix (the software used for working from home) is very slow (IV3)."* Another respondent adds: *"For example, if you entered "underwater concrete" within the Knowledge Center and you get all the data of the projects that have been done with underwater concrete it would save a lot of time and effort. There isn't at the moment (IV1)*".

On the functionalities of the Knowledge Center, a respondent says: *"We are missing documents in which knowledge and experience has been put in, which is in line with the current work and can help us (IV3)."* Another interviewee adds: *"It would be nice if you could throw a kind of shell over the knowledge center for each department to filter out relevant documents (IV8)."* Meaning that this interviewee wants the functionality of applying filters within the current system. Additionally, I have made some observations regarding the topic of the Knowledge Center. When hearing these types of improvements, I became curious of the system. The Knowledge Center can be used for locating certain documents and finding knowledge. However, the search query by the user should be a 100% match with the name of the file this user is seeking. When the official name is different than the name which is used on the work floor (due to different spelling or in different procedures used by different regions), the user cannot find the document. The filters that can be applied to the knowledge center are not adequate enough for different departments to find the documents they need. This has resulted in departments developing their own knowledge systems such as Sharepoint or even in worse cases: storing relevant documents locally and only accessible for themselves. Several interviewees expressed the fact that they have a desire for a system that is tailored to their department and/or expertise.

I performed additional research on-site regarding the Knowledge Center and the current state of standardization. Ironically, there was not much to be found that could have any value for this research. However, by stating that the documents were not available on the platform, it provides insight into the current state of the organization regarding their ability and vision towards transforming towards a learning organization. While the documents were not available on the main platform, during the interviews, I have received one document that is worth mentioning. This document is a LEAN handbook and how to implement this philosophy during construction projects. It provides clear instructions for each phase of a project and contributes to better standardization across projects. However, when speaking of this document to other respondents, 10/12 respondents were not aware of this document. The construction of this document and the implementation has been a big financial investment due to the accompanied training days that were allocated to the employees.

4.2 Sharing Knowledge

On the guidelines and rules regarding sharing knowledge, an interviewee says: *"It's not clear to anyone. If you don't open your mouth and ask questions, you have to do your own thing (IV7)."* Additionally, another respondent adds: *"I have experienced that if you don't get out of your chair yourself, you make it difficult for yourself. We have the buddy system (new employees are matched to an experienced employee where they can ask questions), but in the end it's about how you handle it yourself. Take your chances (IV12)."* Another interviewee is aware of the current guidelines on storing and sharing knowledge but speaks of how this occurs in practice: *"…but what you often notice is that knowledge is stored in a personal folder somewhere on a local disk (IV4)."* Another respondent added the local storing of important files*; "There is also room to do that and that is quite a problem within X because there are few guidelines (IV7)."* Other a respondent adds: *"No choice has been made how it (documenting and applying knowledge) should be done so that is not present at the moment (IV7)."*

Additionally, an interviewee says: *"The official line is the use of the knowledge center as head of the parent files of X. The practice is unruly and there are several projects that are running in other ways such as SharePoint which causes a huge clouding within X in different ways. The managers of information themselves often do not know what the intention is (IV12)."* On what the current guideline is, a respondent says: *"I think it's the default Sharepoint; the new method. Apparently not everyone does that (IV10)".*

Additionally, I noticed that several employees were not fully aware of the functionalities of Sharepoint and Microsoft Teams. The way their online environment had been developed is not suitable for their day-to-day use which causes the sentiment to turn negative regarding Microsoft Teams and Sharepoint. *"If I have to put all separate files on Sharepoint, it will become one big mess, so I don't do that. Final documents must be on SharePoint in any case (IV8)."* The fact that it will become a big mess because it has to be uploaded to Sharepoint, is for me a sign that the knowledge on the functionalities of this system is not adequate (enough) within this department. The system used for working away from office, Citrix, has indeed lag issues with performance. This may result in loading times of over ten seconds for opening a webpage which does not contribute to efficient working.

4.3 Applying Knowledge

On applying knowledge within the organization, a respondent says: "That knowledge is not really available within X itself (IV1)." Meaning that there is no knowledge to be shared because it is not there. Another respondent adds another perspective on applying knowledge: *"The knowledge is with the colleagues, but it is not in a certain fixed place (IV7)."* Another interviewee adds: *"If you take the initiative yourself, they (employees with knowledge) are very willing. The knowledge is really with the people; it is not available within the system (IV12)."* Meaning that the knowledge is not stored within the organization but stored within specific individuals in the organization.

On the way knowledge is integrated within decision-making, an interviewee says: *"Based on my experience and that of my colleagues, our knowledge is certainly used in making decisions (IV4)."* Meaning that their knowledge is used in decision-making. On addressed improvements and the follow-up of this input, a respondent says: *"We also have an improvement monitor (improvements can be*

addressed by employees and these inputs are used in a meeting during the evaluation period and mapped in the "improved monitor"), but it doesn't work either. You bring in certain points for improvement, which will then appear in the improvement monitor because we want to apply that; but you see that it is watering down. It is very demotivating if you introduce improvements that you agree on as a team, but then you notice that they are not being used, budgeted, or not treated at all. That is very frustrating (IV5)."

4.4 Micro System Activator

When speaking of the allocation of resources during work, an interviewee says: "I think X is very good for me so to speak and I think that X is very good for its employees when you see what resources we have at our disposal and what is being arranged and organized. Not even materially, but also socially and developmentally, I think X is doing very well (IV2)."

On employee involvement, a respondent says: *"You have to show interest in your employees and in my opinion that happens too little (IV4)."* Another respondent adds: *"New ideas often just don't get a follow-up. You want to get better together, and you notice on the construction site with the craftsmen that they also notice that their suggestions for improvement are not being taken seriously (IV6)."* Additionally: *"There is nothing more frustrating for an employee that a few years later you run into the same points again during a project because nothing has been done with your improvement. Then you will no longer receive input for improvement from your employees, which they experience is of no use (IV6)."*

On the topic of workload, a respondent says: *"I think I am very good at the work I do, and I have enough time for that (IV9)."* Another respondent adds: *"The workload is quite high. We need more time to take the steps we want to take. You are finishing one task, but you should actually spend a large part of your time organizing and other secondary tasks and now there is too little time for that (IV10)."* On increasing workload, another respondent says: *"We are actually getting more and more work. We now have to do additional things with the same time. That is sometimes difficult (IV5)."* On new software solutions: *"The thing is, I sometimes have trouble with new software solutions. I'm a bit older and I get an hour of explanation and that's what I have to do. That is difficult for me to master the program (IV5)."*

4.5 Micro System Motivator

On giving feedback a respondent says: *"I give feedback to my colleagues (IV11)."* Another respondent adds: *"There are multiple approaches to giving feedback when you mean the same thing and that is much more motivating (IV6)."* Additionally: *"I think you don't get enough formal feedback that you're doing your job well. There is never really any feedback (IV11)."* On the yearly evaluation, a respondent says: *"I think the year-end conversation is no longer of this time because it is often much too late (IV4)."* Regarding new innovations, an interviewee says: *"Although I do think that in the field of safety and improvements, it is sometimes slowed down because it costs more. Investments must also be made for your appearance and for increasing your safety on the construction site and if you want to take steps (IV6)."* Meaning that investments are lacking regarding new innovations.
On the team composition within a project, a respondents says: *"The fact that a composition of a team is here completely randomly thrown together, while we know from evaluations that a good team goes like*

clockwork and a bad team doesn't strike me as strange (IV11).” Another source adds: *“The only problem is that I never work with the same team. You understand each other, you understand each other, and you can go through the processes much better together. As soon as a new project starts, you have all kinds of new people at the table, and it starts all over again (IV5).”*
On how a team operates within a project, a respondent says: *We sit down together when a problem arises to find a new solution (IV1).”*. Another source adds to this: *“We have common goals and those are shared within the team as well. Everyone is behind that (IV9).”*

Concluding, the way feedback is communicated is not received positively according to several respondents. The current evaluation method can improve as well as the team composition with a new project. New innovations that require investments are turned down, according to a respondent, purely based on financial reasons not weighing in the potential benefits. The team goals are known and shared throughout the teams; respondents say.

4.6 Macro System Activator

On growing within the organization, a respondent says: ***“****I sometimes thought I would like to do another course within X, but I would not know what else I could do here within X actually (IV10).”* Within the topic of collaboration within the project-team, respondents say: *“Being involved in the project a month in advance is very pleasant to work with (IV4).”* Another source adds: *“I am helped on all sides, which is really great (IV2).” Additionally: “But in general, everything goes in good consultation! We can't complain within X (IV5).”* Along this line, another interviewee says: *“The standards are generally communicated while you will have more support if you explain why or give more explanation. That explanation is often missing (IV6).”*

Regarding the way a decentralized organization works regarding communication, a respondent says: *“Nationally, something is determined, but each region throws its own vision over it, so that each region determines its own standard on the national standard. It doesn't get any clearer that way (IV3).”* On leadership from management. A respondent says: *“We could be a little more directive. We have to make certain choices and implement them (IV3).”* Similarly: *“It is nice to have frameworks, but if those frameworks are not clear to everyone, it becomes difficult to work (IV7).”* Alongside these statements, this source adds: *“X sets out a certain course and then after that looks whether that was the right course. That is sometimes difficult and that can clash (IV7).”* Additionally: *“Steering lacks in maintaining the standards (IV4).”* On the choice of certain frameworks, a respondent says: *“There are certain frameworks from a client that you may not agree with, but you don't really have a choice. Whoever pays decides (IV7).”* Lastly, on introducing new innovations: *“The innovations are difficult to achieve; meaning that it is listened to and noted and not forgotten. To really get started with it… we find that very difficult (IV3).”*
On standardization within the organization, an interviewee says: *“It should be a bit more standardized because that makes it clearer and easier for everyone (IV7).”* In addition, another respondent says: *“The standards should be better known and workable (IV1).”* Another perspective on this is given by another respondent: *“I would actually work a bit more according to standards (IV12).”*

Concluding, respondents speak positively about the work environment, while there is also room for improvement. The decentralized approach undermines standardization as of now while the board could be more directive in maintaining the standards, respondents say. Additionally, respondents speak out their need for the right frameworks that can improve their work.

4.7 Macro System Motivator

On shared team goals within the organization, a respondent says: *"Together we know where we stand and where we want to go (IV10)."* Another source adds: *"There are goals, whether they are completely shared I don't know (IV1)."*

4.8 Evaluation

Data integration is a key concept of transforming towards a learning organization. Having the right knowledge available and accessible at a given point in time is how the desired state should look like. This also includes the data available of a performed project, which can be used in the future. Learning by doing, so to say. This means that for evaluating projects, data should be used. Speaking on this topic, an interviewee says: *"Too little data is used in my opinion (IV7)."* Another source adds: *"I think there will be dashboard in the follow-up phase but in my own work that is not done no. We started with it once, but it is actually no longer used (IV1)."* And adds: *"We started keeping track of per phase whether the planning was successful per phase, but I don't really know why it stopped (IV1)."* While another source speaks of an improvement to the current system: *"I would only like to have insight into planning, yes, that could be done with the help of data (IV2)."*

Within the topic of evaluation, there are several insights and perspectives. An interviewee speaks about this: *"Projects are actually only treated if things have gone badly; why did it go bad etc. Not really clearly documented (IV2)."* Similarly, another source adds: *"I think that's a weakness of ours, because at the end of the project, points for improvement are not always taken on to the next project (IV4)."*
Additionally: *"What I think is that it is very good that we are doing it (evaluating), but something needs to be done about it. I don't think the findings will be used in future projects (IV5)." Furthermore, another source says: "What I think is the learning curve is that if things are done outside that we didn't think of well with respect to the planning, these insights should actually be fed back to the front. That evaluation and those feedbacks are poorly organized with us (IV2)."*

On the topic of the type of the evaluation, a respondent says: *"I wonder whether it is not wise to take a broader approach to project evaluations than just the team (IV11)."* While another source adds: *"A lot of things can't be compared at all in terms of projects, so I don't really know how you should benchmark that (IV3)."*

On the contrary, another source says: *"No not really no. We are catching up, but we don't have time to look back on work yet (IV10)."* Meaning that they do not have time to evaluate at all. Another source adds to this: *"I do not have a fixed evaluation moment for a project that I have completed. I would like that. Now you often see that during the evaluations the professionals are missing because they are often on another project (IV6)."* On the format of the evaluations, a respondent says: *"Apart from phase reports, there is no fixed format for the other evaluations (IV1)."* And another source adds: *"It would be useful if there is a specific format available for this (IV4)."*

Concluding this section, the need for more and better evaluation methods is shared by several respondents. Improvements identified during the evaluations are not always correctly implemented into future projects and only the projects with a below-average performance are evaluated, which is not an ideal situation according to respondents.

5. Discussion and Conclusion

The research aimed to answer the following research question: "*How can a learning organization be established in a project based, decentralized construction company?"*

Where the definition and the aim of a learning organization have been researched and the different phases of transforming towards a learning organization have been identified with the use of literature. For each of these phases, different requirements, and objectives where constructed and different aspects of a learning organization have been identified. A successful learning organization is aware of the knowledge gaps within their organization, and has a desired state constructed in collaboration with employees that are working towards that desired state. Within the organization, new shared understandings are created within the boundaries of the allocated resources, organizational units, and individuals. Furthermore, the way knowledge is stored, used, and learned is a collective organizational value and is known the all the employees. The knowledge available within the organization is used in present and future decision-making, while the employees share implicit knowledge.

With the use of literature, the desired environment for a learning organization has been constructed. The leadership should enable positive psychological capacities and create an underlying positive ethical climate. Next to the leadership, the psychological environment of a learning organization should reflect a safe and positive space where there is a desire to grow, learn and/or advance with visible audits and feedback. Furthermore, the error-management mindset should be about embracing that errors are not bad but should be used to learn and the focus should put on mitigating the negative error consequences.

The unique aspects of the construction industry, such as the tendency to subcontract work (Yu et al., 2007), the number of technologies and interdependences or the overlap of stages of construction (Dubois & Gadde, 2002) making the transformation towards a learning organization more complex.

During this research, I have gained knowledge about what a project-based organization is and what bottlenecks can arise in such an organization based on literature. What stood out the most, when comparing literature with the reality, is that a decentralized organization such as the case company is not operating effectively. This can be seen in the different amounts of (improvised) methods for knowledge sharing; different departments have improvised their own way of sharing and documenting knowledge. This has led to a lack of harmonization across the different regions, branches and even departments within the case company when it comes to maintaining guidelines and protocols. This can lead to dangerous situations such as data leaks, data integrity problems and the unavailability of the right data needed for a (future) project. Additionally, operating as a decentralized organization should not implicate that all the different regions operate with separate guidelines, rules, and protocols. Instead, a company should benefit from advantages of being decentralized organization. For example, successful decentralization leads to higher levels of team empowerment. This higher level of team empowerment will result in higher team performance (Hempel et al., 2012). The contrary has occurred within the case company. A practical example within the case company to illustrate this is career growth. In their current situation, career growth is only possible if the employee is operating in a certain region where the preferred function exists. If the preferred function is not existing in the specific region, career growth in that direction is not possible for the employee operating in that region.

Another practical example within the case company concerns the mentality of experienced employees. They have accepted that finding the right knowledge within the company is usually a long, inefficient process that is often unsuccessful. The amount of consequent lost energy and time could instead be used for meaningful work by those employees, which creates an improvement potential for the case company. The fact that these experienced employees have accepted this and believe it is part of their job is striking. Due to the quick changing nature of a project-based organization and the urgency for finishing current and new deadlines, no time is taken to evaluate these kinds of mismatches between the desired state and the reality.

5.1 Phases of transforming towards a Learning Organization

By analyzing the host organization on the above-mentioned aspects there is still a lot to be done to successfully transform towards a learning organization. For example, the foundation of a learning organization, namely being aware of the knowledge gaps within the organization, is not adequate at this point. Employees have great difficulties finding what they need, and most of them have improvised approaches to seeking the knowledge they need instead of using the methods and tools provided by their employer.

Additionally, most of the organizational knowledge is not stored within the organization but lays with people according to the interviews. Most of the knowledge is not documented organizational-wide but locally or even worse, not at all. This means that if an experienced employee were to leave, their knowledge is lost and cannot be retrieved. Furthermore, knowledge gaps have not been identified because certain departments are not actively stimulated to map their knowledge. Without having the knowledge accessible within the organization, it can never develop that certain knowledge. In other words. knowledge is not just a resource, but it can help an organization to develop resources further on (Haider, 2003). This study elaborates on the topic of knowledge gaps and argues that an organization has a better chance of survival and growth when it has the ability to identify and fill the knowledge gaps.

The second phase, where a desired state is collectively constructed with the employees, has to improve as well before it has been successfully implemented. While certain employees do know about what they seek from their job personally, collectively it is not known and leaves room for improvement. Shared team goals are more an exception than an organizational value at this point in time. Team performance along other team aspects such as morale is positively linked to having shared team goals (McComb & Green, 1999).

The third phase of transforming towards a learning organization, where the guidelines regarding knowledge storing, sharing, and applying are known, has to improve before this phase has been successfully implemented. For example, several employees are not aware of guidelines regarding these topics and have taken measures into their own hands. This has resulted in different methods within every region and even within every department and does not contribute to a shared organizational value. Guidelines are often unknown, or the chosen guidelines have a negative sentiment along the employees and are neglected without consequences from management. This has resulted in a shattered landscape of protocols and procedures regarding knowledge sharing, documenting, and applying throughout the organization. Increased standardization however may lead to reduced time needed for a

project, reduced costs, improved quality, and improved customer satisfaction (Münstermann & Weitzel, 2008).

However, knowledge is collectively used in decision-making, which sums up the fourth phase of transforming towards a learning organization. New methods are embraced, and new ideas are stimulated within project-teams throughout the organization, which is a positive finding of this research. Using data within decision-making is a key factor to succeed in an industry where there is a lot of information and knowledge available (Jato-Espino et al., 2014). This study speaks of the opportunities data gives a construction organization due to the nature of a construction process. For example, a "general" construction process has multiple tasks, processes and requirements involving a great variety of variables associated with these processes.

5.2 Enablers of a Learning Organization

The first enabler is leadership. Leadership should enable positive psychological capacities and create an underlying positive ethical climate. According to the results of Chapter 4, leadership is currently not enabling these capacities. Several respondents spoke of a lack in directiveness and steering and are seeking more guidelines and frameworks for their day-to-day work. This gives employees the proper tools to do their job correctly (MÍkva et al., 2016). Additionally, employees are seeking more communication when it comes to leadership. Why are certain decisions made and how to correctly implement this? Certain decisions are experienced to be without adequate argumentation which result in a negative sentiment towards this decision. Employees are then never able to fully embrace this decision (Fernandez, 2008).

The second enabler is the psychological environment created by the organization. This should lead to an overall desire to grow and learn with visible audits and feedback. While the desire to learn is collectively present within the different departments, the desire to grow is not present in all departments. Several respondents do not know how to grow within their department or are unhappy about the potential they have growing within their department. Additionally, giving and receiving feedback is not sufficiently done. Several respondents only have two times in a year where they receive feedback on their performance while these two feedback moments are mostly correlated to their team performance, and not their individual performance. Furthermore, the way feedback is given received critical comments by several respondents. The feedback is focused on the negative side of the work, while positive aspects are not mentioned in the given feedback. By only receiving negative feedback, commitment of an employee is likely to decrease over time (Belschak & den Hartog, 2009).

The last enabler of a learning organization, the error-management mentality, has several points of improvement. In a perfect learning organization, making errors is not bad but these errors should lead towards an improved performance in future projects. Respondents spoke of certain errors that are being made, reported as an improvement, but neglected in future projects. Next to the high costs of making the same error over and over, employees are becoming demotivated because they feel not listened to from management (Baehr & Renck, 1958). Additionally, employees that receive no follow-up on their addressed concerns are more likely to not speak-up a next time. This means that in future projects,

problems that may arise are not addressed anymore and that can result in dangerous situations and/or lower morale along the employees (Richardson & Taylor, 2012).

5.3 Project-based Construction Industry

Working in a project-based construction industry brings logical challenges when looking at the core values of a learning organization and its effective implementation. For example, one of the unique values of the construction industry is its ability to subcontract many of the work to external parties (Yu et al., 2007). This means that for introducing standardization (meaning: doing the same thing over and over and getting better at it) is a complex challenge due to the changing subcontractors and its employees.

Additionally, in companies similar to the case company, working with the same team could improve performance. This means that team composition should not be done completely random, but several improvements could be made in this process. For example, higher levels of team diversity within a project result in increased motivation and satisfaction and will lead to better quality team output (Thomas, 2000). Additionally, this study states that non-diverse teams have to adapt to each other and feel restricted in contribution which could eventually lead to a lower motivation. In other words, team-composition has a direct influence on the team output.

Furthermore, construction companies tend to focus on short-term success only when looking at (continuous) improvement, while long-term successes such as direction, good planning, good sequencing are neglected (Sundar et al., 2014). The urge for insight in planning with the help of data can benefit performance. The use of good data is necessary to create this insight. The likelihood of a project successfully reaching its financial goals increases as the level of data and pre-project planning is integrated (R Hamilton & Gibson Jr, 1996). This study speaks of using data in pre-project planning and benchmarking those projects for increased project performance.

Lastly, increasing the awareness of adopting standardization within the construction industry is needed to increase construction efficiency. By doing so, it will result most likely in decrease potential conflict with key stakeholders (Akbar et al., 2015) meaning the (overhead) costs could potentially decrease over time.

5.4 Theoretical Implications

The main goal of this research is to identify how to establish a learning organization in a decentralized, project-based industry. The results of Chapter 4 and the findings from the previous sections will be used to answer this research question. The unique scope of this research, a conservative industry in combination with an innovative transformation, allows me to contribute to existing theories while proposing new insights and proposing areas for further research.

5.4.1 Enablers for Transforming Towards a Learning Organization Within the Construction Industry

For an organization active in the construction industry, there are several enablers identified within this research. These enablers are based on the findings within literature and the results of the analysis conducted. Each of these aspects help with transforming towards a learning organization within a

project-based, decentralized organization such as the case company. When looking at the different aspects of the enablers below, there is a clear correlation with the findings from literature as stated in Chapter 2. The interviews provided a different perspective on these aspects, where respondents spoke out openly about their views which resulted in one additional enabler, namely enabler six. This enabler was not present in such detail in literature, whereas during the interviews it became clear that employees have the wish to receive and use the right data method to integrate data in (pre-project) planning and benchmarking/evaluating.

1: The ability to identify and fill of knowledge gaps.
2: The construction of shared team goals
3: The ability of giving and receiving feedback
4: The error-management mentality
5: Team composition
6: Using data in pre-project planning and benchmarking
7: Adaptation of standardization

1: Within the first phase of transforming towards a learning organization, the knowledge identification phase, the main goal is to map all the knowledge present in the organization. Within literature, different perspectives on this phase are presented, but the goal remains similar. Sharing knowledge, interconnecting between departments, and working together on improving instead of individually (Dovey, 1997; Huang & Shih, 2011; Marsick & Watkins, 2003). An organization's probability of growth and survival is determined by its ability to identify and fill in knowledge gaps (Haider, 2003). For an organization active in the construction industry, the ability of identifying and filling in knowledge gaps can be the difference between a safe work environment and a dangerous environment.

2: As seen in literature, the construction of shared team goals is important for different reasons. Organizational commitment is dependent on a strong belief and acceptance of the organization's goals and values (Mowday et al., 1979) as it can be seen as an active relationship with the organization instead of passive loyalty (Bligh et al., 2006). This means that to create an active relationship with employees, these employees should contribute to the organization's values and beliefs.

3: Within a learning organization, the way to move forward is by learning from past mistakes and improving them. This can only be done if constructively feedback is given and received. Both positive as well as negative feedback should be given. Feedback is all about bridging the gap between desired and actual performance (Boud, 2015). Repeat mistakes within projects can only be minimized if they are openly known within the organization and its employees. This study speaks of the need for a dialogue with effective learning. Therefore, for a construction organization, feedback and evaluation moments should be facilitated by management in order to create that dialogue. One of the findings of the interviews is that due to the hectic overlap of different phases within the construction industry, a next project can be started while the previous project is not finished yet. This can lead to neglecting evaluation due to time allocation and should therefore be facilitated by management to "enforce" a good evaluation possibility.

4: The way an organization deals with made errors determines its ability to grow and develop their learning organization (Haider, 2003). Errors can be made, but they have to be seen as the input for improvement. Therefore, it is important that these errors are addressed, evaluated and improvements should be implemented. Furthermore, input by employees on potential improvements should be taken seriously and integrated within the guidelines. Bringing in improvements should receive positive feedback, not negative.

5: A good-functioning team tends to have a diverse composition. A multitude of demographic and non-demographic differences should seriously be considered by management when constructing teams to maximize its performance (Yeager & Nafukho, 2012). When looking at CP1, where then knowledge is mapped and known to the entire organization, a similar process should be performed with constructing a team. By mapping personal characteristics that can influence the performance of a project and matching team members based on these characteristics, the probability of a successful project and the overall performance of the team could increase (van Knippenberg et al., 2013).

6: The use of good data for monitoring and improving performance is important. It is a good management tool that could create insight in ongoing projects and could identify potential successes and constraints during the project (Douvere F & Ehler CN, 2011). For project-based teams, the biggest influence that data can make is on the aspect of planning. Generating and analyzing the right data for planning and benchmarking project should have a high priority, while continuously the results of this data can be used to improve the planning.

7: Within a learning organization, adaption of standardization is one of the main core values. This also means that for transforming towards a learning organization, guidelines should be known and accessible throughout the organization. This closely correlates with CP1, where knowledge gaps are identified and filled based on the mapped knowledge. Guidelines regarding the day-to-day work or how to document, share, and apply knowledge should be a collective organizational value.

5.5 Practical Implications and Recommendations

Next to the theoretical implications, this research also results in practical implications. The importance of efficiency and cost-effective working should be self-explanatory within project-based working. However, due to the nature of such a construction project, allocating resources such as time or budget to secondary activities such as evaluating or creating knowledge platform(s) tend to be discarded. This is a logical result of the way this industry works. Phases need to be finished before a certain deadline, and that has the highest priority. However, this research shows the potential benefits confirming to the learning organization mentality, such as maximizing performance and increasing customer satisfaction.

Through the conducted interviews, it has become clear that employees are embracing certain aspects of this mentality but feel that the current level of the organization is not good enough to apply the principles of the learning organization optimally. There is a gap between management and the region, whereas there is a clear wish for a more directive approach on certain core aspects of the learning organization.

This research has shown that the performance of the current knowledge platform is not sufficient and results in different methods used by different departments. The sought knowledge by an employee is not accessible right now, due to the fact that the limitations of the current system are decreasing the practical use of the system. Searching for a keyword should return all projects with specifications containing that keyword. As of now, this only works if the search query used is 100% similar to the document name. Within several departments, this adds time to preparing and executing tasks. Additionally, this research has shown that the guidelines regarding knowledge sharing, documenting, and applying are unknown to most of the departments. Important documents that should be accessible by different employees are still stored locally and creates knowledge gaps within the organization.

Another practical contribution this research has made is the importance of constructing shared team goals. Currently, several departments do not have shared team goals while this research has shown that this can lead to higher team morale, employee commitment and overall team performance. Additionally, this research has created insights in potential benefits of more detailed team composition. A team that is diverse and has different knowledge areas tend to deliver better performance. Different respondents showed their negative sentiment regarding the current team composition, where they feel that the only thing what matters within team composition is the financial results.

Within the knowledge sharing and applying area, understanding the benefits of a new technology is important to create employee commitment. However, this research has shown that respondents feel that new technologies are often introduced without probable cause and are enforced instead of proposed which result into negative morale. Furthermore, some new technologies require more explanation time (such as software solutions that require time to get used to is) to be successfully implemented within the organization.

Another practical implication this research has shown is that within a construction organization, different departments work parallel on the same project which can result in systematic misunderstandings. For example, the project planning department is rarely communicating with the aftercare department, while their performance is interconnected. This research has shown that while the core process of a construction company seems linear and chronological, the complex nature of a project-based workflow can result in negative consequences when not being actively monitored. For example, facilitating structural evaluation moments with all the interlinked departments could contribute to better communication and performance between the different departments. Additionally, involving all the departments within the project planning phase could further increase the organization's ability to develop and grow over time in performance and efficiency.

Another important practical contribution this research has shown with respect to the construction industry is the current state of evaluation. The construction industry is committed to finishing project after project with the highest quality, lowest time, and the lowest costs. This results in only evaluating projects that affects one of these three values, resulting in only (potentially) evaluating negative projects. By also evaluating well executed projects, new ideas and concepts can be learned and can be used in future projects. Furthermore, allowing employees to address and propose improvements is improving an organization's ability to develop within the boundaries of a learning organization. By not listening to your employees, the morale and commitment is decreasing among the employees.

The last part of this recommendations section is dedicated to improving the current level of decentralization. All the practical implications stated above are more or less a result of a lack in standardization across all the four regions and their branches. This means that for the most effective approach, the case company should consider splitting up each of the four regions into their own company with their own standardization. I have not researched the other three regions, but the sentiment towards the (lack of) standardization may implicate that other regions are performing in a similar fashion. It must be said that the employees of the researched region are satisfied with their employer but have good improvements to the current system that are being neglected. The case company should consider putting more power and autonomy to each region, potentially resulting in higher efficiency and performance. In other words, the case company could facilitate the development of independent concept plans where the input of working groups faces sufficient support.

5.6 Limitations and Future Research

Next to the additions to existing literature and theory, this research also has its limitations and provides opportunities for new research. The first limitation is that while this research is meant for all organizations active in the construction industry, the scope of the data generation is only for one construction organization. This means that the results of the interviews and other data generation methods could include bias and result in a subjective representability for the construction organization. Adding to this, negative or positive sentiment towards certain aspects of this organization can include a certain bias as well and may not be representative to the entire industry.

Another limitation of this research is the fact that all my data comes from one specific region within the decentralized organization. This is due to time limitations as well as the added complexity that is not in the scope of this research. The presented results and propositions are likely to be tailored for the other regions as well but that is to be analyzed in further research (either by the organization itself or other researchers).

Another limitation of this research is concerned with the findings about team composition. The different sources that have been used to create insights state that their results could be prematurely based on the lack of evidence. While most research suggest improvement in team morale, commitment, and overall performance can benefit from detailed team composition techniques, the limited amount of research done on this topic could mean that these results are not applicable.

However, what does remain next to this limitation is that the current team composition of the case company is done completely random. It is therefore highly likely that by introducing any sort of method or theory of compositing project teams, these teams would benefit from it. It should therefore be stated that while the results of more detailed team composition could be prematurely, the current state of the team composition leaves room for improvement. The results from the interviews also show similar results, where several respondent speak negatively about the current situation.

Several aspects deserve more attention in the (near) future and could create even more insights in performance within the construction industry. The mentioned constraints that occur when looking at the learning organization theory in combination with the construction industry create opportunities for

further research. For example, the area of team composition is highly interesting due to the limited research available and the potential benefits it could give regarding morale and performance. This is also stated as a limitation, but it could also be seen as an area of future research. The performance of a team is directly linked to the performance of a project. Being able to steer the performance of a team is very important and should be considered in future research.

Furthermore, the area of this research is based on a decentralized organization, but the scope was set on one of the regions within this decentralized region. Analyzing the different regions and its interconnectivity within these regions should create another potential new insight and contribution to existing theory.

5.7 Conclusion

The purpose of this research was to create insight in how a learning organization can best be established for an organization active in the construction industry. Due to the conservative and project-based nature of the construction industry, not many similar approaches to this combination of topics are known. This is why I choose to base the data mainly on the interviews in a qualitative research approach. I performed an extensive literature study on the topic of the learning organization to create insight in each of the aspects of this and proposed a method to integrate the ideology within the construction industry.

This resulted in the identification of the most important phases of transforming towards a learning organization based on different perspectives and for each of these phases corresponding objectives and requirements were constructed. Additionally, activities that are linked to each phase were constructed during this part of my research which resulted in a clear overview of objectives, requirements and activities needed to move on to the next phase of transforming towards a learning organization. This also resulted in an increased awareness on the importance of employees' commitment to the idea, where the construction of shared beliefs, goals and organizational values was identified as an important pillar of transformation towards a learning organization. Furthermore, the interviews showed that there is still a lot of room for improvement for the case company in the coming periods for successful implementation.

The need and importance for standardization is what strikes out the most. Currently this is not adequate on different aspects of the organization, which results in a decrease in important factors of an organization such as team morale, employee commitment, the level of knowledge within the organization and even overall performance. Within a construction organization, transforming towards a learning organization clearly has benefits. Due to the complex structure of a construction company, it can be a challenge to successfully establish a learning organization across all departments and aspects of the organization. This could mean that concessions may have to be done on selecting which phases of transforming towards a learning organization will benefit the organization's health and performance the most.

Furthermore, this research adds to the existing theory of a learning organization and provides guidelines and tools to measure and improve an organization's probability of establishing a learning organization.

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Appendix A: Interviews

Gathering Knowledge

1. In what way is the knowledge you need to perform your job known? Has this been mapped out, does the case company know about this, etc.?
2. Is the knowledge you need for your work that you do not have available within the organization? In what way?
3. Do you know who to turn to if you need certain knowledge to carry out your work? With whom?
4. What agreements have you made with your colleagues with regard to storing knowledge and making knowledge accessible?

Share knowledge

1. Do you share your knowledge about your field and work formally with your colleagues?
2. Do you share your knowledge about your field and work informally with your colleagues?

Apply knowledge

1. Is the way in which knowledge is shared, documented, and applied within the case company familiar to you?
2. Is the knowledge you have or have received from colleagues used by everyone in making decisions at work?

Micro-System Activator

1. Do you know what is expected of you during your work?
2. Do you have everything you need from the case company to properly perform your tasks and activities?
3. Is your team open to new ideas that you bring in during meetings?
4. Does your team encourage you to come up with new ideas?
5. Do you have enough time to do your job properly?

Micro system motivator

1. Is there always room for improvement in your work?
2. Do you wish to learn from your work and to grow within your field?
3. Do you regularly receive feedback about what is going well and what could be done better in your work?

Macro system activator

1. Is your supervisor involved in how you carry out your work and does he have clear ideas about this?
2. Do you agree with the approach that your manager has determined on your project?
3. Is there a good balance between working independently and working according to the standards within your field?
4. If you need help for the proper performance of my work, will you get it?

Macro system motivator

1. Do you know during a working day which activities have the highest urgency? How do you determine that?
2. Do you have shared goals in your team (question specifics)?
3. Do you know what you are responsible for during your work?
4. Is the way to grow within your field familiar to you?

Evaluation

1. Do you have fixed agreed times when you look back on work?
2. Is there a fixed format that you use to look back on work?
3. With whom do you look back on work?
4. Do you use data in your team to see if your goals are being achieved?

Appendix B: Quotes used for first-order concepts

Text fragment	First Order
The knowledge lies somewhere in a system, but exactly where no idea. There is no getting started; there are pieces in it that are five years out of date.	Not certain where information is stored
No, we have no agreements about it. We miss that at X. Of course, we have a knowledge center but that is a huge puzzle and we actually miss an environment that is really for us.	Misses an online environment that works for their department
The employees are young, so the knowledge is not there. It can be very difficult for them but my own knowledge is based on my own experience, so they do not have that.	New young employees do not have the knowledge
If you do not have certain knowledge, it is also a quest. You have to be assertive here.	Finding the right knowledge is a complex process
What I do find is that what I need is very focused on the head office. All facets you need are all in HQ and are not available at the location. We have assigned people, but they are all in HQs. I sometimes regret that they are not in our building.	Finds that everything is focused on the HQ with regards to resources and manpower
It would be nice if you could throw a kind of shell over the knowledge center for each department.	Wants to use filters for the Knowledge Center
We are missing documents in which knowledge and experience has been put in, which is in line with the current work and can help us.	Essential documents are missing
In terms of resources, my computer system is really insanely slow right now and that's our tool that we have to work with. Citrix is very slow.	PC system and Citrix is very slow
Knowledge center has many things; sometimes it is untraceable but there are a lot of things on it;	Knowledge Center is (too) big and complex
I can see it if I go looking for it, but it's not the case that I first look at all of that at every address I get a notification from, because that's not doing it. But that is actually very important information, and it should be easier to visualize.	Finding the right data should be more efficient
I have experienced that if you don't get out of your chair yourself, you make it difficult for yourself. We have the buddy system, but in the end it's about how you handle it yourself. Take your chances.	You have to be assertive
There is also room to do that and that is quite a problem within X because there are few guidelines.	There are not enough guidelines for working
For example, if you entered “underwater concrete” and you get all the data of the projects that have been done with underwater concrete; would save a lot of time and effort. There isn't at the moment.	There is no fixed system for knowledge
but what you often notice is that it is stored in a folder somewhere on a local disk.	Files are often stored locally on a disk
It's not clear to anyone. If you don't open your mouth and ask questions, you have to do your own thing.	The way of working is not clear
The knowledge is with the colleagues, but it is not in a certain fixed place.	Knowledge is not at a fixed place

That knowledge is not really available within X itself.	Knowledge is not available
If you take the initiative yourself, they are very willing. The knowledge is really with the people; it is not available.	The knowledge lays by people, not stored in systems
Based on my experience and that of my colleagues, our knowledge is certainly used in making decisions yes.	Knowledge/experience is used in decision-making
We also have an improvement monitor, but it doesn't work either. You bring in certain points for improvement, which will then appear in the improvement monitor because we want to apply that; but you see that it is watering down	The improvements addressed are not receiving a follow-up
It is very demotivating that if you introduce improvements that you agree on as a team, but then you notice that they are not being used, budgeted, or not treated at all, then that is frustrating.	Finds it frustrating that addressed improvements are ignored
No choice has been made how it should be done so that is not present at the moment.	Top management has not made decisions regarding guidelines for working
The official line is the use of the knowledge center as head of the parent files of van Wijnen. The practice is unruly and there are several projects that are running in other ways such as SharePoint which causes a huge clouding within X in different ways. The managers of information themselves often do not know what the intention is.	Other methods are used by employees for applying knowledge
I think it's the default Sharepoint; the new method. Apparently not everyone does that.	Is not sure about the official method for knowledge Share/storing
I think X is very good for me so to speak and I think that X is very good for its employees when you see what resources we have at our disposal and what is being arranged and organized. Not even materially, but also socially and developmentally, I think X is doing very well.	The case company treats its employees good
You have to show interest in your employees and in my opinion that happens too little.	Showing interest in employees could improve
New ideas often just don't get a follow-up. You want to get better together, and you notice on the construction site with the craftsmen that they also notice that their suggestions for improvement are not being taken seriously.	Craftsmen notice that their suggestions for improvement are not being taken seriously.
There is nothing more frustrating for an employee that a few years later you run into the same points again during a project because nothing has been done with your improvement. Then you will no longer receive input for improvement from your employees, which they experience is of no use.	Employees will not give input for improvements if they are ignored
I think I am very good at the work I do, and I have enough time for that.	Has enough time for the work

Yes, if the workload is related to that, it is quite high. We need more time to take the steps we want to take. You are finishing the notifications, but you should actually spend a large part of your time organizing and making contact and now there is less time for that.	Has no time left for secondary tasks that increase the effiency of the work
We are actually getting more and more work. We now have to do additional things with the same time. That is sometimes difficult.	There is more and more work to be done in less time over the years
The thing is, I sometimes have trouble with new software solutions. I'm a bit older and I get an hour of explanation and that's what I have to do. That is difficult for me to master the program.	Wants more time for understanding new software
I also give feedback to my colleagues.	Feedback to coworkers is given
I think the year-end conversation is no longer of this time because it is often much too late.	The year-end evaluation is no longer of this time
There are multiple approaches to giving feedback when you mean the same thing and that is much more motivating.	Want a more positive approach for giving feedback
I think you don't get enough formal feedback that you're doing your job well. There is never really any feedback.	Positive feedback is limited
Although I do think that in the field of safety and improvements, it is sometimes slowed down because it costs more. Investments must also be made for your appearance and for increasing your safety on the construction site and if you want to take steps.	New innovations with safety are disregarded due to the additional costs
The fact that a composition of a team is here completely randomly thrown together, while we know from evaluations that a good team goes like clockwork and a bad team doesn't strike me as strange.	The composition of a new team is not well executed
We sit down together when a problem arises to find a new solution.	Sit downs are done when problems occur
The only problem is that I never work with the same team. You understand each other, you understand each other, and you can go through the processes much better together. As soon as a new project starts, you have all kinds of new people at the table, and it starts all over again.	Never works with the same team twice which results in startup periods for every project
We have common goals and those are shared within the team as well. Everyone is behind that.	Has shared team goals
I sometimes thought I would like to do another course and what would I want to do and what would suit it, but I would not know what else I could do here within X actually	Does not know to grow within organization X
Being involved in the project a month in advance is very pleasant to work with.	Early involvement with other departments is good
And I am helped on all sides, which is really great.	Gets help from all sides
But in general, everything goes in good consultation! We can't complain within X.	Think there is a good collaboration within X

The standards are generally communicated while you will have more support if you explain why or give more explanation. That explanation is often missing.	New guidelines receive more support if they are communicated better and with more explanation
Nationally, something is determined, but each region throws its own sauce over it, so that each region determines its own standard on the national standard. It doesn't get any clearer that way.	Disadvantages of a decentralized organization
We could be a little more directive. We have to make certain choices and implement them.	Wants a more directive organization
It is nice to have frameworks, but if those frameworks are not clear to everyone, it becomes difficult to work.	Frameworks are not clear for everyone
The innovations are difficult to achieve; that it is listened to and noted and not forgotten, I believe, but whether we really get started with it; we find that very difficult.	New innovations are rarely started up
X sets out a certain course and then goes to see whether that was the right course. That is sometimes difficult and that can clash.	Decisions by top management are sometimes difficult to understand
Steering lacks in maintaining the standards.	Steering lacks in maintaining the standards.
There are certain frameworks from a client that you may not agree with, but you don't really have a choice. Whoever pays decides.	Certain frameworks are not fully supported but have to be used
. It should be a bit more standardized because that makes it clearer and easier for everyone.	Standardization should be increased
The standards should be better known and workable.	The standards should be better known and workable.
. I would actually work a bit more according to standards	Wants to work more through standards
Together we know where we stand and where we want to go.	Collective team goals are known
There are goals, whether they are completely shared I don't know.	Is not sure of the team goals are collectively shared
Too little data is used in my opinion.	Too little data is used
I think there will be dashboard in the follow-up phase but in my own work that is not done no. We started with it once, but it is actually no longer used.	No dashboard is used
We started keeping track of per phase whether the planning was successful per phase, but I don't really know why it stopped.	Does not know why using data has stopped
I would only like to have insight into planning, yes, that could be done with the help of data.	Would like extra insight in planning

Projects are actually only treated if things have gone badly; why did it go bad etc. Not really clearly documented.	Only the projects with below average results are evaluated
I think that's a weakness of ours, because at the end of the project, points for improvement are not always taken on to the next project.	Points for improvement are not taken on to the next project
No not really no. We are catching up, but we don't have time to look back on work yet.	Has no time to evaluate the work
What I think is the learning curve is that if things are done outside that we didn't think of well inside, they should actually be fed back to the front. That evaluation and those feedbacks are poorly organized with us.	Evaluation and feedback from the work floor is poorly organized
What I think is that it is very good that we are doing it, but something needs to be done about it. I don't think the findings will be used in future projects.	Does not believe findings from evaluations are used in future projects
I do not have a fixed evaluation moment for a project that I have completed. I would like that. Now you often see that during the evaluations the professionals are missing because they are often on another project.	Misses craftsmen during evaluation
I wonder whether it is not wise to take a broader approach to project evaluations than just the team.	Wants a broader evaluation approach
A lot of things can't be compared at all in terms of projects, so I don't really know how you should benchmark that.	Does not know how to benchmark projects properly
Eeh, apart from phase reports, there is no fixed format for the other 8. Evaluations.	There is no fixed format for standardization
It would be useful if there is a specific format available for this.	A specific format should be made available